MiniCommand

Marine Propulsion Systems



MiniCommand - Positive Control, Compact, Simple, Affordable

MiniCommand provides single lever control of electronically actuated diesel engines and marine transmissions in a robust, compact package.

Designed for pleasure craft and some light duty commercial vessels up to 50 feet in length with a maximum of two control stations, the MiniCommand control processor incorporates the logic circuits for two engines in one compact package. This single unit design allows the MiniCommand processor to fit in smaller spaces while maintaining two completely separate operating systems.

MiniCommand can be equipped with the same control heads as the MicroCommander, CruiseCommand, and ClearCommand control systems. In addition, ZF Marine Electronics introduces the new 4200 Series control head a derivative of the popular 5200 series SmartCommand control head.

MiniCommand is a reasonably priced control system having features of control systems costing significantly more. MiniCommand continues the ZF Marine Electronics tradition of making boat handling and docking easy and effortless.

Normal-profile 4200 Control Head

Low-profile 4200LP Control Head

MC2000 Control Head

463 Control Head

Standard features of the MiniCommand system

- Start interlock - prevents the engine from starting while the transmission is in gear.
- Warm up mode - enables engine speed only with the transmission locked in Neutral. This allows the engine to get up to operating temperature more quickly in preparation for departure. Warm up mode is also useful for engine testing.
- Cruise mode - is the standard operating condition. In this mode the operator has single lever control of clutch and throttle with one lever for each engine. Two engine systems can easily be operated with one hand.
- Single lever mode - allows for twin engine operation of shift and throttle control utilizing one single lever.
- Automatic "open loop" engine synchronization - maintains the same speed on multiple engines. Engine synchronization improves fuel economy and reduces both noise and vibration.

MiniCommand is suitable for one or two control station yachts.

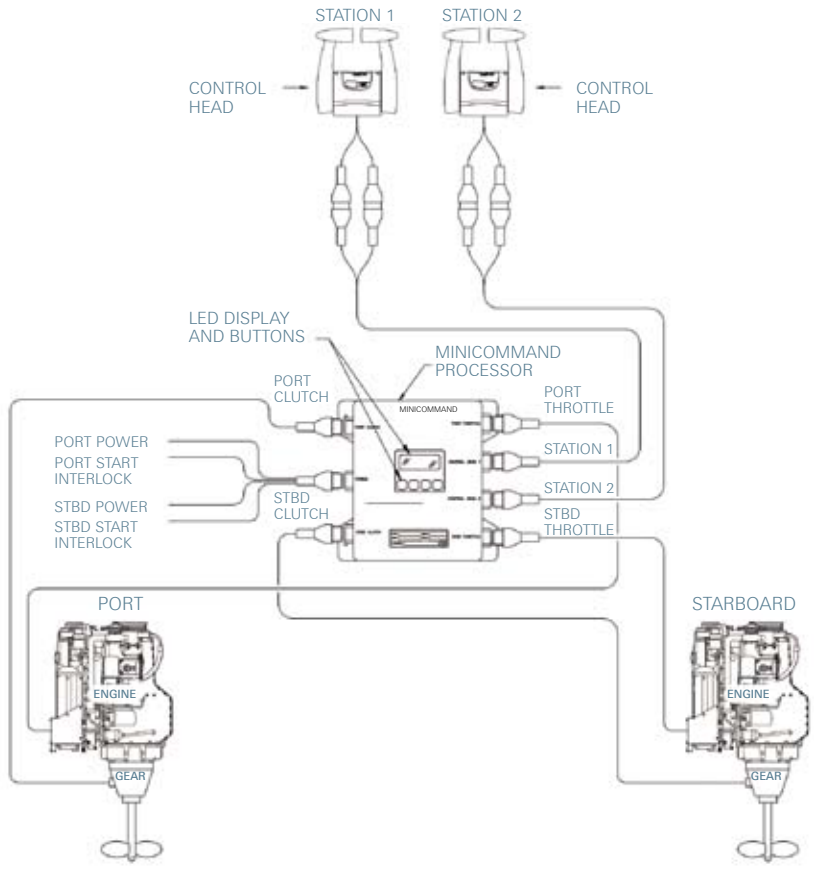
Technical features

- Compatible with 12 or 24 volt systems.
- Diesel and gas engines.
- Maximum two stations.
- Analog throttle output (PWM, 4-20MA, 0-5V, Frequency, Dual Voltage)
- CAN Interface (available).
- Twin screw application built into one enclosure, with two microprocessors for redundancy (one for each engine and gear).
- Single lever control of transmission direction and engine speed.
- Proportional pause on emergency reversal protection.
- Two on/off solenoid outputs for transmission control (ahead and astern clutches).
- Start interlock relay contacts for safe engine start.
- Daylight viewable LEDs (light emitting diodes) for status indication.
- Audible tones for warnings and faults.
- Push buttons and display for ease in set up and troubleshooting.
- "Open loop" synchronization of engine speed.
- The MiniCommand processor is designed with side mounted plug connectors for quick and easy installations and neatly organized cable routing.

Available Options

- MiniCommand is compatible with ZF Marine Electronics 400, 700, MC2000, and 4000 series pluggable control heads. Tournament levers and handheld controls can also be utilized.
- Automatic power selector - offers increased power supply redundancy.
- "Open loop" trolling valve control - available for transmissions with electronic trolling valves. This feature controls clutch slippage for hull speeds lower than engine idle rpm. The same control heads used for clutch and throttle enable trolling valve operation in an unlimited range without additional switches. The MiniCommand processor can be ordered with or without trolling function.

MI2002
MiniCommand Processor



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Photos: Itama Forty - courtesy of Itama S.p.A.

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Driveline and Chassis Technology

Commercial Craft
Propulsion Systems

Marine Propulsion Systems

ZF Marine Group

Your propulsion system partner

ZF Marine is the Marine Propulsion Systems business unit of the ZF Group – a multi-billion, international conglomerate specializing in drive-line and chassis technology for the automotive industry, with headquarters at ZF Friedrichshafen AG, Germany.

The marine headquarters is at ZF Padova SpA, which is also a manufacturing location producing transmissions for Commercial Craft and Pleasure Craft segment, as well as other products and components.

In addition, transmissions are produced for special applications, including marine and industrial gas turbine prime movers. This company also manufactures many of the gear wheels and pinions for distribution to other group companies.

Since 1998, ZF Marine's strategy has been to expand the product portfolio and enter new markets, particularly the Commercial Craft segment. This has been successfully achieved through acquisitions and new product design and development. Transmissions can now be offered for

Pleasure Craft

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Fast Craft

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P.R.CHINA
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engine powers up to 14,000 kW, complete with matching fixed or controllable pitch propellers and electronic control systems.

ZF Marine has also implemented an ongoing improvement process in order to meet the various needs of customers in the Pleasure, Fast and Commercial Craft market segments.

The statement “Coming Closer to our Customers” is not an empty slogan, but a commitment to work together with engine manufacturers, shipyards, boat owners and operators to provide the best possible products and services - worldwide.

Roland Heil
ZF Marine Group CEO

Commercial Craft

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In addition, ZF Marine is supported by 500 Sales & Service offices worldwide.

See www.zf.com/marine, for contact details

The Marine Propulsion experience –

Turnkey solutions!

Experience is what counts in a harsh unforgiving marine environment, and ZF Marine has been exposed to such elements for over 50 years!

As a truly international supplier of marine propulsion systems, with design and production facilities in six countries and an extensive sales and service network, ZF Marine is well positioned to serve all your propulsion requirements.

World-renowned for high quality, high performance transmissions ideally suited to applications in all types of fast craft, particularly luxury motor yachts and defense vessels, the company has steadily expanded its marine activities into the commercial vessel market.

Over the past ten years, by means of internal design and development, as well as acquisitions, the power capacity of ZF Marine products has been increased to satisfy the requirements of specialized work boats such as fishing boats, tugs and inland waterway vessels.

In addition, using advanced development techniques and a modular design concept, a family of gearboxes was created especially for medium-speed Diesel installations with power ratings up to 16 MW which are typically installed in ocean going vessels.

Today, ZF Marine is recognised as a supplier of compact, light-weight transmissions for fast craft, as well as heavy duty gearboxes for all types of commercial vessels.

ZF Marine's controllable pitch propeller (CPP) experience stretches over thirty years and grew out of the tough and demanding Spanish fishing industry. From those roots, modern and mature products have been developed to match today's high-tech medium-speed diesel engines, and with the reliability demanded by a competitive marine transportation industry.

ZF Marine HRP produces state-of-the-art electronic control systems for propulsion systems installed in commercial vessels for azimuth thrusters, tunnel thrusters and CPP propulsion systems.

Marine propulsion packages are the logical outcome of ZF Marine's vision to establish a turn-key customer service. This means a single source and single responsibility for azimuth thrusters, tunnel thrusters, transmissions, shaft lines, bearings, propellers, control systems and all associated accessories. ZF Marine's experienced professionals develop fully integrated systems according to individual customer requirements which help to add value to our customer's enterprises!

Today, ZF Marine products are in operation in vessels worldwide.

ZF Marine offers...

Integrated propulsion packages: with transmissions, shaft lines, stern tubes, CPP or FPP propellers and nozzles.

Transmissions: a comprehensive range of high quality transmissions for all types of vessels.

Azimuth Thrusters: well mounted, deck mounted and retractable units.

Tunnel Thrusters: for stern- and bow thrusters applications.

Rudder systems: different type according to aplication.

Stern tube systems: oil- or water-lubricated stern tubes with white metal or rubber bearings and seals.

Nozzles: standard designs such as type 19A or type 37 for improved astern operation and high efficiency nozzles.

Control systems: electronic or pneumatic control systems.

Shaft brakes: pneumatic-over- hydraulic systems for dynamic braking or for holding only.

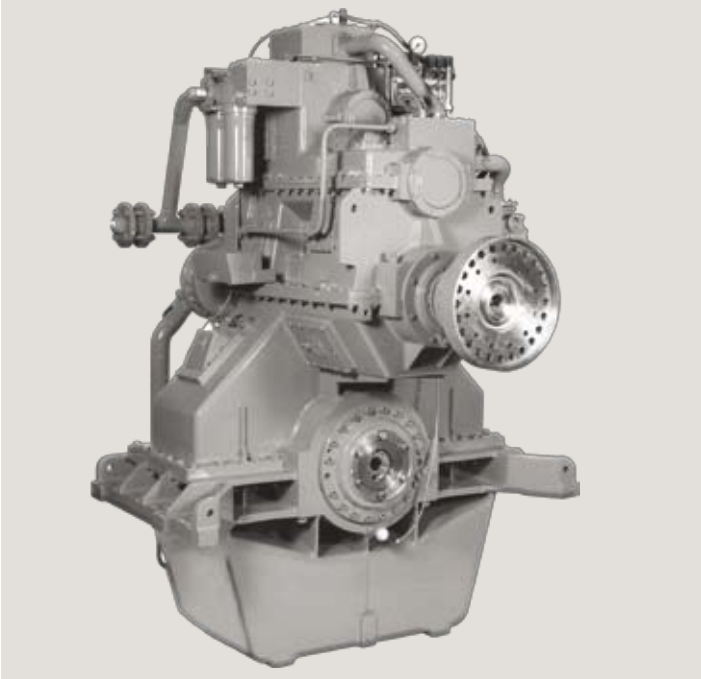
Propellers: Controllable Pitch Propeller, Fix Pitch Propeller.

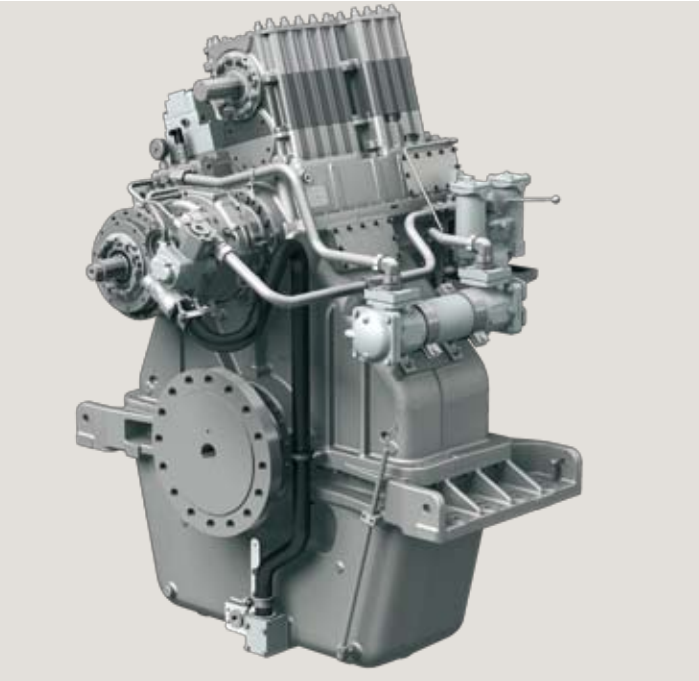
Products Description

Reversing and non-reversing transmissions

The ZF Marine organization can take advantage of the vast experience coming from the parent company, ZF Friedrichshafen AG, one of the world's leading suppliers to the automotive industry.

The ZF Group's R & D facilities have been available during the development of a series of modern reduction gearboxes which incorporate state-of-the-art tooth design to achieve low noise signature and high load transmission capabilities.



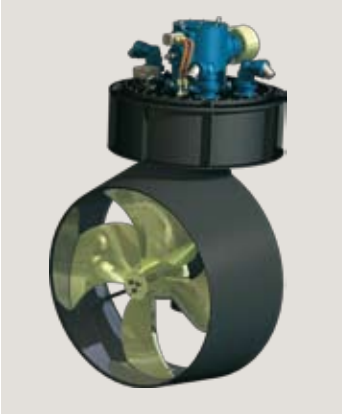


The gearbox housings are extremely resistant to torsional stresses and are generously sized to safely transmit the thrust loads to the ship's foundation.

The steel composition is according to ZF's own "Class 1A" specification which is well known and accepted throughout the industry. The gearbox models are available with or without engaging clutches (types NR and NC) and also with a wide range of Power Take Off (PTO) and Power Take In (PTI) secondary drives. Also reversible gearboxes are now avaible with lots of accessories. They are suitable for FOO applications.

Thruster Systems

ZF Marine HRP has more than 30 years of experience in building azimuth thrusters. The company has designed, produced and commissioned various types of thrusters, for a multitude of applications around the world, bringing ZF Marine HRP the reputation of a reliable and renowned thruster supplier. All thrusters are developed, designed and produced in house and built in accordance with high quality standards, guaranteeing the reliability of the product.



Well mounted steerable azimuth thruster units to be placed below deck

Steerable azimuth thrusters with counter-rotating propellers wich guaratee higher efficency and comfort on board

Deck mounted thruster units placed on deck, with contai-nerised prime mover

Retractable Thrusters mostly used as auxiliary or back up propulsion specially designed for offshore applications like OSVs and PSVs

Shallow Draught Thrusters

Tunnel thrusters for stern-and bow thruster applications

Propulsion Control Systems

ZF Marine propulsion control systems are based on decades of experience in marine control system design and are therefore at the leading edge of marine electronics technology, providing ideal solutions for single engine, multiple engine or multi station installations.

Being a crucial element for vessel and crew safety, ZF Marine control systems incorporate only reliable, well designed components and provide for easy operation and easy maintenance.

Control systems from ZF Marine interface with mechanically or electronically controlled engines, thrusters, transmissions and auxiliary systems. In particular, the electronic control systems for CPP's can be supplied for either constant speed operation or combined mode operation.

Using its own technology gained trough the years, interfaces can be made to DP Systems, Autopilot, Single Joystick systems and VCR units. Customized programming is also available for special applications. The number, location (bridge, engine control room or bridge wings) and layout of the control panels is customized to meet the application and operational constraints.

For thrusters solutions the hydraulic power pack for steering and / or lifting is mounted near the thruster and hooked up by means of hydraulic hoses and piping.

The hydraulic pump is driven by the inputshaft of the thruster, or by a constant speed electric motor. The power pack is as a standard provided with filters, clogging indicator, valves, level indicator etc. and fulfils the rules and regulations of any classification society.

ZF Marine manufactures multiple levels of commercial grade propulsion control systems to meet the various needs and requirements of commercial vessel operators. From the most basic tug boat to large double ended Ferries, our state of the art control systems are designed for the harsh engine room environment. Military Vessels and Offshore Supply Vessels, which demand highly sophisticated Dynamic Positioning systems, are today equipped with ZF Marine propulsion control systems.

ZF Marine control systems are available for mechanical or electronic engine and transmission applications, and are designed and tested to meet stringent classification society standards.

Standard features

- Plug in Installation
- Push button configuration
- Start interlock
- Multiple Transmission protection functions
- Synchronization
- Warm up mode
- Multiple control station capability with simple station transfer

CPP and FPP propulsion packages

Turnkey responsibility for the propulsion drive-line offers many benefits, not only during project conception and system commissioning but also for service support throughout the vessel's life!

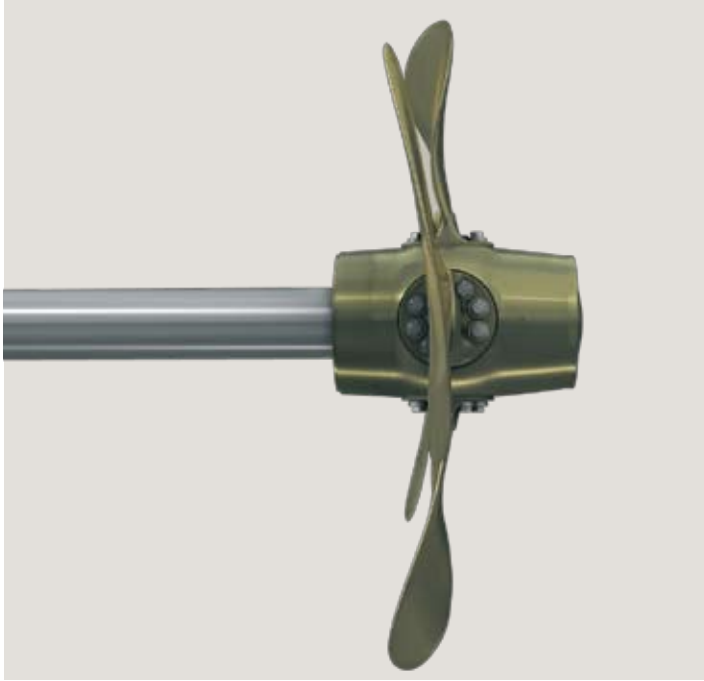
Benefits

- Optimized design through careful matching of gearbox and propeller to the hull and engine characteristics. ZF Marine's design experts work closely with ship designers, shipbuilders and engine manufacturers during the project phase, construction period and are available for analysis of sea-trial results.
- Standardization of propulsion components results in simple systems, easy maintenance and increased reliability. ZF Marine utilizes their well-proven controllable pitch propeller hub design for all applications, from small fast craft up to large product tankers.
- Simplified installation, with no "hidden costs" or unexpected exclusions to the scope of supply.
- ZF Marine service engineers are commissioning experts for propellers, gearboxes and all associated components, hydraulic and electronic systems.
- Package with fixed pitch propeller is available with 4 or 5 blades up to Ø 6 m

The new Controllable Pitch Propeller KS-Series has a unique design, based on the long-standing experience of ZF Marine in the field of propulsion systems for commercial vessels.

The new KS propeller series combines propulsion efficiency and ease of installation with state-of-the art technology.

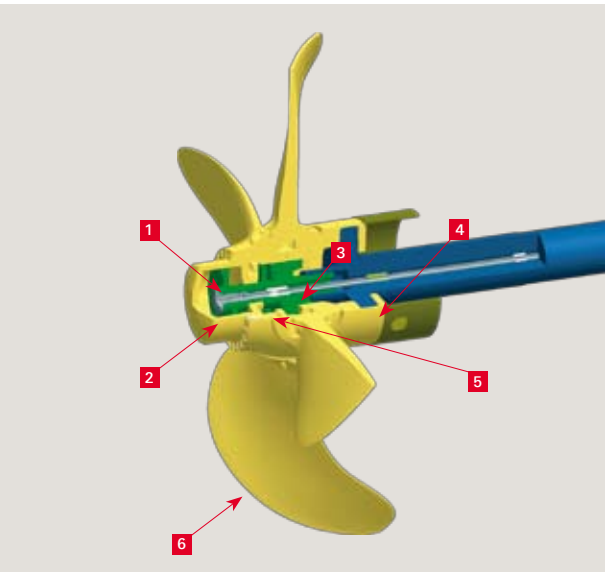
The controllable pitch propellers of the new KS-Series from ZF Marine have a reduced hub/prop diameter ratio for better hydrodynamic efficiency, larger hub diameter family for optimized selection, easier maintenance, a more compact hub design, achieved through an equilibrated choice of components.



The hub profile as been hydro-dynamically improved, leading to better fuel efficiency of the vessel. Assembly and servicing is simplified, as access to internal components is possible from the back of the hub. The range of available propeller hubs has been increased from the previous KH-Series with 11 models to now 20 models for the new KS-Series. With the new KS-Series propellers double sealing between hub and propeller base is now standard, improving significantly sealing efficiency. The new KS-Series controllable pitch propellers are available up to 7,75 m diameter with hub diameter of 1,55 m, with custom designed propeller blades to maximize efficiency and can be matched to engines from 350 kW to 16.000 kW.

The oil distribution box, as an important part of each controllable pitch propeller propulsion system, has been made more compact and much lighter, compared to the previous versions. Installation has been made easier. Easier installation and increased maximum allowed rpm, are further improvements worth mentioning.

CPP & Internal Components



KH and KS Series

Hub details for KH and KS versions

1 Robust, solid hub with large blade ports

2 Servo cylinder inside hub

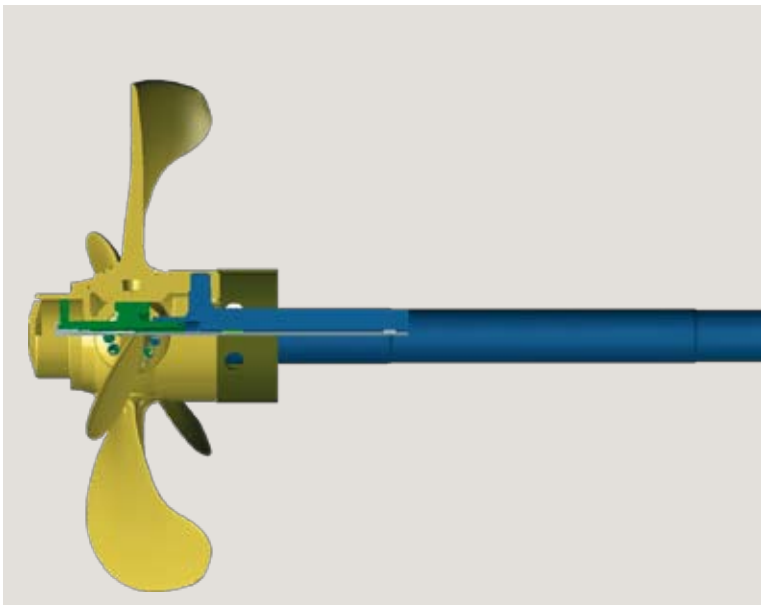
3 Double sealing system for environmental safety

4 Hydraulic oil tubes, available with single or double pipe

5 Robust, single piece yoke-piston rod arrangement

6 Optimized, "wake-adapted" blade design for high efficiency, low noise performance

Twin pump hydraulic system with proportional valve



Transmissions details

7 Gearbox with or without disengaging clutch (type NR and NC).

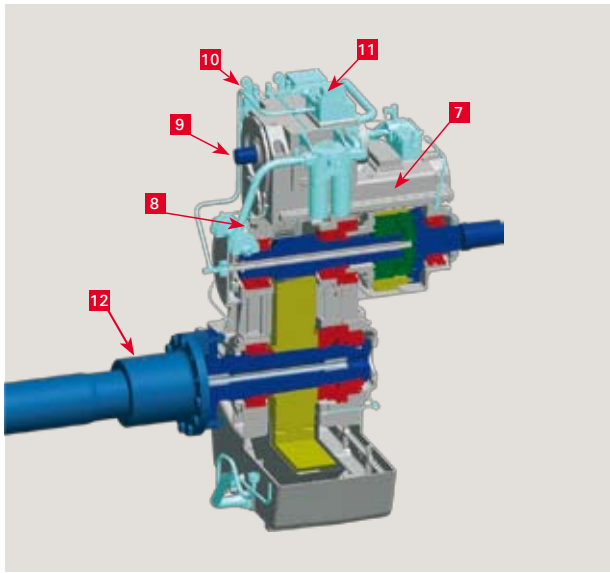
8 Integrated hydraulic pump (standby pump loose or fitted on gearbox)

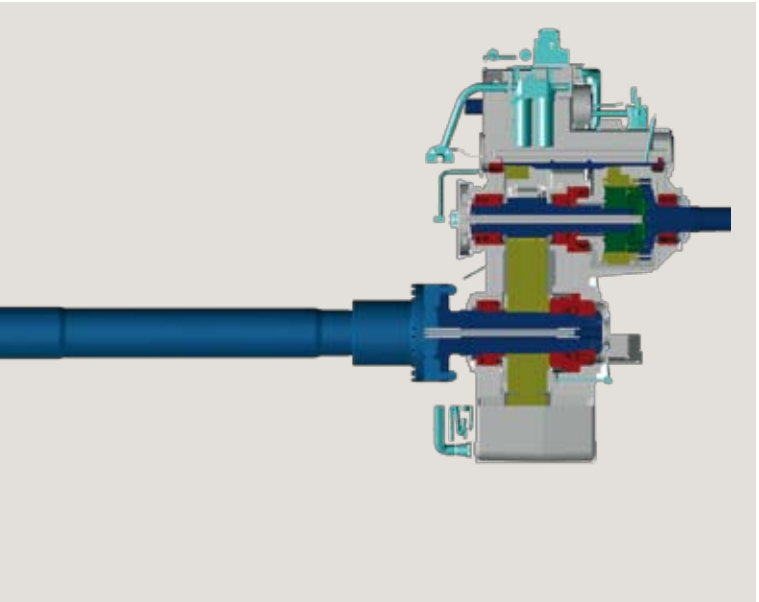
9 PTO assembly: Primary and secondary PTO's with or without clutch.

10 Centralized and ergonomic alarm and monitoring group.

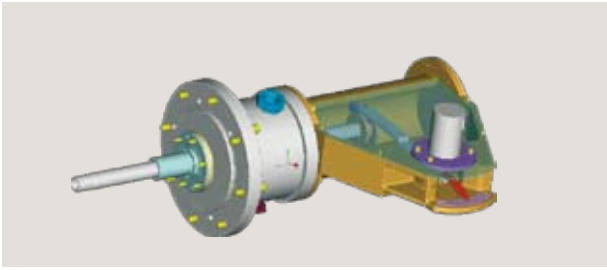
11 Integrated hydraulic control unit.

12 Hydraulically fitted flange coupling with integrated drive-up piston.
SKF-coupling option for plane bearings Gearbox

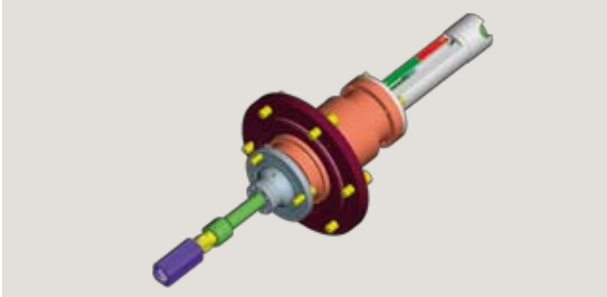




OD box - KH Series



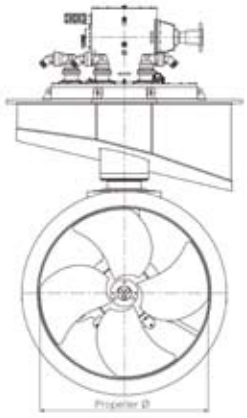
OD box - KS Series

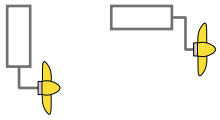


Technical Data

Thrusters

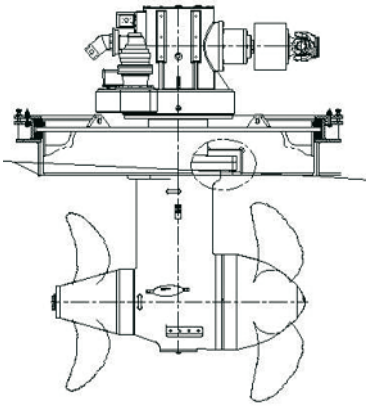
Well Mounted Azimuth Propulsion Thrusters

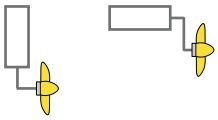




Model	Max. power* kW	hp	Typical prop. dia. open mm	inch	Typical prop. dia. nozzle mm	inch
ZF AT 2000 WM-FP	200	272	750	30	700	28
ZF AT 3000 WM-FP	300	408	1050	41	1000	39
ZF AT 400 WM-FP	440	598	1150	45	1100	43
ZF AT 4000 WM-FP	525	714	1350	53	1300	51
ZF AT 5000 WM-FP	850	1156	1700	67	1650	65
ZF AT 6000 WM-FP	1200	1632	1950	77	1900	75
ZF AT 7000 WM-FP	1650	2244	2300	91	2200	87
ZF AT 8000 WM-FP	2000	2720	2500	98	2400	94
ZF AT 9000 WM-FP	2700	3672	2900	114	2600	102

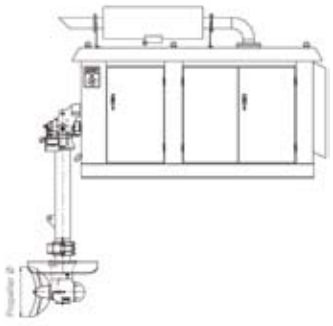
Contra Rotating Azimuth Thrusters

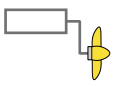




Model	Max. power* kW	hp	Propeller dia. pulling propeller mm	inch	Propeller dia. pushing propeller mm	inch
ZF AT 2000 WM-CR ZF AT 2000 DM-CR ZF AT 2000 RT-CR	200	272	700	30	70	30
ZF AT 4000 WM-CR ZF AT 4000 DM-CR ZF AT 4000 RT-CR	525	714	1100	40	1050	40
ZF AT 5000 WM-CR ZF AT 5000 DM-CR ZF AT 5000 RT-CR	850	1156	1650	70	1580	60

Deck Mounted Azimuth Thrusters

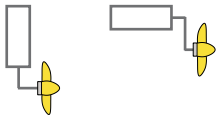




Model	Max. power* kW	hp	Typical prop. dia. open mm	inch	Typical prop. dia. nozzle mm	inch
ZF AT 2000 DM-FP	180	245	750	30	700	28
ZF AT 3000 DM-FP	300	408	1050	41	1000	39
ZF AT 400 DM-FP	440	598	1150	45	1100	43
ZF AT 4000 DM-FP	525	714	1350	53	1300	51
ZF AT 5000 DM-FP	825	1122	1700	67	1650	65
ZF AT 6000 DM-FP	1200	1632	2100	83	2050	81

* Rating, subject to classification.
Consult ZF Marine HRP's technical staff to determine applicable power for each specific use.
Can be supplied with any type or make of diesel engine

Retractable Azimuth Thruster



Model	Max. power*		Typical prop. nozzle dia.	
	kW	hp	mm	inch
ZF AT 2000 RT-FP	200	272	700	28
ZF AT 3000 RT-FP	300	408	1000	39
ZF AT 400 RT-FP	440	598	1100	43
ZF AT 4000 RT-FP	525	714	1300	51
ZF AT 5000 RT-FP	850	1156	1650	65
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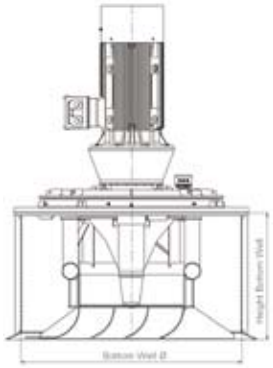
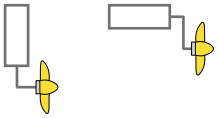
Shallow Draught Thrusters





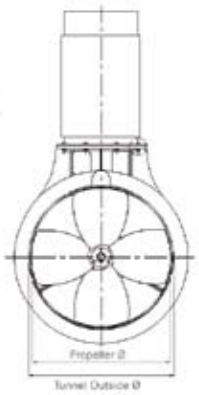
Model	Max. power*		Diameter outer well approx.		Height of outer well approx.	
	kW	hp	mm	inch	mm	inch
ZF SDT 2000 FP	100	130	1030	41	615	24
ZF SDT 3000 FP	195	260	1460	58	867	34
ZF SDT 4000 FP	350	470	1960	77	1158	46
ZF SDT 5000 FP	575	770	2520	99	1493	59
ZF SDT 6000 FP	850	1140	3060	121	1805	71

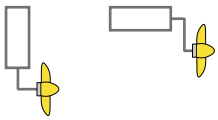
*Rating, subject to classification.
Consult ZF Marine HRP's technical staff to determine applicable power for each specific use.

Technical Data

Thrusters

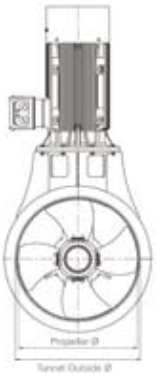
Fixed Pitch Tunnel Thrusters

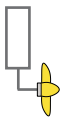




Model	Max. power*		Typical prop. dia.		Tunnel outer dia.		Tunnel wall thickness stand.		Tunnel length standard	
	kW	hp	mm	inch	mm	inch	mm	inch	mm	inch
ZF TT 1000 FP**	100	136	600	24	660	26	15	0,6	1000	39
ZF TT 2000 FP**	200	272	700	28	760	30	15	0,6	1000	39
ZF TT 3000 FP	300	408	1050	41	1110	44	15	0,6	1000	39
ZF TT 400 FP	440	598	1150	45	1220	48	15	0,6	1000	39
ZF TT 4000 FP	525	714	1350	53	1420	60	16	0,6	1500	59
ZF TT 5000 FP	850	1156	1650	65	1730	70	18	0,7	2000	79
ZF TT 6000 FP	1200	1632	1900	75	1990	80	20	0,8	2000	79
ZF TT 7000 FP	1650	2244	2300	91	2400	90	22	0,9	2200	80
ZF TT 8000 FP	2000	2720	2450	97	2550	100	22	0,9	2550	100

Controllable Pitch Tunnel Thrusters



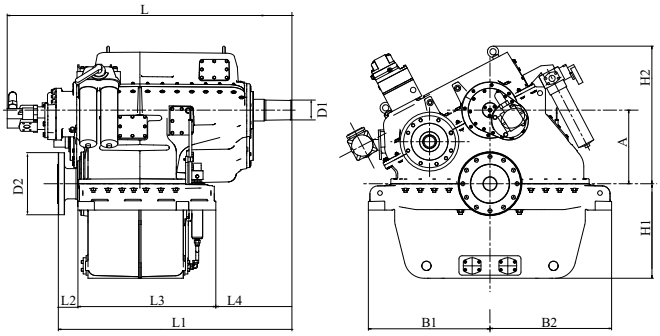


Model	Max. power*		Typical prop. dia.		Tunnel outer dia.		Tunnel wall thickness stand.		Tunnel length standard	
	kW	hp	mm	inch	mm	inch	mm	inch	mm	inch
ZF TT 4000 CP	500	670	1350	53	1420	60	16	0,6	1500	59
ZF TT 5000 CP	850	1164	1650	65	1730	70	18	0,7	2000	79

*Rating, subject to classification.
Consult ZF Marine HRP's technical staff to determine applicable power for each specific use.
**Also available in Al. gearbox and tunnel

Transmissions

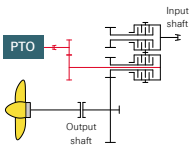
Reversing and Non-reversing Transmissions - Vertical Offset



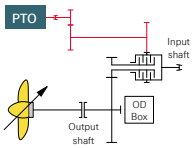
	Dimensions mm/inches										Weight (dry) Approx	
	A	B1+B2	H1	H2	L	L1	L2	L3	D1	D2	Kg	lb
ZF W11000	415 16,3	1300 51,2	530 20,9	830 32,7	1562 61,5	1210 47,6	117 4,6	714 28,1	112 4,4	420 16,5	2650	5830
ZF W11000 NR	415 16,3	1300 51,2	530 20,9	830 32,7	1562 61,5	1210 47,6	117 4,6	714 28,1	112 4,4	420 16,5	2250	4950
ZF W11100	530 20,9	1400 55,1	600 23,6	945 37,2	1562 61,5	1238 48,7	145 5,7	672 26,5	112 4,4	450 17,7	3100	6820
ZF W11100 NR	530 20,9	1400 55,1	600 23.6	945 37,2	1562 61,5	1238 48,7	145 5,7	672 26,5	112 4,4	450 17,7	2700	5940
ZF W11200	660 26,0	1650 65,0	688 27,1	1075 42,3	1562 61,5	1238 48,7	145 5,7	714 28,1	112 4,4	540 21,3	3700	8140
ZF W11200 NR	660 26,0	1650 65,0	688 27,1	1075 42,3	1562 61,5	1238 48,7	145 5,7	714 28,1	112 4,4	540 21,3	3300	7260
ZF W17000	475 18,7	1570 61,8	610 24,0	944 37,2	1818 71,6	1504 59,2	127 5,0	890 35,0	129 5,1	400 15 ,7	4550	10010
ZF W17000 NR	475 18,7	1570 61,8	610 24,0	944 37,2	1818 71,6	1504 59,2	127 5,0	890 35,0	129 5,1	400 15,7	3900	8580
ZF W17100	600 23,6	1700 66,9	725 28,5	1016 40,0	1818 71,6	1504 59,2	117 4,6	925 36,4	129 5,1	500 19,7	5350	11770
ZF W17100 NR	600 23,6	1700 66,9	725 28,5	1016 40,0	1818 71,6	1504 59,2	117 4,6	925 36,4	129 5,1	500 19,7	4750	10450
ZF W17200	700 27,6	1700 66,9	825 32,5	1167 45,9	1818 71,6	1504 59,2	117 4,6	925 36,4	129 5,1	600 23,6	5800	12760
ZF W17200 NR	700 27,6	1700 66,9	825 32,5	1167 45,9	1818 71,6	1504 59,2	117 4,6	925 36,4	129 5,1	600 23,6	5250	11550

For any further detail regarding ZF W11000 and ZF W17000 family, please refer to ZF Selection Guide.

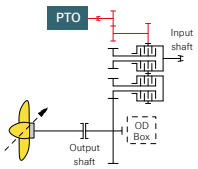
Front PTO83 (R* Version)



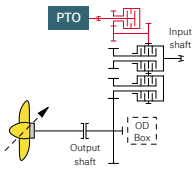
Front PTO83 (NR* Version)



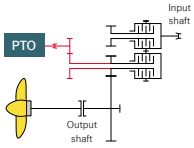
Top PTO73 (R*+NR* Version)



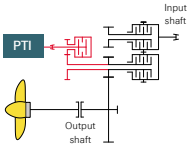
Top PTO74 (R*+NR*Version)



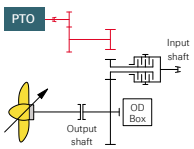
Front PTO23 (R* Version)



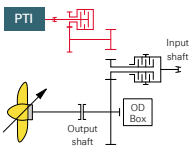
Front PTI24 (R* Version)



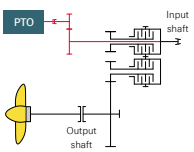
Front PTO23 (NR* Version)



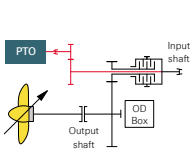
Front PTI24 (NR* Version)



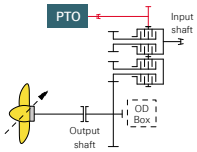
Front PTO73 (aux. pump) with SAE A to CC (R* Version)



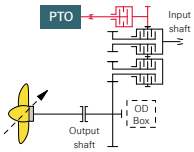
Front PTO73 (aux. pump) with SAE A to CC (NR* Version)



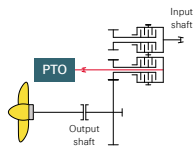
Top PTO71 (R*+NR* Version)



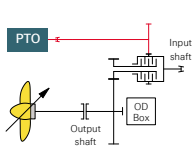
Top PTO72 (R*+NR*Version)



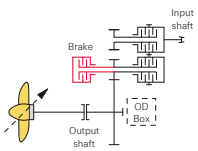
Front PTO81 (R* Version)



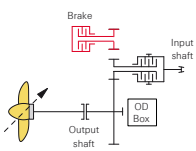
Front PTO81 (NR* Version)



Brake (R* Version)



Brake (NR* Version)



Note: Front PTO81 (NR version) and Brake (NR version) are not requested on ZF W17000 family

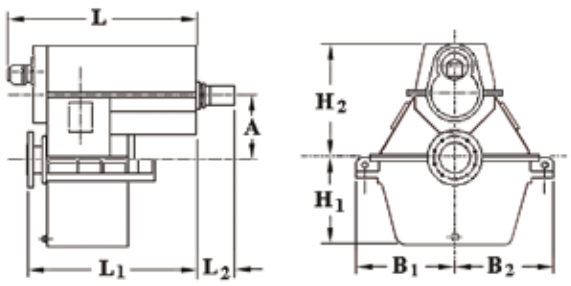
*R= Reversing *NR= Non-Reversing

Technical Data

Transmissions

Non-reversing Transmissions, with clutch (Type NR)

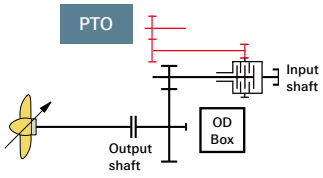
Vertical Offset



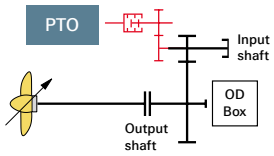
Model	Dimensions mm/inches								Weight (dry) Approx	
	A	B1	B2	H1	H2	L	L1	L2	Kg	lb
ZF W23100 NR	630 24,8	810 31,9	810 31,9	710 28,0	1010 39,8	1448 57,0	1301 51,2	288 11,3	4700	10340
ZF W33100 NR	700 27,6	860 33,9	860 33,9	800 31,5	1260 49,6	1596 62,8	1493 58,8	301 11,9	6080	13376
ZF W43000 NR	600 23,6	860 33,9	860 33,9	800 31,5	1210 47,6	1768 69,6	1598 62,9	336 13,2	6400	14080
ZF W43100 NR	770 30,3	995 39,2	995 39,2	900 35,4	1380 54,3	1768 69,6	1653 65,1	336 13,2	9300	20460
ZF W63000 NR	670 26,4	995 39,2	995 39,2	900 35,4	1367 53,8	1836 72,3	1785 70,3	346 13,6	9200	20240
ZF W83100 NR	980 38,6	1230 48,4	1230 48,4	1120 44,1	1760 69,3	1989 78,3	2059 81,1	376 14,8	16600	36520
ZF W93300 NR*	980 38,6	1235 48,6	1235 48,6	1125 44,3	2438 96,0	3124 123	3415 135	270 10,6	23800	52360

* PTO3 not available

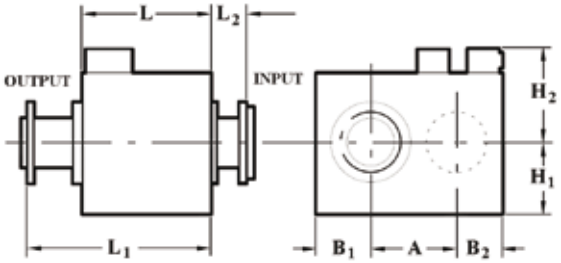
PTO73 (old PTO3-Live)



PTO14 (old PTO4-Clutchable)

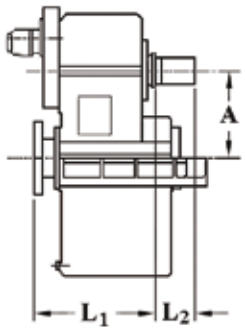


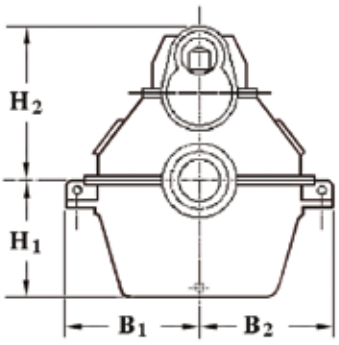
Horizontal Offset



Model	Dimensions mm/inches								Weight (dry) Approx	
	A	B1	B2	H1	H2	L	L1	L2	Kg	lb
ZF W63000 NR2H	670 26,4	948 37,3	772 30,4	770 30,3	1146 45,1	1531 60,3	1768 69,9	364 14,3	9900	21780

Non-reversing Transmissions, without clutch (Type NC)

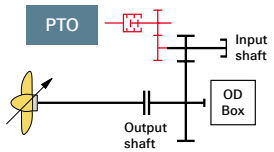




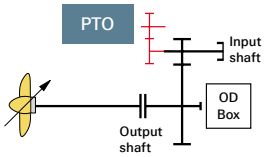
Model	Dimensions mm/inches							Weight (dry) Approx	
	A	B1	B2	H1	H2	L1	L2	Kg	lb
ZF W23100 NC	630 24,8	810 31,9	810 31,9	710 28,0	1120 44,1	790 31,1	250 9,80	3800	8360
ZF W33100 NC	700 27,6	860 33,9	860 33,9	800 31,5	1350 53,1	880 34,6	290 11,4	4500	9900
ZF W43000 NC	600 23,6	860 33,9	860 33,9	800 31,5	1255 49,4	930 36,6	340 13,4	5400	11880
ZF W43100 NC	770 30,3	995 39,2	995 39,2	900 35,4	1432 56,4	985 38,8	340 13,4	6800	14960
ZF W83000 NC	750 29,5	1090 42,9	1090 42,9	1000 39,4	1562 61,5	1130 44,5	360 14,2	9270	20394
ZF W83100 NC	980 38,6	1230 48,4	1230 48,4	1120 44,1	1792 70,6	1210 47,6	360 14,2	14800	32560
ZF W93100 NC	980 38,6	1230 48,4	1230 48,4	1120 44,1	1792 70,6	1210 47,6	360 14,2	15800	34760
ZF W93300 NC	980 38,6	1235 48,6	1235 48,6	1125 44,3	2140 84,2	2490* 98,0	425 16,7	21000	46200
ZF W103100 NC	1120 44,1	1375 54,1	1375 54,1	1340 52,7	1810 71,3	2190* 86,2	425 16,7	27000	57200

*cylindrical outputshaft without flange

PTO14 (old PTO4-Clutchable)



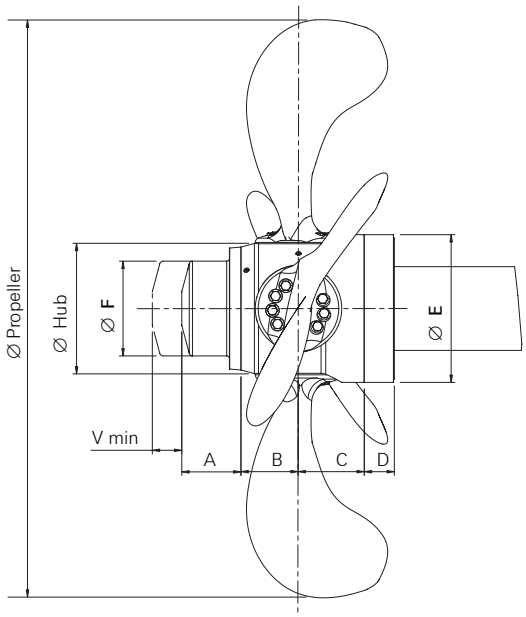
PTO13 (old PTO5-Live)



Technical Data

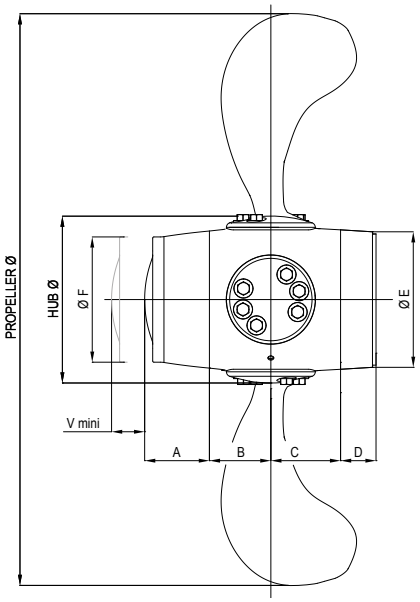
Controllable Pitch Propeller

KH Series



Model	MAX prop. Dia.		Hub Propeller		A		B		C		D		Ø E		Ø F		V min	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
KH-425	1850	73	425	17														
KH-480	2050	81	480	19														
KH-515	2200	87	515	20	193	8	190	7	217	9	107	4	488	19	311	12	70	3
KH-560	2400	94	560	22	208	8	207	8	236	9	118	5	530	21	341	13	70	3
KH-600	2600	102	600	24	210	8	221	9	253	10	105	4	580	23	365	14	70	3
KH-680	2900	114	680	27	256	10	250	10	287	11	119	5	650	26	414	16	90	4
KH-760	3300	130	760	30	290	11	280	11	322	13	160	6	720	28	463	18	90	4
KH-850	3700	146	850	33	323	13	314	12	359	14	177	7	806	32	517	20	100	4
KH-960	4000	157	960	38	341	13	355	14	405	16	200	8	910	36	584	23	110	4
KH-1070	4500	177	1070	42	389	15	394	16	451	18	210	8	1012	40	650	26	120	5
KH-1200	5000	197	1200	47	460	18	442	17	506	20	244	10	1136	45	730	29	160	6
KH-1350	5700	224	1350	53	576	23	500	20	570	22	300	12	1280	50	870	34	200	8
KH-1500	6300	248	1500	59	720	28	560	22	640	25	370	15	1425	56	1036	41	240	9

KS Series



Model	MAX prop. Dia.		Hub Propeller		A		B		C		D		Ø E		Ø F		V min	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
KS-350	1750	69	350	14	137	5	130	5	148	6	75	3	285	11	265	10	70	3
KS-400	2000	79	400	16	157	6	149	6	169	7	86	3	326	13	303	12	80	3
KS-450	2250	89	450	18	176	7	167	7	190	7	96	4	366	14	341	13	90	4
KS-500	2500	998	500	20	196	8	186	7	211	8	107	4	407	16	379	15	100	4
KS-550	2750	108	550	22	215	8	204	8	232	9	118	5	448	18	416	16	110	4
KS-600	3000	118	600	24	235	9	223	9	253	10	129	5	489	19	454	18	120	5
KS-650	3250	128	650	26	254	10	241	9	274	11	139	5	529	21	492	19	130	5
KS-700	3500	138	700	28	274	11	260	10	295	12	150	6	570	22	530	21	140	6
KS-760	3800	150	760	30	297	12	282	11	320	13	163	6	619	24	575	23	152	6
KS-820	4100	161	820	32	321	13	305	12	346	14	176	7	668	26	621	24	164	6
KS-880	4400	173	880	35	344	14	327	13	371	15	189	7	717	28	666	26	176	7
KS-940	4700	185	940	37	368	14	349	14	396	16	201	8	765	30	712	28	188	7
KS-1010	5050	199	1010	40	395	16	375	15	426	17	216	9	822	32	765	30	202	8
KS-1080	5400	213	1080	43	423	17	401	16	455	18	231	9	879	35	818	32	216	9
KS-1150	5750	226	1150	45	450	18	427	17	485	19	246	10	936	37	871	34	230	9
KS-1220	6100	240	1220	48	478	19	453	18	514	20	261	10	993	39	924	36	244	10
KS-1300	6500	256	1300	51	509	20	483	19	548	22	279	11	1059	42	984	39	260	10
KS-1380	6900	272	1380	54	540	21	513	20	582	23	296	12	1124	44	1045	41	276	11
KS-1460	7300	287	1460	57	571	22	542	21	615	24	313	12	1189	47	1105	44	292	11
KS-1550	7750	305	1550	61	607	24	576	23	653	26	332	13	1262	50	1174	46	310	12

ZF Marine - one of the world's largest supplier of transmissions and propulsion systems

ZF was founded by Graf Zeppelin in 1915. To fulfil his dream to develop high technology airships, he needed lightweight, precision transmissions to match the high performance Daimler Benz engines. The company grew rapidly and soon diversified to supply the automotive industry.

The transmissions developed for the airships were ideally suited for installation in fast boats and in 1938 the first marinized version, the KS 25, was delivered to Daimler Benz. This very compact gearbox was close-coupled to the MB501 engine, transmitting 2500 hp at 1600 rpm.

Throughout the '50's and '60's many marine transmissions were developed including small mechanical shift gearboxes and larger models fitted with electromagnetic couplings. Finally, the latter were phased out in favor of hydraulically controlled transmissions.

During the '70's, the pleasure craft business increased and ZF introduced more transmissions to meet the growing demands of the engine suppliers, then in 1986, the Italian company MPM (Meccanica Padana Monteverde) was acquired. (now ZF Padova S.p.A.)

The ZF Padova transmissions complemented the Friedrichshafen products, extending the lower end of the product range and soon ZF Padova S.p.A. became the headquarters of ZF's marine products division.

In 1995, ZF acquired the Hurth group of companies and the ZF Marine group was expanded with the establishment of ZF Marine Arco, Italy, a company producing small mechanically operated transmissions and hydraulic transmissions for small pleasure craft.

In 1999, ZF Marine started to market a comprehensive range of surface-drives and trim-tabs.

In 2000, controllable and fixed pitch propellers were added to the product portfolio with the acquisition of ZF-FPS (Faster Propulsion System Co. Ltd.), Kaohsiung, Taiwan. Electronic controls systems were also added with the acquisition of ZF Marine Electronics LLC at Mukilteo WA, USA and also the world-wide Sales & Service network was expanded by founding new Sales & Service offices such as the ZF Marine Representatives Office in Shanghai, ZF Marine Middle East in Sharjah, UAE and several satellite offices in North America.

The year 2002 saw a consolidation of the ZF Marine Group, and restructuring of the organization to address specific market segments.

ZF Marine introduced the SeaRex range of trimmable surface drives augmented by the smaller MiniRex drive.

In 2005 SmartCommand, a state-of-the-art electronic controls system, was successfully introduced to the Pleasure Craft market.

Since 2002, there has been ongoing development of large transmissions suitable for commercial vessels powered by medium-speed Diesels, as well as corresponding controllable pitch propellers and associated controls.

In June 2006, a Joint Venture was established with Nanjing Highspeed & Accurate Gear (Group) Co. Ltd. in the People's Republic of China. The new company, ZF Nanjing Marine Propulsion Co. Ltd., assembles and markets products for commercial vessels and work boats worldwide.

In September 2009 ZF Marine has acquired HRP Nederland b.v. and all its subsidiaries, including production locations in the Netherlands and Indonesia as well as sales and service locations worldwide. HRP will continue in business as ZF Marine HRP within the ZF Marine Group.

ZF Marine HRP produces a wide range of steerable thrusters, which include well mounted thrusters, retractable thrusters, tunnel thrusters and controls, available in fixed pitch, CP and CRP versions.

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03 98 002 1110 · November 2010

Driveline and Chassis Technology

SmartCommand®

Marine Propulsion Systems

SmartCommand - the intelligent choice

SmartCommand is a powerful control system which integrates the latest in CANbus (Controller Area Network) technology in a user-friendly control head. This development utilizes ZF's fifty year's experience in the design of all kinds of controls systems.

The innovative and compact control head design combines an ergonomic lever shape with a user-friendly display where all functions can be easily selected using soft-touch pushbuttons. Visual indicators help to locate the neutral detent position and 2-color LED's indicate which control head is in command and whether the corresponding transmission is engaged.

SmartCommand puts you in complete control, offering special features for docking or trolling.

The dedicated control modes incorporated in SmartCommand include:

Easidock, Autotroll, Warm-up and One Lever Operation.

Cruise mode is the default operating condition. In this mode the operator has single lever control of clutch and throttle with one control lever for each engine.

EASIDOCK® mode ensures positive clutch response resulting in easy and precise maneuverability in confined waters. This provides the ability to modulate the clutches and control the engine speed to obtain the optimum propeller speed for safely docking the vessel.

AUTOTROLL® mode permits a full range of low-speed control incorporating a sensor for closed-loop feedback to maintain the demanded propeller rpm. By this means, clutch slippage is controlled while maintaining slow engine speed.

Warm up mode is useful to increase engine speed with the transmission locked in neutral. This allows the engine to warm up to operating temperature more quickly while preparing to get underway.

One Lever mode allows you to enjoy the benefit of multi-engine operation with full shift and throttle control by simply operating a single lever.

SmartCommand's CANbus communication perfectly synchronizes engines automatically in any mode without the need for special buttons or switches.

SmartCommand is quick and easy to install requiring simple connections between the control head, engine and transmission.

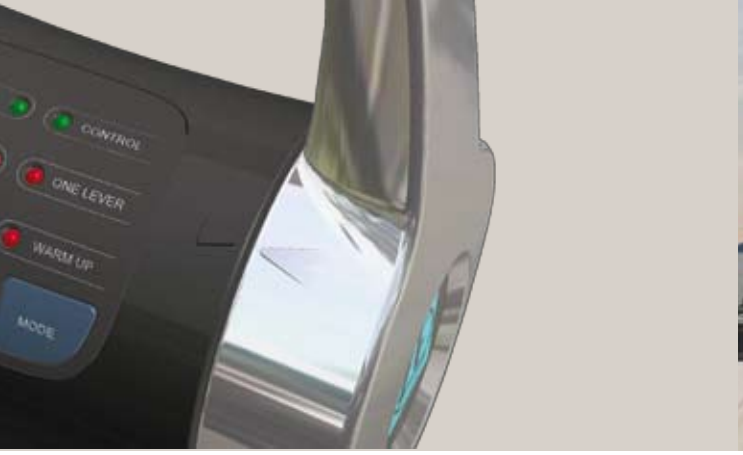
Designed to be compatible with the most advanced propulsion systems, SmartCommand works with electronically governed engines and all electrically controlled ZF transmissions.

Normal-profile SC Control Head

Low-profile SC Control Head

SC Processor

SC Display



for complete propulsion control

Available Options

- Low profile control head – fits neatly in enclosed consoles (normally used as an additional station on the aft deck)
- LCD Display - shows which station is in command, propeller rpm and engine rpm
- Tournament Levers with detached selection panel – typically used on sport fishing boats
- Automatic Power Selector - for increased power supply redundancy
- Handheld Remote
- Smart Backup - for engine and transmission override in case of main system failure
- Single screw applications
- Triple screw applications
- Joystick Maneuvering System (JMS) interface
- SteerCommand interface
- One button one function control panel allows the use of any ZF produced control head to operate with SC system
- 2-Speed processor version: automatically controls the upshift and downshift transition based on engine rpm

Technical features

- Compatible with 12 V or 24 V power systems
- Metal, watertight enclosure which never needs opening
- CANbus protocol used for communication between control head and main processor
- Control head provided with two microprocessors (one per lever) for converting analog into digital CANbus output, ensuring a high level of redundancy
- Two independent CANbus lines for connecting up to three control heads per line (maximum six stations), ensuring high flexibility to define the shortest path for connection as well as redundancy
- Throttle control signals available as Voltage – Current – PWM, compatible with all types of electronically controlled engine models
- Feedback signals from two independent sensors located on the transmission, measuring input shaft rpm and propeller shaft rpm
- Plug-in connections to reduce installation time and prevent incorrect wiring
- 4-digit LED display and keypad on the main processor simplify the set-up configuration and ease troubleshooting by displaying error codes
- CE marked and designed to meet major classification society standards
- J-1939 and NMEA 2000 compliant interface

MC2000 Control Head

One button one function control panel

Handheld Remote

Joystick Maneuvering System

ZF Marine Electronics LLC
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Fax +1 (0)425 493 1569

03 07 002 0910 - September 2010

Driveline and Chassis Technology

SteerCommand

Marine Propulsion Systems

Steer-by-wire technology has long been used by the aviation industry, and now it's available for your boat! No more messy mechanical and hydraulics links – just fit & fly!

Photo: courtesy of Ferretti Group

The System

The main advantages of SteerCommand are:

- improved control
- better performance
- reduced maintenance
- easy installation
- reduced weight
- minimum space required

Like active steering systems in luxury cars, SteerCommand gives you a similar feeling when driving your boat, thanks to a patented electronic force feedback system specially designed by ZF Marine.

Controlled by ZF SmartCommand electronic control system, SteerCommand includes a Helm Unit which sends via CANbus the wheel position to the SmartCommand processor for further computation and a linear actuator which turns the rudder, according to the signal sent via CAN bus, from the SmartCommand processor.

The whole system is designed for heavy loads and has been proven to work continuously, safely and reliably, guaranteeing maximum performance under the most arduous conditions.

Active Feedback Helm Unit *

Rudder Actuator *

Normal-profile SC Control Head

SC Processor

* actual components could differ slightly from those shown on pictures

Performance characteristics

When taking the helm you experience unmatched handling and performance, enabling you to cruise and maneuver with maximum safety at any speed.

- faster rudder response
- tighter turning radius
- higher efficiency with continuous micro-processor control
- highest safety in any sea condition
- maximum smooth control, with active feedback to the helm
- automatic back-to-zero position of the steering wheel (optional)

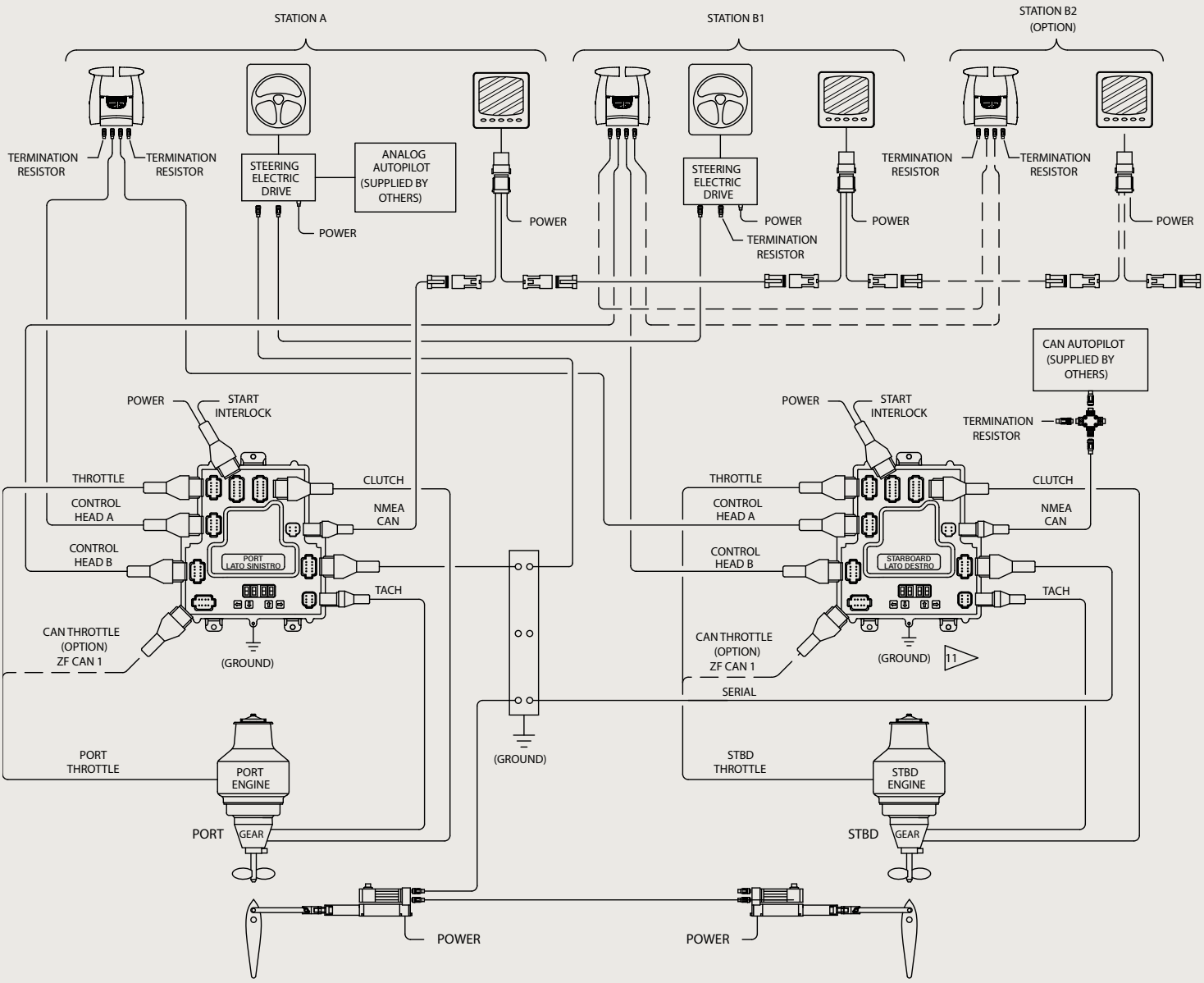
Technical features

- Standard Linear Actuator, can provide up to 10 KN thrust & 250 mm stroke.
- 24VDC system.
- CAN bus communication.
- Micro-processor control integrated into SmartCommand control unit.
- SmartCommand control system capable of a max of 6 station.
- CE&ABYC approved
- Single or dual control stations (main bridge and flying bridge).
- Additional tiller control connection (optional).
- Optional integration with autopilot.
- Angle of rudders varies as a function of boat speed.
- Independent control of port and stbd rudders (available with the two linear actuator configuration).

Safety

- In case of total power failure, the rudders can be actuated mechanically.
- Full redundancy: the system can function with either the starboard or port processor in operation.

SteerCommand layout



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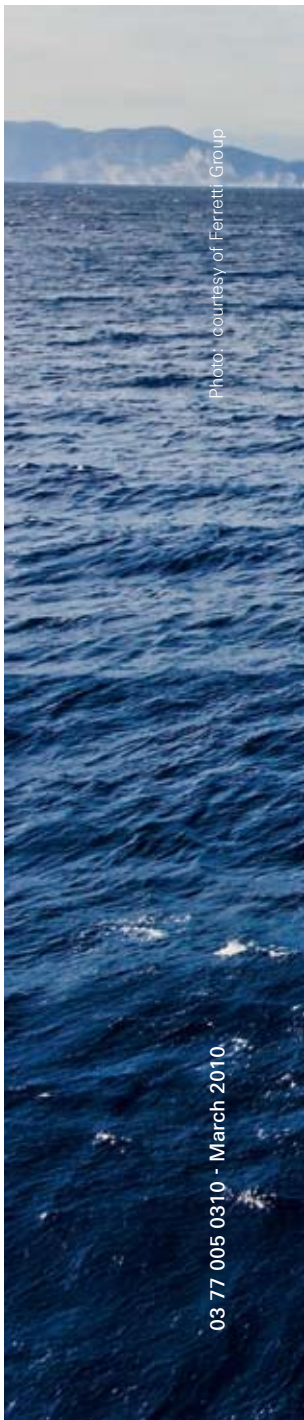
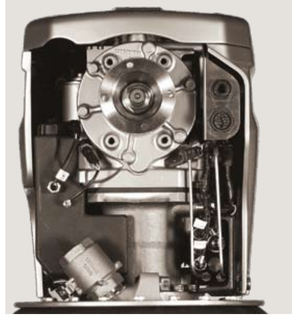


Driveline and Chassis Technology

03 77 005 0310 - March 2010



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maneuverability and comfort

Enhanced Maneuverability

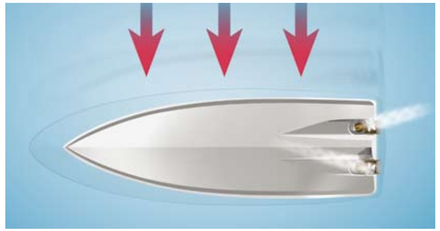
Feel the performance! More like driving a luxury car than a luxury yacht!

Each pod moves independently, resulting in excellent turning efficiency and superb response. Reliable, smooth, hydraulic power steers the pods and actuates the integrated trim-tabs, which are automated to improve performance and visibility during acceleration. The pod, which conventionally faces aft, has a thru-hub exhaust and can be steered though a large angle without rudder blow-out. Counter-rotating propellers eliminate lateral forces, resulting in absolutely straight tracking. At the helm, the response of the self-centering wheel can be customized, as required, and there's a power tilt wheel with two-person, two-position memory. This gives a whole new meaning to the word „cruise"!

Docking with Ease

No need to worry about wind and current when approaching the dock!

The advanced joy-stick control system is incredibly intuitive, operated with a simple turn of the wrist! One hand controls it all - sideways tracking, turning on the spot – all with precise speed control. Whether at the dock or backing down on a blue marlin, the total command and maneuverability is simply unmatched!



Clear, Quiet and Comfortable

Because the Zeus® Pod Drive System uses counter-rotating propellers and is mounted on large rubber supports, gear noise and vibration are significantly reduced, resulting in a quiet, comfortable ride. The engine exhaust is nearly eliminated by venting through the propeller hubs so that the water flow takes it far back into the wake.

Driveline and Chassis Technology

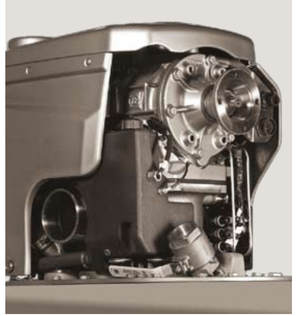
ZEUS® Pod Drive System

3500 & 3800 Series

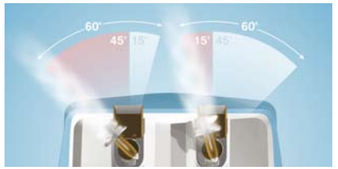
Safety
Comfort
Efficiency
Maneuverability

03 75 004 0710 - July 2010

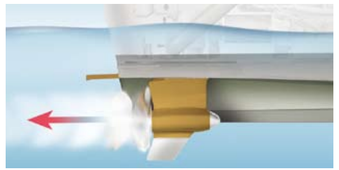
Marine Propulsion Systems



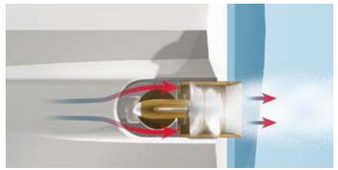
An unparalleled level of safety, control & boating enjoyment



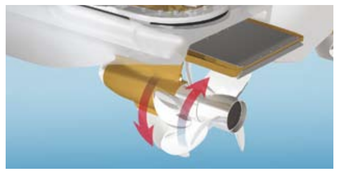
The single units of the Zeus® Pod Drive System can be steered independently. The amount of each pod's thrust can be varied as required, thanks to a special mechanism which is electronically controlled. This means much smoother and accurate maneuverability.



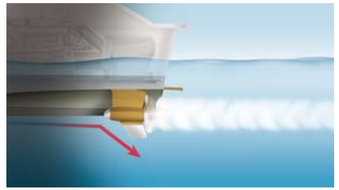
Because the thrust from the Zeus® Pod Drive System is horizontal, the full power of the engines is available to drive the boat forward, unlike a standard inboard shaft arrangement which tends to push the bow down.



The hydrodynamic shape of the Zeus® Pod Drive System creates much less drag than a shaft, strut and rudder. By locating the propellers facing aft, there is less form drag.



Counter-rotating propellers eliminate rotational losses produce no side forces and minimize cavitation. In addition, the increased blade area permits larger gear ratios to be used.



Safer by design

If the pod drive strikes underwater debris, aft-facing propellers are protected by the pod gearcase and skeg. In addition, by mounting the Zeus® Pod Drive System in a tunnel, the torpedo shape of the drive is the same depth as the keel. Most floating objects will be deflected downward by the keel and skeg, and therefore, away from the propellers. Should the pod hit a substantial object, the skeg is designed to shear below the torpedo, minimizing damage to the drive and hence, costly repair bills!

An aft-facing pod drive mounted in a tunnel results in greatly improved efficiency, without sacrificing safety!

Easy to install

The Zeus® Pod Drive System is a complete package with integrated exhaust, engine cooling system, trim-tabs, steering, throttle and shift controls. It therefore requires significantly less time to install, compared to conventional inboards or other pod systems. Naturally, all materials in contact with seawater are either bronze or stainless steel, with high corrosion resistance.

Skyhook® Electronic Anchor

Envision pulling up to a busy fuel dock, tending your lines and fenders yourself without having to constantly operate the controls! Imagine fishing a jetty on your own, without ever moving the helm! At the touch of a button, the Skyhook® Electronic Anchor maintains the boat on a fixed heading within a tight area, even in strong currents and windy conditions.

Information at your fingertips

With electronic connectivity throughout the vessel, you can monitor and control a wide array of systems – from engines to generators, AC to navigation! Never before has such a high level of integration been available to recreational boating enthusiasts!

Up to: 30% improved fuel economy;15% faster cruising speed; 15% faster top speed

Available ratios and weight

Model	Ratios	Power/rpm		Input Power Capacity						Max Input Engine	Weight	
		kW/ rpm	hp/ rpm	kW	hp	kW	hp	kW	hp	rpm	kg	lb
				2500 rpm		3000 rpm		3300 rpm				
ZEUS 3500	2,06	0,1214	0,163	304	407	364	488	401	537	3400	395	871
ZEUS 3800	2,06	0,1214	0,163	304	407	364	488	401	537	3400	417	921
	1,795	0,1392	0,187	348	466	418	560	459	616			
	1,489	0,169	0,227	423	566	507	680	558	748			

ZF POD
Pod Drive System

2500 & 2800 Series

Safety

Comfort

Efficiency

Maneuverability

Marine Propulsion Systems

Efficiency

The ZF POD is one of the most efficient propulsion system, ideal for medium-sized pleasure craft of 30 to 48 feet overall length, can be used with engines up to 450 hp.

The increased propulsion efficiency, compared to traditional shaft-line systems, can give up to 15% faster cruise speed and up to 15% faster top speed. Better performance translates into improved fuel economy up to 30%, environmental footprint reduction and both initial and through-life cost reduction. The system consists of a transmission unit, a steering system and counter-rotating propellers, governed by an electronic control system.

This Pod Drive System is a compact and light unit, best suited for the most popular sized pleasure crafts.

Joystick Maneuvering System

SmartCommand Control Head

Maneuverability

The ZF POD is controlled by ZF's SmartCommand control system and the JMS (Joystick Maneuvering System), which ensures easy and safe cruising and maneuvering.

Each pod moves independently, resulting in excellent turning efficiency and superb response. Reliable, smooth, electric power steers the pods and optional automated trim-tabs improve performance and trim angle during acceleration.

Patented tunnel installation gives to the boat exceptional stability when turning, due also to the vertical installation of the pod units.

A full range of propellers with different diameters and pitch angles is available, making this system a perfect match for both planing and non-planing boats.

The drive can be matched to all types of diesel or gas engines within the approved power range.

The advanced Joystick Maneuvering System (JMS), developed by ZF, controls all ZF POD maneuvering functions. It is incredibly intuitive and can be operated with a simple turn of the wrist! One hand controls it all - sideways tracking, turning on the spot – all with precise speed control. The optional "iAnchor" function, thanks to an integrated GPS receiver, enables the vessel to be kept at an exact position and orientation at the press of a button.

Whether at the dock or backing down on a blue marlin, the total command and maneuverability is simply unmatched!

Safety

If the pod drive strikes underwater debris, aft-facing propellers are protected by the pod gearcase and skeg.

In addition, by mounting the ZF POD in a tunnel, the torpedo shape of the drive is the same depth as the keel. Most floating objects will be deflected downward by the keel and skeg, and therefore, away from the propellers.

Should the pod hit a substantial object, the skeg is designed to shear below the torpedo, minimizing damage to the drive and hence, costly repair bills!

Comfort

The ZF POD uses counter-rotating propellers and is mounted on large rubber supports. Gear noise and vibration are significantly reduced, resulting in a quiet, comfortable ride.

The engine exhaust is nearly eliminated by venting through the propeller hubs so that the water flow takes it far back into the wake.

Selected features

- Drive by wire electrically actuated steering
- Joystick with proportional speed control
- Electronic throttle & shift control
- Electronically controlled trim-tabs
- Auto sync
- Single lever
- Dock mode
- Troll
- Warmup
- Keyswitch
- Display
- Required switch panels
- Gearcase with breakaway skeg
- One piece grommet
- Mercathode
- iAnchor

Available ratios and weight

Model	Ratios			Power/rpm		Input Power Capacity						Max Input Engine	Weight	
				kW/ rpm	hp/ rpm	kW	hp	kW	hp	kW	hp	rpm	kg	lb
						3000 rpm		3300 rpm		3800 rpm				
ZF POD 2500	2,01	2,138	2,236	0,073	0,098	219	294	241	323	277	372	5000	240	528
ZF POD 2800	1,495	1,59	1,663	0,098	0,131	294	393	323	432	372	498	3800	260	573
	1,752	1,864	1,949	0,084	0,113	252	339	277	373	319	429	4400		
	2,01	2,138	2,236	0,073	0,098	219	294	241	323	277	372	5000		
	2,26	2,405	2,515	0,065	0,087	195	261	215	287	247	331	5600		
ZF POD 2800-1	1,495	1,59	1,663	0,107	0,145	321	436	353	480			3800	260	573
	1,752	1,864										4400		

Note: Please verify engine compatibility with ZF Marine local distributors

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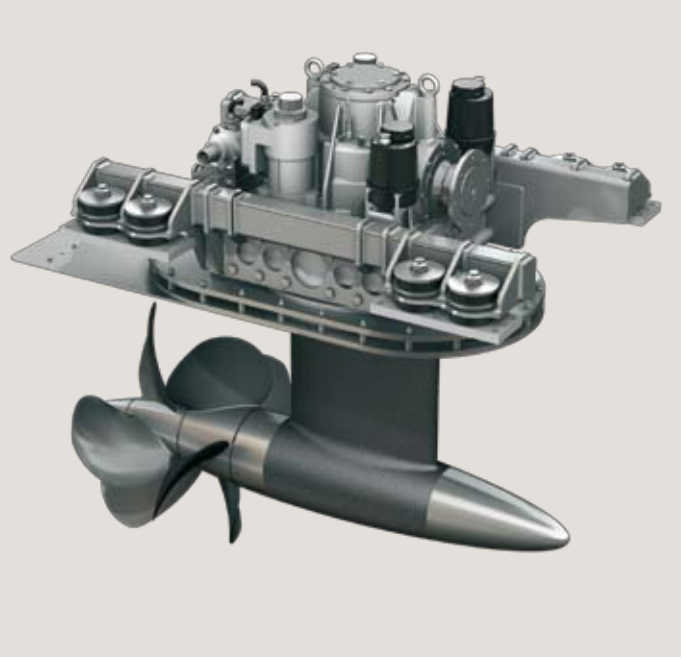
Driveline and Chassis Technology

ZF POD
Pod Drive System

4000 Series

Marine Propulsion Systems



Efficiency

The ZF POD is one of the most efficient propulsion systems, ideal for large, twin-engined pleasure craft of 50 to 75 feet overall length, but equally suitable for superyachts up to 120 feet, with a triple or quad configuration.

The increased propulsion efficiency, compared to traditional shaft-line systems, can result in speed increases up to 15% and significant reduction in fuel consumptions at crusing speed (up to 20%). Better performance also means less environmental pollution and reduced initial and through-life costs.

The system comprises a conventional transmission and steering pod system equipped with counter-rotating propellers, managed by an electronic control system.

Maneuverability

The ZF POD is controlled by ZF's SmartCommand control system and the JMS (Joystick Maneuvering System), which ensures safe cruising and easy maneuvering.

Each pod is rotated independently, depending on speed and turning circle, which results in excellent handling and superb response. The reliable, smooth, electric motor which steers each pod is fitted with sensors which optimize boat handling under all conditions.

The vertical installation of the pod units gives the boat exceptional stability when turning at any speed.

Using trolling valves and the advanced Joystick Maneuvering System (JMS) all ZF POD maneuvering functions are precisely controlled and simply intuitive. One hand controls it all - sideways tracking, turning on the spot – all with accurate speed control. Whether at the dock or backing down on a blue marlin, this total command and maneuverability is unbeatable!

The optional "iAnchor" function, thanks to an integrated GPS receiver, enables the vessel to be kept at an exact position and orientation at the press of a button.

Ratings

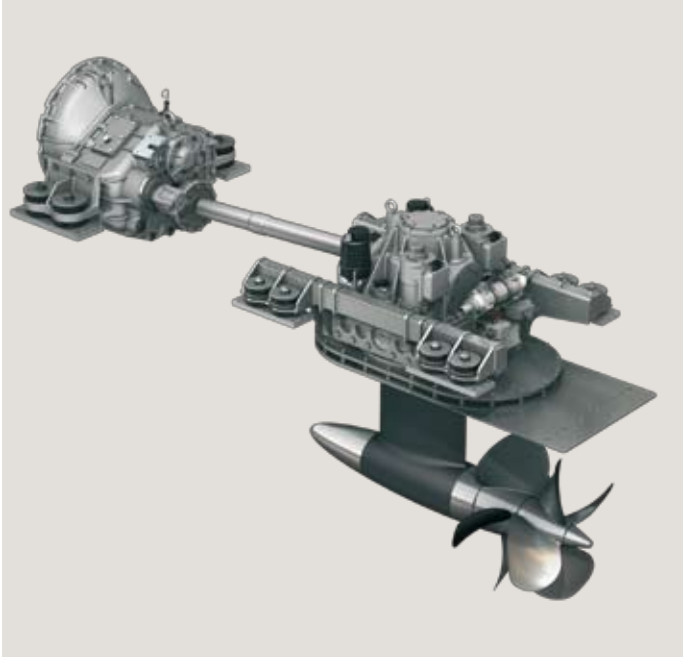
A full range of propeller sizes and pitch angles is available, making this system perfectly suitable either for planing or semi-displacement boats, driven by any diesel engine within the approved power range up to 3670 Nm (2716 lbft) in pleasure duty (i.e. 1200 hp at 2300 rpm).

Model	Ratios	Power/rpm		Input Power Capacity						Max Input Engine	Weight	
		kW/rpm	hp/rpm	kW	hp	kW	hp	kW	hp	rpm	kg	lb
				2100 rpm		2300 rpm		2450 rpm				
ZF POD 4000	1,985	0,385	0,516	809	1083	886	1187	943	1264	2500	~1000	~2200
	2,212	0,368	0,493	772	1035	846	1134	901	1207			

Safety

If the pod drive strikes underwater debris, the aft-facing propellers are protected by the pod gear casing.

In the event of hitting a substantial object, the gear casing is designed to shear below the hull, minimizing damage to the drive and minimizing repair costs!

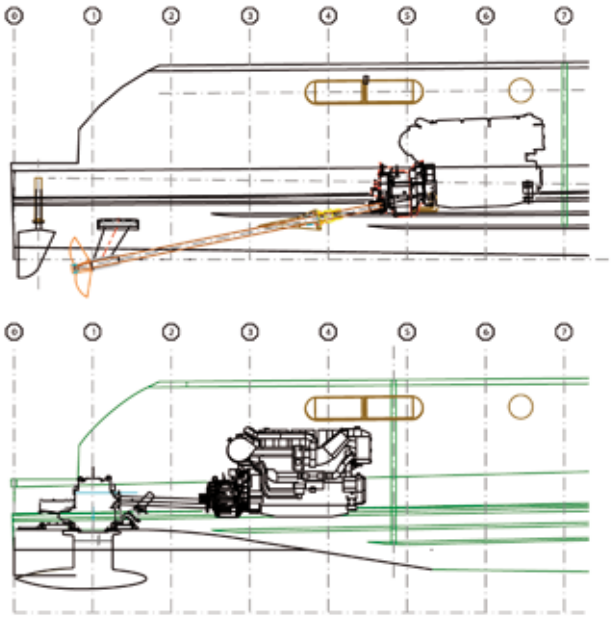


Comfort and Installation Simplicity

The ZF POD uses counter-rotating propellers and is mounted on large rubber supports. Gear noise and vibration are therefore significantly reduced, resulting in a quiet, comfortable ride.

Since the thrust is transferred to the stringers and not through the hull, the traditional fiberglass lamination process doesn't have to be changed. Naturally, the drive can also be installed in aluminum hulls.

The compactness of the ZF POD maximizes accommodation space and fits all boats, including low-deck sport fishing.



Selected features

- Drive-by-wire, electrically actuated steering
- Joystick with proportional speed control
- Electronic throttle & shift control
- Electronically controlled interceptors
- Auto sync
- Single lever control
- Docking mode
- Trolling mode
- Warm-up mode
- Display
- iAnchor

The 4000 series POD has been developed in cooperation with AZIMUT YACHTS and CAZZARA YACHTS

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Driveline and Chassis Technology

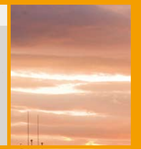
ZF Marine Products (examples)

Transmissions for Pleasure Craft

ZF 10 M

ZF 63 IV

ZF 286 A



ZF 500-1 IV Hybrid

ZF 2060

ZF 550 ATS

Control Systems for Pleasure Craft

MiniCommand

SmartCommand

5200 Series

MC 2000-2

J5000 - JMS

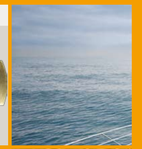
SteerCommand

Fixed Pitched Propellers for Pleasure Craft

ZF FP NR

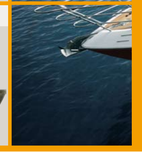
ZF FP NF

ZF FP KA



Shaftline System

ZF FP SPP



Propulsion Solutions for Pleasure Craft

Bow Thruster

Sail Drive

ZF POD 2500/2800

ZF POD 4000

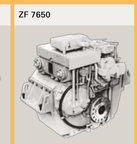
SeaRex

Transmissions for Fast Craft

ZF 3060 V

ZF 4650

ZF 7650



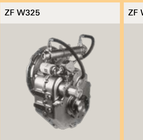
ZF 9000 NR2HL

ZF 30350 SG

ZF 60000 NR2H

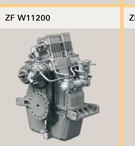
Transmissions for Commercial Craft

ZF W325

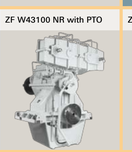


ZF W350

ZF W11200

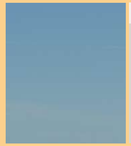


ZF W43100 NR with PTO



ZF W103100

Controllable Pitch Propeller, Fix Pitch Propeller and Controls for Commercial Craft



ZF CP KS

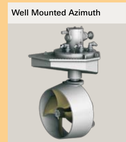
Propulsion Package

ZF FP DUCT

Control Panel

Thrusters for Commercial Craft

Well Mounted Azimuth

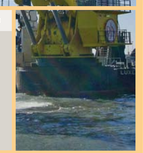


Tunnel Thruster

Deck Mounted Azimuth

Rectractable Thrusters

Shallow Draught Thrusters



Product Overview

Marine Propulsion Systems

ZF Marine - The Success Story

ZF was founded by Graf Zeppelin in 1915. To fulfil his dream to develop high technology airships, he needed lightweight, precision transmissions to match the high performance Daimler Benz engines. The company grew rapidly and soon diversified to supply the automotive industry.

The transmissions developed for the airships were ideally suited for installation in fast boats and in 1938 the first marinized version, the KS 25, was delivered to Daimler Benz. This very compact gearbox was close-coupled to the MB501 engine, transmitting 2500 hp at 1600 rpm.

Throughout the '50's and '60's many marine transmissions were developed including small mechanical shift gearboxes and larger models fitted with electromagnetic couplings. Finally, the latter were phased out in favor of hydraulically controlled transmissions.

During the '70's, the pleasure craft business increased and ZF introduced more transmissions to meet the growing demands of the engine suppliers, then in 1986, the Italian company MPM (Meccanica Padana Monteverde) was acquired. (now ZF Padova s.rl.). The ZF Padova transmissions complemented the Friedrichshafen products, extending the lower end of the product range and soon ZF Padova SpA became the headquarters of ZF's marine products division.

In 1995, ZF acquired the Hurth group of companies and the ZF Marine group was expanded with the establishment of ZF Marine Arco, Italy, a company producing small mechanically operated transmissions and hydraulic transmissions for small pleasure craft.

In 1999, ZF Marine started to market a comprehensive range of surface-drives and trim-tabs.

In 2000, controllable and fixed pitch propellers were added to the product portfolio with the acquisition of ZF-FPS (Faster Propulsion System Co. Ltd.), Kaohsiung, Taiwan. Electronic controls systems were also added with the acquisition of ZF Marine Electronics LLC at Mukilteo WA, USA and also the world-wide Sales & Service network was expanded by founding new Sales & Service offices such as the ZF Marine Representatives Office in Shanghai, ZF Marine Middle East in Sharjah, UAE and several satellite offices in North America.

The year 2002 saw a consolidation of the ZF Marine Group, and restructuring of the organization to address specific market segments.

ZF Marine introduced the SeaRex range of trimmable surface drives augmented by the smaller MiniRex drive.

In 2005 SmartCommand, a state-of-the-art electronic controls system, was successfully introduced to the Pleasure Craft market.

Since 2002, there has been ongoing development of large transmissions suitable for commercial vessels powered by medium-speed Diesels, as well as corresponding controllable pitch propellers and associated controls.

In September 2009 ZF Marine has acquired HRP Nederland b.v. and all its subsidiaries, including production locations in the Netherlands and Indonesia as well as sales and service locations worldwide. Locations are ZF Marine Krimpen, PT ZF Marine Batam and ZF Marine Singapore. ZF Marine offers since then a wide range of steerable thrusters, which include well mounted thrusters, retractable thrusters, tunnel thrusters and controls, available in fixed pitch, CP and CRP versions.

In the year 2010 at the location of ZF Marine Zhuhai, acquired in 1998 by the ZF Marine Group, a major investment has been implemented, with completely renewed and additional facilities at the company grounds. This includes a foundry, a gear manufacturing and assembly facility to assemble complete propulsion systems with controllable pitch propellers and an area for testing these systems, including controllable pitch propellers, propeller shafts, transmissions and auxiliary equipment.

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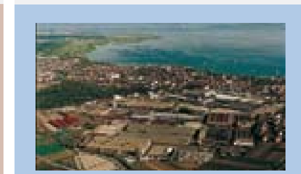
Fast Craft



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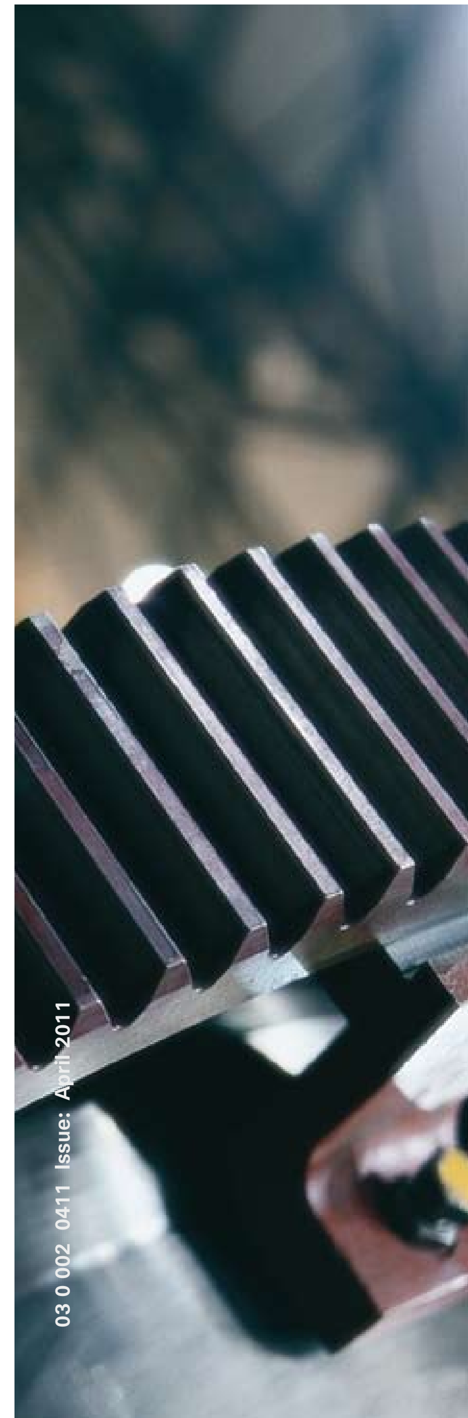

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