



November, 2010

Azipod[®] C

Propulsion and Thruster Units for 1300 – 4500 kW

Azipod® C for Low Power Applications in Azipod® Product Family



- Azipod CO is intended for open water ship applications between 1300 ...4500 kW, such as
 - Offshore Supply Vessels
 - Mega Yachts
 - Ferries
 - Tankers
 - Research Vessels
 - Wind Turbine Installation Vessels
- Azipod CZ is a thruster unit (3300 & 4500 kW designs, up to 60...84* tons thrust) with a nozzle intended for high thrust applications such as
 - Drilling rigs and ships
 - Pipe layers and other DP vessels

Azipod® C - Technical Concept



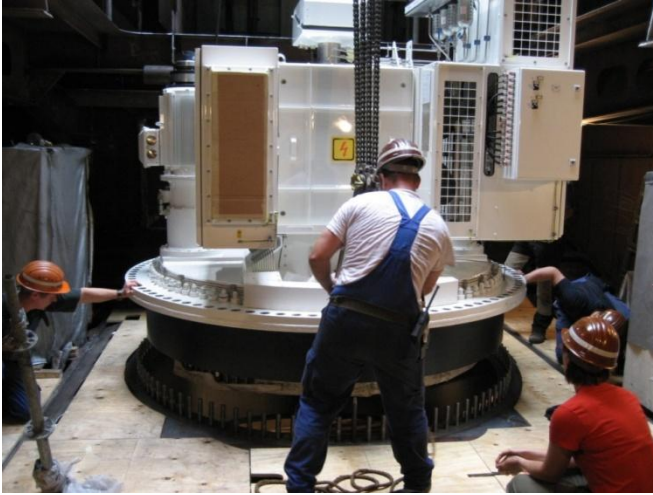
- A fully 360 degrees steerable propulsion unit
- No rudders needed
- Supplied by 690 V frequency converter
- Fixed-pitch propeller, directly mounted on the motor shaft

Azipod® C - Technical Concept



- Electric power transmission
 - No gear losses
 - No gear lubrication oil
 - Less maintenance
- Permanent magnet synchronous motor
 - Very high efficiency over a wide power range
- Thruster unit directly cooled to surrounding sea water
 - No separate cooling system

Azipod® C - Technical Concept



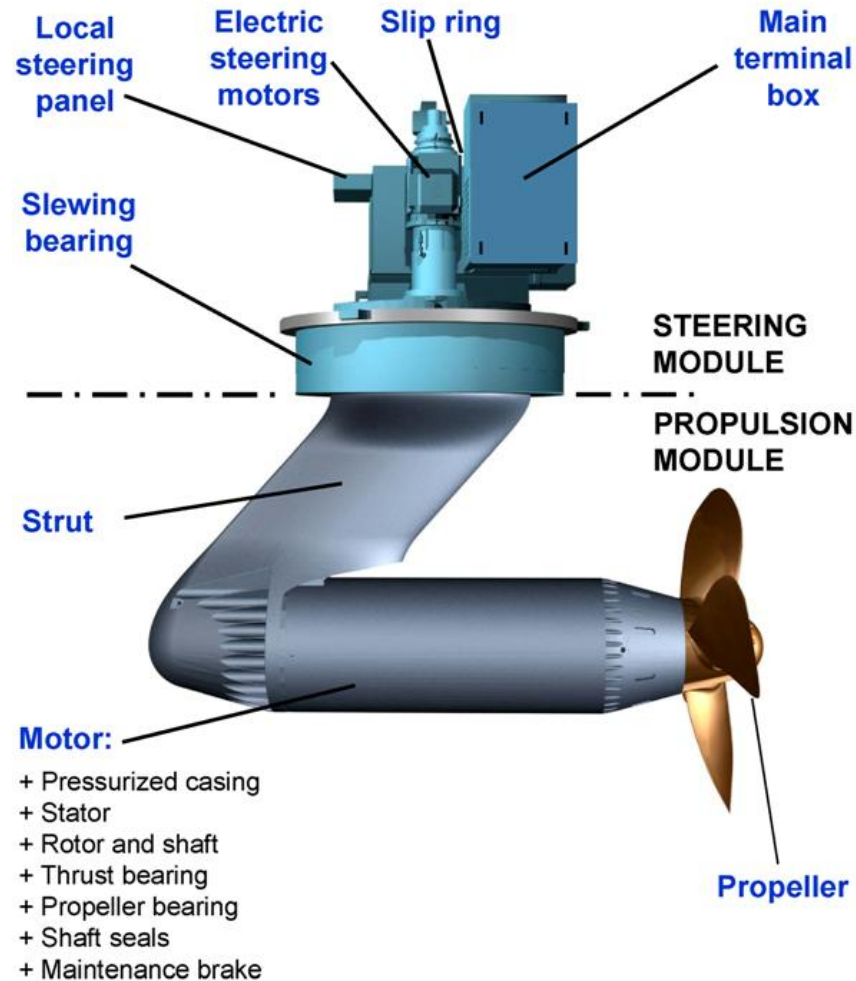
- Fully electric steering gear
- Simple installation at the yard

Azipod® C - Technical Concept



- Double shaft seal system with 2 step leakage follow up
- Positive air pressure toward sea
- Water lubricated outer seal
- No leakages

Functional Elements of the Azipod C



Azipod® C - Modular Construction

3 Standard Steering Modules



**Steering drive cabinet,
2 units/propulsor**

**4 Standard Propulsors
Modules**

Strut module



Motor module



Propeller



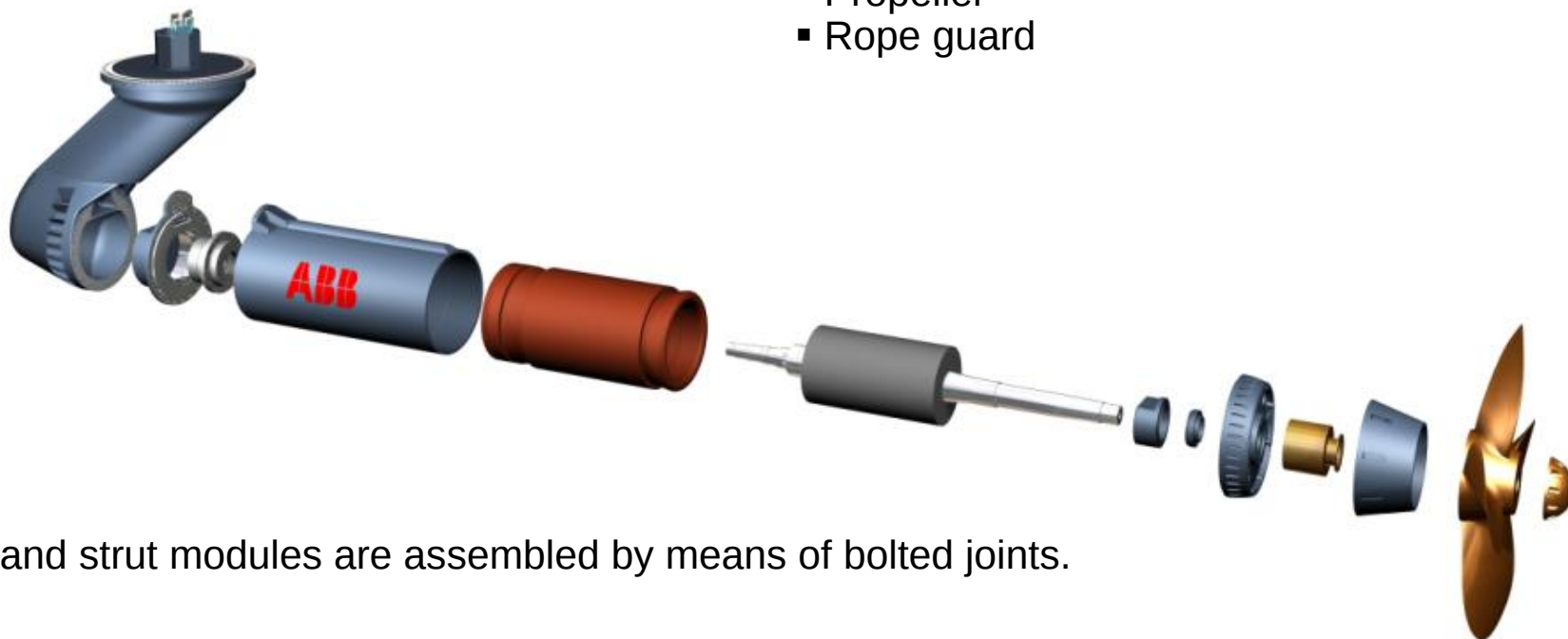
Azipod® C - Propulsion Module

Strut module:

- Strut casting
- Cabling
- Piping (hoses)

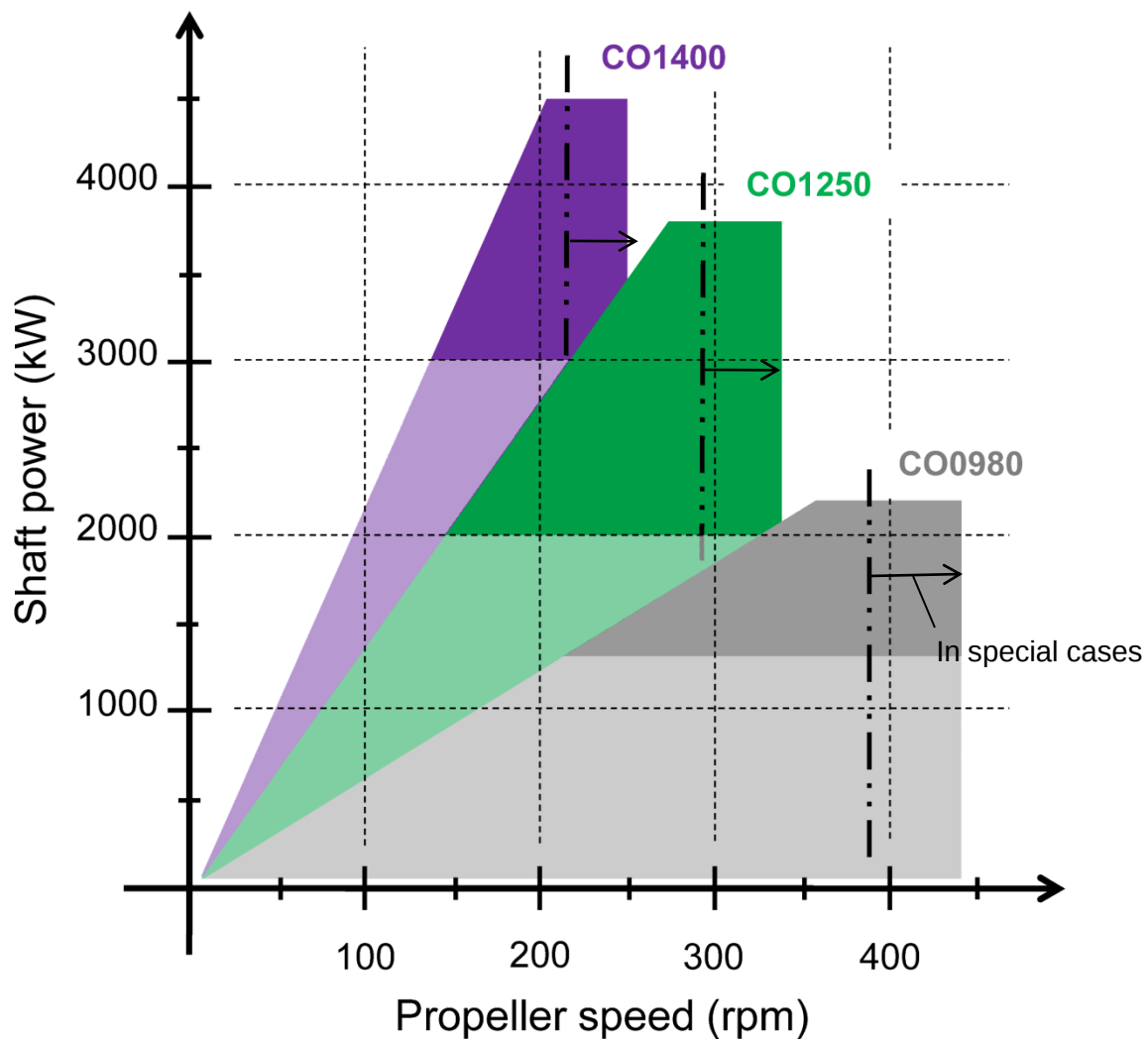
Motor module:

- Propulsion motor
- Stator frame tube
- Thrust bearing assembly
- Propeller bearing assembly
- Shaft sealing
- Propeller
- Rope guard



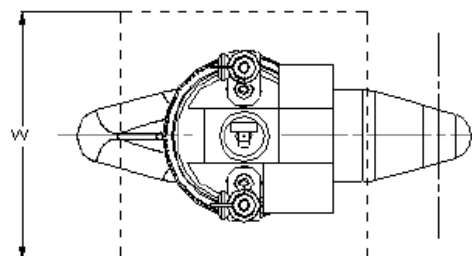
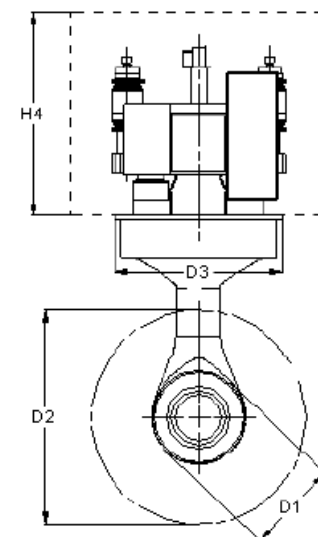
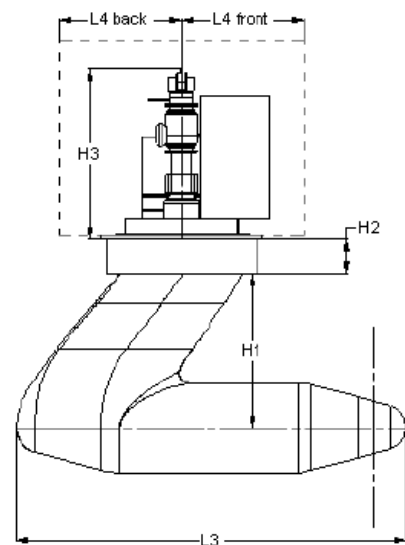
Motor and strut modules are assembled by means of bolted joints.

Azipod® CO - Sizes



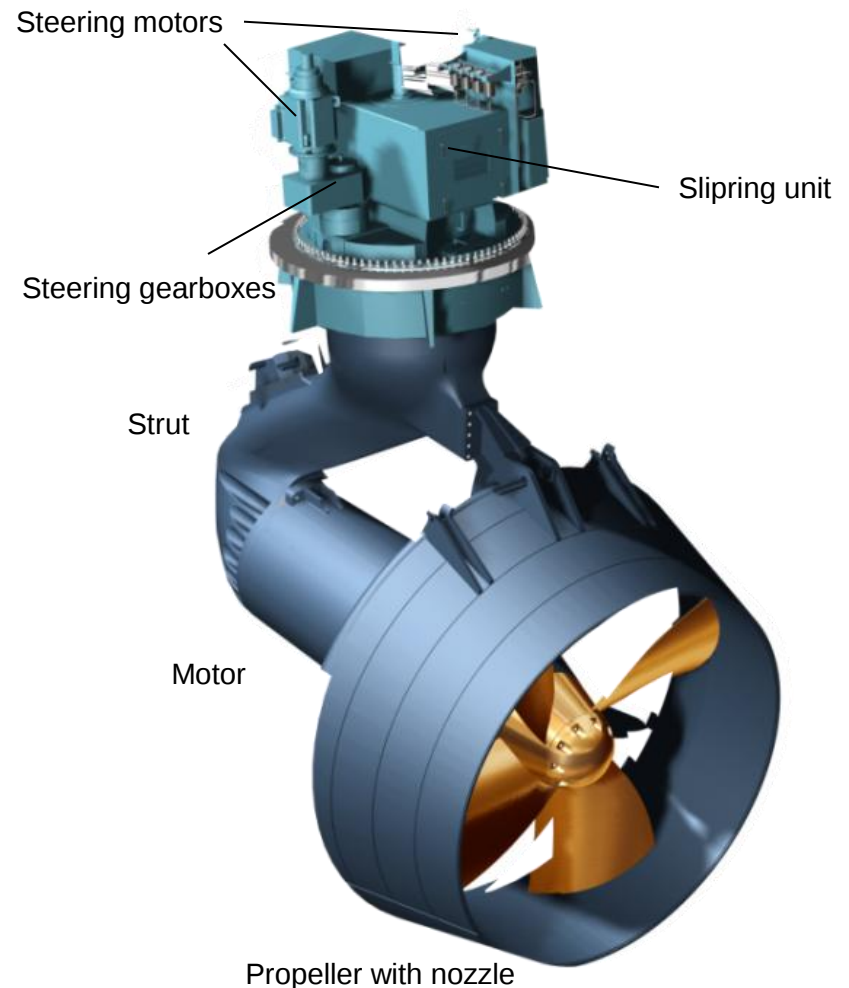
Azipod® CO - Main Dimensions

Figure	CO0980	CO1250	CO1400
D1 [mm] Outer diameter of the motor	1039	1310	1470
D2 [mm] Propeller diameter (min. – max.)	1900 – 2600	2400 – 3500	2700 – 4000
D3 [mm] Connection flange outer diameter	2300	2780	2780
L3 [mm] Length of the Propulsion Module	4800	5730	6200
H1 [mm] Height from motor shaft line to the ship bottom	1950	2710	3090
H2 [mm] Height of slewing bearing assembly to the connection flange lower surface	495	650	650
H3 [mm] Height from connection flange lower surface to the top of the steering module	1980	1980	1980
H4 [mm] Maintenance area	2300	2300	2300
L4 back [mm] Maintenance area	1400	1700	1700
L4 front [mm] Maintenance area	2100	2250	2250
W [mm] Maintenance area	4000	4000	4000
M1 [ton] Total weight of complete Azipod	27	49	60
M2 [ton] Weight of the Steering Module	7	11	11
M3 [ton] Mass of the Propulsion Module (including approximate max. weight of propeller)	20	38	49
V [m³] Displacement of the Propulsion Module (at assumed draft)	4	8,5	11
v [knots] Maximum water speed at the Azipod	18	19	21
R [mm] Azipod turning radius	2700	3050	3350

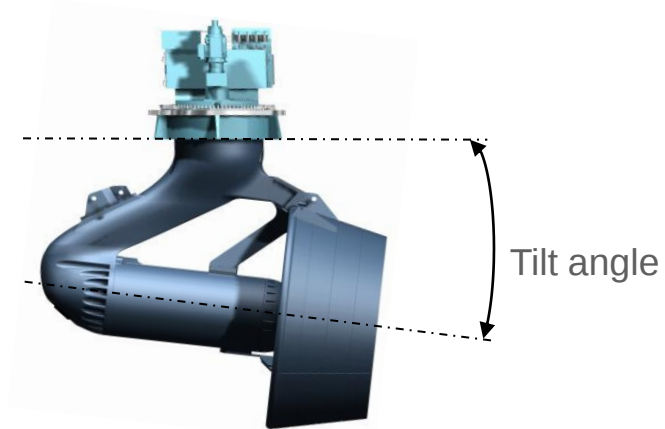
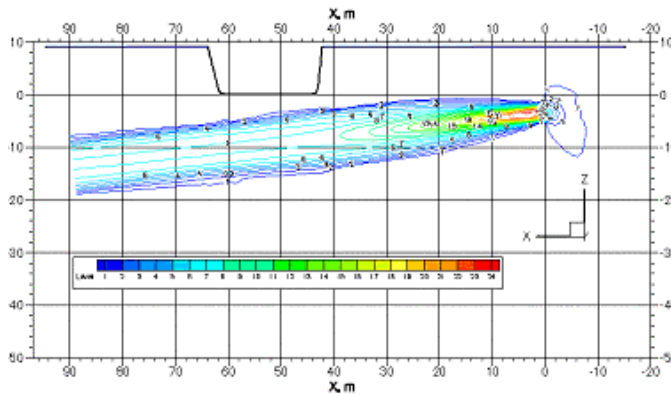


Azipod CZ

- Designed e.g. for drilling vessels.
- Available for power ratings of up to 4500 kW.
- Static thrust up to 84 metric tons (at zero speed)
- Underwater mountable
- Optimized for DP operations



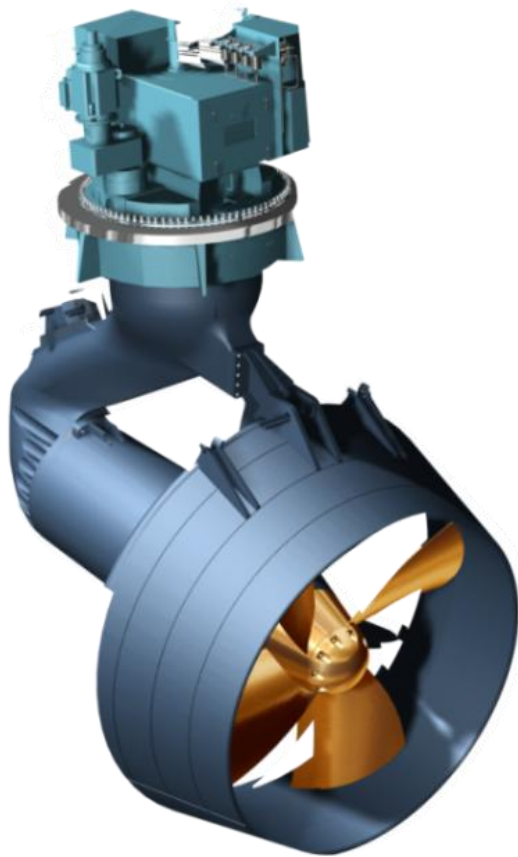
Azipod® CZ – Hydrodynamic Benefits



- Rig version (= Pushing Azipod® C with Nozzle) with 7 degrees tilt angle in full scale - Minimized interaction with pontoons
- Tilting the motor module gives hydrodynamically
 - 4 - 6 % advantage to the thruster where only the nozzle is tilted
 - over 20 – 30 % advantage in thrust compared to non tilted thruster/nozzle (depends on thrust angle)

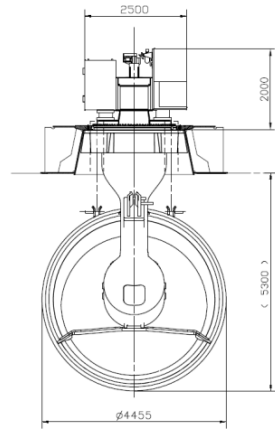
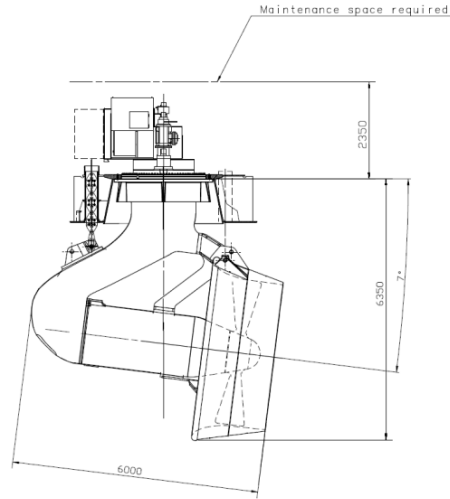
Note: Above values when thruster jet stream is in the direction of the rig's pontoon or towards other thrusters.

Azipod® CZ – Model Sizes

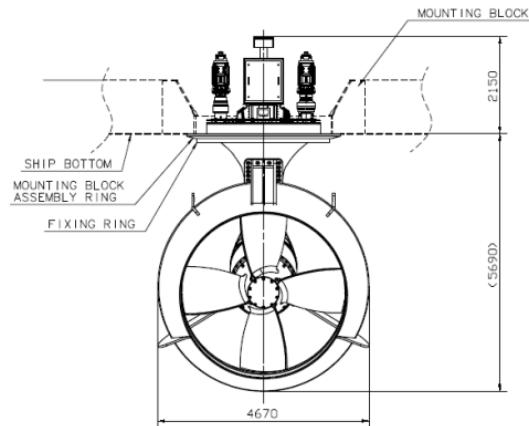
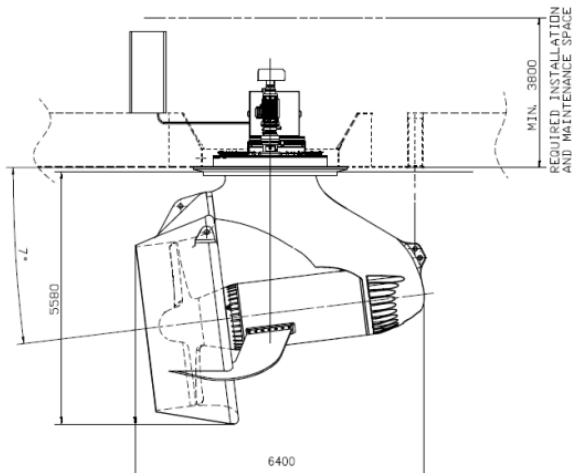


Rated power/kW	Effective thrust/tons	Max transit speed/ knots
3300	63	9
3800	73	9
3800- 4500	72 - 84	14

Azipod® CZ – Dimensions



Azipod CZ1400S



Azipod CZ1400L

Azipod® C Experience, Nov 2010



- Units delivered or on order (incl spare units) 75 pcs
 - Azipod® CO 50 pcs
 - Azipod® CZ 25 pcs
- Vessels, total number 26 vessels
 - Supply vessels 4
 - Ferries 4
 - Research vessels 5
 - Yachts 7
 - Tankers 1
 - Drilling rigs 2
 - Crane and Heavy Lift vessels 2
 - Wind Turbine Installation vessels 1

Azipod® C – Summary of Benefits



Low operation cost

- Benefits of electric propulsion and power plant principle

- High hydrodynamical efficiency

- High internal efficiency

- Minimum need for maintenance



Environmentally friendly

- Minimum amount of lubricants

- Low noise and vibrations



High reliability

- Simplicity, low number of components

- Minimum amount of wearing parts

- Short installation and commissioning time

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for a better world™

