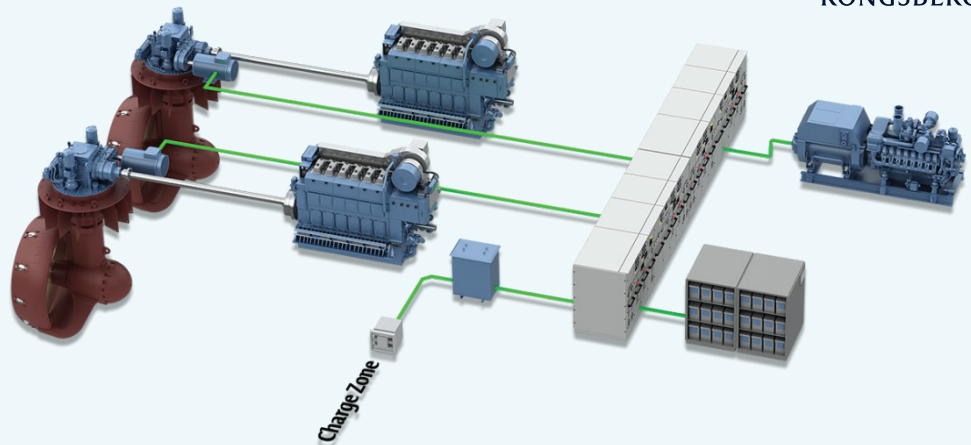


# AZIMUTH THRUSTERS



KONGSBERG



## KONGSBERG AZIMUTH THRUSTERS

### Azimuth thrusters with Dual or Twin power input

Operators are increasingly looking at ways to reduce the fuel consumption and emissions of their vessels, with battery power and LNG becoming key players in Marine propulsion. To ensure more sustainable propulsion is efficient and accessible as possible KONGSBERG is developing more solutions designed from Hybrid Tugs.

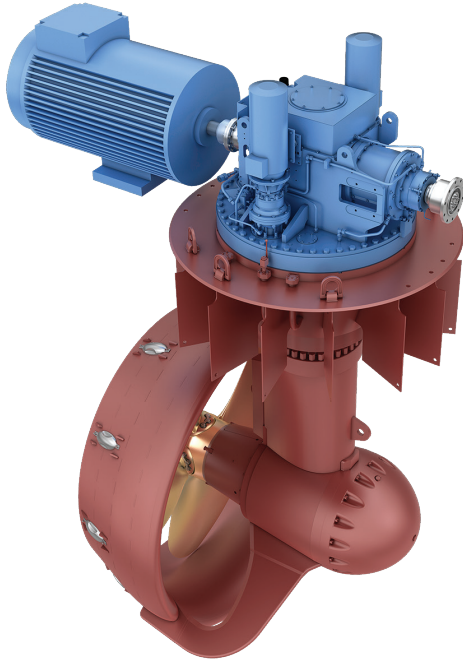
Hybrid diesel and electric propulsion is particularly relevant for Harbour tugs where 'loitering' is common and charging points are more accessible. Incorporating electrical power into a propulsion system with the Dual or Twin input system allows you to free sail solely on electric motors, provide booster in full power operation, or act as hotel load and battery charge in medium power operation. Tugs can be near emissions free in harbour, helping to comply with increasingly stringent legislation, as well as significantly reduce fuel consumption by for example running on the battery's during transit and then also to support the engines during more stringent duties, decreasing the size of

**In both solutions, the main engine can be engaged/ disengaged with integrated slipping clutch. This allows the vessel to sail with only battery power, cutting emissions to nearly zero. Both solutions also enable captains to operate in following example modes:**

- Free sailing (loitering) with only electric motor
- Light duty operation with main engine while electric motor acting as generator for hotel load
- Full power with both engines

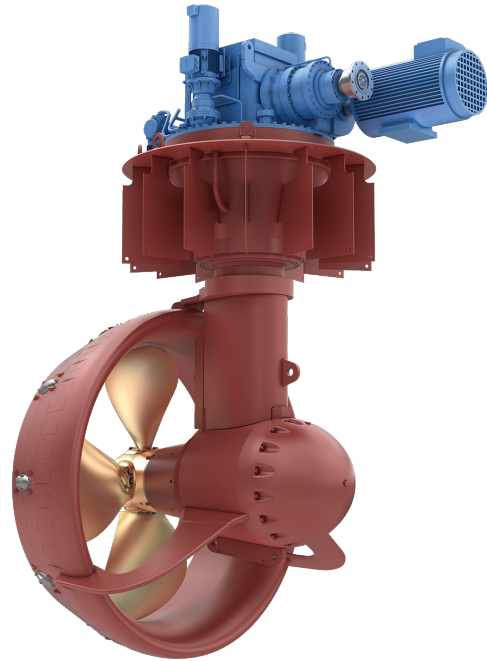
## Twin Input Solution

The second input flange is located at the opposite side from main input. As they share the same horizontal shaft the system is called Twin. Due to this, the rpm of main and auxiliary motor needs to be the same. If the thruster room is equipped with more open space, specifically “behind” the thruster, the Twin Input system is your optimal solution. The system enables a simpler solution compared to the Dual Input, but the electric motor size increases some steps as its and main engines rpm needs to be the same.



## Dual Input solution

The electric motor is installed parallel to main input shaft. Between them there is a gear box, which enables usage of electric motor with more rpm’s than main engine. When there is limited space in thruster room, the Dual Input thruster is the optimal solution. It requires a physically smaller electric motor next to intermediate shaft. The gearbox between the main and secondary input synchronises their rpm’s.



### EXAMPLES OF TECHNICAL SOLUTIONS

Twin input	US 205S	US 255S
Input power kW (total)	1900	2500
Main engine power	1500	2000
Main engine rpm	1800	1800
Secondary motor power	400	500
Secondary motor rpm	1800	1800
Propeller diameter (mm)	2500	2800
Stem length (mm)	3305	3600/3800
Weight (tons)	18	27
Performance estimates with example tug:		
Free sailing (only electric)	0-8 knots	0-9 knots
Towing (only diesel)	BP 55t	BP 72t
Towing (diesel + electric)	BP 64t	BP 83t

### EXAMPLES OF TECHNICAL SOLUTIONS

Dual input(ratio 2:1)*	US 205S	US 255S
Input power kW (total)	1900	2500
Main engine power	1500	2000
Main engine rpm	750	750
Secondary motor power	400	500
Secondary motor rpm	1500	1500
Propeller diameter (mm)	2500	2800
Stem length (mm)	3305	3600/3800
Weight (tons)	18	27
Performance estimates with example tug:		
Free sailing (only electric)	0-8 knots	0-9 knots
Towing (only diesel)	BP 55t	BP 72t
Towing (diesel + electric)	BP 64t	BP 83t

