

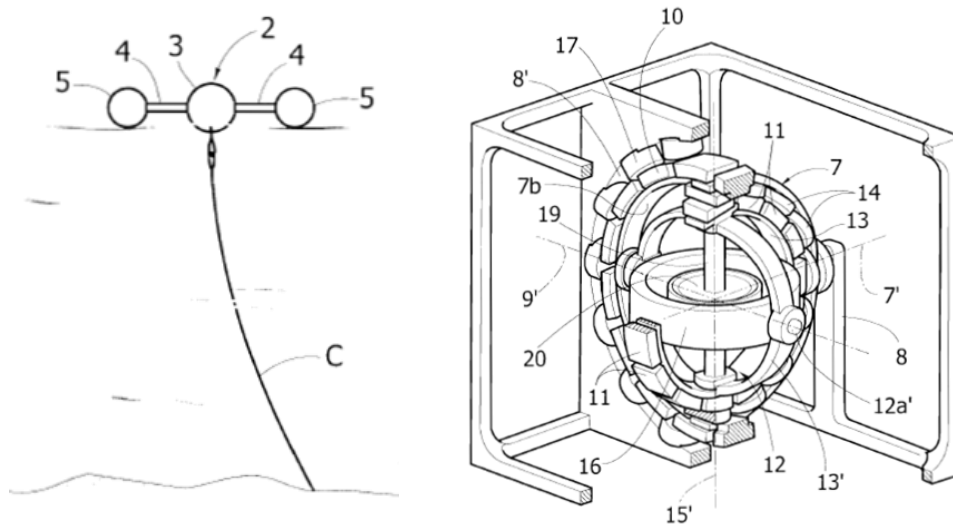
# Wave energy converter

## Abstract

The presented system is an energy converter, using gyroscopic effects to generate electrical power from the sea waves. The device consists of an external hull that is sealed and constrained to the seabed through a slack mooring. The rocking movement induced by the waves triggers the gyroscopic system placed inboard, which in turn actuates two rotary generators and produces electricity.

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Politecnico di Torino



marine energy

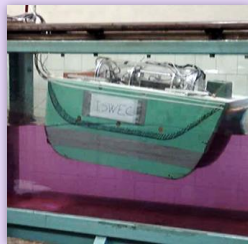
gyroscope

oscillating frames

planetary ring configuration

flywheel

# Wave energy converter



## Description

The presented system is an energy converter, using gyroscopic effects to generate electrical power from the sea waves. The device consists of a hull-shaped external structure that is constrained to the seabed through a chain, loosely connected to the central body, at least two oscillating frames arranged on planes orthogonal to each other, a flywheel installed around a third axis and located within the central floater. The rocking movement induced by the waves in accordance with roll and pitch motions or a

combination of both, triggers a gyroscope fixed upon an internal frame, which in turn actuates two rotary generators, producing electricity. Furthermore, an independent control unit monitors the operating conditions of the system in real-time. The planetary ring configuration of the electric generating means and their large radius allows for obtaining high torque and ensures a greater performance compared to other solutions available on the market, even in the presence of low angular velocities.

## Advantages

The described energy converter allows to develop highly efficient electric generating systems that are integrated into the gyroscopic structure without the interposition of any kinematic structure, hence the performance losses due to mechanical friction or inertia are reduced to the minimum. Moreover, the device has a simple and resistant configuration, requires no maintenance services and is particularly suitable for operating in adverse meteorological conditions.

## Applications

The main uses of the present invention fall in the distributed energy production, that occurs by means of grid connected systems, stand-alone devices and custom solutions in which the generator can be easily integrated. A number of potential applications concern wave farms that are relatively close to the coastline, arrays of converters delivering electricity to transmission and distribution facilities through submerged cables, signaling buoys and offshore radio bridges.

