Claims

1. A mooring buoy for a vessel comprising:

a floating body arranged to project out of the surface of the water;

at least one buoy anchoring line connected between the floating body and the sea floor;

at least one vessel mooring line connectable between the mooring buoy and the vessel; and

at least one moveable electric cable connected to a remote power supply and the moveable electric cable has a free end connectable to a switchboard of the vessel when the vessel is tethered to the at least one vessel mooring line;

wherein the free end of the at least one moveable electric cable is moveable between a retracted position and a connected position and the tension of the at least one vessel mooring line is greater than the tension in the at least one moveable electric cable when the free end of the at least one moveable electric cable is in the connected position;

wherein the mooring buoy comprises a rotatable electrical connection coupled between the at least one moveable electric cable and an input subsea cable.

2. A mooring buoy according to 1 wherein the rotatable electrical connection is an electrical slip ring.

3. A mooring buoy according to claim 2 wherein the electrical slip ring is sealed in a canister configured to shield the marine environment from the electrical slip ring.

4. A mooring buoy according to any of the preceding claims wherein the free end of the at least one moveable electric cable is adjacent to the floating body in the retracted position.

5. A mooring buoy according to any of the preceding claims wherein the free end of the at least one moveable electric cable is arranged to retract towards the floating body when disconnected from the vessel.

6. A mooring buoy according to claim 5 wherein the at least one moveable electric cable is arranged to retract due to the weight of the at least one moveable electric cable.

7. A mooring buoy according to claims 5 or 6 wherein the moveable electric cable comprises a clump weight mounted on a portion of the at least one moveable electric cable.

8. A mooring buoy according to any of the preceding claims wherein the floating body comprises a curved surface for limiting the bend radius of the at least one moveable electric cable.

9. A mooring buoy according to any of the preceding claims wherein the floating body comprises a chute for receiving the at least one moveable electric cable.

10. A mooring buoy according to any of the preceding claims wherein the at least one vessel mooring line is retractable towards the floating body.

11. A mooring buoy according to any of the preceding claims wherein the at least one vessel mooring line is one or more of a line, wire, and / or chain.

12. A mooring buoy according to any of the preceding claims wherein the free end of the at least one moveable electric cable comprises a magnetic connector.

13. A mooring buoy according to any of the claims 1 to 11 wherein the free end of the at least one moveable electric cable comprises an electrical plug or an induction loop.

14. A mooring buoy according to any of the preceding claims wherein the at least one moveable electric cable is connected to a remote transformer arranged to vary the voltage of the power supply in dependence of a vessel parameter.

15. A mooring buoy according to claim 14 wherein the mooring buoy comprises a controller and the controller is configured to send a control signal to the transformer to

vary the voltage of the at least one moveable electric cable in dependence of a vessel parameter.

16. A mooring buoy according to claims 14 or 15 wherein the at least one moveable electric cable is configured to receive the voltage at 440V or 690V from the transformer.

17. A mooring buoy according to any of the preceding claims wherein the at least one buoy anchoring line is three buoy anchoring lines.

18. A mooring buoy according to any of the preceding claims wherein the at least one moveable electric cable and the at least one vessel mooring line are rotatable about a central axis of the floating body.

19. A mooring buoy according to claim 18 wherein the at least one moveable electric cable and the at least one vessel mooring line are rotatable 360 degrees about the central axis of the floating body.

20. A power system for an offshore vessel comprising:

at least one mooring buoy according to claims 1 to 19;

a transformer connected to the at least one mooring buoy and a power supply.

21. A power system according to claim 20 wherein the power system comprises a plurality of mooring buoys according to claims 1 to 19.

22. A method of mooring a vessel with a mooring buoy having a floating body arranged to project out of the surface of the water and at least one buoy anchoring line connected between the floating body and the sea floor, wherein the method comprises:

connecting at least one vessel mooring line between the mooring buoy and the vessel;

moving a free end of at least one moveable electric cable connected to a power supply between a retracted position and a connected position;

connecting the free end of the at least one moveable electric cable to a switchboard of the vessel when the vessel is tethered to the at least one vessel mooring line wherein the mooring buoy comprises a rotatable electrical connection

coupled between the at least one moveable electric cable and an input subsea cable; and

tensioning the at least one vessel mooring line such that the tension in the at least one vessel mooring line is greater than the tension in the at least one moveable electric cable when the free end of the at least one moveable electric cable is in the connected position.