CLAIMS

1. Arrangement (1) for power distribution on a vessel, comprising:

a first DC bus (7) operating at a first medium voltage;

at least one second DC bus (9) operating at a second medium voltage and having no direct connection with the first DC bus (7);

a first AC bus (13) operating at a low voltage;

a first inverter (15) coupled between the first DC bus (7) and the first AC bus (13) for allowing power flow from the first DC bus (7) to the first AC bus (13) in a first operation mode;

a second AC bus (17) operating at the low voltage;

a second inverter (19) coupled between the at least one second DC bus (9) and the second AC bus (17) for allowing power flow from the at least one second DC bus to the second AC bus in the first operation mode;

a low voltage connection system (21) for selectively connecting or disconnecting the first AC bus and the second AC bus;

wherein the arrangement is adapted, in a second operation mode to connect the first AC bus (13) and the second AC bus (17) via the low voltage connection system (21) and to control the first inverter (15) and the second inverter (19), in order to supply power from the at least one second DC bus (9) via the second inverter (19) to the second AC bus (17), from the second AC bus to the first AC bus (13) and from the first AC bus via the first inverter (15) to the first DC bus (7) or vice versa.

2. Arrangement according to claim 1,

wherein the second operation mode is adopted when a power failure occurs in the first DC bus (7).

3. Arrangement according to claim 1 or claim 2,

further comprising a first transformer (47) coupled between the first inverter (15) and the first AC bus (13) for transforming the first medium voltage to the low voltage;

a second transformer (46) coupled between the second inverter (19) and the second AC bus (17) for transforming the second medium voltage to the low voltage.

4. Arrangement according to any preceding claim,

further comprising at least one first (41) and/or a second AC consumer (45), in particular a thruster;

a first (39) and/or second consumer inverter (43) coupled to the first respectively second AC consumer and connectable to the first (7) respectively second DC bus (9) for providing power to the first respectively second AC consumer.

5. Arrangement according to claim 4,

further comprising:

a first (104) and/or second battery (105);

a first (101) and/or second battery inverter (103) coupled to the first respectively second battery and being connectable to the first (13) respectively second AC bus (17),

wherein, in a third operation mode, the first (104) respectively second battery (105) is connected to the first (41) respectively second consumer (45) inverter directly via or not via the first (15) respectively second inverter (19), in order to supply power from the first respectively second battery to the first respectively second AC consumer.

6. Arrangement according to claim 5,

wherein, in a fourth operation mode, the first and/or second battery (104, 105) is connected via the first respectively second battery inverter (101, 103), the first respectively second AC bus (13, 17), the first respectively second transformer (47, 46) and the first respectively second inverter (15, 19) to the first respectively second DC bus (7, 9), in order to allow power flow there between.

a controller (95) adapted, in particular using frequency droop control, to control breakers, inverters and/or generators, in particular generator speed, in dependence of power requirements of the consumers and failure state.

12. Arrangement according to any preceding claim,
wherein plural low voltage AC consumers (41, 45) are connectable to the first AC bus (13) or the second AC bus (17).

13. Arrangement according to at least claim 7 or claim 10,
wherein first medium voltage is different from the second medium voltage,
wherein in particular the first medium voltage and the second medium voltage is between 1 kV and 10 kV, wherein further in particular the low voltage is between 500 V and 1 kV, wherein still further in particular the very low voltage is between 300 V and 200 V.

14. Method for power distribution on a vessel, comprising:
operating a first DC bus (7) at a first medium voltage;
operating at least one second DC bus (9) having no direct connection with the first DC bus at a second medium voltage;
operating a first AC bus (13) at a low voltage;
allowing power flow from the first DC bus to the first AC bus in a first operation mode by using a first inverter (15) coupled between the first DC bus (7) and the first AC bus (13);
operating a second AC bus (17) at the low voltage;
allowing power flow from the at least one second DC bus (9) to the second AC bus (17) in the first operation mode by using a second inverter (19) coupled between the at least one second DC bus (9) and the second AC bus (17);
selectively connecting or disconnecting the first AC bus and the second AC bus by using a low voltage connection system;

wherein in a second operation mode the first AC bus (13) and the second AC bus (17) are connected via the low voltage connection system (21) and control the first inverter (15) and the second inverter (19), in order to supply power from the at least one second DC bus (9) via the second inverter (19) to the second AC bus (17), from the second AC bus to the first AC bus (13) and from the first AC bus via the first inverter (15) to the first DC bus (7) or vice versa.