Claims

1. Power distribution system, in particular for a dynamically positionable vessel, the power distribution system comprising:

- a plurality of busses (101,103,105,107) comprising a first bus (103) to which a load (123) is connectable;
- a plurality of switches (109,111,113,115) comprising a first switch (111) and a second switch (113),

wherein the plurality of busses is connected via the plurality of switches in a interjacent manner to form a ring (117), the first bus is connected in between the first switch and the second switch, and
the power distribution system is configured to open the first switch and concurrently open the second switch,
if a first current (149) flowing via the first switch in a direction towards the first bus is above a predetermined current threshold for longer than a predetermined time duration and
a second current (145) flowing via the second switch in a direction towards the first bus is above the predetermined current threshold for longer than the predetermined time duration,
thereby disconnecting the first bus from the ring,
wherein each of the first switch and the second switch comprises a programmable relay including a logical unit providing logical functionality,
wherein the first bus is identified using the logical functionality within the first switch and the second switch.

2. Power distribution system according to claim 1, wherein the first switch is configured to determine the first current and a direction of the first current and the second switch is configured to determine the second current and a direction of the second current.

3. Power distribution system according to claim 1 or 2, wherein the first switch is configured to send an inhibit

signal (147,151) to the second switch for inhibiting the second switch from opening, if a first opposite current flowing via the first switch in a direction away from the first bus is above the predetermined current threshold for longer than the predetermined time.

4. Power distribution system according to claim 3, wherein the second switch is configured to open, if the second switch does not receive the inhibit signal from the first switch and the second current flowing via the second switch in a direction towards the first bus is above the predetermined current threshold for longer than the predetermined time and if in particular additionally a voltage at the first bus is below a predetermined voltage threshold.

5. Power distribution system according to claim 4, wherein the second switch is configured to open, if a third current flowing via the second switch in a direction towards the first bus or in a direction away from the first bus is above another predetermined current threshold for longer than another predetermined time, wherein the other predetermined current threshold is greater than the predetermined current threshold and/or the other predetermined time is greater than the predetermined time.

6. Power distribution system according to one of the preceding claims, wherein the plurality of busses comprises a second bus (105) connected to the first bus via the second switch (113),
wherein the plurality of switches comprises a third switch (115) connected to the second bus,
wherein the second switch is configured to send an inhibit signal (147) to the third switch for inhibiting the third switch from opening, if
the second current (145) via the second switch in the direction towards the first bus is above the predetermined current threshold for longer than the predetermined time.

7. Power distribution system according to one of the preceding claims, further comprising at least one generator (119) connected to the first bus.

8. Power distribution system according to claim 7, further comprising a generator switch (121) via which the generator is connected to the first bus.

9. Power distribution system according to one of the preceding claims, wherein the load (123) is connectable to the first bus via a load switch (125).

10. Power distribution system according to one of the preceding claims, wherein at least one of the third switch, the generator switch, and the load switch comprises a programmable relay including a logical unit.

11. Vessel comprising a power distribution system according to one of the preceding claims, the vessel being dynamically positioned using at least two electrical motors (123,623,823,1023,1223).

12. Vessel according claim 11, configured for supporting an offshore oil platform or an offshore drilling platform.

13. Method for power distribution using a power distribution system, in particular for a dynamically positioned vessel, in particular the power distribution system according to one of the preceding claims,
the power distribution system comprising:

- a plurality of busses comprising a first bus to which a load is connectable;
- a plurality of switches comprising a first switch and a second switch,

wherein the plurality of busses is connected via the plurality of switches in an interjacent manner to form a ring,
the first bus is connected in between the first switch and the second switch,

the method comprising:

- determining a first current flowing via the first switch in a direction towards the first bus;
- determining a second current flowing via the second switch in a direction towards the first bus; and
- disconnecting the first bus from the ring by opening the first switch and concurrently opening the second switch, if the first current is above a predetermined current threshold for longer than a predetermined time duration and the second current is above the predetermined current threshold for longer than the predetermined time duration,

wherein each of the first switch and the second switch comprises a programmable relay including a logical unit providing logical functionality,

wherein the first bus is identified using the logical functionality within the first switch and the second switch.

CLAIMS:

1. Power distribution system, the power distribution system comprising:

- a plurality of busses comprising a first bus to which a load is connectable;

- a plurality of switches comprising a first switch and a second switch,

wherein the plurality of busses is connected via the plurality of switches in a interjacent manner to form a ring, the first bus is connected in between the first switch and the second switch, and

the power distribution system is configured to open the first switch and concurrently open the second switch,

if a first current flowing via the first switch in a direction towards the first bus is above a predetermined current threshold for longer than a predetermined time duration and

a second current flowing via the second switch in a direction towards the first bus is above the predetermined current threshold for longer than the predetermined time duration,

thereby disconnecting the first bus from the ring,

wherein each of the first switch and the second switch comprises a programmable relay including a logical unit providing logical functionality,

wherein the first bus is identified using the logical functionality within the first switch and the second switch.

2. The power distribution system of claim 1, wherein the power distribution system is for a dynamically positionable vessel.

3. Power distribution system according to claim 1 or 2, wherein the first switch is configured to determine the first current and a direction of the first current and the second switch is configured to determine the second current and a direction of the second current.

4. Power distribution system according to any one of claims 1 to 3, wherein the first switch is configured to send an inhibit signal to the second switch for inhibiting the second switch from opening, if a first opposite current flowing via the first switch in a direction away from the first bus is above the predetermined current threshold for longer than the predetermined time.

5. Power distribution system according to claim 4, wherein the second switch is configured to open, if the second switch does not receive the inhibit signal from the first switch and the second current flowing via the second switch in a direction towards the first bus is above the predetermined current threshold for longer than the predetermined time and if in particular additionally a voltage at the first bus is below a predetermined voltage threshold.

6. Power distribution system according to claim 5, wherein the second switch is configured to open, if a third

current flowing via the second switch in a direction towards the first bus or in a direction away from the first bus is above another predetermined current threshold for longer than another predetermined time, wherein the other predetermined current threshold is greater than the predetermined current threshold and/or the other predetermined time is greater than the predetermined time.

7. Power distribution system according to any one of claims 1 to 6, wherein the plurality of busses comprises a second bus connected to the first bus via the second switch,

wherein the plurality of switches comprises a third switch connected to the second bus,

wherein the second switch is configured to send an inhibit signal to the third switch for inhibiting the third switch from opening, if

the second current via the second switch in the direction towards the first bus is above the predetermined current threshold for longer than the predetermined time.

8. Power distribution system according to any one of claims 1 to 7, further comprising at least one generator connected to the first bus.

9. Power distribution system according to claim 8, further comprising a generator switch via which the generator is connected to the first bus.

10. Power distribution system according to any one of claims 1 to 9, wherein the load is connectable to the first bus via a load switch.

11. Power distribution system according to any one of claims 1 to 10, wherein at least one of the third switch, the generator switch, and the load switch comprises a programmable relay including a logical unit.

12. Vessel comprising a power distribution system according to any one of claims 1 to 11, the vessel being dynamically positioned using at least two electrical motors.

13. Vessel according claim 12, configured for supporting an offshore oil platform or an offshore drilling platform.

14. Method for power distribution using a power distribution system, the power distribution system comprising:

- a plurality of busses comprising a first bus to which a load is connectable;

- a plurality of switches comprising a first switch and a second switch,

wherein the plurality of busses is connected via the plurality of switches in an interjacent manner to form a ring,

the first bus is connected in between the first switch and the second switch,

the method comprising:

- determining a first current flowing via the first switch in a direction towards the first bus;

- determining a second current flowing via the second switch in a direction towards the first bus; and

- disconnecting the first bus from the ring by opening the first switch and concurrently opening the second switch, if the first current is above a predetermined current threshold for longer than a predetermined time duration and the second current is above the predetermined current threshold for longer than the predetermined time duration,

wherein each of the first switch and the second switch comprises a programmable relay including a logical unit providing logical functionality,

wherein the first bus is identified using the logical functionality within the first switch and the second switch.

15. The method of claim 14, wherein the power distribution system is for a dynamically positioned vessel.

16. The method of claim 14 or 15, wherein the power distribution system is the power distribution system of any one of claims 1 to 11.