

1. Motor controller (100) for driving and controlling the electrical motor (51; 51-2) of a blood pump (50) for percutaneous insertion comprising an electrical motor (51) for driving the blood pump (50), the electrical motor (51; 51-2) comprising at least three motor winding units (Lu, Lv, Lw), wherein each motor winding unit (Lu, Lv, Lw) is arranged and configured to be individually connected to a power supply (110) via separate phase supply lines (Lu1, Lu2; Lv1, Lv2; Lw1, Lw2) connected to respective motor winding unit terminals (LuE1, LuE2; LvE1, LvE2; LwE1, LwE2),

the motor controller (100) comprising corresponding phase supply line driving units (DH1, DH2, DH3; DL1, DL2, DL3) for each motor winding unit (Lu, Lv, Lw) which are respectively connectable through the corresponding phase supply lines (Lu1, Lu2; Lv1, Lv2; Lw1, Lw2) with one of the motor winding units (Lu, Lv, Lw) ; and a control unit (120) configured to control the phase supply line driving units (DH1, DH2, DH3; DL1, DL2, DL3) to operate the electrical motor (51; 51-2);

wherein the control unit (120) is configured to detect a fault in one of the motor winding units (Lu, Lv, Lw), and, in case of a detected faulty motor winding unit, to adjust driving parameters for the faulty motor winding unit and to further operate the electrical motor (51; 51-2) by all motor winding units; or

wherein a fault in the motor winding units is defined by a short circuit between the wires of two of the motor winding units (Lu, Lv, Lw), the control unit (120) is configured to detect the two faulty motor winding units based on a comparison of the actual electrical current (lu, lv, lw) through the two faulty motor winding units, and the control unit (120) is configured to determine one of the two faulty motor winding units as the faulty motor winding unit of which the corresponding phase supply line driving unit (DH1, DH2, DH3; DL1, DL2, DL3) is to be switched off or which is to be operated with adjusted parameters.

2. Motor controller (100) of claim 1,

wherein each of the phase supply line driving units (DH1, DH2, DH3; DL1, DL2, DL3) is implemented by two corresponding half bridge units configured to be switchable for a cooperative control of the electrical power supplied to the corresponding motor winding unit (Lu, Lv, Lw).

3. Motor controller (100) of claim 1 or 2, further comprising at least one of

respective phase current measuring units (Ru, Rv, Rw) for measuring an actual value of the electrical current (lu, lv, lw) through the corresponding motor winding unit (Lu, Lv, Lw);

a total current measuring unit (Rtotal) for measuring the actual value of the total electrical current (Itotal) through all motor winding units (Lu, Lv, Lw); and

respective measuring units configured for measuring a respective induced counter electromagnetic force, CEMF, for motor winding units (Lu, Lv, Lw) not driven.

4. Motor controller (100) of any one of the claims 1-3, wherein the control unit (120) is configured to drive and control at least one of the rotational speed of the electrical motor (51; 51-2), the rotational direction of the electrical motor (51), and the torque produced by the electrical motor (51; 51-2).

5. Blood pump system comprising a blood pump (50) for percutaneous insertion comprising an electrical motor (51) for driving the blood pump (50), the electrical motor (51; 51-2) comprising at least three motor winding units (Lu, Lv, Lw), wherein each motor winding unit (Lu, Lv, Lw) is arranged and configured to be individually connected to a power supply (110) via separate phase supply lines (Lu1, Lu2; Lv1, Lv2; Lw1, Lw2) connected to respective motor winding unit terminals (LuE1, LuE2; LvE1, LvE2; LwE1, LwE2) and a motor controller (100) of any one of the claims 1-4.
6. Blood pump system of claim 5,
wherein the electrical motor (51; 51-2) is a permanent magnet excited synchronous motor.
7. Blood pump system of claim 5 or 6,
wherein the electrical motor (51; 51-2) comprises three motor winding units (Lu, Lv, Lw), each motor winding unit (Lu, Lv, Lw) being connected to corresponding phase supply lines (Lu1, Lu2; Lv1, Lv2; Lw1, Lw2).
8. Blood pump system of any one of the claims 5-7, wherein the electrical motor (51, 51-2) is an integral component of the blood pump (50), which is configured for being completely inserted percutaneously into a patient's body so that when the blood pump (50) is inserted, the motor controller (100) for providing electrical power to and controlling the electrical motor (51; 51-2) is located outside the patient's body and a connection for power supply to and control of the operation of the electrical motor (51; 51-2) is to be passed through a catheter (10) to the blood pump (50).
9. Control method for controlling the power supply to motor winding units (Lu, Lv, Lw) of a blood pump (50) for percutaneous insertion comprising an electrical motor (51) for driving the blood pump (50), the electrical motor (51; 51-2) comprising at least three motor winding units (Lu, Lv, Lw), wherein each motor winding unit (Lu, Lv, Lw) is arranged and configured to be individually connected to a power supply (110) via separate phase supply lines (Lu1, Lu2; Lv1, Lv2; Lw1, Lw2) connected to respective motor winding unit terminals (LuE1, LuE2; LvE1, LvE2; LwE1, LwE2), wherein the method comprises:
 - (i) detecting a fault in one of the motor winding units (Lu, Lv, Lw);
 - (ii) in case of a detected faulty motor winding unit, and adjusting driving parameters for the faulty motor winding unit and further operating the electrical motor (51; 51-2) by all motor winding units (Lu, Lv, Lw); or
 in the case that the fault in one of the motor winding units (Lu, Lv, Lw) is defined by a short circuit between the wires of two of the motor winding units (Lu, Lv, Lw) and detecting the two faulty motor winding units is based on a comparison of the actual electrical current (Iu, Iv, Iw) through the two faulty motor winding units, determining one of the two faulty motor winding units as the faulty motor winding unit; either switching off the corresponding phase supply line driving unit (DH1, DH2, DH3; DL1, DL2, DL3) of the faulty motor winding unit and further operating the electrical motor (51; 51-2) by controlling the phase supply line driving units (DH1, DH2, DH3; DL1, DL2, DL3) of the remaining motor windings, or further operating the faulty winding unit with adjusted parameters.

10. Control method of claim 9, wherein the electrical motor (51, 51-2) is an integral component of the blood pump (50), which is configured for being completely inserted percutaneously into a patient's body so that when the blood pump (50) is inserted, the motor controller (100) for providing electrical power to and controlling the electrical motor (51; 51-2) is located outside the patient's body and a connection for power supply to and control of the operation of the electrical motor (51; 51-2) is to be passed through a catheter (10) to the blood pump (50).