CLAIMS

1. A winding switching circuit and thermal protection for single phase dual voltage hermetic induction motor of a hermetic cooling compressor, characterized by comprising:

a first main winding (M1) with the negative pole connected to a first node (N1) and the positive pole connected to a second node (N2),

a second main winding (M2) with the positive pole connected to a third node (N3), and the negative pole connected to a fourth node (N4),

a first switch (R1) connected between the second node (N2) and the third node (N3), and a start-up relay (R) connected to the third node (N3),

an auxiliary winding (A) with the positive pole connected to the start-up relay (R) and the negative pole connected to the fourth node (N4), and the auxiliary winding (A) is connected in parallel with the second main winding (M2),

a second switch (R2) connected between the third node (N3) and the first node (N1),

a third switch (R3) connected between the first node (N1) and the fifth node (N5), and

a voltage source connected between the second node (N2) and the fifth node (N5);

wherein the circuit is operative in a first and in a second arrangements, where in the first arrangement, the first switch (R1) and the third switch (R3) are connected, the second switch is disconnected, and the first main winding (M1), the second main winding (M2) and the auxiliary winding (A) is connected in parallel;

in the second arrangement, the first switch (R1) and the third switch (R3) are disconnected, the second switch (R2) is connected, the first main winding (M1) and the second main winding (M2) are connected in series and the auxiliary winding (A) is connected in parallel only to the second main winding (M2), and

the circuit comprises thermal protection means (P,P1,P2) that perform the thermal protection of the first and second main windings (M1,

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M2) in the first and in the second arrangements, each of the thermal protection means (P,P1,P2) comprising a resistance.

2. A winding switching circuit and thermal protection according to claim 1, characterized wherein the circuit is operative in a voltage range between 90V and 260V, and the first arrangement operates in a voltage range nearer to 115V and the second arrangement operates in a voltage range nearer to 220V.

3. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a single thermal three-phase protector (P) having three terminals, one terminal being connected to the positive pole of the first main winding (M1), one terminal connected to the first switch (R1) and one terminal connected to the positive pole of the power supply.

4. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the positive pole of the power supply and the second node (N2), and a second thermal protector connected between the first switch (R1) and the second switch (R2).

5. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the positive pole of the first main winding (M1) and the second node (N2), and a second thermal protector connected between the fourth node (N4) and the fifth node (N2).

6. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the negative pole of the power supply and the fifth node (N5), and a second thermal protector connected between the fourth node (N4) and the fifth node (N5).

7. A winding switching circuit and thermal protection according to any of claims 1 to 6, characterized wherein the thermal protection means (P;

P1, P2) are disposed internally of the shell of the circuit, in contact with the main windings (M1, M2), and are opened when the temperature of the windings exceeds a threshold value.

8. A winding switching circuit and thermal protection according to any of claims 1 to 6, characterized wherein the thermal protection means (P; P1, P2) are disposed externally of the shell of the circuit, and are opened when the current or the temperature of the compressor shell exceeds a threshold value.

9. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1, R2, R3) are driven mechanically.

10. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1, R2, R3) are electronic switches.

11. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1, R2, R3) are electromechanical relays controlled by way of an electronic circuit.

12. A winding switching circuit and thermal protection according to either of claims 1 to 11, characterized wherein the first and the second main windings (M1, M2) are each divided into two independent coil parts ($M1_a$, $M1_b$; $M2_a$, $M2_b$) and connected in series, each coil part of a same winding being disposed on one side of the stator.

13. A winding switching circuit and thermal protection according to either of claims 1 to 12, characterized by being disposed inside a hermetic shell of the compressor which comprises a hermetic five-pin terminal (1, 2, 3, 4, 5), wherein:

the first pin (1) is located in the positive pole of the first main winding (M1);

the second pin (2) is coupled between the negative pole of the first main winding (M1) and the first node (N1);

the third pin (3) is coupled between the positive pole of the second main winding (M2) and the third node (N3);

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the fourth pin (4) is coupled between the positive pole of the auxiliary winding (A) and the start-up relay (R); and

the fifth pin (5) is located between the fourth node (N4) and the fifth node (N5).

CLAIMS

1. A winding switching circuit and thermal protection for single phase dual voltage hermetic induction motor of a hermetic cooling compressor, characterized by comprising:

a first main winding (M1) with the negative pole connected to a first node (N1) and the positive pole connected to a second node (N2),

a second main winding (M2) with the positive pole connected to a third node (N3), and the negative pole connected to a fourth node (N4),

a first switch (R1) connected between the second node (N2) and the third node (N3), and a start-up relay (R) connected to the third node (N3),

an auxiliary winding (A) with the positive pole connected to the start-up relay (R) and the negative pole connected to the fourth node (N4), and the auxiliary winding (A) is connected in parallel with the second main winding (M2),

a second switch (R2) connected between the third node (N3) and the first node (N1),

a third switch (R3) connected between the first node (N1) and the fifth node (N5), and

a voltage source connected between the second node (N2) and the fifth node (N5);

wherein the circuit is operative in a first and in a second arrangements, where in the first arrangement, the first switch (R1) and the third switch (R3) are connected, the second switch is disconnected, and the first main winding (M1), the second main winding (M2) and the auxiliary winding (A) is connected in parallel;

in the second arrangement, the first switch (R1) and the third switch (R3) are disconnected, the second switch (R2) is connected, the first main winding (M1) and the second main winding (M2) are connected in series and the auxiliary winding (A) is connected in parallel only to the second main winding (M2), and

the circuit comprises thermal protection means (P,P1,P2) that perform the thermal protection of the first and second main windings (M1,

M2) in the first and in the second arrangements, each of the thermal protection means (P,P1,P2) comprising a resistance proximate to a bimetal disk.

2. A winding switching circuit and thermal protection according to claim 1, characterized wherein the circuit is operative in a voltage range between 90V and 260V, and the first arrangement operates in a voltage range nearer to 115V and the second arrangement operates in a voltage range nearer to 220V.

3. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a single thermal three-phase protector (P) having three terminals, one terminal being connected to the positive pole of the first main winding (M1), one terminal connected to the first switch (R1) and one terminal connected to the positive pole of the power supply.

4. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the positive pole of the power supply and the second node (N2), and a second thermal protector connected between the first switch (R1) and the second switch (R2).

5. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the positive pole of the first main winding (M1) and the second node (N2), and a second thermal protector connected between the fourth node (N4) and the fifth node (N2).

6. A winding switching circuit and thermal protection according to either of claims 1 and 2, characterized wherein the thermal protection means comprise a first thermal protector (P1) connected between the negative pole of the power supply and the fifth node (N5), and a second thermal protector connected between the fourth node (N4) and the fifth node (N5).

7. A winding switching circuit and thermal protection according to

any of claims 1 to 6, characterized wherein the thermal protection means (P; P1, P2) are disposed internally of the shell of the circuit, in contact with the main windings (M1, M2), and the thermal protection means (P,P1,P2) are opened when the temperature of the windings (M1,M2) exceeds a threshold value.

8. A winding switching circuit and thermal protection according to any of claims 1 to 6, characterized wherein the thermal protection means (P; P1, P2) are disposed externally of the shell of the circuit, and the thermal protection means (P,P1,P2) are opened when the current or the temperature of the compressor shell exceeds a threshold value.

9. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1, R2, R3) are driven mechanically.

10. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1,.R2, R3) are electronic switches.

11. A winding switching circuit and thermal protection according to any of claims 1 to 8, characterized wherein the switches (R1, R2, R3) are electromechanical relays controlled by way of an electronic circuit.

12. A winding switching circuit and thermal protection according to either of claims 1 to 11, characterized wherein the first and the second main windings (M1, M2) are each divided into two independent coil parts ($M1_a$, $M1_b$; $M2_a$, $M2_b$) and connected in series, each coil part of a same winding being disposed on one side of the stator.

13. A winding switching circuit and thermal protection according to either of claims 1 to 12, characterized by being disposed inside a hermetic shell of the compressor which comprises a hermetic five-pin terminal (1, 2, 3, 4, 5), wherein:

the first pin (1) is located in the positive pole of the first main winding (M1);

the second pin (2) is coupled between the negative pole of the first main winding (M1) and the first node (N1);

the third pin (3) is coupled between the positive pole of the second main winding (M2) and the third node (N3);

the fourth pin (4) is coupled between the positive pole of the auxiliary winding (A) and the start-up relay (R); and

the fifth pin (5) is located between the fourth node (N4) and the fifth node (N5).