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ABSTRACT

A medium-frequency hermetically sealed refrigerant compressor capable of unloading during start, comprising: an electric connector (2), a front end socket (1), a rear end socket (6), a barrel (7), a medium-frequency motor (3) disposed in the barrel (7), a movable disc (4), a motion transmission sleeve (8), a main shaft (9), a clutch coil (10) and a clutch friction plate (11); the front and back ends of the barrel (7) are respectively connected to the front end socket (1) and the rear end socket (6); the barrel (7) has a stator disc (5) fixed therein cooperating with the movable disc (4); the movable disc (4) and the stator disc (5) are sleeved on one side of the main shaft (9), and the clutch friction plate (11) and the clutch coil (10) are sleeved on another side of the main shaft (9); the movable disc (4) and the clutch friction plate (11) are fixed on a side surface of the main shaft (9); the output shaft of the medium-frequency motor (3) is connected to the clutch coil (10) via the motion transmission sleeve (8); the electric connector (2) is fixed on the barrel (7); and the electric connector (2) is connected to the clutch coil (10). The compressor achieves a low current start, and reduces the impact against the on-board power supply.
MEDIUM-FREQUENCY HERMETICALLY SEALED REFRIGERANT COMPRESSOR CAPABLE OF UNLOADING DURING START

BACKGROUND OF THE INVENTION

[0001] The present invention relates to the technical field of vapor cycle refrigerant system in a helicopter, and more specifically relates to a medium-frequency hermetically sealed refrigerant compressor capable of unloading during start.

[0002] Nowadays, a vapor cycle refrigerant system of a helicopter mainly comprises a compressor, a medium-frequency motor, an evaporator, a condenser, an expansion valve, a condensing fan, and an expansion valve. Motion transmission of the medium-frequency motor is achieved by a belt so as to drive the compressor to realize refrigeration. This method of driving the compressor has the following disadvantages: 1) motion transmission by using a belt occupies a large area of space and requires good positioning of the components and high precision with respect to installation; 2) the motor has an independent cooling mechanism which requires additional cooling fan and airducts etc. to be provided, thereby resulting in undesirable bulkiness and heaviness; 3) tension of the belt and its limited service life requires additional maintenance and replacement. A hermetically sealed refrigerant compressor may effectively solve the above problems. However, a hermetically sealed refrigerant compressor according to prior art generally has a start current 5-7 times stronger than a working current. In an on-board device such a strong start current will trigger power protection of the helicopter and thus causes power failure which is dangerous.

BRIEF SUMMARY OF THE INVENTION

[0003] In view of the aforesaid disadvantages now existing in the prior art, the present invention provides a medium-frequency hermetically sealed refrigerant compressor capable of unloading during start. The medium-frequency hermetically sealed refrigerant compressor achieves a low current start.

[0004] In order to attain the above object, the medium-frequency hermetically sealed refrigerant compressor provided by the present invention comprises an electric connector, a front end socket, a rear end socket, a barrel, a medium-frequency motor provided inside the barrel, a movable disc, a motion transmission sleeve, a main shaft, a clutch coil and a clutch friction plate.

[0005] A front end and a rear end of the barrel are connected with the front end socket and the rear end socket respectively; a stator disc cooperating with the movable disc is fixed in the barrel; the movable disc and the stator disc are sleeved on one side of the main shaft the clutch friction plate and the clutch coil are sleeved on another side of the main shaft; the movable disc and the clutch friction plate are fixed on a side surface of the main shaft; an output shaft of the medium-frequency motor is connected with the clutch coil via the motion transmission sleeve; the electric connector is fixed on the barrel; the electric connector is connected with the clutch coil.

[0006] The stator disc is fixed in the barrel by using a seal ring provided between the stator disc and the side surface of the main shaft.

[0007] A seal ring is provided between the stator disc and the side surface of the main shaft.

BENEFICIAL EFFECTS OF THE PRESENT INVENTION

[0008] The medium-frequency hermetically sealed refrigerant compressor capable of unloading during start provided by the present invention comprises an electric connector, a barrel, a medium-frequency motor provided inside the barrel, a movable disc, a motion transmission sleeve, a main shaft, a clutch coil and a clutch friction plate. During operation, the voltage value is lowered upon starting, and the medium-frequency motor drives the clutch coil to rotate via the motion transmission sleeve to achieve an unloaded start; when rotation of the medium-frequency motor becomes stable, the electric connector supplies power to the clutch coil so that the clutch coil and the clutch friction plate will be mutually attracted to each other, as such the main shaft will be driven by the medium-frequency motor to rotate to achieve a low current start. With the same refrigeration capacity, the present invention uses a hermetically sealed structure so as to significantly reduce the size and weight of the vapor cycle refrigeration system. At the same time, the present invention achieves a low current start of the medium-frequency hermetically sealed refrigerant compressor to reduce the impact against the on-board power supply.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a structural view of the present invention.

[0010] In the figure, 1 refers to a front end socket, 2 refers to an electric connector, 3 refers to a medium-frequency motor, 4 refers to a movable disc, 5 refers to a stator disc, 6 refers to a rear end socket, 7 refers to a barrel, 8 refers to a motion transmission sleeve, 9 refers to a main shaft, 10 refers to a clutch coil, and 11 refers to a clutch friction plate.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The present invention will be described further in detail below with reference to the figure.

[0012] In FIG. 1, the medium-frequency hermetically sealed refrigerant compressor provided by the present invention comprises an electric connector 2, a front end socket 1, a rear end socket 6, a barrel 7, a medium-frequency motor 3 provided inside the barrel 7, a movable disc 4, a motion transmission sleeve 8, a main shaft 9, a clutch coil 10 and a clutch friction plate 11. A front end and a rear end of the barrel 7 are connected with the front end socket 1 and the rear end socket 6 respectively. A stator disc 5 cooperating with the movable disc 4 is fixed in the barrel 7. The movable disc 4 and the stator disc 5 are sleeved on one side of the main shaft 9. The clutch friction plate 11 and the clutch coil 10 are sleeved on another side of the main shaft 9. The movable disc 4 and the clutch friction plate 11 are fixed on a side surface of the main shaft 9. An output shaft of the medium-frequency motor 3 is connected with the clutch coil 10 via the motion transmission sleeve 8. The electric connector 2 is fixed on the barrel 7. The electric connector 2 is connected with the clutch coil 10. The stator disc 5 is fixed in the barrel 7 by using screws. A seal ring is provided between the stator disc 5 and the side surface of the main shaft 9. The clutch friction plate 11 is made by iron material.

[0013] The present invention has the following working principle: At first, power is not supplied by the electric connector 2 to the clutch coil 10, and the clutch coil and the clutch friction plate 11 are separated; next, activate the
medium-frequency motor 3 so that the medium-frequency motor 3 drives the clutch coil 10 to rotate via the motion transmission sleeve 8; when rotation of the medium-frequency motor 3 becomes stable, the electric connector 2 supplies electricity to the clutch coil 10, and then the clutch coil 10 is magnetized by the received electricity; the clutch coil 10 and the clutch friction plate 11 will then be mutually attracted to each other to drive the main shaft 9 to rotate via the medium-frequency motor 3; the movable disc 4 at another side of the main shaft will then also rotate to achieve compression refrigeration.

What is claimed is:

1. A medium-frequency hermetically sealed refrigerant compressor capable of unloading during start comprises an electric connector (2), a front end socket (1), a rear end socket (6), a barrel (7), a medium-frequency motor (3) provided inside the barrel (7), a movable disc (4), a motion transmission sleeve (8), a main shaft (9), a clutch coil (10) and a clutch friction plate (11);

   a front end and a rear end of the barrel (7) are connected with the front end socket (1) and the rear end socket (6) respectively; a stator disc (5) cooperating with the movable disc (4) is fixed in the barrel (7); the movable disc (4) and the stator disc (5) are sleeved on one side of the main shaft (9); the clutch friction plate (11) and the clutch coil (10) are sleeved on another side of the main shaft (9); the movable disc (4) and the clutch friction plate (11) are fixed on a side surface of the main shaft (9); an output shaft of the medium-frequency motor (3) is connected with the clutch coil (10) via the motion transmission sleeve (8); the electric connector (2) is fixed on the barrel (7); the electric connector (2) is connected with the clutch coil (10).

2. The medium-frequency hermetically sealed refrigerant compressor capable of unloading during start according to claim 1, wherein the stator disc (5) is fixed in the barrel (7) by using screws.

3. The medium-frequency hermetically sealed refrigerant compressor capable of unloading during start according to claim 1, wherein a seal ring is provided between the stator disc (5) and the side surface of the main shaft (9).

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