Claims

[Claim 1]

A turbo chiller comprising:

a closed refrigeration cycle that includes a turbo compressor, a condenser, a decompression device, and an evaporator connected in sequence via piping and is filled with a refrigerant; wherein

the refrigerant is a low-pressure refrigerant R1233zd(E) refrigerant with low global warming potential and low ozone depletion potential;

the turbo compressor has a direct drive configuration in which a rotating shaft of an impeller is directly joined to a motor;

the motor is provided with a rotor and a stator, and is centrally disposed inside the motor housing;

the motor housing includes an expansion portion that expands an internal space thereof in a direction intersecting with the rotating shaft;

the expansion portion is only provided in a non-overlap area with the rotor, seen from a direction orthogonal to the rotating shaft;

the expansion portion is configured to store liquid; and

the rotating shaft is supported by a magnetic bearing.

[Claim 2]

A turbo chiller comprising:

a closed refrigeration cycle that includes a turbo compressor, a condenser, a decompression device, and an evaporator connected in sequence via piping and is filled with a refrigerant; wherein

the refrigerant is a low-pressure refrigerant R1233zd(E) refrigerant with low global warming potential and low ozone depletion potential;

the turbo compressor has a direct drive configuration in which a rotating shaft of an impeller is directly joined to a motor;

the motor is provided with a rotor and a stator, and is centrally disposed inside the motor housing;

the motor housing includes an expansion portion that expands an internal space thereof in a direction intersecting with the rotating shaft, and a stepped surface that is formed between the expansion portion and another portion;

the stepped surface is only provided in an area that avoids the rotor, seen from a direction orthogonal to the rotating shaft;

the expansion portion is configured to store liquid; and

the rotating shaft is supported by an oil-free ceramic bearing.

[Claim 3]

The turbo chiller according to claim 1 or 2, wherein the expansion portion is a refrigerant reservoir in which the refrigerant is collected.

[Claim 4]

The turbo chiller according to claim 1 or 2, wherein the expansion portion expands the internal space of the motor housing in a direction of gravity.

[Claim 5]

The turbo chiller according to claim 1, wherein the expansion portion is disposed between the motor and the impeller, seen from the direction orthogonal to the rotating shaft.

[Claim 6]

The turbo chiller according to claim 2, wherein the stepped surface is disposed between the motor and the impeller, seen from the direction orthogonal to the rotating shaft.

[Claim 7]

The turbo chiller according to claim 1 or 2, wherein the expansion portion is connected to a refrigerant discharge pipe.