(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 063 771 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.09.2022 Bulletin 2022/39

(21) Application number: **22158695.1**

(22) Date of filing: **25.02.2022**

(51) International Patent Classification (IPC):
F25D 29/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F25D 29/00; F25B 2600/0251

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **22.03.2021 TR 202105166**

(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **CURA, Huseyin**
  34445 ISTANBUL (TR)
- **PEKER, Gokmen**
  34445 ISTANBUL (TR)
- **ATAKURU, Seren**
  34445 ISTANBUL (TR)
- **HUSAIN, Salman Mustafa**
  34445 ISTANBUL (TR)
- **AYNUR, Tolga Nurettin**
  34445 ISTANBUL (TR)

(54) **A METHOD OF OPERATING A COOLING APPLIANCE**

(57) The present invention relates to a method of operating a cooling appliance comprising; providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation, providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation, providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator, providing a check valve on an outlet of the freezer evaporator, providing a condenser and a compressor, providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve.

EP 4 063 771 A2

Description

[0001] The present invention concerns a method of operating a cooling appliance.

[0002] Cooling devices having a relatively large inner volume are cooled by means of a refrigerant that is compressed by means of a compressor. The refrigerant compression cycle at its simplest comprises a compressor, at least an evaporator, plurality of valves controlling the flow of the refrigerant, a condenser, and a capillary circulating refrigerant in a closed fluid cycle. In the case of cooling appliances having parallel cooling, an evaporator is assigned to each of the compartments of the cooling appliance, meaning that to the fresh food compartment and the freezer compartment. Depending on the cooling needs of said compartments, a solenoid valve is provided before the capillary to direct the flow of the refrigerant towards the evaporator of one of the said compartments. By means of this, cooling needs of the compartments are separated thanks to the fully parallel cooling system and only one compartment can be cooled based on need. In parallel cooling systems as mentioned above and to meet the separate cooling requirements of the separate compartments, a check valve component is used in the system at the outlet of the freezer compartment evaporator that allows unidirectional flow. In parallel refrigerator systems, due to the working pressure difference between the fresh food evaporator and the freezer evaporator, the refrigerant remains in the freezer evaporator after the freezer compartment operates. Before cooling the fresh food compartment, the fluid is pumped out from the freezer evaporator to the condenser and the fluid is then collected in the condenser before the evaporator of the fresh food compartment operates. The purpose of this process is to ensure that enough refrigerant flows into the Fresh food evaporator before the Fresh food compartment starts to be cooled. In the pump-out process, the solenoid valve (or simply known as check valve) is turned off and the compressor is operated at high speed for a certain period of time to collect the fluid in the condenser.

[0003] A prior art publication in the technical field of the present invention may be referred to as KR100826179 among others, the document disclosing a cooling appliance and a controlling method thereof.

[0004] A prior art publication in the technical field of the present invention may be referred to as JP2012017881 among others, the document disclosing a cooling appliance.

[0005] An aim of the present invention is to provide a method of operating a cooling appliance by means of which the operation parameters of the compressor such as time and revolutions per minute (rpm) can be adjusted to increase energy efficiency of the cooling appliance. Another purpose of this invention is to provide optimum cooling both for the fresh food compartment and the freezer compartment.

[0006] Another aim of the present invention is to provide an energy efficient system operation ehich will be achieved by preventing the compressor from operating at high speed and time in case of low ambient temperature, usage and load, where the pump-out process is not turned off.

[0007] Another aim of the present invention is to optimize the cooling of the fresh food compartment by increasing the compressor cycle and operating time in pump-out operation at high ambient temperature, high usage, and high loads.

[0008] The present invention relates to a method of operating a cooling appliance comprising;
providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation, providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation, providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator, providing a check valve on an outlet of the freezer evaporator, providing a condenser and a compressor, providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve.

[0009] In the preferred embodiment of the invention, the method of operating the cooling appliance further comprises the control unit that is configured to determine whether the second evaporator is activated after or before the first evaporator, and

if the second evaporator is activated after the first evaporator, the control unit measures last 5 run time of the first evaporator and if the average run time of the first evaporator is equal or less than %30, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of F, if the average run time of the freezer is between %30 to %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of E, if the average run time of the freezer is equal or greater than %50, activates the compressor to pump out the refrigerant towards the condenser at an rpm of D, or
if the second evaporator is activated before the first evaporator, the control unit measures last 5 run time of the first evaporator and if the average run time of the first evaporator is equal or less than %30, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of C, if the average run time of the first evaporator is between %30 to %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of B, if the average run time of the first evaporator is more than %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of A,
wherein A > B > C and D > E > F and wherein A is almost equal to F.

[0010] In the preferred embodiment of the invention,

the rpm values of "A", "B", "C", "D", "E" and "F" are between 2400-2100 rpm, 2100-1800 rpm, 1800-1500 rpm, 3000-2700 rpm, 2700-2400 rpm, 2400-2100 rpm respectively.

[0011] Another method of the present invention relates to a method of operating a cooling appliance comprising; providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation, providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation, providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator, providing a check valve on an outlet of the freezer evaporator, providing a condenser, providing a compressor which upon being activated pumps out the refrigerant towards the condenser, providing an ambient temperature sensor that measures the ambient temperature, providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve, and that the control unit receives the ambient temperature value from the temperature sensor.

[0012] In another preferred embodiment of the invention, the control unit is configured to detect the ambient temperature, and

if the ambient temperature is less than 16 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for T2 seconds otherwise for T1 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM2, otherwise at an rpm value RPM1, or

if the ambient temperature is equal or greater than 16 Celsius but less than 25 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser for T3 seconds otherwise for T2 seconds, and if the and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM3, otherwise at an rpm value RPM2, or

if the ambient temperature is equal or greater than 25 Celsius but less than 32 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for T4 seconds otherwise for T3 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM4, otherwise at an rpm value RPM3, or

if the ambient temperature is equal or greater than 32 Celsius but less than 43 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %70 the control unit activates the compressor to pump out the refrigerant towards the condenser for T5 seconds otherwise for T4 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM5, otherwise at an rpm value RPM4, or

if the ambient temperature is equal or greater than 43 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for T6 seconds otherwise for T5 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM6, otherwise at an rpm value RPM5,

wherein RPM6 > RPM5 > RPM4 > RPM3 > RPM2 > RPM1, and

wherein T6 > T5 > T4 > T3 > T2 > T1.

[0013] In another preferred embodiment of the invention, the rpm values of RPM1, RPM2, RPM3, RPM4, RPM5 and RPM6 are between 1200-1600 rpm, 1600-2000 rpm, 2000 -2400 rpm, 2400 -2800 rpm, 2800-3200 rpm, 3200-3600 rpm respectively.

[0014] In another preferred embodiment of the invention, the pump out times T1, T2, T3, T4, T5 and T6 are between 30-45, 45-60, 60-75, 75-90, 90-105 and 105-120 seconds respectively.

[0015] Another embodiment of the present invention relates to a method of operating a cooling appliance comprising;

providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation,

providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation,

providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator,

providing a check valve on an outlet of the freezer evaporator,

providing a condenser,

providing a compressor which upon being activated pumps out the refrigerant towards the condenser,

providing an ambient temperature sensor that measures the ambient temperature,

providing a sensor configured to detect the position of a door of the cooling appliance,

providing a control unit that activates or deactivates

the first evaporator, the second evaporator, compressor and the valve, and that the control unit receives the ambient temperature value from the temperature sensor and that the control unit receives the position information of the door from the sensor and measures the time (P1, P2, P3, P4, P5) the door remained open per hour.

[0016] In another preferred embodiment of the invention, the control unit is configured to detect the ambient temperature, and

if the ambient temperature is less than 16 Celsius and
if the time the door remained open is less than P1, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 30-45 seconds otherwise finishes the pump out process, and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1400-1600 rpm, otherwise at an rpm interval of 1200-1400 rpm, or if the time the door remained open is greater than P1, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is greater than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 45-60 seconds, otherwise for a time interval of 30-45 seconds, and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1600-1800, otherwise at an rpm interval of 1400-1600, or
if the ambient temperature is equal or greater than 16 Celsius but less than 25 Celsius and if the time the door remained open is less than P2, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 60-75 seconds, otherwise for a time interval of 45-60 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1800-2000 rpm, otherwise at an rpm interval of 1600-1800 rpm, or if the time the door remained open is greater than P2, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 75-90 seconds, otherwise for a time interval of 60-75 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 2000-2200 rpm, otherwise at an rpm interval of 1800-2000 rpm, or
if the ambient temperature is equal or greater than 25 Celsius but less than 32 Celsius and if the time the door remained open is less than P3, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 90-105 seconds, otherwise for a time interval of 75-90 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of
2200-2400 rpm, otherwise at an rpm value interval of 2000-2200, or if the time the door remained open is greater than P3, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 105-120 seconds, otherwise for a time interval of 90-105 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 2400-2600, otherwise at an rpm value interval of 2200-2400, or
if the ambient temperature is equal or greater than 43 Celsius and if the time the door remained open is less than P5, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for time interval of 150-165 seconds, otherwise for time interval of 135-150 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 3000-3200, otherwise at an rpm value interval of 2800-3000, or if the time the door remained open is greater than P5, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for time interval of 165-180 seconds, otherwise for time interval of 150-165 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 3400-3600, otherwise at an rpm interval of 3200-3400,
wherein P5 > P4 > P3 > P2 > P1.

[0017] All these applications involve alternative solutions to a particular embodiment, therefore it is inappropriate to cover these alternatives by a single claim.

[0018] An advantageous effect provided by means of the invention is that the cooling appliance is responsive to outer environmental conditions such as temperature, load of the cooling appliance and/or the time the door of the cooling appliance remained open, thus improving the energy efficiency of the cooling appliance.

Claims

1. A method of operating a cooling appliance comprising;

providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation,
providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation,
providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator,
providing a check valve on an outlet of the freezer evaporator,
providing a condenser and a compressor,
providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve,
characterized in that
the control unit determines whether the second evaporator is activated after or before the first evaporator, and
if the second evaporator is activated after the first evaporator, the control unit measures last 5 run time of the first evaporator and if the average run time of the first evaporator is equal or less than %30, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of F, if the average run time of the freezer is between %30 to %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of E, if the average run time of the freezer is equal or greater than %50, activates the compressor to pump out the refrigerant towards the condenser at an rpm of D, or
if the second evaporator is activated before the first evaporator, the control unit measures last 5 run time of the first evaporator and if the average run time of the first evaporator is equal or less than %30, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of C, if the average run time of the first evaporator is between %30 to %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of B, if the average run time of the first evaporator is more than %50, the control unit activates the compressor to pump out the refrigerant towards the condenser at an rpm of A,
wherein A > B > C and D > E > F and wherein A is almost equal to F.

2. A method of operating a cooling appliance according to claim 1, **characterized in that** the rpm values of "A", "B", "C", "D", "E" and "F" are between 2400-2100 rpm, 2100-1800 rpm, 1800-1500 rpm, 3000-2700 rpm, 2700-2400 rpm, 2400-2100 rpm respectively.

3. A method of operating a cooling appliance comprising;

providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation,
providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation,
providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator,
providing a check valve on an outlet of the freezer evaporator,
providing a condenser,
providing a compressor which upon being activated pumps out the refrigerant towards the condenser,
providing an ambient temperature sensor that measures the ambient temperature,
providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve, and that the control unit receives the ambient temperature value from the temperature sensor,
wherein
the control unit detects the ambient temperature, and
if the ambient temperature is less than 16 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for T2 seconds otherwise for T1 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM2, otherwise at an rpm value RPM1, or
if the ambient temperature is equal or greater than 16 Celsius but less than 25 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser

for T3 seconds otherwise for T2 seconds, and if the and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM3, otherwise at an rpm value RPM2, or
if the ambient temperature is equal or greater than 25 Celsius but less than 32 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for T4 seconds otherwise for T3 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM4, otherwise at an rpm value RPM3, or if the ambient temperature is equal or greater than 32 Celsius but less than 43 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %70 the control unit activates the compressor to pump out the refrigerant towards the condenser for T5 seconds otherwise for T4 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM5, otherwise at an rpm value RPM4, or if the ambient temperature is equal or greater than 43 Celsius, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for T6 seconds otherwise for T5 seconds, and if the second evaporator is to be activated after the first evaporator, the control unit activates the compressor at an rpm value RPM6, otherwise at an rpm value RPM5,
wherein RPM6 > RPM5 > RPM4 > RPM3 > RPM2 > RPM1, and
wherein T6 > T5 > T4 > T3 > T2 > T1.

4. A method of operating a cooling appliance according to claim 3, **characterized in that** the rpm values of RPM1, RPM2, RPM3, RPM4, RPM5 and RPM6 are between 1200-1600 rpm, 1600-2000 rpm, 2000 -2400 rpm, 2400 -2800 rpm, 2800-3200 rpm, 3200-3600 rpm respectively.

5. A method of operating a cooling appliance according to claims 3 to 4, **characterized in that** the pump out times T1, T2, T3, T4, T5 and T6 are between 30-45, 45-60, 60-75, 75-90, 90-105 and 105-120 seconds respectively.

6. A method of operating a cooling appliance comprising;

providing a freezer compartment and a first evaporator configured to cool the freezer compartment upon activation,
providing a fresh food compartment and a second evaporator configured to cool the fresh food compartment upon activation,
providing a valve configured to direct the flow of the refrigerant towards the freezer evaporator or to the fresh food evaporator,
providing a check valve on an outlet of the freezer evaporator,
providing a condenser,
providing a compressor which upon being activated pumps out the refrigerant towards the condenser,
providing an ambient temperature sensor that measures the ambient temperature,
providing a sensor configured to detect the position of a door of the cooling appliance,
providing a control unit that activates or deactivates the first evaporator, the second evaporator, compressor and the valve, and that the control unit receives the ambient temperature value from the temperature sensor and that the control unit receives the position information of the door from the sensor and measures the time (P_1, P_2, P_3, P_4, P_5) the door remained open per hour, wherein
the control unit detects the ambient temperature, and
if the ambient temperature is less than 16 Celsius and
if the time the door remained open is less than P_1, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 30-45 seconds otherwise finishes the pump out process, and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1400-1600 rpm, otherwise at an rpm interval of 1200-1400 rpm, or if the time the door remained open is greater than P_1, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is greater than %20, the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 45-60 seconds, otherwise for a time interval of 30-45 seconds, and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1600-1800, otherwise at an rpm interval of

1400-1600, or

if the ambient temperature is equal or greater than 16 Celsius but less than 25 Celsius and if the time the door remained open is less than P_2, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 60-75 seconds, otherwise for a time interval of 45-60 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 1800-2000 rpm, otherwise at an rpm interval of 1600-1800 rpm, or if the time the door remained open is greater than P_2, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %35 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 75-90 seconds, otherwise for a time interval of 60-75 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 2000-2200 rpm, otherwise at an rpm interval of 1800-2000 rpm, or

if the ambient temperature is equal or greater than 25 Celsius but less than 32 Celsius and if the time the door remained open is less than P_3, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 90-105 seconds, otherwise for a time interval of 75-90 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm interval of 2200-2400 rpm, otherwise at an rpm value interval of 2000-2200, or if the time the door remained open is greater than P_3, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %50 the control unit activates the compressor to pump out the refrigerant towards the condenser for a time interval of 105-120 seconds, otherwise for a time interval of 90-105 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 2400-2600, otherwise at an rpm value interval of 2200-2400, or

if the ambient temperature is equal or greater than 43 Celsius and if the time the door remained open is less than P_5, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for time interval of 150-165 seconds, otherwise for time interval of 135-150 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 3000-3200, otherwise at an rpm value interval of 2800-3000, or if the time the door remained open is greater than P_5, the control unit measures the average of last 5 run time of the first evaporator and if the average run time of the first evaporator is more than %90 the control unit activates the compressor to pump out the refrigerant towards the condenser for time interval of 165-180 seconds, otherwise for time interval of 150-165 seconds and if the first evaporator is to be activated after the second evaporator, the control unit activates the compressor at an rpm value interval of 3400-3600, otherwise at an rpm interval of 3200-3400,

wherein $P_5 > P_4 > P_3 > P_2 > P_1$.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- KR 100826179 **[0003]**
- JP 2012017881 B **[0004]**