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108p
Tables
Graphs
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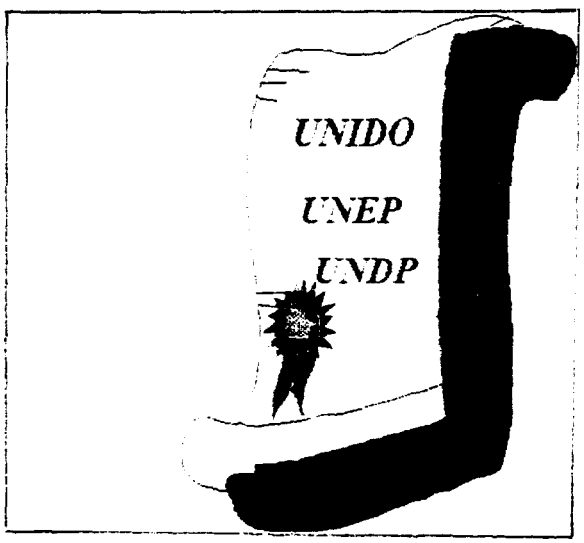
AZMAYESH INDUSTRIAL FACTORIES COMPANY

PROJECT NO. MP/IRA/96/041



FINAL REPORT

CONTRACT NO. 96/082P

Prototype Testing and Training to Phase out CFC's

September 1996

Prepared by: A. Bahmani

AZMAYESH INDUSTRIAL FACTORIES CO.
Electrical / Gas Home Appliances

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Electrical / Gas Home Appliances

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INTRODUCTION

Based on UNIDO's request for proposal no. P. 96/29 and contract no. 96/082/P between UNIDO and Azmayesh co. Will carry out training programme and prototype testing of the 24 prototypes of six major refrigerator manufactures consist of Fariz Iran, Lorestan, Gadook, Movalled, Pars Monark and Pars Machine.

The project has been assigned to UNIDO in an agreement with the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol in response to a request from the Government of the Islamic Republic of Iran. The project was entitled as " Conversion of Domestic Refrigerator Production Facilities to Phase-out CFC-11 and CFC-12 " of the above mentioned companies.

Azmayesh co. as the pioneer of executing UNIDO's CFC Phase - out project in Iran was selected by UNIDO to implement a part of the project for the second group of the Iranian Refrigerator Manufacturers. The missions that originally were assigned to Azmayesh are mainly referring to convert production models, Azmayesh will assist all these companies to be familiar and accomplish following activities by executing two contracts no. 96/080/P and 96/082/P:

1) Making Prototypes;
2) Testing Prototypes;
4) Calculating Heat Leaks;
5) Being familiar with Montreal Protocol and UNIDO's Projects;
6) Being familiar with aim of the project in Iran;
7) Selecting Components for each models;
9) Preparing Technical Specifications and Characteristics;
10) and other services as mentioned in the subject contracts;

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SYNOPSIS

1 - General Background

a) This final report was prepared based on the UNIDO's contract no 96/082/P between UNIDO and Azmayesh for the provision of services related to testing of 24 prototype models of Refrigerators and Freezers and training of designated personnel and relevant terms of reference prepared by UNIDO and the requirement of Islamic Republic of Iran indicated in the country program No. UNEP/OZL. PRO/EX COM/10/24 dated May 1993 prepared by UNDP, the Project Document "Conversion of Second Group of Domestic Refrigerator Production Facilities to phase out CFC11 and CFC12" prepared by UNIDO was presented at the 18th session meeting of the Executive Committee of the Multilateral Fund for the implementation of the Montreal Protocol, was approved.

b) The project will phase out the use of.CFC11 and ÇFC12 for the production of domestic refrigerators in six refrigerator manufacturers in Iran. This project will be implemented in six companies. The testing of the prototypes made by these companies (Gadook, Fariz Iran, Lorestan, Movaled, Pars Machine, and Pars Monarch) and also training the experts is the main concept of this project.

A- Companies Background

1 - FARIZ IRAN

FARIZ IRAN in Tehran is a large manufacturer of home appliances which started manufacturing home appliances 30 years ago. The production of refrigerators started originally under license from General Electric (USA).

The refrigerator and freezer models are based on General Electric's designs. To modernize production machinery, the company purchased the technology of

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manufacturing "no frost indoor" refrigerators from an Italian company, Merloni.

The company is producing following products and should be converted:

1. Refrigerator 11 cu ft.
2. Refrigerator 13 cu ft
2. Freezer 13 cu ft

Approximately 1,000,000 units manufactured by this company are still operated in Iran. All refrigerator components are imported.

2 - GADOOK INDUSTRIES CO

GADOOK is a private company. It employs 58 people, and the installed annual production capacity is about 40,000 refrigerator units based on the daily production rate of 120-150 units. The actual production in 1992-1993 was 14,000 refrigerators and freezers in five models in one shift.

The company produces two refrigerator models (12, 15 cu ft) and one freezer model (11,cu ft) per year.

Two Refrigerator models and one Freezer model have been considered to be converted.

3 - LORESTAN REFRIGERATOR MFG. INDUSTRIES

LORESTAN is 100% owned by the Bank of Industry and Mines. It employs 300 people. The company was established in 1987 for a nominal production capacity of 180,000 units per year, based on a daily production rate of 650-750 units, with 15 different models of household refrigerators and freezers from 12 to 21 cu ft. Six models of refrigerators and freezers have been considered to be converted.

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4 - MOVALLED HOME APPLIANCES CO

MOVALLED is a private company. It employs 490 people and the installed annual production capacity is about 100,000 units based on the daily production rate of 300-360 units. The actual production in 1992-1993 was 60,000 refrigerators and freezers in three different models. The annual consumption of CFC-12 is 22 mt., including 2 mt. for servicing. The company produces three models of refrigerators and one freezer model. Four models of refrigerators and freezers have to be converted.

5 - PARS MACHINE MFG. CO

PARS MACHINE is 100% owned by the 15th Khordad foundation. It employs 400 people, and was established in 1967. The annual production capacity is 100,000 units per year, based on a daily production rate of 350-450 units.

The actual production in 1992-1993 was 50,000 refrigerators and freezers in four models; the annual consumption of CFC-12 is 20 mt., including 2 mt. for servicing.

The company produces three models of refrigerators (5, 10, 12 cu ft) and one freezer model (11 cu ft), which they should be converted.

6 - PARS MONARK COMPANY

MONARK is a private company and was established in 1984 in Tehran and moved to Yazd in 1989. It employs 45 people, and the installed annual production capacity is about 40,000 refrigerator units; the actual production in 1992-1993 was 14,000 refrigerators and freezers in four different models.

The annual consumption of CFC-12 is 6 mt., including 0.8 mt. for servicing. The consumption of CFC-11 is 12.5 mt. The company produces one refrigerator model (330 l) and three models of freezers (220, 280, 330 l). All products produced consist of four models should be converted.

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B- Aim of the Project

The aim of the project is to carry out training programme for designated personnel of the above mentioned companies. The purpose of this training programme is to enable each company to do necessary design, calculation, redefinition, prototyping, and check and test of converted models. The trainees will be familiar with methods of calculation and redefinition of the models and prototypes. At least one prototype model previously made by each company will be tested for functionality and performance ability as follow.

1) Fariz Iran	Three prototype models
2) Gadook	Three prototype models
3) Lorestan	Six prototype models
4) Movaled	Four prototype models
5) Pars Machine	Four prototype models
6) Pars Monark	Four prototype models

C - Statement of work to be Accomplished

a) A theorical course was being conducted for the purpose of explaining the methods of calculating heat leaks for a typical refrigerator model.

b) At least three well-known methods of refrigeration load calculation were discussed and compared during the course.

c) The most common method of optimization programme for modification and redesigning of the converted refrigerators and freezers were explained.

d) The following subjects were discussed during the course.
1) Dimensional specifications
2) Type and insulation thickness
3) Refrigeration unit component details
4) Working performance
5) Selection of HFC-134a compatible components
6) Redesigning of the complete refrigeration circuit

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7) Specifying necessary change in the cooling system if required
8) The related ISO standards for check and testing prototypes
9) Methods of measuring energy consumption

e) Testing prototypes to determine performance characteristics of the prototypes.

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ACTIVITIES AND TASKS PERFORMED

Following activities were accomplished so far and from the date of the contract according to our work plan,

- Visiting all six companies' facilities, in order to designate and define all Models for testing the prototypes.

- Preparing existing hot chamber in Tehran for testing prototypes.

- Providing all necessary documentation and data for conducting training course.

- Determining technical specification of all prototypes.

- Providing enough facilities and room for all trainees during the course.

- Providing necessary facilities for prototypes at the site.

Major Activities

1 - Collecting Data

In order to conduct the training course we had to collect all necessary data concerning CFC phase- out in different countries as well as different companies in Islamic Republic of Iran and other companies that are mainly European companies. These data are mainly concerning following subjects;

- Technical data;
- Name of the companies that has successfully achieved this project;

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- Resources and references;
- UNDP and UNIDO's technical references
- Azmayesh past experiences in converting designated models
- Coordinating with Arj, Bahman, Pars , and Iran pouya to receive more data
- Contacting with some Compressor manufacturer in order to get more technical information regarding new R134a compressor generation.

We are proud to declare that Azmayesh CFC department has successfully established a very enhanced and complete archive of information and documents from many sources including UNEP and many other sources as indicated in references.

2 - Coordinating with the Companies

We had many correspondences and coordination with six companies to select and prepare prototypes and assess existing facilities and equipment.

3 - Reviewing Source and References

We collected all existing technical references and resources from different sources either in each plant area or through UNEP, UNDP, and UNIDO to get ready for conducting training course and making prototypes. Some of the references that we use to prepare lesson plan from UNEP publications are as follows;

- Chillers and Refrigerant Management Training Manual;
- Technologies for protecting the Ozone layer;
- Flexible and Rigid Foam;
- Good Practices in refrigeration, training manual;
- Refrigeration air conditioning and heat pumps;
- CFC production and related issues;
- Recovery and recycling;
- Practical guidelines for industry for managing the Phase-out of Ozone Depleting substances;
- Cyclopentane agent for polyurethane foams for insulation in domestic refrigerator freezer;

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- HCFCS and air conditioning Montreal Protocol controls and options;
- Blends as refrigerants to replace CFC's and HCFCs;
- Elimination of CFC refrigerants from domestic refrigeration manufacture;
- Retrofitting with NON-CFC substitutes;
- Protecting the Ozone Layer; (Refrigerants)
- Protecting the Ozone Layer; (Foams)

4 - Evaluating Existing Technical Documentation

In order to make prototypes and prepare lesson plans of the training course we reviewed all existing technical documentation and references, as well as assessing capability of manufacturing prototypes by each manufacturer and consult with them to get prepared for this mission.

5 - Selecting and interviewing with technical experts

Since we a limitation of accepting certain people to take part in the course we asked from each company to introduce as many as experts as possible, and then we chose following experts to take part in the course, in addition to these people some other student from different organization except those from the second group were participating in the course. total of 20 students attended in the course;

1 - Fariz Iran
- Mr. Fakhabadi
- Mrs Shahbandi

2 - Gadook
- Engr. Ghahramanpour
- Engr. Riazi

3 - Lorestan
- Engr . G. Ahmdi
- Engr. A. Roozbehani

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4 - Movalled
- Engr. Valadkhani
- Engr. Haghgo
- Engr. Barati
- Engr. Karami

5 - Pars Machine
- Engr. Isfahani
- Engr. Hayati

6 - Pars Monark
- Mr. Hekayati
- Mr. Azarpendar

6 - Preparing Programme of Instruction of the course

Following topics were selected as the main subject for preparation of the programme of instruction of the course:

1 - Introduction to the Course;

2 - Montreal Protocol Overview;

3 - Aim of the Project

4 - Ozone Depletion, its Causes & Results;

5 - Refrigeration Summary;

6 - Basic Concept on Refrigeration;

7 - Methods of Refrigeration Load Calculation;

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8 - Refrigeration System Analysis;

9 - Refrigeration System Component Selection;

10 - Refrigeration System Optimization Plan, Methods and Procedures;

11 - Test Characteristics;

12 - Handling and Recovery;

13 - System Condition;

14 - Servicing Practices;

15 - Preventing Maintenance

16 - Alternative Refrigerant and technologies;

17 - System design;

18 - Standards:

7 - Preparation of the course lesson plan

According to the above mentioned subjects and available references and documentation 18 subjects were selected as the maun part of the course and four each title, some related subtitled were chosen that are enclosed to this report and were used as our main references for teaching the course.

8 - Conducting the Course

From 25 April 1996 for a period of two weeks (10 working days) and three hours per day (total 30 hours) we conducted a course named Conversion of CFC

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production facility into non CFC, at Azmayesh CFC phase out department office in Tehran. 20 students were participating in this course that 14 of them were from the second group of refrigerator manufacturers and 6 of them from different Iranian organizations.

9 - Other Activities

Other major avtievities and tasks can be briefly listed as follows:

- Preparation of a class room for 20 students;
- Preparation of training aids such as TV, Video player, white board, note book, book lets, documents, and etc.;
- Presentation of Montreal protocol Programme;
- Reviewing Course Subjects;
- Training post evaluation;
- Issuing course participation certificates;
- Contacting major compressor suppliers in Iran;
- Contacting major compressor manufacturers;
- Assessing raw material supplier for Refrigerant and parts.
- coordinating with D. O. E. for coordinating related activities and tasks;
- Coordinating with UNDP office in Tehran to receive more information;
- Performing other tasks related to the project and contract;

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Training Course Topics

- **Heat Transfer**
  - **Conduction**
  - **convection**
  - **Radiation**
- **The Entholpy Diagram**
  - **The p-h diagram**
- **The refrigerants**
- **Components Functions**
  - **Compressor**
  - **Evaporator**
  - **Condenser**
  - **Capillary Tube**
  - **Super heat**
  - **Sub - Cooling**
  - **Filter Drier**

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- Refrigeration Today

CFC's Phase out

- Taxes on all CFC's
- Service requirements on refrigeration systems
- CFC replaces with non chlorine gases
- Recovery, Recycling, Reclaiming
- Leak testing on regularly basis
- Certification on refrigeration technicians

- Refrigeration Future

New system design, less refrigerant filling

- New leak testing
- Fixed install leak testing
- Strict requirements on refrigerant handling
- Fine's to the contractor which release refrigerant
- Refrigerant gases sky high prices
- New refrigerant applications, Ammonia, CO2, etc.
- System logging
- System efficiency

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- Refrigerant Summary

- CFC's developed 60 years ago with unique properties.
  - low toxicity
  - non flammable
  - non corrosive
  - Compatible with many refrigerants with better thermodynamic physical properties.
- CFC used as blowing agent
  - Blowing agent as insulation
  - packaging
  - Cushioning foams
  - cleaning agent, for metal & electronic component & many other application
- 28 % of the Ozone layer is caused by CFC-12, due to the:
  - Bad maintenance
  - Bad service routine
  - Bad system design

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P.O.I
Program Of Instruction

1) Introduction To The Course

2) Montreal Protocol Overview

3) Aim Of The Project

4) Ozone Depletion , Its Causes & Results

5) Refrigeration Summary

6) Basic Consept On Refrigeration

7) Methods Of Refrigeration Load Calculation

8) Refrigeration System Analysis

9) Refrigeration System Component Selection

10) Refrigeration System Optimization Plan , Methods & Procedurs

11) Test Characteritics

12) Handling & Recovery

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13) System Contamination

14) Servicing Practices

15) Preventing Maintenance

16) Alternative Refrigerant And Technologies

17) System Design

18) Standards

Date :

Time :

No. Of Students :

Duration :

Language :

Location :

Class Room No. :

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LESSON PLAN
(L P)

INTRODOCTION TO THE COURSE

Date : Time : Duration :

Topics :

1) Brieffing

2) Introduction , Member of the Course & Students

3) Course Subject Breiffing

4) Scope of Work

5) Aim of the Course

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REFRIGERANT SUMMARY

Date : Time : Duration :

Topics :

1) Refrigerator History

2) Refrigerator Today

3) Refrigerator Future

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AIM OF THE PROJECT

Date : Time : Duration :

Topics :

1) Summary

2) UNIDO's Mission

3) UNDP's Mission

4) CFC Phase-out Project in Iran
First Group & Second Group

5) Phase - One (Product Conversion)

6) Phase - Two (Facility Convertion)

7) Resouces , Budjet & Fund

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OZONE DEPLETION
CAUSES & RESULTS

Date : Time : Duration :

Topics :

1) Overview

2) Ozone Depletion

3) Effects on the Environment
   Human Heath
   Skin Cancer
   Cataracts
   Immune System
   Other Impacts

4) Global Warming

5) CFC's and other Halogen containing substances

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BASIC CONCEPT ON REFRIGERATOR

Date : Time : Duration :

Topics :

1) Introduction

2) Thermodynamic

3) The Refrigerant Cycle

4) Components Function

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MONTREAL PROTOCOL OVERVIEW

Date : Time : Duration :

Topics :

1) Summary

2) History

3) Today

4) Future

5) UNEP

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TOP MOUNT REFRIGERATOR

1) Cabinet Type & Overall Dimensions

2) Gasket Width

3) Door Edge

4) Cabinet Wedge Dim .

5) Refrigerated Volume (Freezer & Fresh Food)

6) Compressor Comp . Dim .

7) Freezer Insulation Thickness

8) Freezer Insulation Resistivities

9) Fresh Food Insulation

10) Air & Cabinet Temp .

11) Door Openning Schedule

12) Gasket Heat Leaks

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10 - Testing Prototypes

The following prototype models should be functionality tested at 43 °C ambient Temperature. Continuous run test and cyclic run test were accomplished on the most of prototypes. :

1. Fariz Iran , Upright Freezer Model FIF13
2. Fariz Iran, Upright Refrigerator Model FIR13
3. Fariz Iran, Upright Refrigerator Model FIR11

4. Lorestan, Upright Refrigerator Model ROM10
5. Lorestan, Upright Refrigerator Model ROM13
6. Lorestan, Upright Refrigerator Model ROM14
7. Lorestan, Upright Freezer Model UFM10
8. Lorestan, Upright Freezer Model UFM13
9. Lorestan, Ref.- Freezer Model RAT12
10. Movalled Upright Freezer Model F80

11. Movalled Ref. Freezer Model RF80
12. Movalled Ref.Freezer Model RF85
13. Movalled Ref.- Freezer Model RF14

14. Gadook Ref. Freezer Model RF-350
15. Gadook Upright Refrigerator Model R-280
16. Gadook Upright Freezer Model FU280

17. Pars Machine Upright Refrigerator model Damavand 15
18. Pars Machine Upright Freezer 1072
19. Pars Machine Upright Refrigerator Model PMR6
20. Pars Machine Upright Refrigerator Model 1070

21. Pars Monark Ref. Freezer Model PKRF17
22. Pars Monark Upright Freezer Model MNKF12
23. Pars Monark Upright Freezer Model PMKF7
24. Pars Monark Upright refrigerator Model PMKR12

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Test Results Evaluation

a) Lorestan

1 - Refrigerator Model ROM10

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	3	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-5.1	-12
Refrigerator Compartment Mean Temperature (◦ C)	+ 3.8	−5
Condenser Outlet Temperature (◦ C)	+38	----------
Compressor Discharge Temperature (◦ C)	+44.9	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+ 42	----------
Compressor Shell (◦ C)	+57.3	----------
Type of Compressor Gold Star Model VR 75 LAEG	----------	----------

Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

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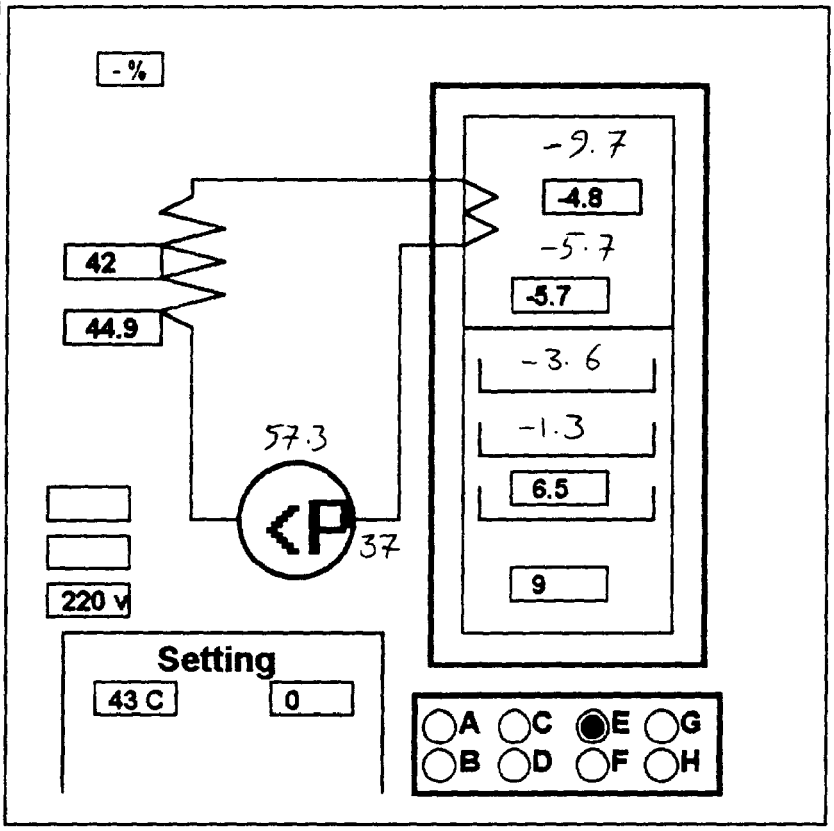
Performance Test



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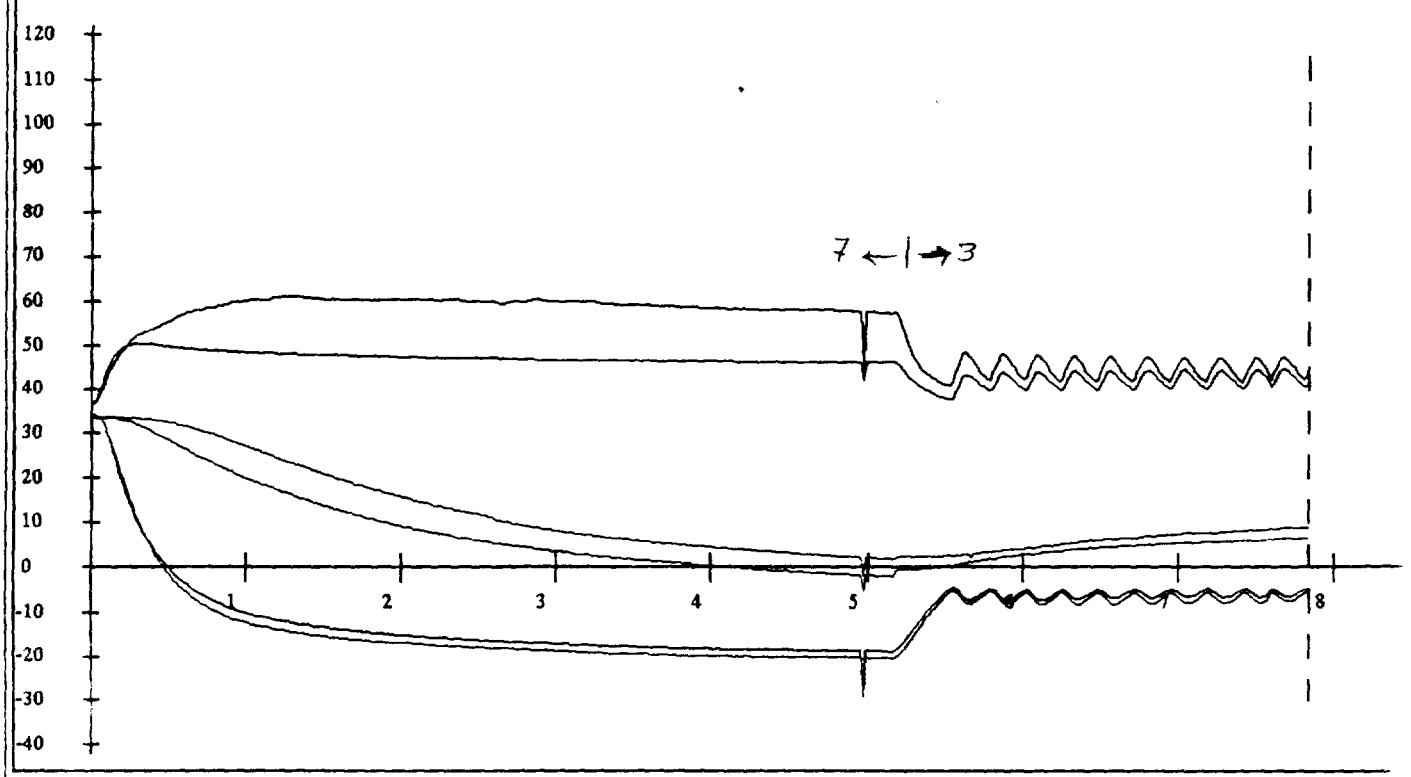
HR750615.D07

Product Name	Lorestan
Product Model	ROM10
product. Capacity	280 LI.
Compresor Name	GOLD STAR
Compresor Model	NR 52 LAEG
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	7 / 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



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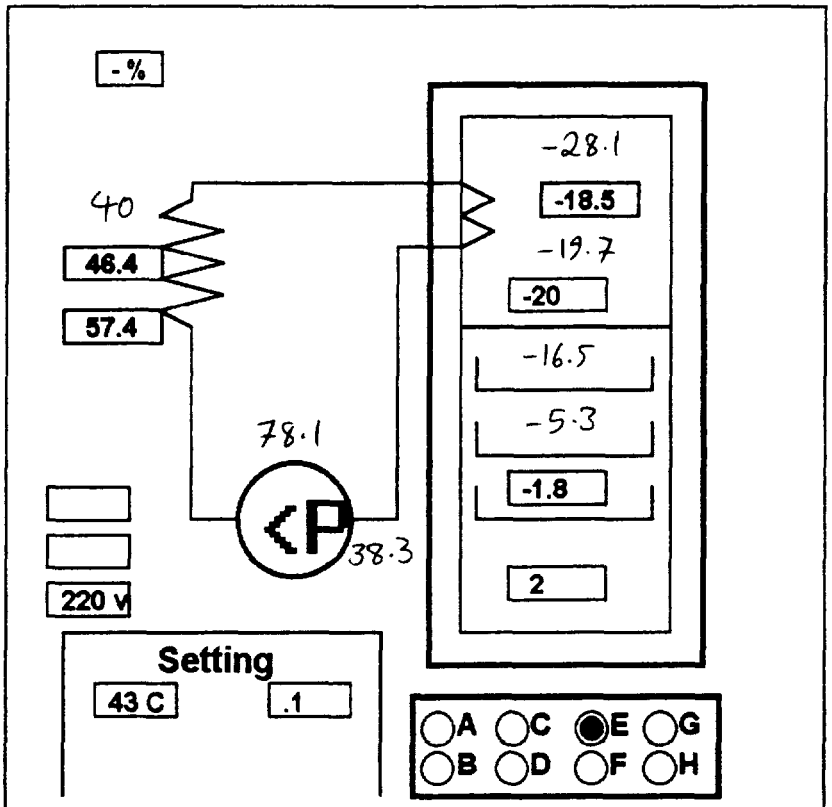
Performance Test



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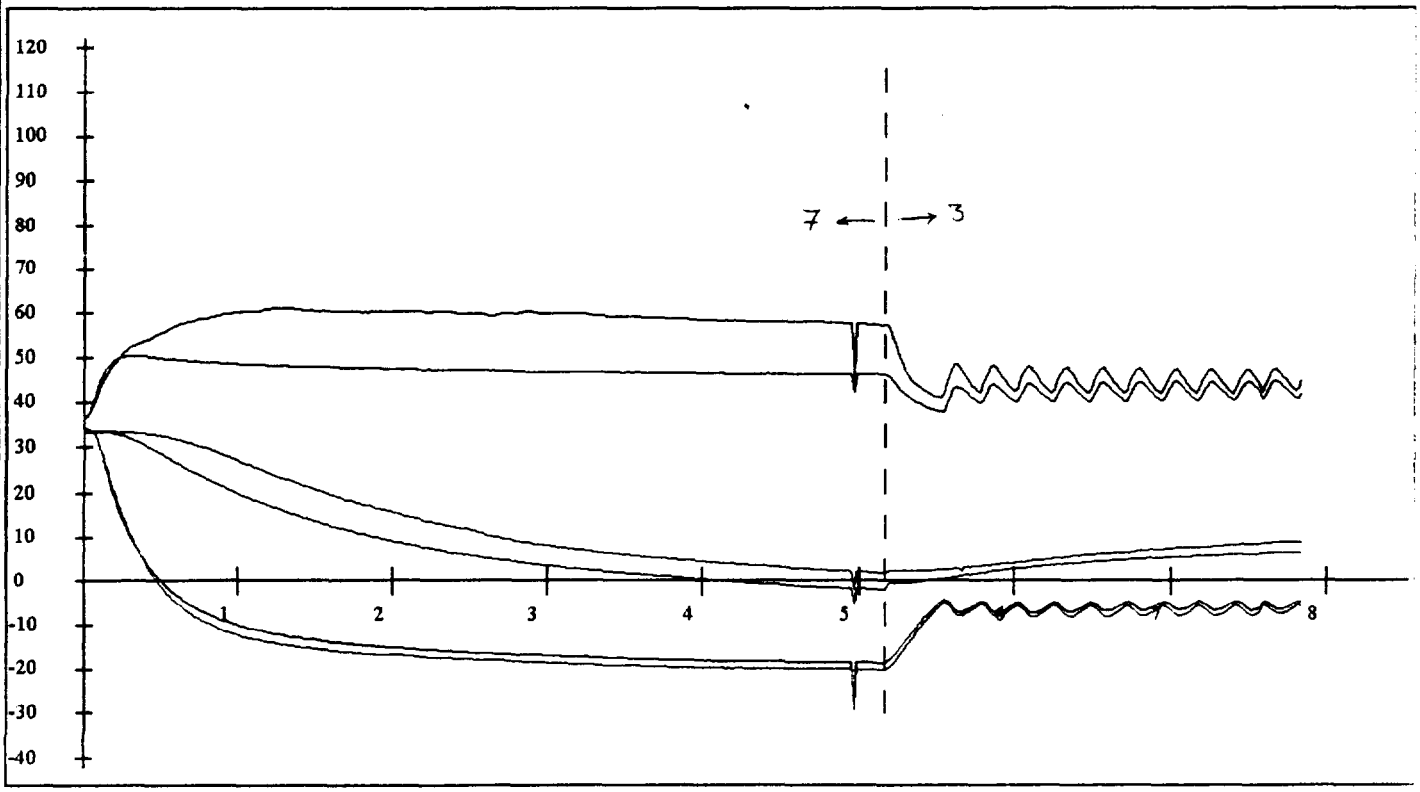
HR750615.D07

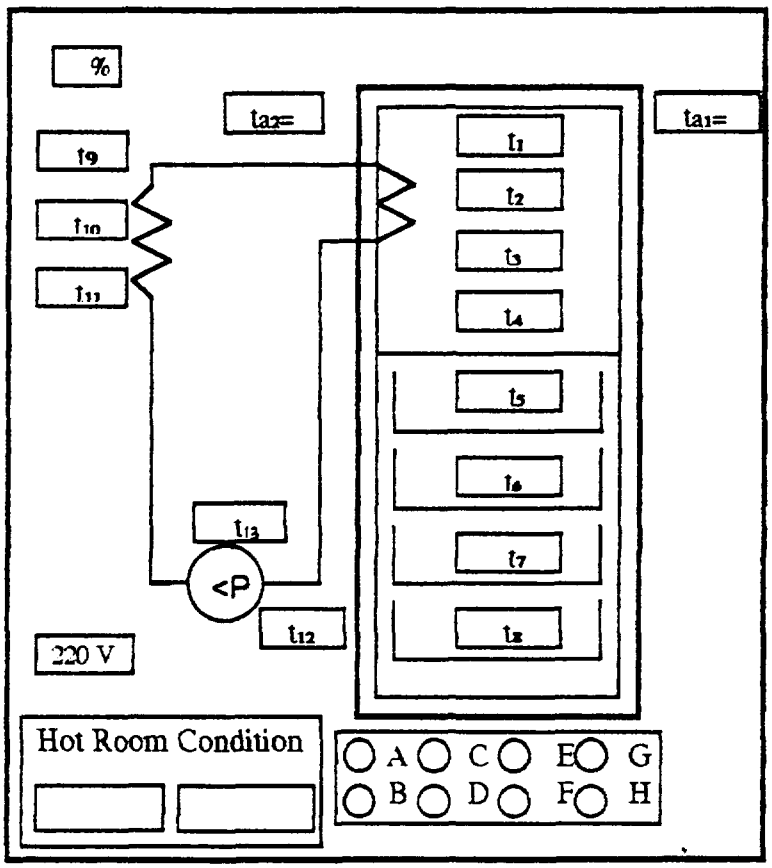
Product Name	Lorestan
Product Model	ROM10
product. Capacity	280 LI.
Compresor Name	GOLD STAR
Compresor Model	NR 52 LAEG
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	7 / 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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LORESTAN

Product Name	Refrigerator
Product Model	ROM 10
Product Capacity	280 lit.
Compressor Name	Gold star
Compressor Model	NR 52LAEG
Compressor Power	1/6 hp
Compressor Current	1.1A
Thermostat Position	7 & 3
Thermostat Type	Semi-Auto
Total Test Time	

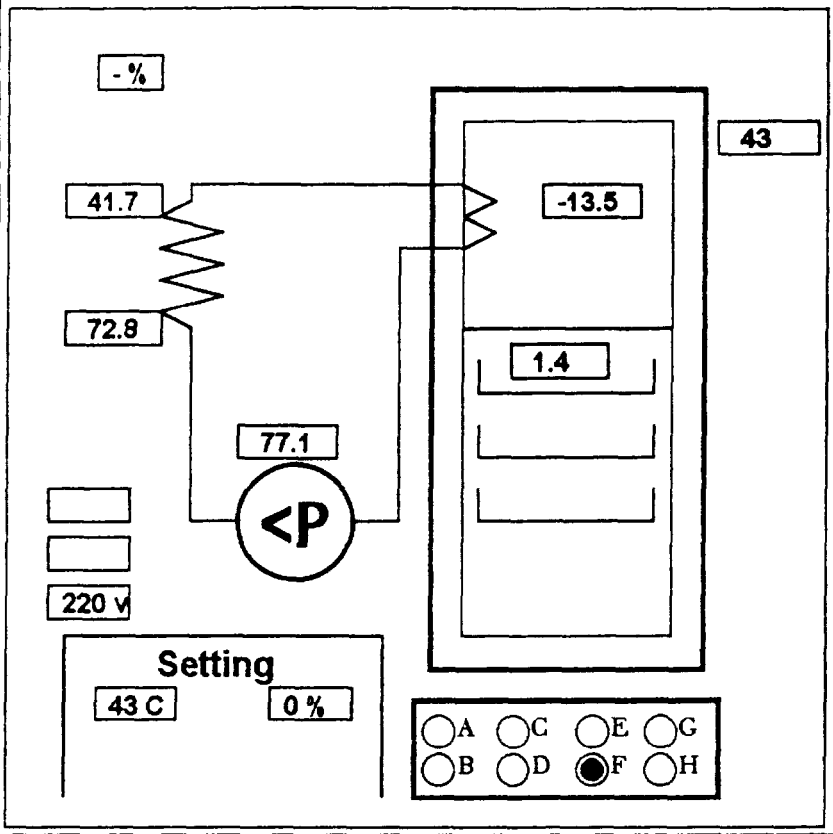
Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-23.3	-25.9	-27	-27.8	-28	-7.6	-4.4	-9.7	
Evap. Air Temp. (t_2)	-10	-15	-16.9	-18	-18.3	-5.1	-5.4	-4.8	
Evap. Air Temp. (t_3)	-11.4	-16.4	-18.2	-19.3	-19.6	-5.9	-6.3	-5.7	
Evap. Air Temp. (t_4)	-12.2	-16.7	-18.5	-19.6	-20	-5.8	-6.5	-5.7	
Evap. Mean Temp.	-25.4	-16	-17.9	-19	-19.3	-5.6	-6	-5.4	
Meat Tray (t_5)	-4	-11	-13.9	-15.5	-16.5	-5.4	-4.3	-3.6	
Ref. Comp. Temp (t_6)	19.7	9.3	3.8	-0.7	-4.1	2.5	-16.9	-1.3	
Ref. Comp. Temp (t_7)	20	9.3	3.7	0.6	-1.6	2.9	5.6	6.5	
Ref. Mean Temp	11.9	7.6	-6.4	-5.2	-7.4	0.0	-5.2	0.5	
Cellar Comp. Temp. (t_8)	27.2	15.9	6.3	4.6	2.2	4.3	7.6	9	
Cond. Outlet Temp. (t_9)	46.6	43.9	43.6	58.6	57.6	42.5	46.4	44.9	
Cond. Mid Temp. (t_{10})	48.7	47.7	47	46.6	46.4	40.1	43.6	42	
Cond. Inlet Temp. (t_{11})	60.4	60.5	60.1	41.7	41	38.5	18.7	22.9	
Comp. Suction Temp. (t_{12})	38.9	38.8	38.5	38.3	38.3	38	36.9	37	
Comp. Shell Temp. (t_{13})	74.3	74.1	78.9	78.2	78.2	59.5	58	57.3	

UNIDO Hotroom Test

تست یخچال

Performance Test

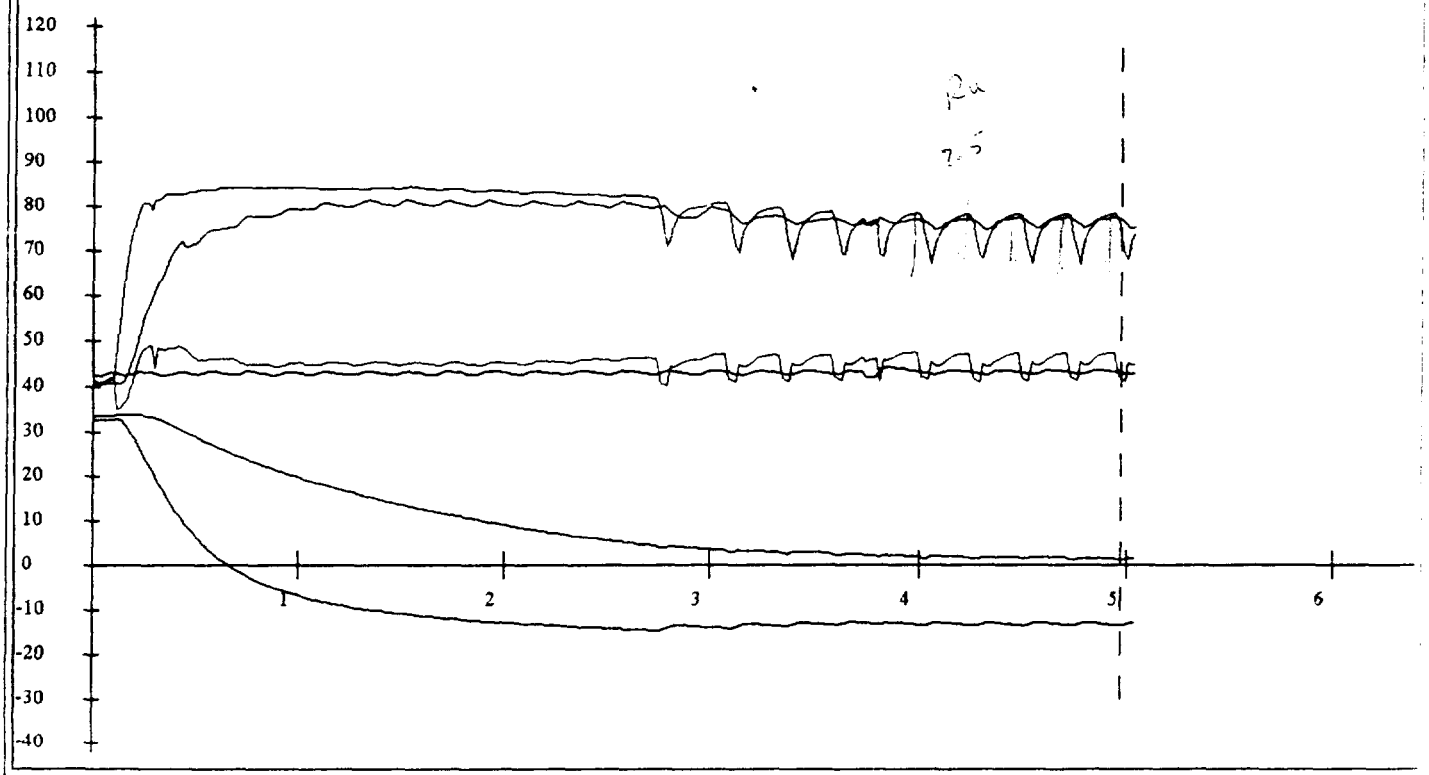


30

HR750518.D11

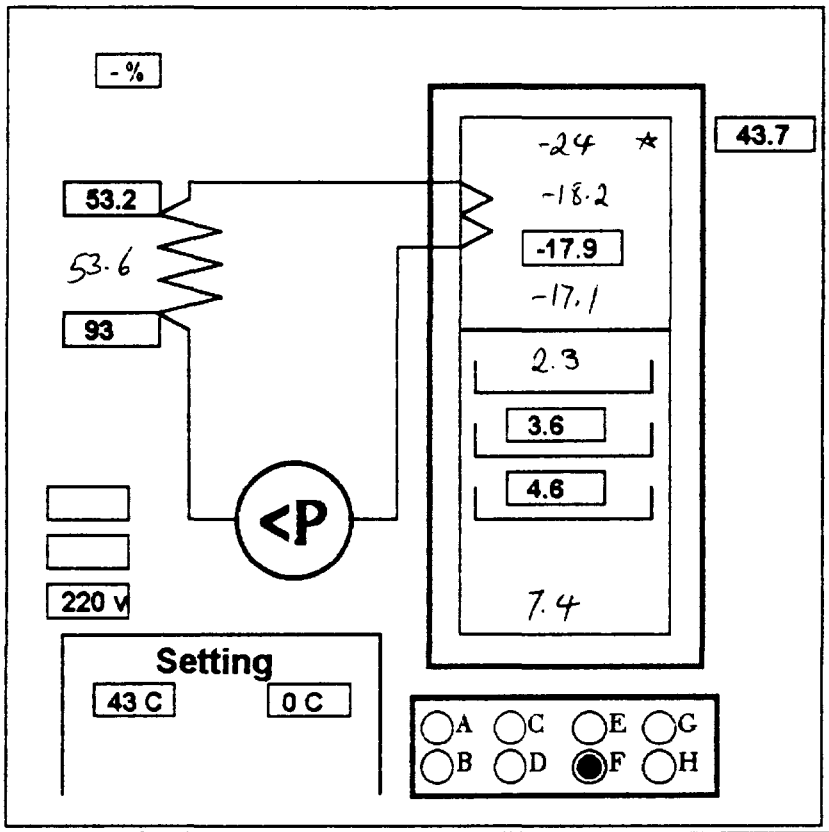
Product Name	Lorestan (R)
Product Model	ROM 13
product. Capacity	368 lit
Compresor Name	Gold Star
Compresor Model	NK 62 LAEG
Compresor Power	1/5 Hp
Compresor Current	1.3 A
Thermost. position	5
Thermost. Type	Semi auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test

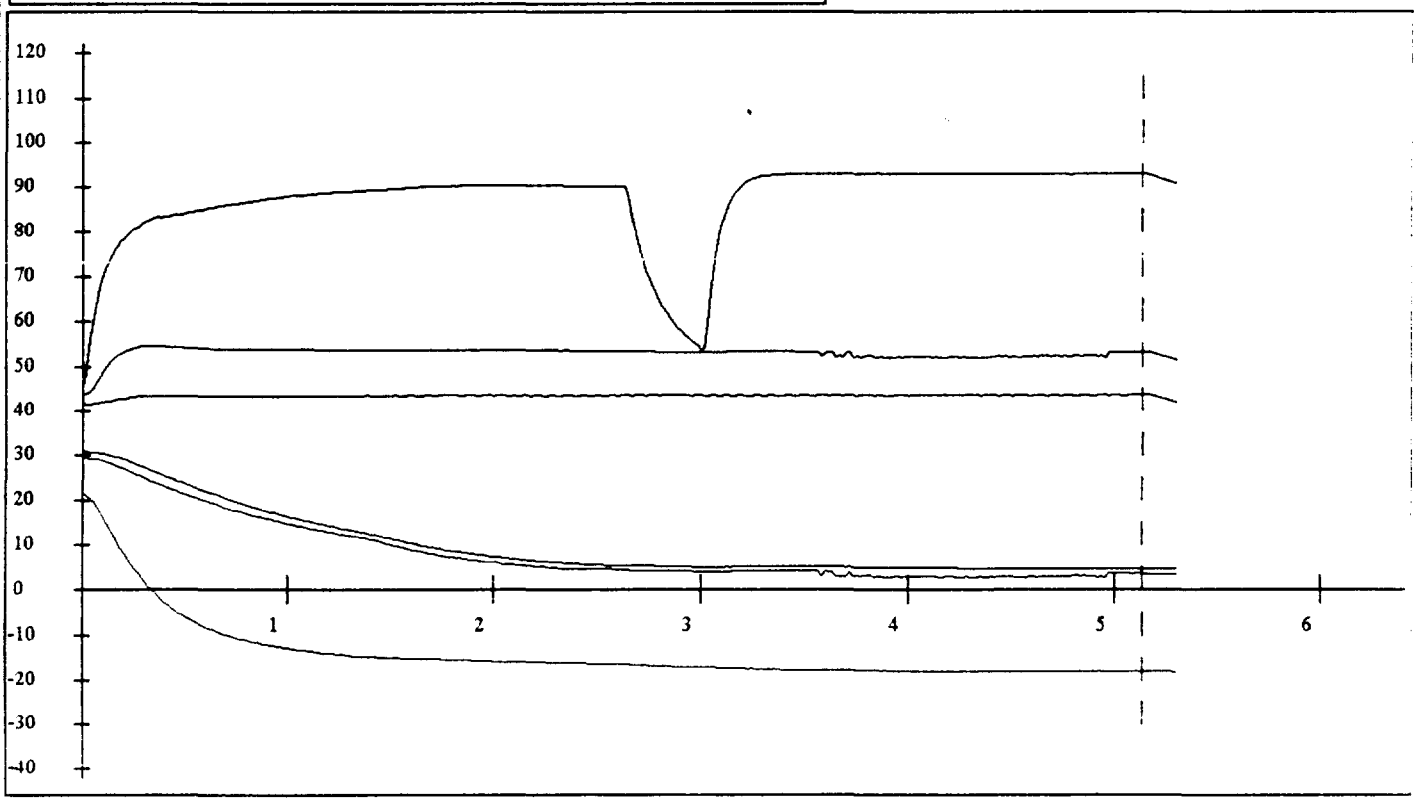


31

HR750606.D10

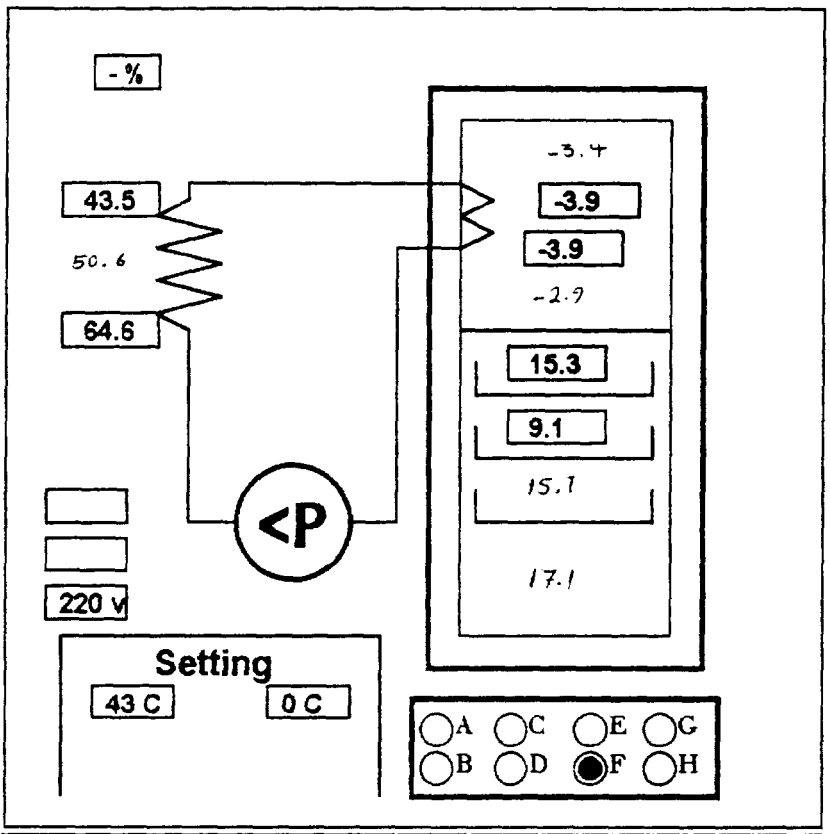
Product Name	LORESTAN
Product Model	ROM 14
product. Capacity	390 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	7
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test

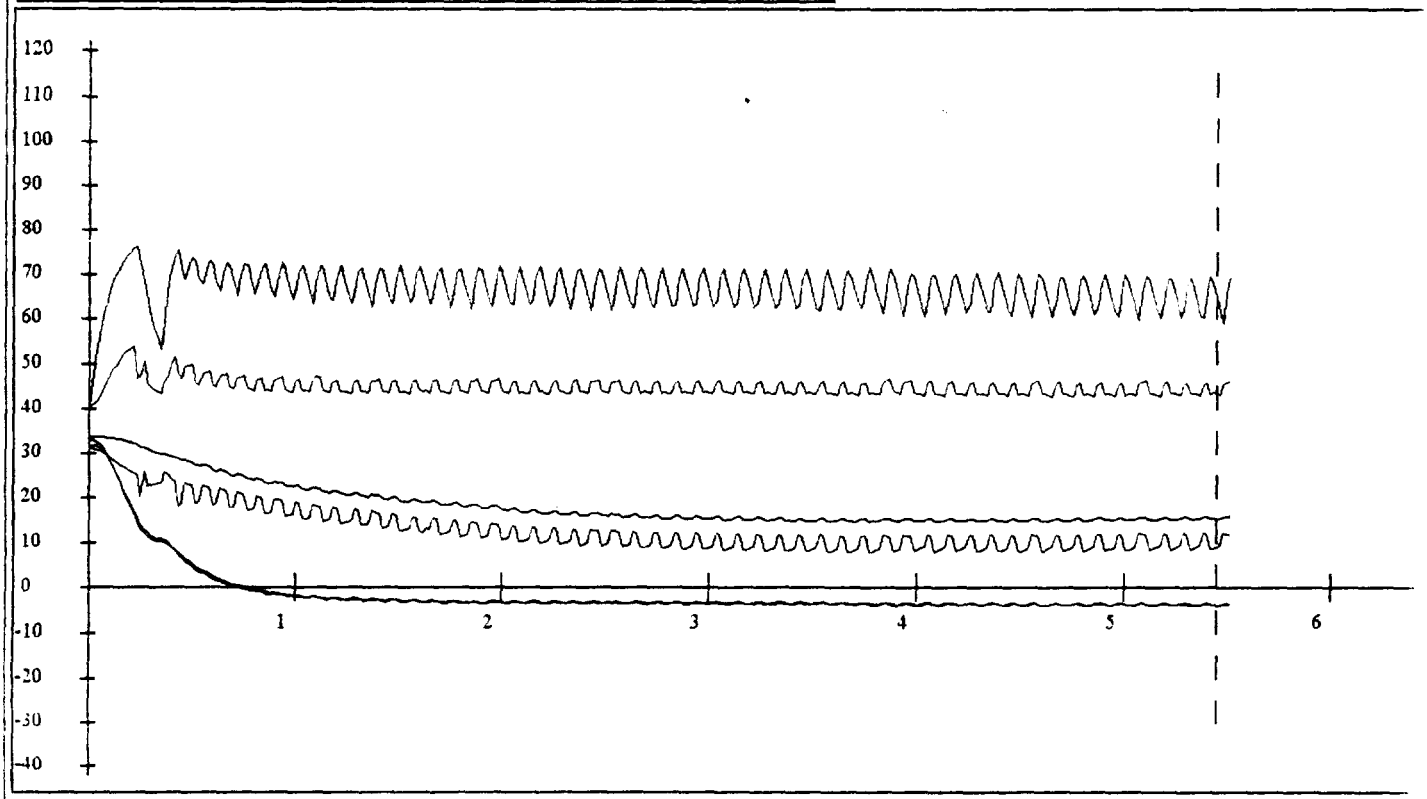


32

HR750604.D13

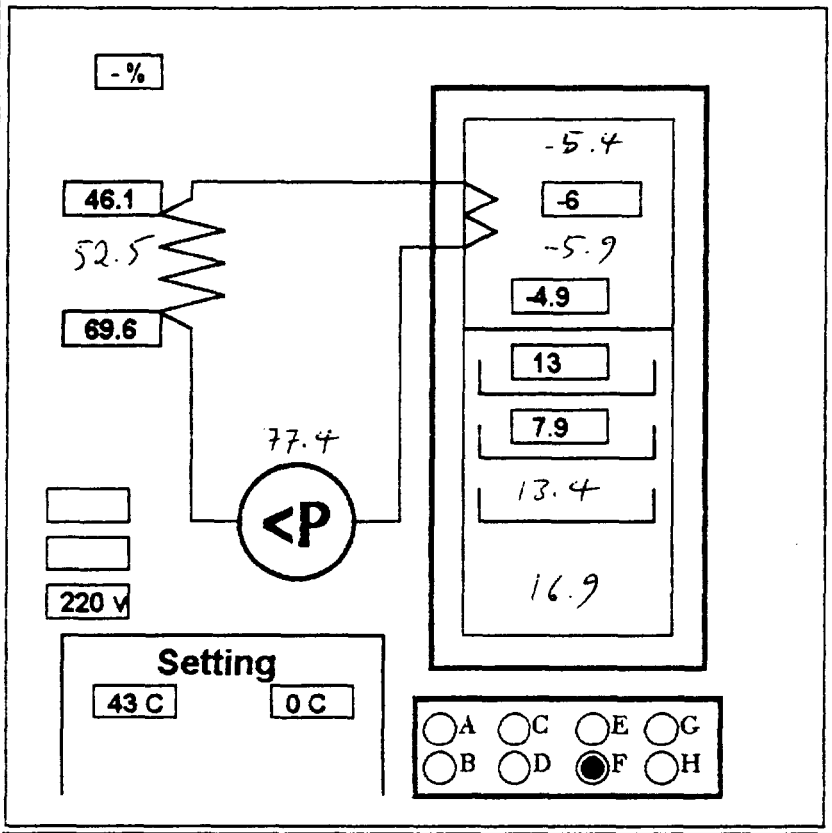
Product Name	**LORESTAN**
Product Model	**ROM 14**
product. Capacity	**390 LI.**
Compresor Name	**GOLD STAR**
Compresor Model	**V 75 LAEG**
Compresor Power	**1/4 HP.**
Compresor Current	**1.35 AMP.**
Thermost. position	**2**
Thermost. Type	**Semi auto**
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test

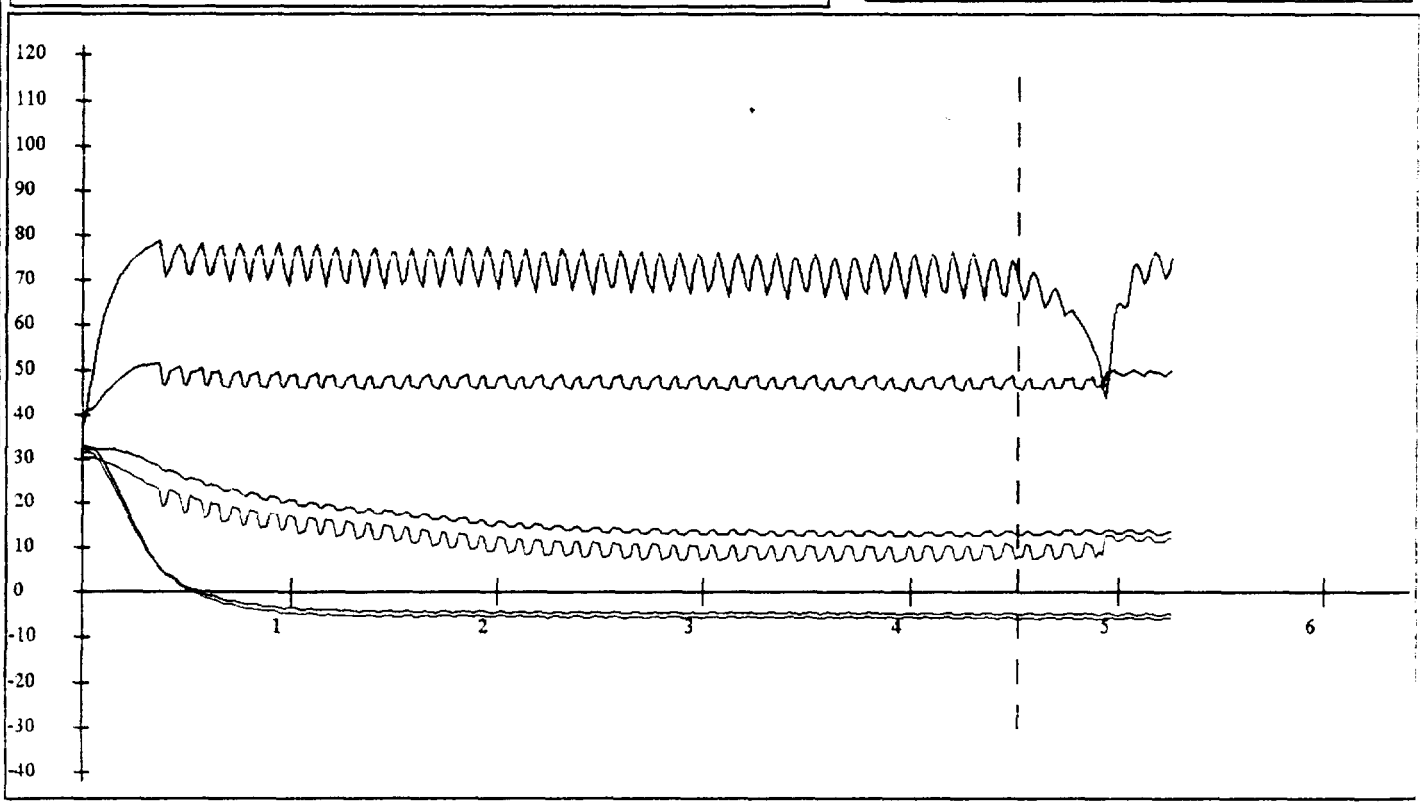


33

HR750605.D10

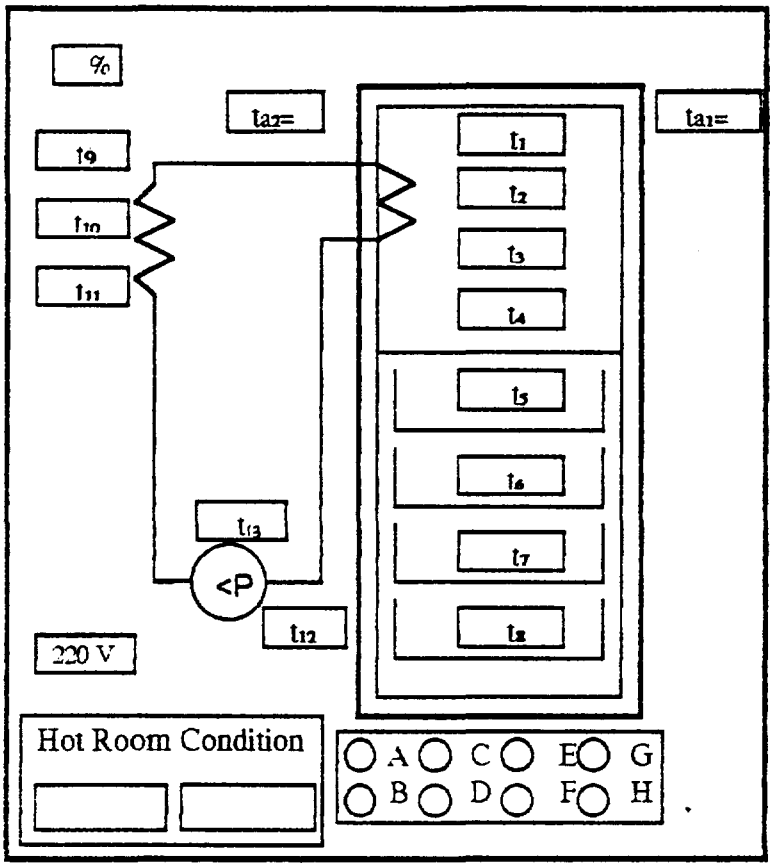
Product Name	LORESTAN
Product Model	ROM 14
product. Capacity	390 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	3.5
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



34

LCRESTAN

Product Name	Refrigerator
Product Model	ROM14
Product Capacity	390 Lit.
Compressor Name	Gold Star
Compressor Model	V75LAEG
Compressor Power	1/4 hp
Compressor Current	1.35 A
Thermostat Position	7
Thermostat Type	Semi Auto
Total Test Time	630 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-20.8	-22.3	-23.3	-23.7	-24				
Evap. Air Temp. (t_2)	-13.2	-16.4	-17.6	-18.3	-18.2				
Evap. Air Temp. (t_3)	-12	-15.2	-16.5	-17.2	-17.1				
Evap. Air Temp. (t_4)									
Evap. Mean Temp.									
Meat Tray (t_5)	14.3	4.2	2.4	2.6	2.3				
Ref. Comp. Temp (t_6)	14.4	6	3.4	3	3.7				
Ref. Comp. Temp (t_7)	16.5	7.4	5	4.4	4.7				
Ref. Mean Temp									
Cellar Comp. Temp. (t_8)	22.4	14.2	10	7.8	7.4				
Cond. Outlet Temp. (t_9)	53.4	53.3	53.3	52.4	53.2				
Cond. Mid Temp. (t_{10})	55.6	54.7	54	53.5	53.6				
Cond. Inlet Temp. (t_{11})	33.1	70.5	89.1	93.1	93				
Comp. Suction Temp.(t_{12})									
Comp. Shell Temp. (t_{13})									

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Refrigerator Compartment Mean Temperature (◦ C)	+ 11.4	+5
Condenser Outlet Temperature (◦ C)	+46.1	----------
Compressor Discharge Temperature (◦ C)	-69.6	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+52.5	----------
Compressor Shell (◦ C)	+77.4	----------
Type of Compressor Gold Star Model VR 75 LAEG	---------- -----	----------

Evaluation

We got satisfactory results from continuois test run but according to the above test results from cyclic run test at thermostat setting 3.5, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

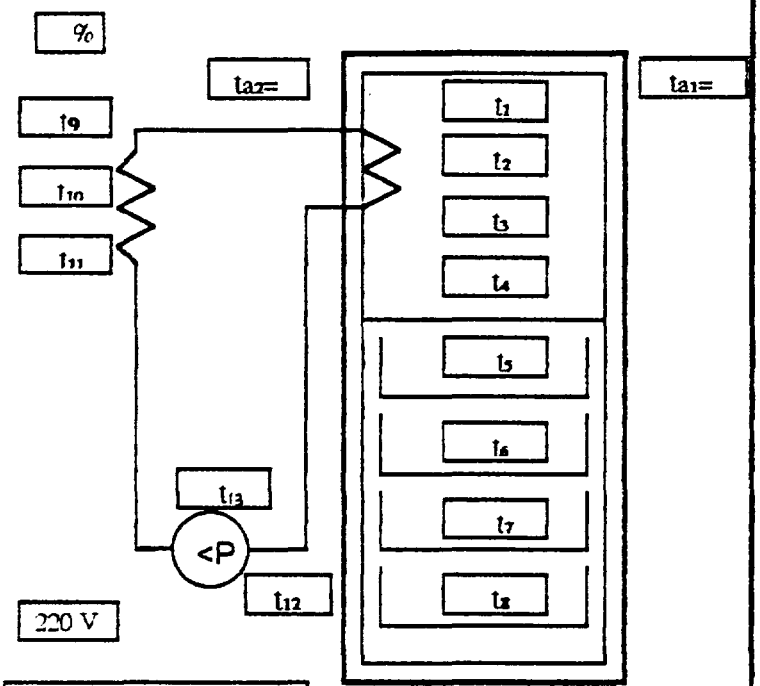
1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator internal design as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

4-Freezer Model UFM 10

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	3	----------
Freezer Mean Air Temperature (◦ C)	-10.6	-18
Condenser Outlet Temperature (◦ C)	-57.6	----------

AZMAYESH HOT ROOM TEST SHEET

Performance Test



LORESTAN 36

Product Name	Freezer
Product Model	UFM 10
Product Capacity	280 lit.
Compressor Name	Gold Star
Compressor Model	NR52LAEG
Compressor Power	1/6 hp
Compressor Current	1.1 A
Thermostat Position	3 & 7
Thermostat Type	Semi-Auto
Total Test Time	375 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-4.4	-9.9	-11.9	-12.7	-13	-13.1			
Evap. Air Temp. (t_2)	4.1	-3.6	-6.3	-7.2	-7.6	-7.7			
Evap. Air Temp. (t_3)	-0.4	-7.3	-10.3	-11.2	-11.6	-11.7			
Evap. Air Temp. (t_4)	-0.3	-8.1	-10.8	-11.7	-12.2	-12.3			
Evap. Mean Temp.	1.1	-6.3	-7.1	-10	-10.5	-10.6			
Meat Tray (t_5)	-	-	-	-	-	-			
Ref. Comp. Temp (t_6)	-	-	-	-	-	-			
Ref. Comp. Temp (t_7)	-	-	-	-	-	-			
Ref. Mean Temp	-	-	-	-	-	-			
Cellar Comp. Temp. (t_8)	-	-	-	-	-	-			
Cond. Outlet Temp. (t_9)	60.8	59	57.8	57.5	57.4	57.6			
Cond. Mid Temp. (t_{10})	67.3	64.3	62.7	62.5	62.2	62.2			
Cond. Inlet Temp. (t_{11})	74.7	75.7	73.9	73.5	73.3	72.7			
Comp. Suction Temp. (t_{12})									
Comp. Shell Temp. (t_{13})									

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Compressor Discharge Temperature (◦ C)	+72.9	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+62.2	----------
Compressor Shell (◦ C)	-85.6	----------
Type of Compressor Gold Star Model NR 52 LAEG	----------	----------

Evaluation

According to the above test results from cyclic run test at thermostat setting 3, we did not get desired figures from Freezer. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

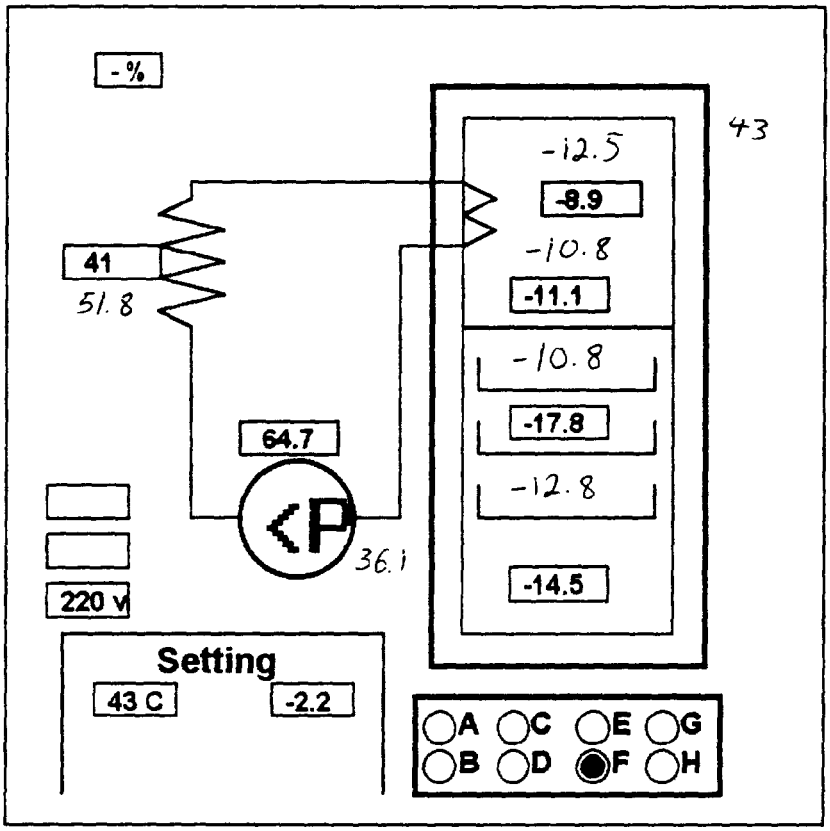
1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Perform different performance tests in accordance with ISO standard 5155.

5-Freezer Model UFM13

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	7 & 3.5	----------
Freezer Warmest Air Temperature (◦ C)	-8.9	-18
Condenser Outlet Temperature (◦ C)	+43.2	----------
Compressor Discharge Temperature (◦ C)	+51.8	----------
Condenser Mid Point (1/3) Temperature (◦ C)	-41	----------
Compressor Shell (◦ C)	-64.7	----------
Type of Compressor Gold Star Model VR 75 LAEG	----------	----------

تست یخچال کارخانجات صنعتی آزمایش

Performance Test

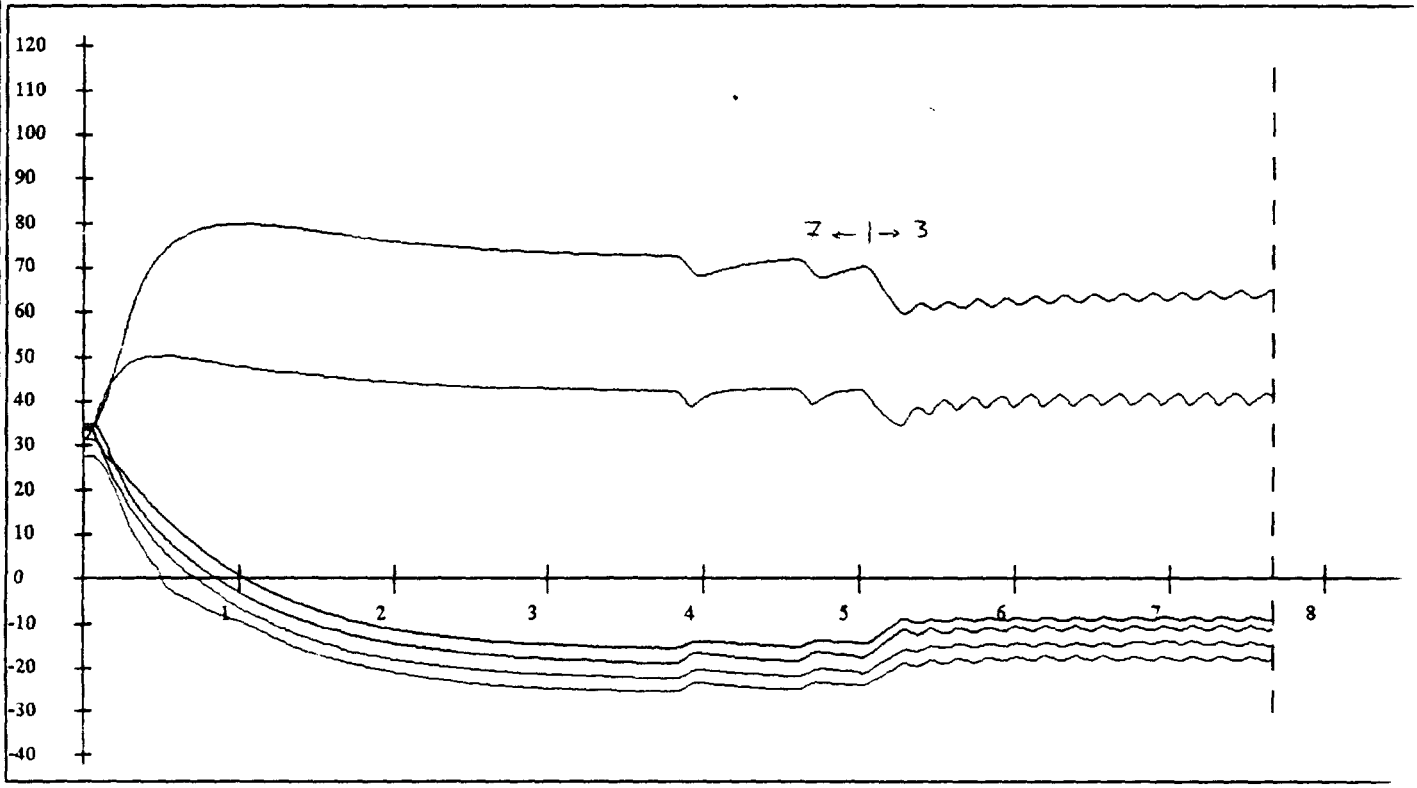


38

HR750617.D10

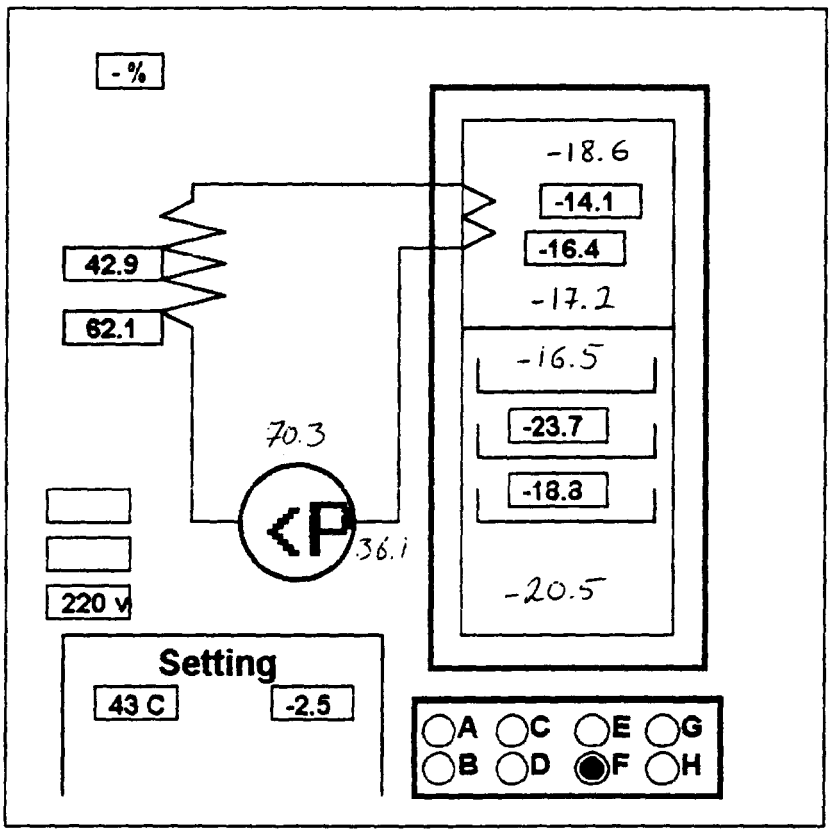
Product Name	Lorestan
Product Model	UFM 13
product. Capacity	368 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	7 – 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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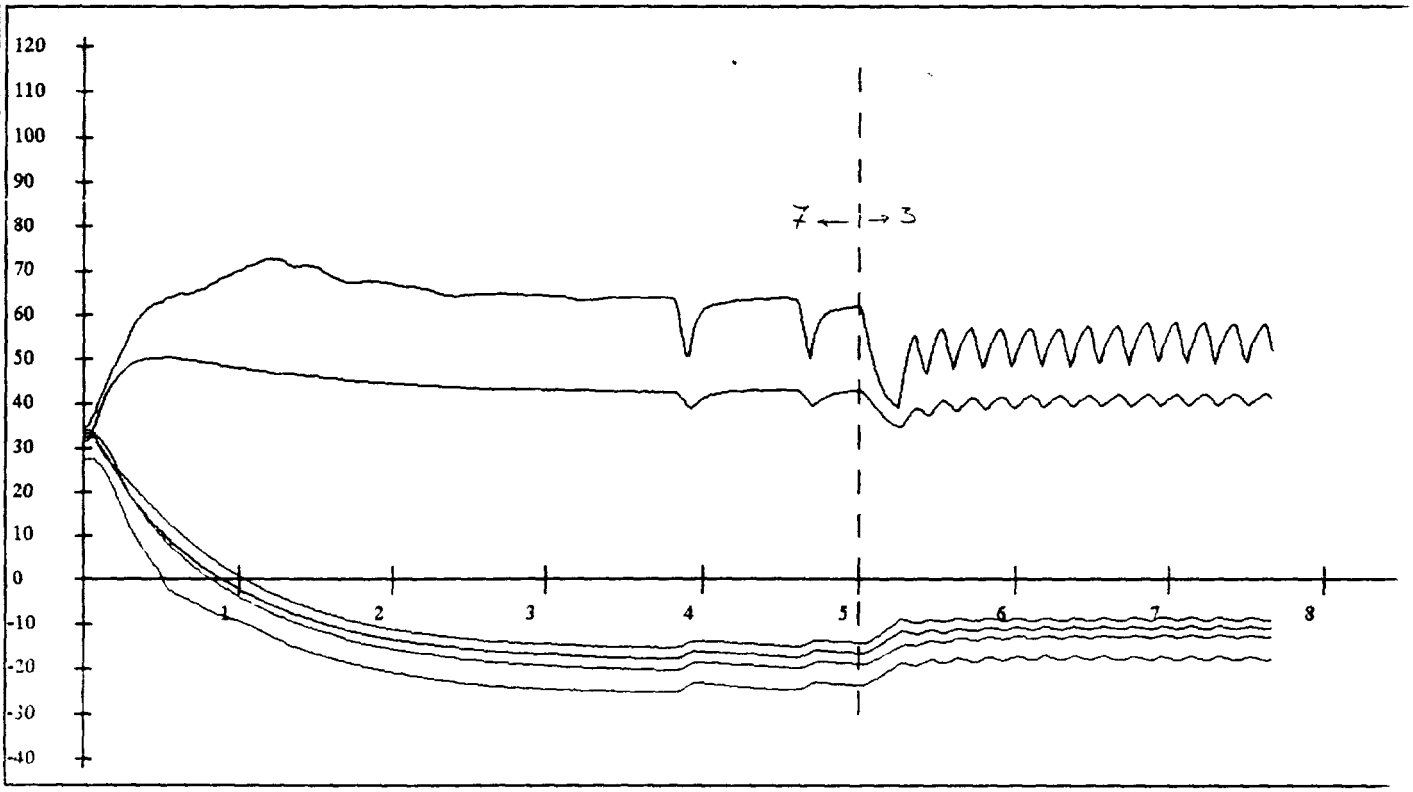
HR750617.D10

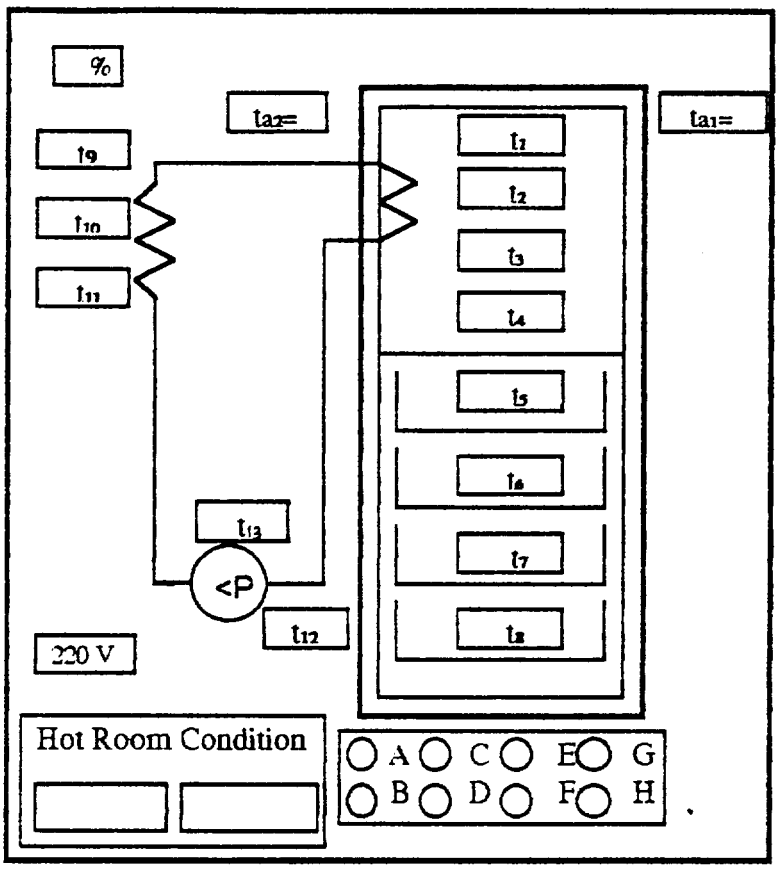
Product Name	Lorestan
Product Model	UFM 13
product. Capacity	368 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	7 – 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



Lorestan Freezer 40

Product Name	Lorestan
Product Model	UFM 13
Product Capacity	368 lit.
Compressor Name	Gold Star
Compressor Model	V75LAEG
Compressor Power	1/4 hp
Compressor Current	1.3 A
Thermostat Position	7 & 3.5
Thermostat Type	Semi Auto
Total Test Time	490 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature °C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-6.2	-16.1	-18.9	-17.3	-18.6	-11.5	-12.4	-12.5	
Evap. Air Temp. (t_2)	0.8	-11.1	-14.4	-13.7	-14.1	-8.5	-8.5	-8.9	
Evap. Air Temp. (t_3)	-2.2	-13.4	-16.8	-16.1	-16.4	-10.4	-10.5	-10.8	
Evap. Air Temp. (t_4)	-3.1	-14.2	-17.7	-16.4	-17.2	-10.3	-10.6	-11.1	
Evap. Mean Temp.									
Meat Tray (t_5)	-2.4	-13.6	-17	-16.3	-16.5	-10.6	-10.6	-10.8	
Ref. Comp. Temp (t_6)	-3.3	-20.8	-24.5	-23.2	-23.7	-17.1	-17.5	-17.8	
Ref. Comp. Temp (t_7)	-3.9	-15.5	-19.3	-18.5	-18.8	-12.6	-12.5	-12.8	
Ref. Mean Temp									
Cellar Comp. Temp. (t_8)	-6.4	-17.8	-21.2	-20.1	-20.5	-14	-13.7	-14.5	
Cond. Outlet Temp. (t_9)									
Cond. Mid Temp. (t_{10})	43	44.5	43.2	41.3	42.9	39.2	41.1	41	
Cond. Inlet Temp. (t_{11})	70.1	67	64.6	61.5	62.1	51.5	56.7	51.8	
Comp. Suction Temp.(t_{12})	36.3	36.1	35.9	36	36.1	35.9	36	36.1	
Comp. Shell Temp. (t_{13})	79.1	76.2	73.6	68.2	70.3	61.3	62.9	64.2	

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Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 5155

6 - Refrigerator Freezer Model RAT12

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	3.5 & 7	----------
Freezer Compartment Mean Air Temperature (°C)	-16.3	-18
Refrigerator Compartment Mean Temperature (°C)	+ 1	+5
Condenser Outlet Temperature (°C)	+36.1	----------
Compressor Discharge Temperature (°C)	+63.2	----------
Condenser Mid Point (1/3) Temperature (°C)	+48.2	----------
Compressor Shell (°C)	+87.9	----------
Type of Compressor Gold Star Model NR 62 LAEG	----------	----------

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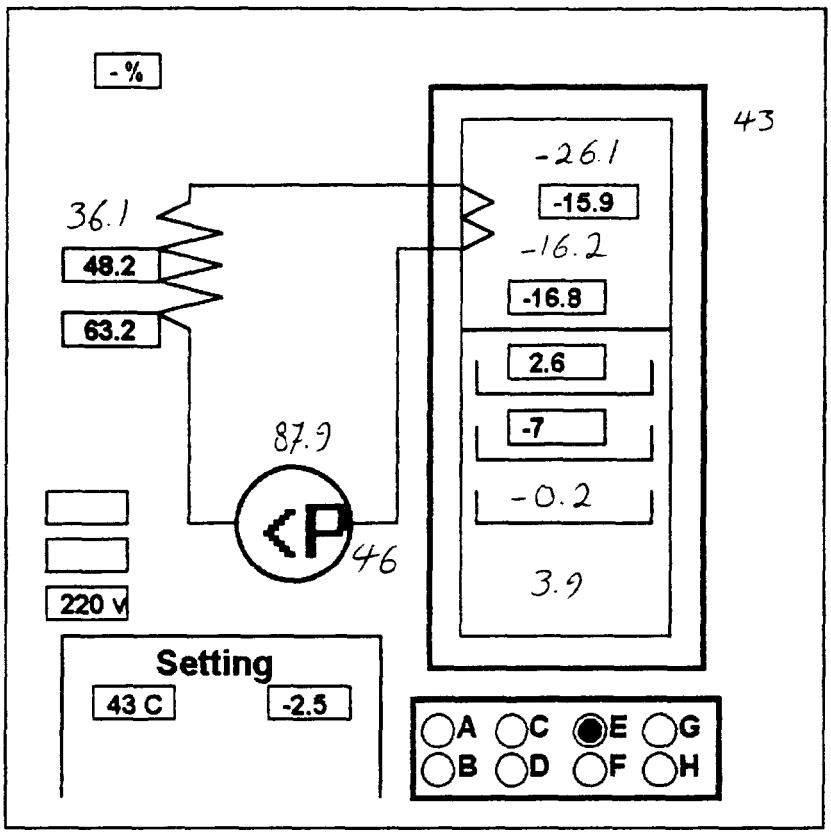
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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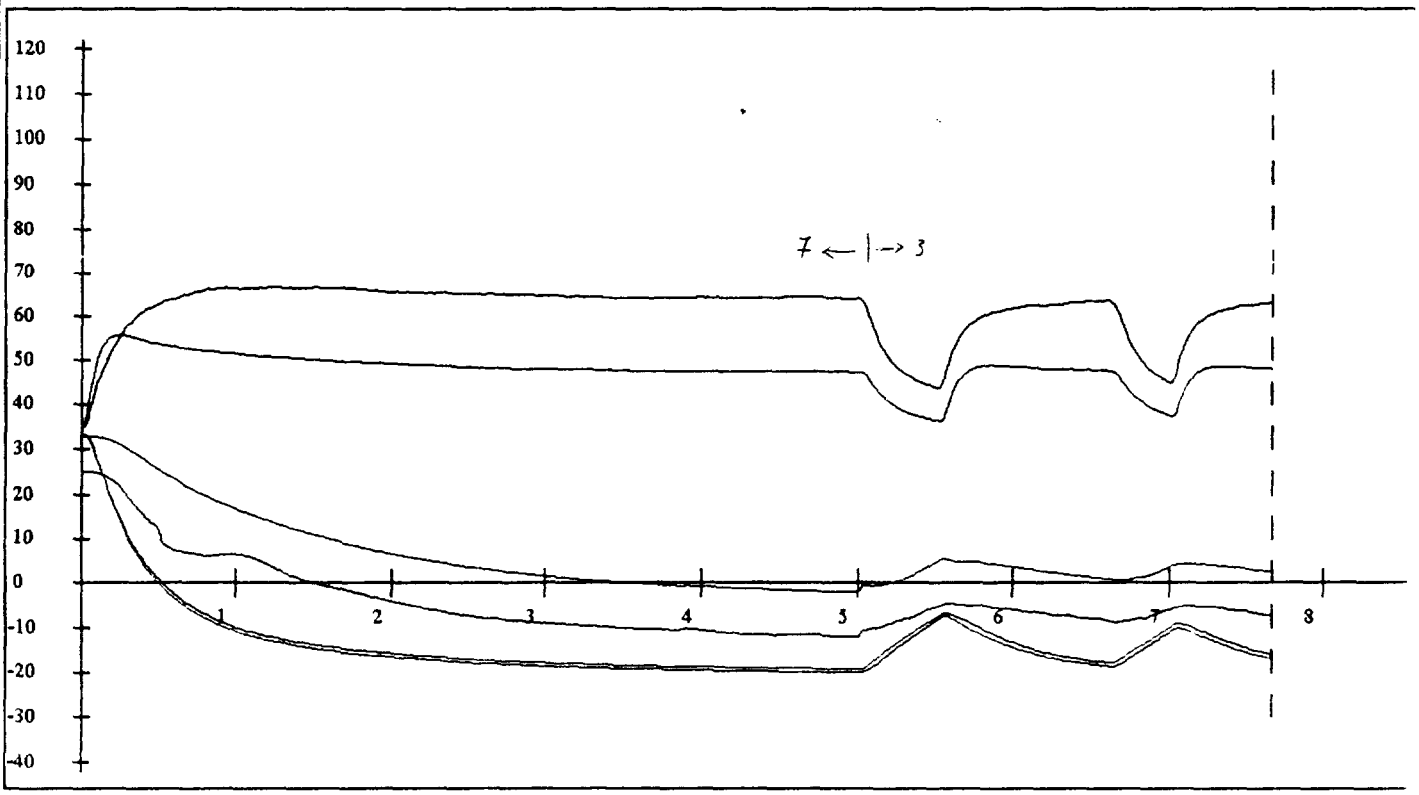
HR750617.D10

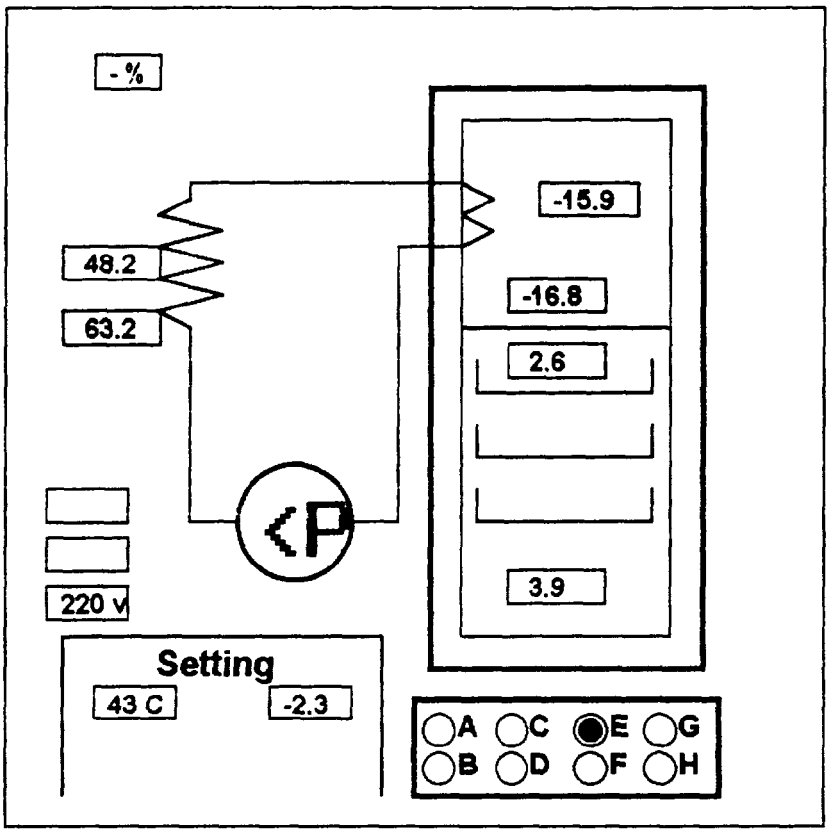
Product Name	Lorestan
Product Model	RAT 12
product. Capacity	326LI.
Compresor Name	GOLD STAR
Compresor Model	NR 62 LAEG
Compresor Power	1/5 HP
Compresor Current	1.2 A
Thermost. position	7 — 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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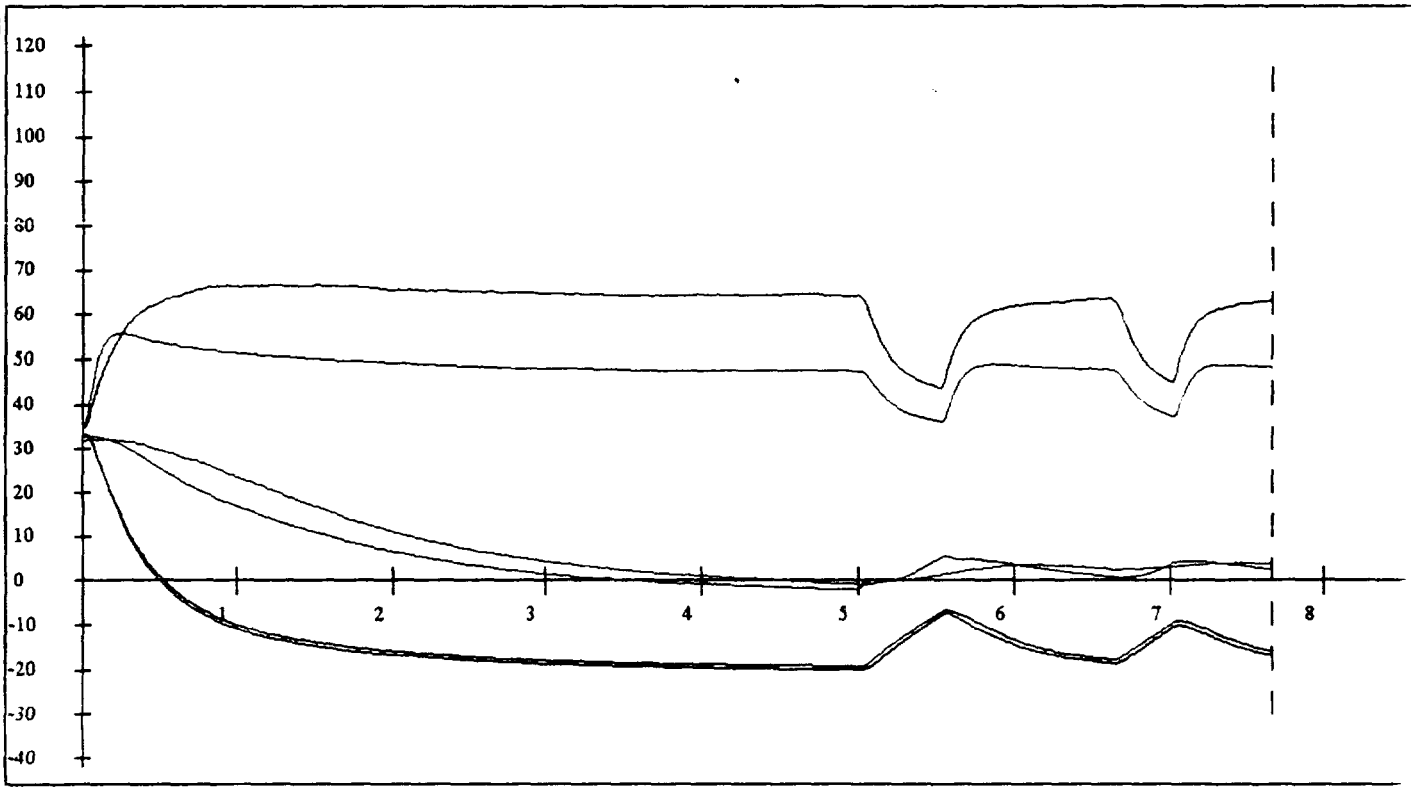
HR750617.D10

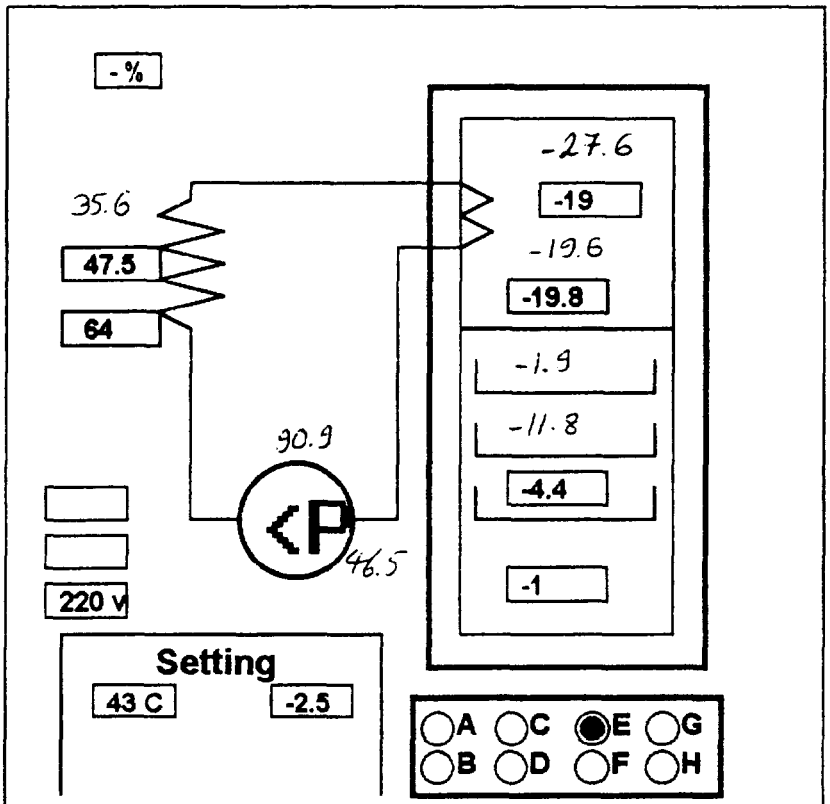
Product Name	Lorestan
Product Model	RAT 12
product. Capacity	326LI.
Compresor Name	GOLD STAR
Compresor Model	NR 62 LAEG
Compresor Power	1/5 HP
Compresor Current	1.2 A
Thermost. position	7
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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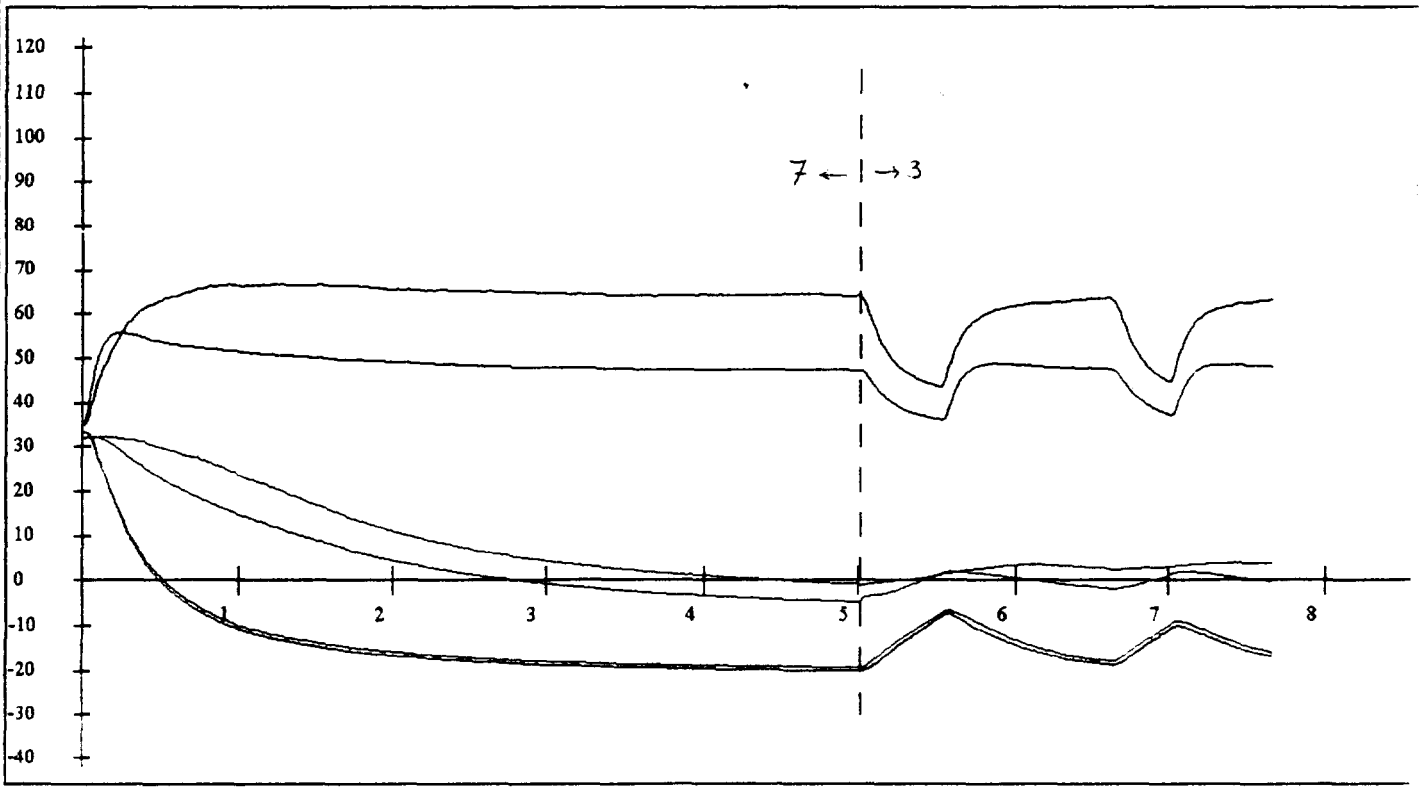
HR750617.D10

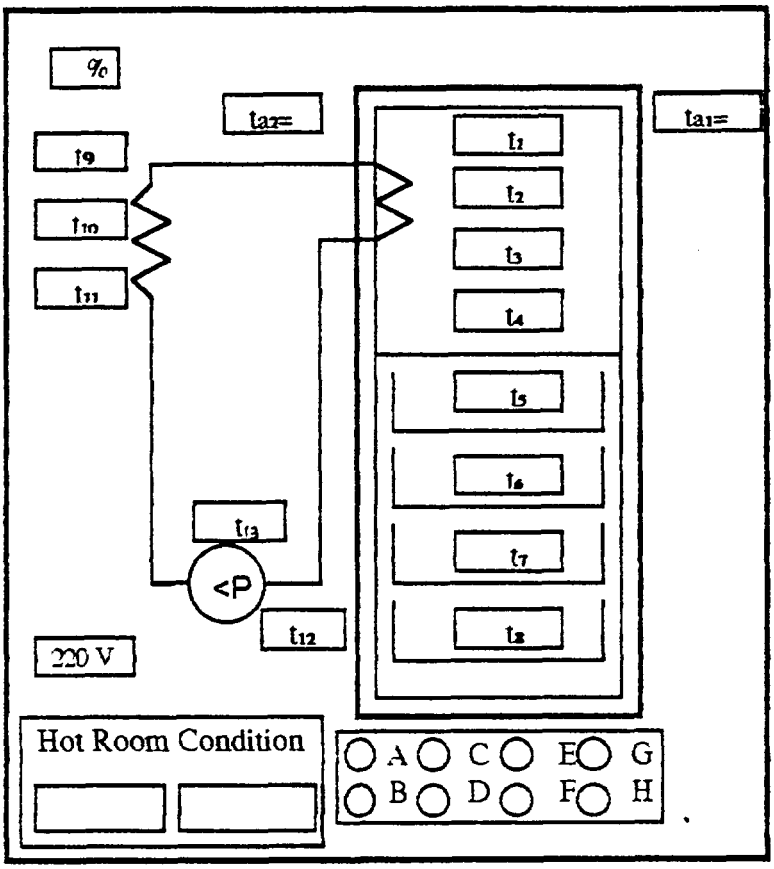
Product Name	**Lorestan**
Product Model	**RAT 12**
product. Capacity	**326LI.**
Compresor Name	**GOLD STAR**
Compresor Model	**NR 62 LAEG**
Compresor Power	**1/5 HP**
Compresor Current	**1.2 A**
Thermost. position	**7 — 3**
Thermost. Type	**SEMI AUTO**
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



Hot Room Condition

A C E G
B D F H

Lorestan 46

Product Name	Ref. Freezer
Product Model	RAT 12
Product Capacity	326 Lit.
Compressor Name	Gold Star
Compressor Model	NR 62 LAEG
Compressor Power	1/5 hp
Compressor Current	1.2 A
Thermostat Position	7 & 3.5
Thermostat Type	Semi Auto
Total Test Time	510 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Temperature ° C \ Time(Hrs)	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-20.7	-24.6	-26.4	-27.3	-27.6	-24	-15.4	-26.1	
Evap. Air Temp. (t_2)	-9.9	-15.7	-17.7	-18.3	-19	-13.2	-9.7	-15.9	
Evap. Air Temp. (t_3)	-10.2	-16.2	-18.3	-19.2	-19.6	-13.6	-10.7	-16.2	
Evap. Air Temp. (t_4)	-10.8	-16.4	-18.5	-19.4	-19.8	-14.3	-10.9	-16.8	
Evap. Mean Temp.	-10.3	-16.1	-18.1	-19	-19.5	-13.7	-10.5	-16.3	
Meat Tray (t_5)	17	6.7	1.7	0.6	-1.9	3.7	3.8	2.6	
Ref. Comp. Temp (t_6)	6.7	-4	-8.8	-10.5	-11.8	-5.8	-5.9	0.7	
Ref. Comp. Temp (t_7)	14.8	4.6	-0.6	-3.2	-4.6	0.7	1.3	-0.2	
Ref. Mean Temp	+12.8	2.4	-2.6	-4.4	-6.1	-0.5	-0.3	1.0	
Cellar Comp. Temp. (t_8)	23.6	11.1	4.5	1.3	-0.7	3.5	3.2	3.9	
Cond. Outlet Temp. (t_9)	38.2	36.4	35.4	35.8	35.6	36.5	30.6	36.1	
Cond. Mid Temp. (t_{10})	51.5	49.3	48.2	47.7	47.5	48.7	37.6	48.2	
Cond. Inlet Temp. (t_{11})	66.6	65.7	65	64.6	64.4	62	45.1	63.2	
Comp. Suction Temp.(t_{12})	47.5	47.2	46.8	46.4	46.5	45.5	48.1	46	
Comp. Shell Temp. (t_{13})	90.7	93.2	92.1	91.4	90.7	84.6	68.7	87.9	

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b) Fariz Iran

1 - Freezer Model FIF13

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	4	----------
Freezer Warmest Air Temperature (◦ C)	-9.7	-18
Condenser Outlet Temperature (◦ C)	-35.7	----------
Compressor Discharge Temperature (◦ C)	-87	----------
Condenser Mid Point (1 3) Temperature (◦ C)	-48.6	----------
Compressor Shell (◦ C)	-40.1	----------
Type of Compressor Zanussi Model GA99AA	----------	----------

Evaluation

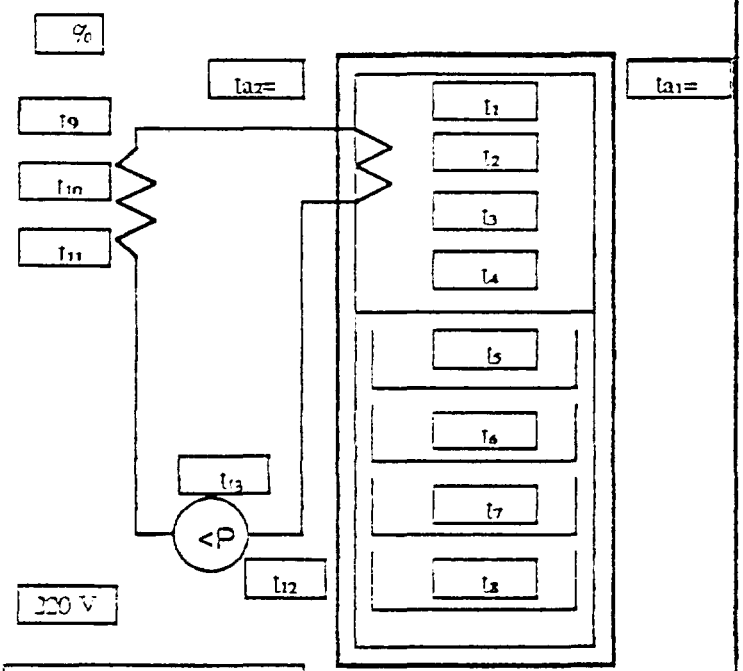
According to the above test results from cyclic run test at thermostat setting 3, we did not get desired figures from Freezer compatment. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 5155.

AZMAYESH HOT ROOM TEST SHEET

Performance Test

48



Hot Room Condition

A C E G
B D F H

Freezer

Product Name	Fariz Iran
Product Model	FIF13
Product Capacity	290 Lit
Compressor Name	Zanussi
Compressor Model	GL99AA
Compressor Power	1/4 HP
Compressor Current	1.3 A
Thermostat Position	0 → 4-1
Thermostat Type	Semi Auto
Total Test Time	21 hrs.

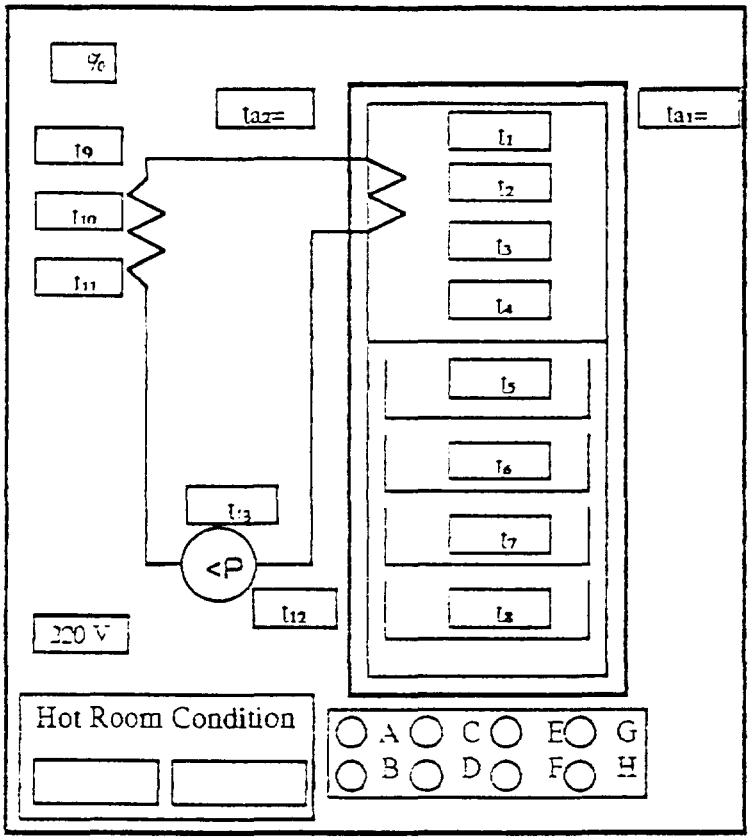
Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)									
Evap. Air Temp. (t_2)	-10.3	-16.1	-16.5	+3.7	-10.3	-10	-12	-11.6	-9
Evap. Air Temp. (t_3)	-13.9	-19.1	-19.4	1.4	-14	-13.5	-15.3	-14	-12.1
Evap. Air Temp. (t_4)	-14.4	-19.5	-19.9	0.4	-14.4	-14.1	-15.9	-14.6	-12.9
Evap. Mean Temp.									
Meat Tray (t_5)									
Ref. Comp. Temp (t_6)	-14	-19.3	-19.6	-0.2	-14.1	-13.8	-15.6	-14.7	-12.6
Ref. Comp. Temp (t_7)	-14.9	-20.6	-21	-1	-15.1	-15	-16.7	-15.9	-13.9
Ref. Mean Temp									
Cellar Comp. Temp. (t_8)	-19.2	-26.3	-27.2	-10.9	-25.7	-23.5	-19.4	-18.3	-15.6
Cond. Outlet Temp. (t_9)	40	41	42	42.3	42.4	42.4	41	38.9	37.7
Cond. Mid Temp. (t_{10})	48.8	48.2	49.1	42.4	51.1	50.8	52.8	44.7	50.1
Cond. Inlet Temp. (t_{11})	63.9	65.6	69.4	38.7	67.6	68.5	99.3	65.9	92.3
Comp. Suction Temp.(t_{12})	36.1	36.9	37.6	38.2	38.4	38.3	37	36	35.2
Comp. Shell Temp. (t_{13})	68.4	70.7	71.3	59.7	69.4	66.4	66.2	53.1	43

AZMAYESH HOT ROOM TEST SHEET

Performance Test

48-1



Product Name	Fariz Iran
Product Model	FIF13
Product Capacity	290 Lt.
Compressor Name	Zanussi
Compressor Model	GL79HA
Compressor Power	1/4 Hp
Compressor Current	1.3 A
Thermostat Position	9-4-1
Thermostat Type	Semi Auto
Total Test Time	

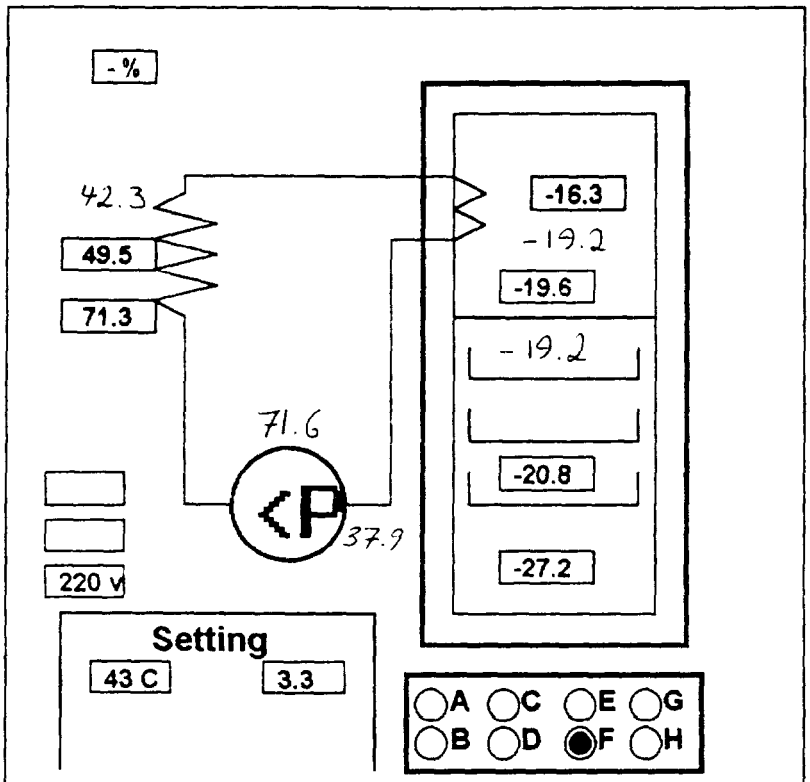
Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	11	12	13	14	15	16	19	20	21
Evap. Inlet Temp. (t_1)									
Evap. Air Temp. (t_2)	-10.8	-8	-9.1	-11	-11.2	-9.7	-7.4	-5.2	-5.2
Evap. Air Temp. (t_3)	-14.2	-10.8	-11.1	-13.7	-14.5	-12.9	-9.8	-7.8	-7.3
Evap. Air Temp. (t_4)	-14.8	-11.4	-11.7	-14.4	-15.2	-13.6	-10.4	-8.5	-7.9
Evap. Mean Temp.									
Meat Tray (t_5)									
Ref. Comp. Temp (t_6)	-14.4	-11.3	-12	-14.3	-14.8	-13.3	-10.4	-8.5	-8.2
Ref. Comp. Temp (t_7)	-15.7	-12.6	-13.2	-15.5	-16	-14.5	-11.4	-9.6	-9.3
Ref. Mean Temp									
Cellar Comp. Temp. (t_8)	-17.2	-14.1	-14.9	-17.1	-17.4	-15.9	-13.7	-11.8	-12
Cond. Outlet Temp. (t_9)	36.8	36.3	36.3	36.3	35.9	35.7	41.8	42.3	42.2
Cond. Mid Temp. (t_{10})	49.7	47.1	38.9	43	48.8	48.6	42.6	49	48.5
Cond. Inlet Temp. (t_{11})	91.3	81.3	49.4	64.4	89.2	87	50.7	66.2	52.9
Comp. Suction Temp. (t_{12})	34.6	34.3	34.4	34.3	34	33.9	37.9	38.4	38.4
Comp. Shell Temp. (t_{13})	41.9	40.8	40.8	40.9	40.7	40.1	58.5	61.3	59.6

تست یخچال کارخانجات صنعتی آزمایش

48-2

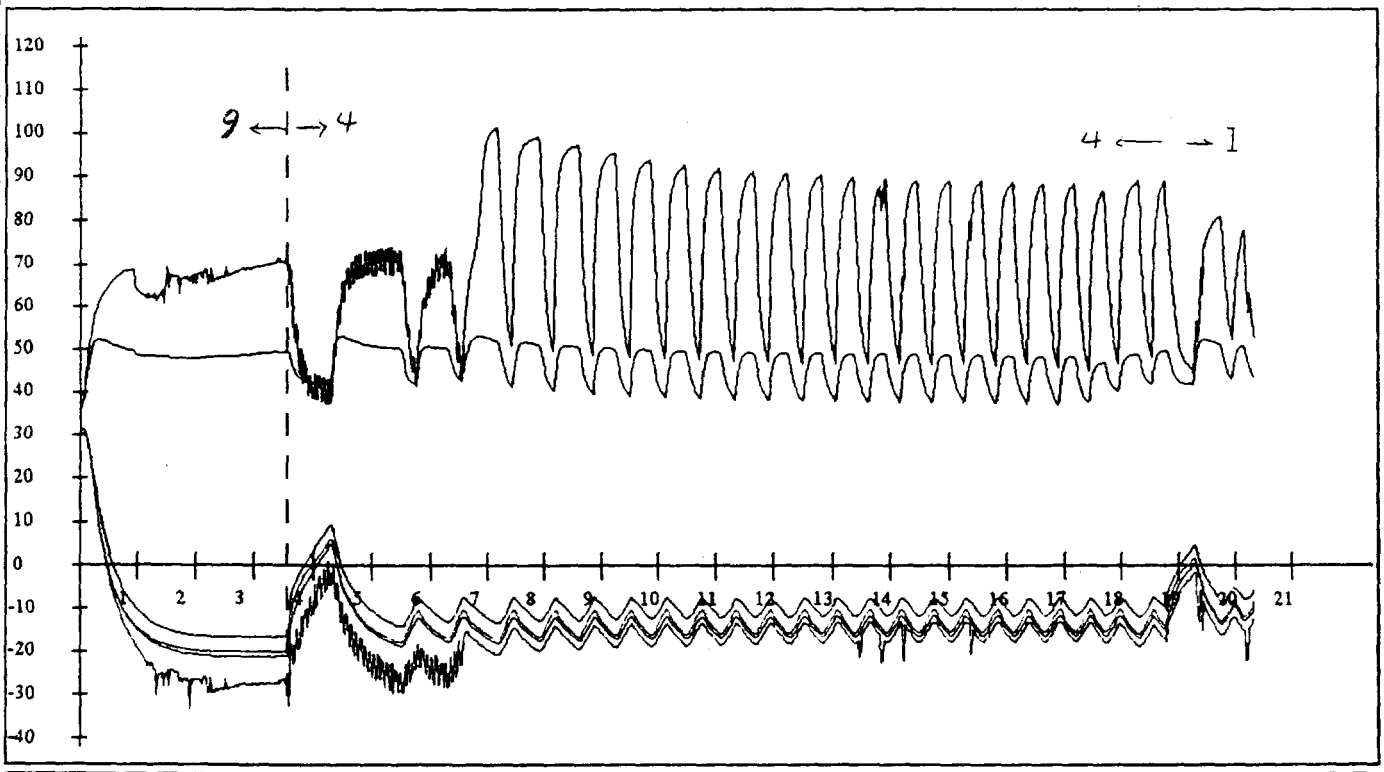
Performance Test



HR750625.D12

Product Name	FARIZ IRAN
Product Model	FIF 13
product. Capacity	290 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 99 AA
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	9 & 4 - 1
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	

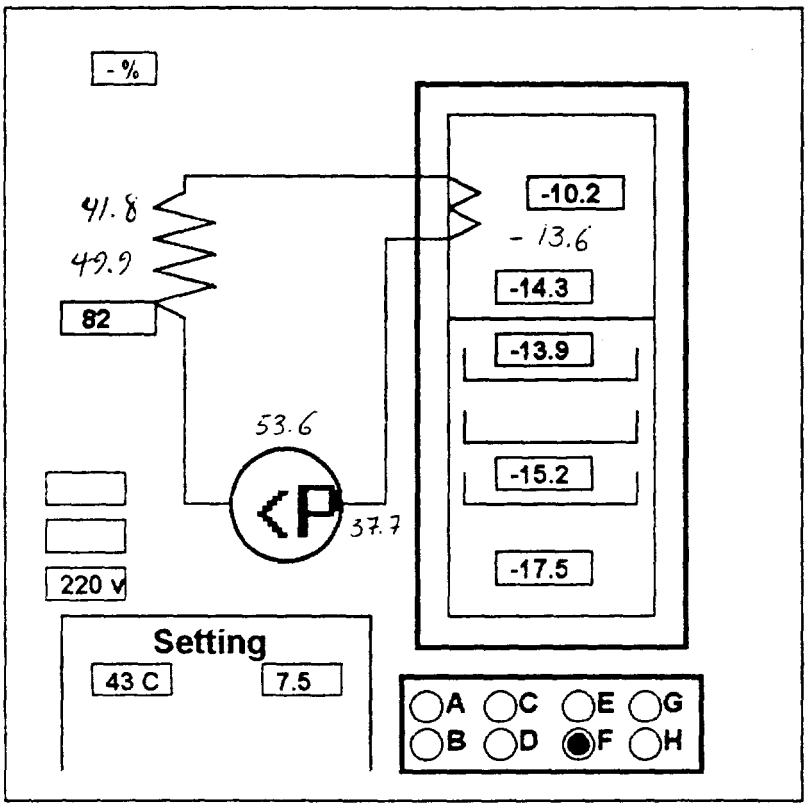


Ft. Mean Temp. = -20.4°C, Thermostate position is 9

تست یخچال کارخانجات صنعتی آزمایش

48-3

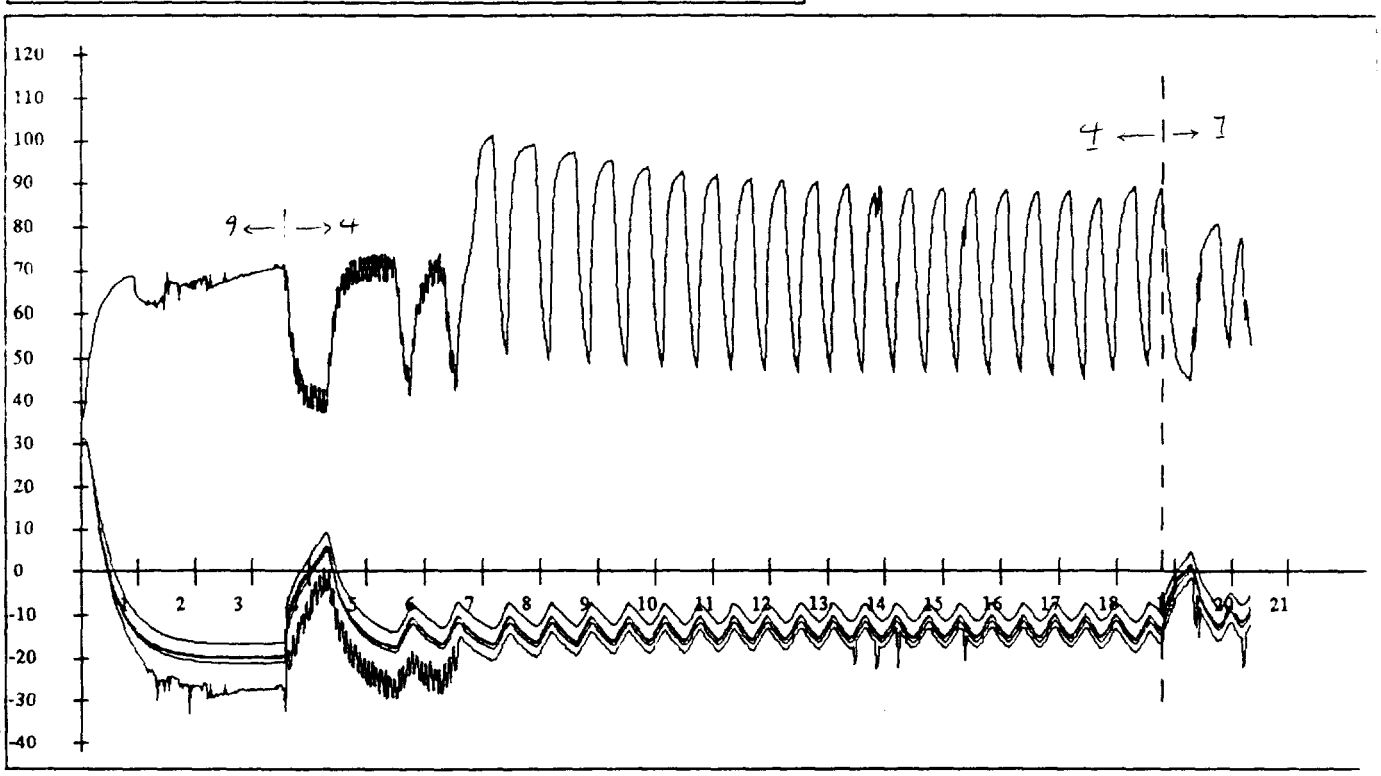
Performance Test



HR750625.D12

Product Name	FARIZ IRAN
Product Model	FIF 13
product. Capacity	290 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 99 AA
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	9 & 4 - 1
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	

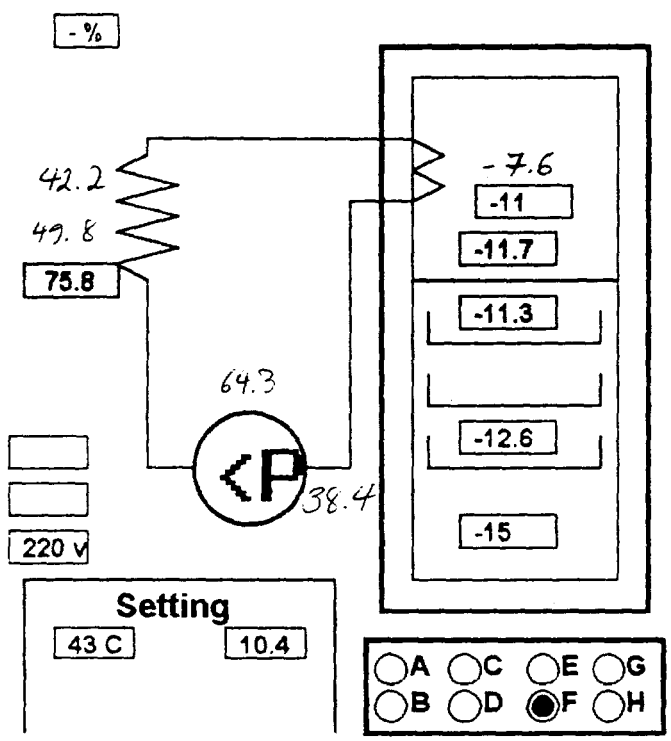


Max. Temp. = -14.1 °C
Min. Temp. = -10.3 °C
→ Thermostate position is 4

تست یخچال کارخانجات صنعتی آزمایش

48-4

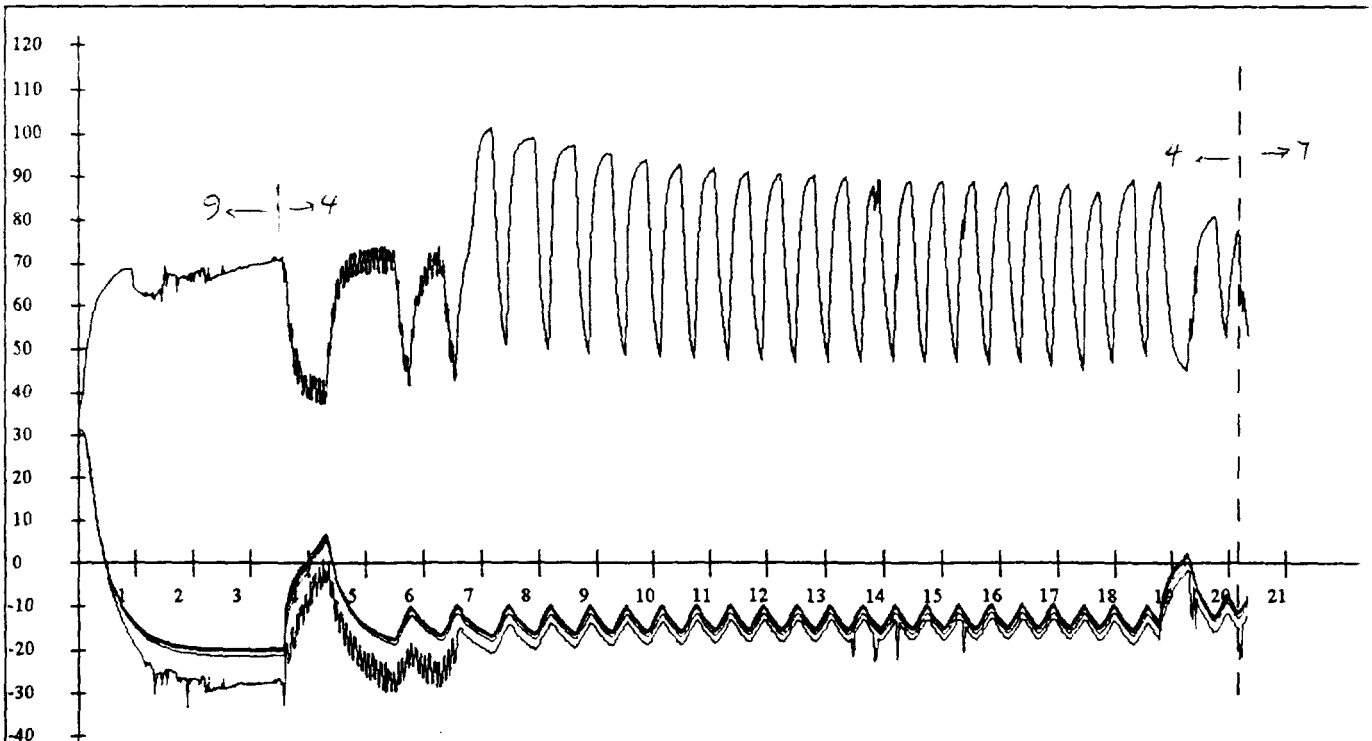
Performance Test



HR750625.D12

Product Name	**FARIZ IRAN**
Product Model	**FIF 13**
product. Capacity	**290 LI.**
Compresor Name	**ZANUSSI**
Compresor Model	**GL 99 AA**
Compresor Power	**1/4 HP**
Compresor Current	**1.3 A**
Thermost. position	**9 & 4 - 1**
Thermost. Type	**SEMI AUTO**
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



max. Temp. = -11.5 °C
min. Temp. = -8 °C
→ Thermostate position is = 1

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2 - Refrigerator Model FIR11

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	3	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-1.2	-12
Refrigerator Compartment Mean Temperature (◦ C)	+ 8.8	+5
Condenser Outlet Temperature (◦ C)	+35.3	----------
Compressor Discharge Temperature (◦ C)	+60.1	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+47.6	----------
Compressor Shell (◦ C)	+72.4	----------
Type of Compressor Zanussi Model GL60AA	----------	----------

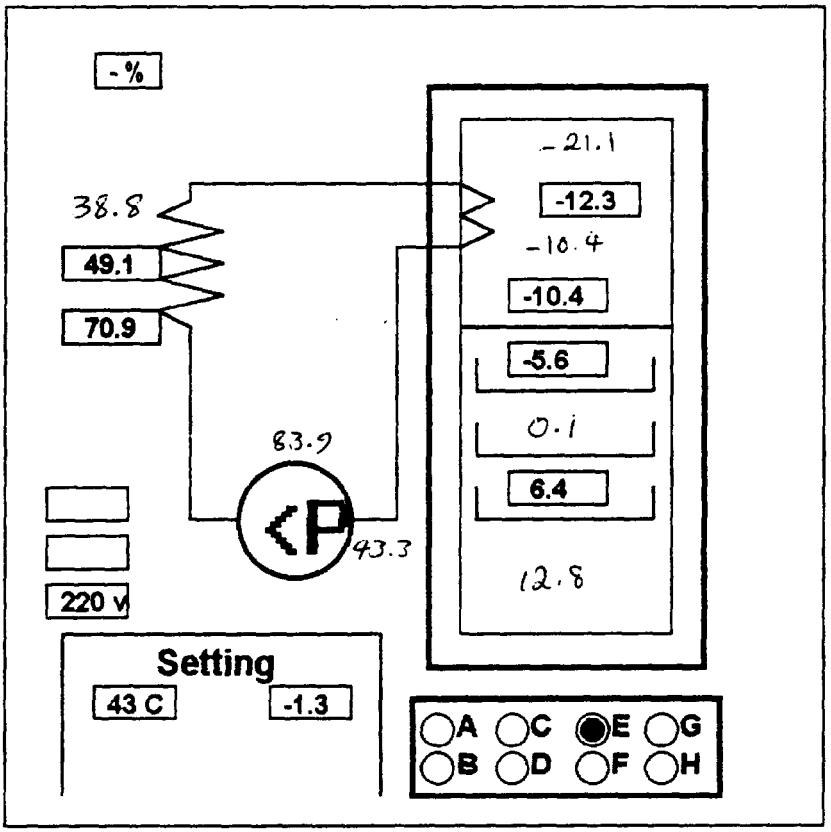
Evaluation

According to the above test results from cyclic run test at thermostat setting 3, we did not get desired figures from freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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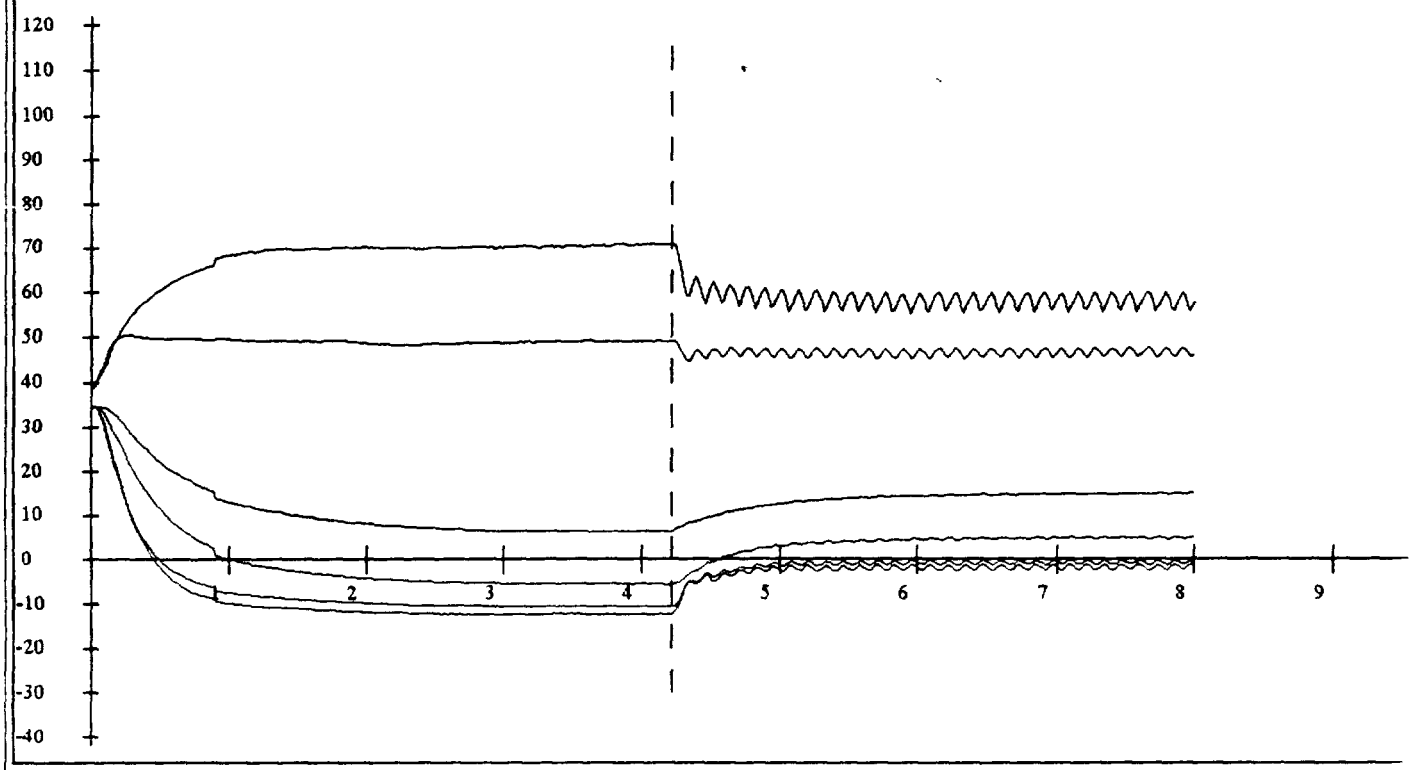
HR750614.D09

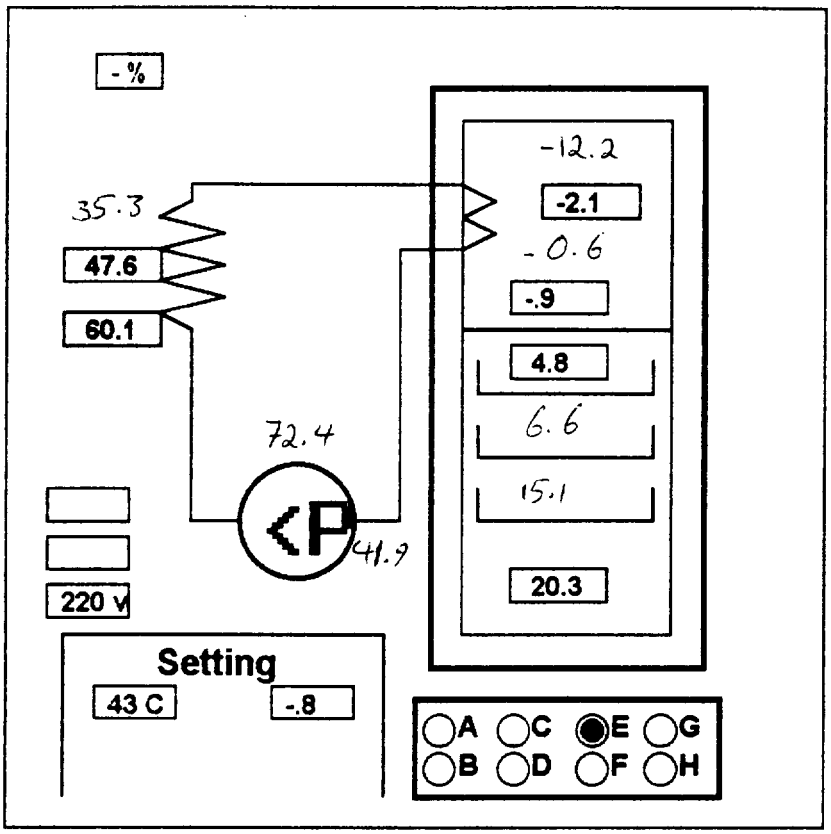
Product Name	FARIZ IRAN
Product Model	FIR 11
product. Capacity	318 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 60 AA
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	9
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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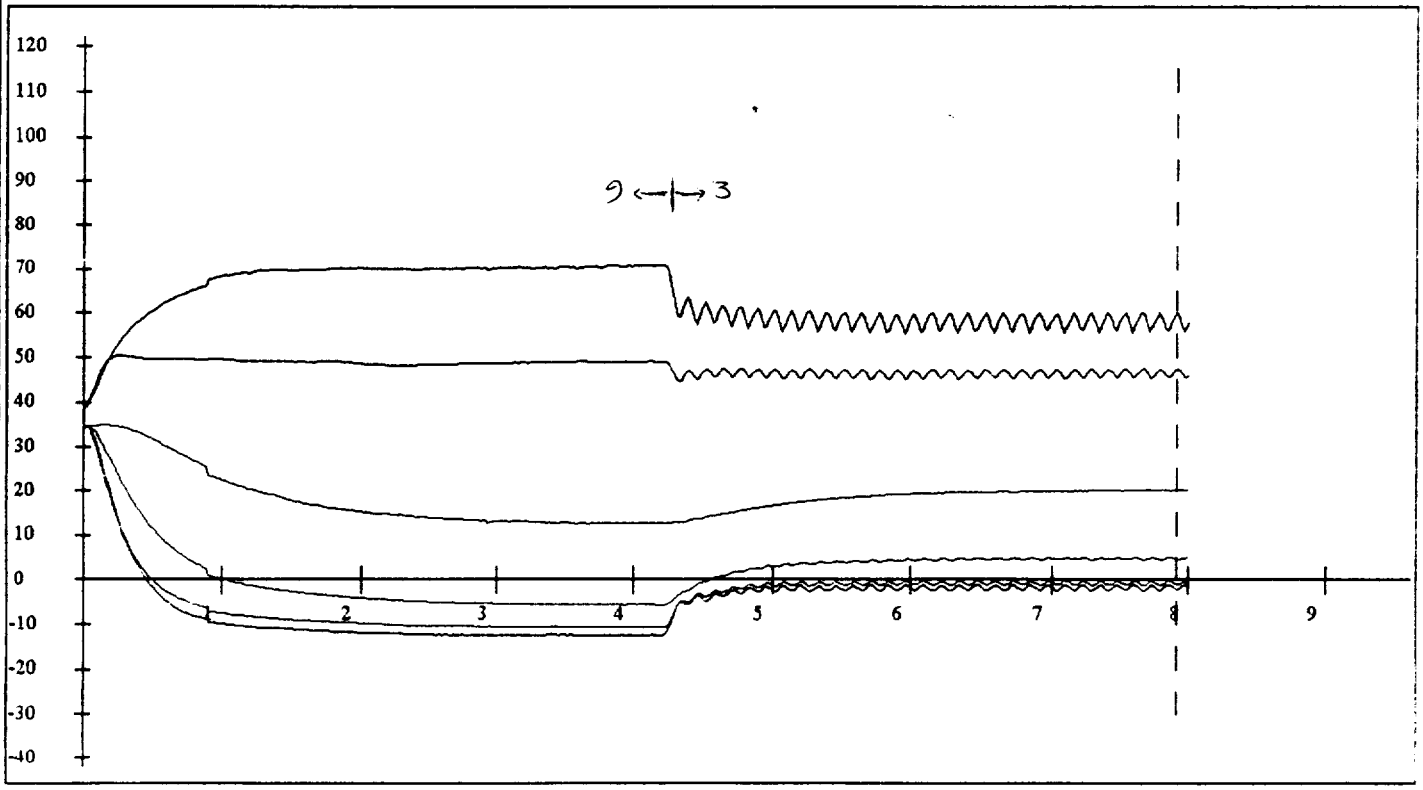
HR750614.D09

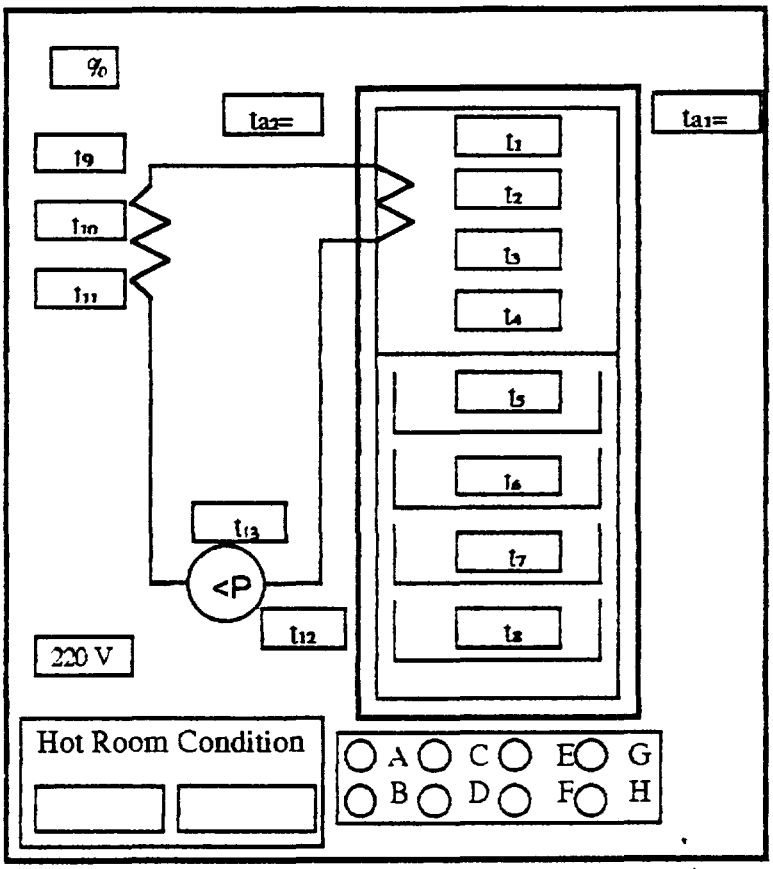
Product Name	FARIZ IRAN
Product Model	FIR 11
product. Capacity	318 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 60 AA
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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Fariz Iran

Product Name	Refrigerator
Product Model	FIR11
Product Capacity	318 Lit.
Compressor Name	Zanussi
Compressor Model	GL60 AA
Compressor Power	1/6 hp
Compressor Current	1.1 A
Thermostat Position	9 & 3
Thermostat Type	Semi Auto
Total Test Time	

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-18.7	-20.8	-21.1	-21	-11.9	-11	-10	-8.6	
Evap. Air Temp. (t_2)	-9.7	-11.8	-12.3	-12.3	-2.4	-1.8	-1.5	-1.1	
Evap. Air Temp. (t_3)	-7.1	-9.5	-10.4	-10.4	-1	-0.3	-0.1	0.1	
Evap. Air Temp. (t_4)	-7.4	-9.7	-10.4	-10.4	-1.2	-0.6	-0.3	-0.2	
Evap. Mean Temp.	-8.1	-10.3	-11	-11	-1.5	-0.9	-0.6	-0.5	
Meat Tray (t_5)	0.3	-4	-5.3	-5.5	3.2	4.7	5	5.1	
Ref. Comp. Temp (t_6)	1	-0.4	1.8	1	8.5	5.7	10.6	7.7	
Ref. Comp. Temp (t_7)	13.1	8.2	6.7	6.5	12.8	14.6	15	15.3	
Ref. Mean Temp	4.8	+3.9	+1.1	+0.6	8.1	8.3	10.2	9.4	
Cellar Comp. Temp. (t_8)	22.5	15.5	13.2	12.9	16.8	19.5	20	20.3	
Cond. Outlet Temp. (t_9)	33.9	35.8	38.9	39.6	39.5	34	38.3	34.5	
Cond. Mid Temp. (t_{10})	47.7	48.8	48.9	49.1	47.4	46.8	46.6	46.1	
Cond. Inlet Temp. (t_{11})	68.4	70.4	70.4	70.8	60.7	59	58.7	58	
Comp. Suction Temp. (t_{12})	43.7	43.1	43.1	43.5	41.1	40.9	40.7	40.8	
Comp. Shell Temp. (t_{13})	80.8	83.2	83.4	83.9	74	71.7	71.6	71.6	

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3 -Refrigerator Model FIR13

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	5	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-7.6	-12
Refrigerator Compartment Mean Air Temperature	7.9	-5
Condenser Outlet Temperature (◦ C)	-40.7	----------
Compressor Discharge Temperature (◦ C)	+65.7	----------
Condenser Mid Point (1/3) Temperature (◦ C)	-52.5	----------
Compressor Shell (◦ C)	-80.5	----------
Type of Compressor Zanussi Model GL80AA	----------	----------

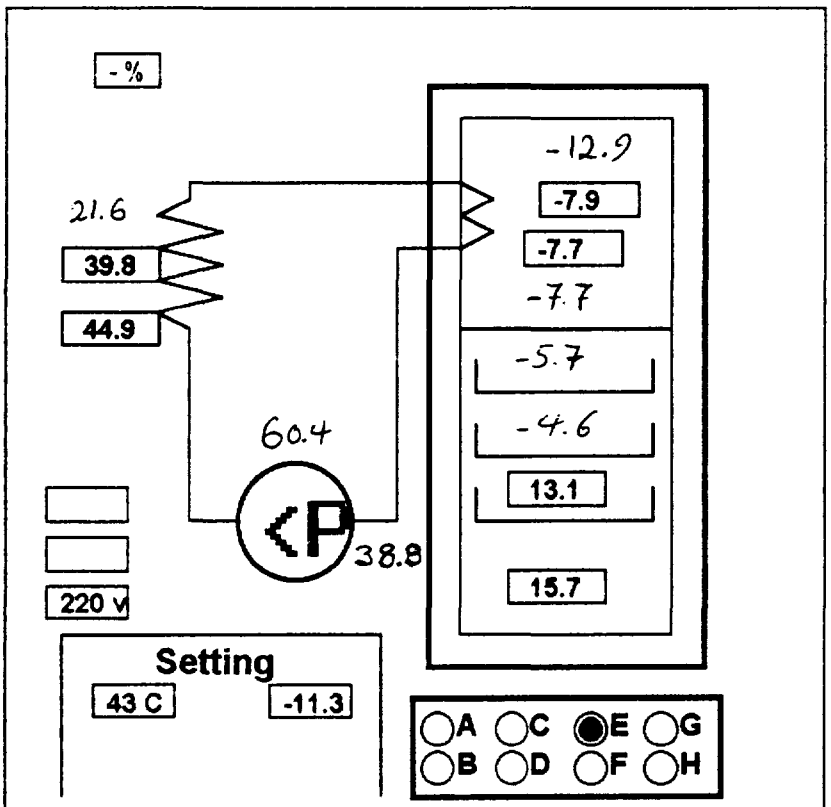
Evaluation

According to the above test results from cyclic run test at thermostat setting 5, we did not get desired figures from Refrigerator and Freezer compartment. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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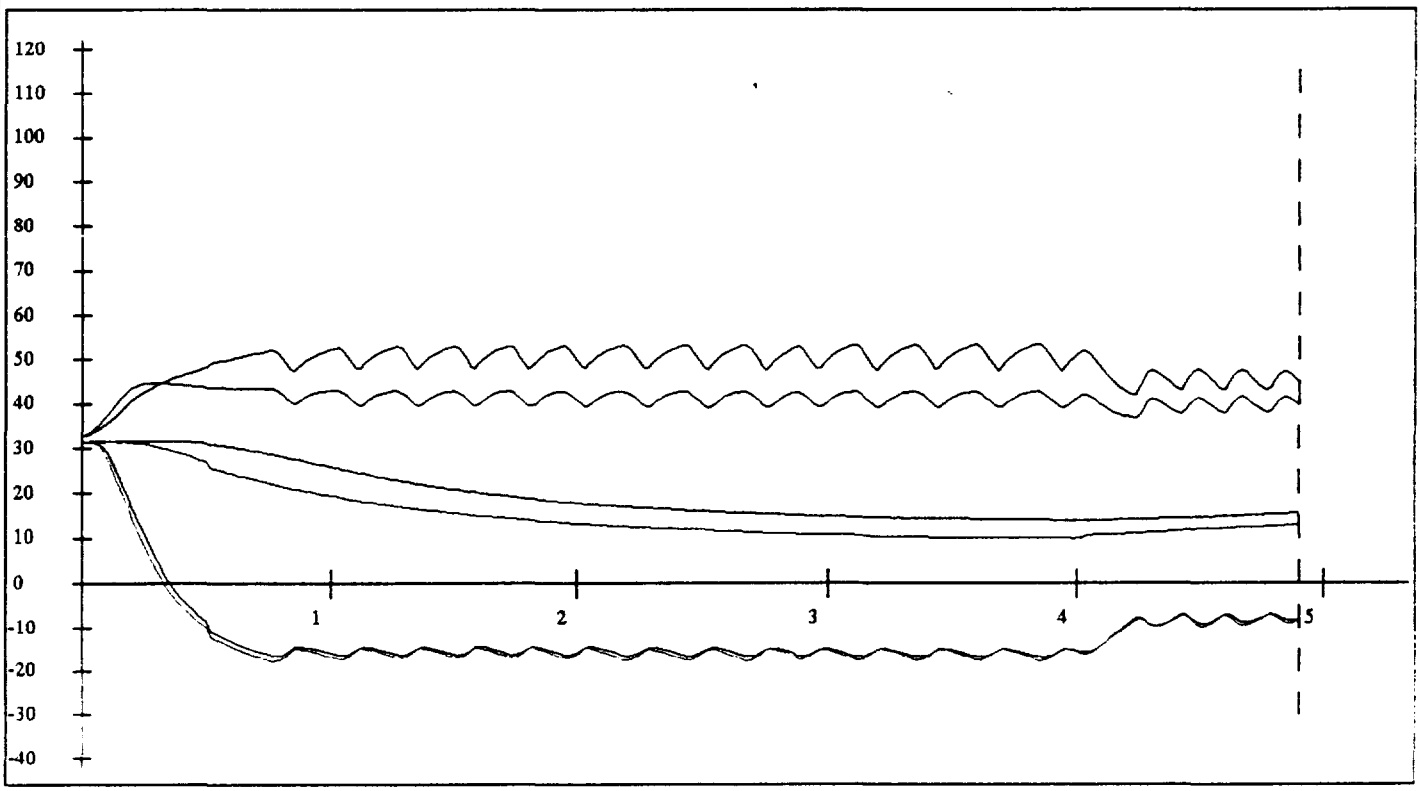
HR750618.D10

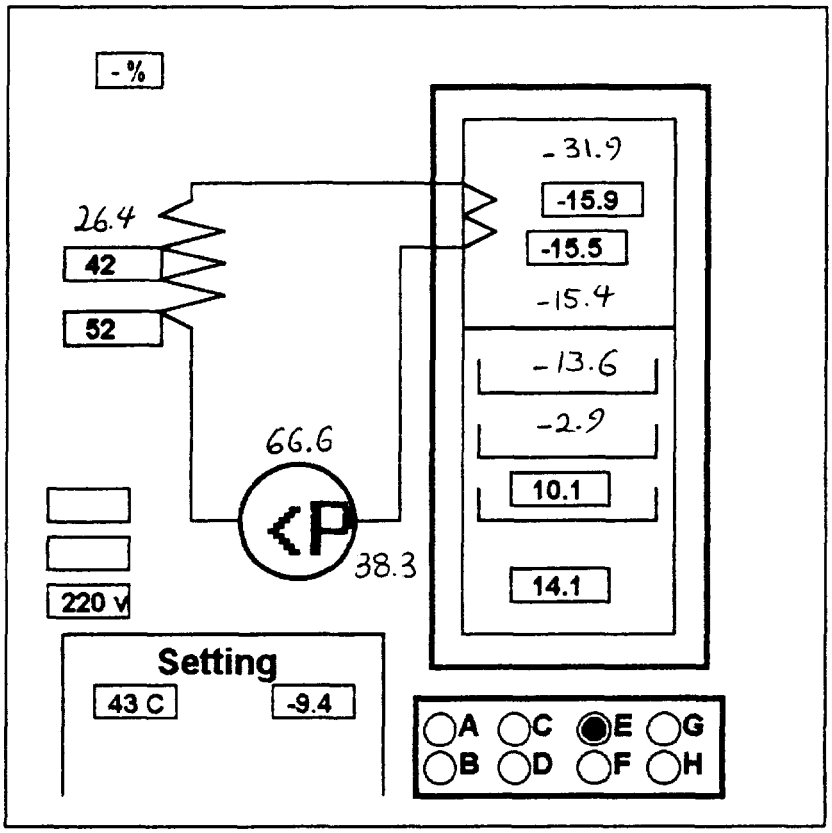
Product Name	Fariz Iran
Product Model	FIR 13
product. Capacity	338 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 80 AA
Compresor Power	1/5 HP
Compresor Current	1.2 A
Thermost. position	9 — 4
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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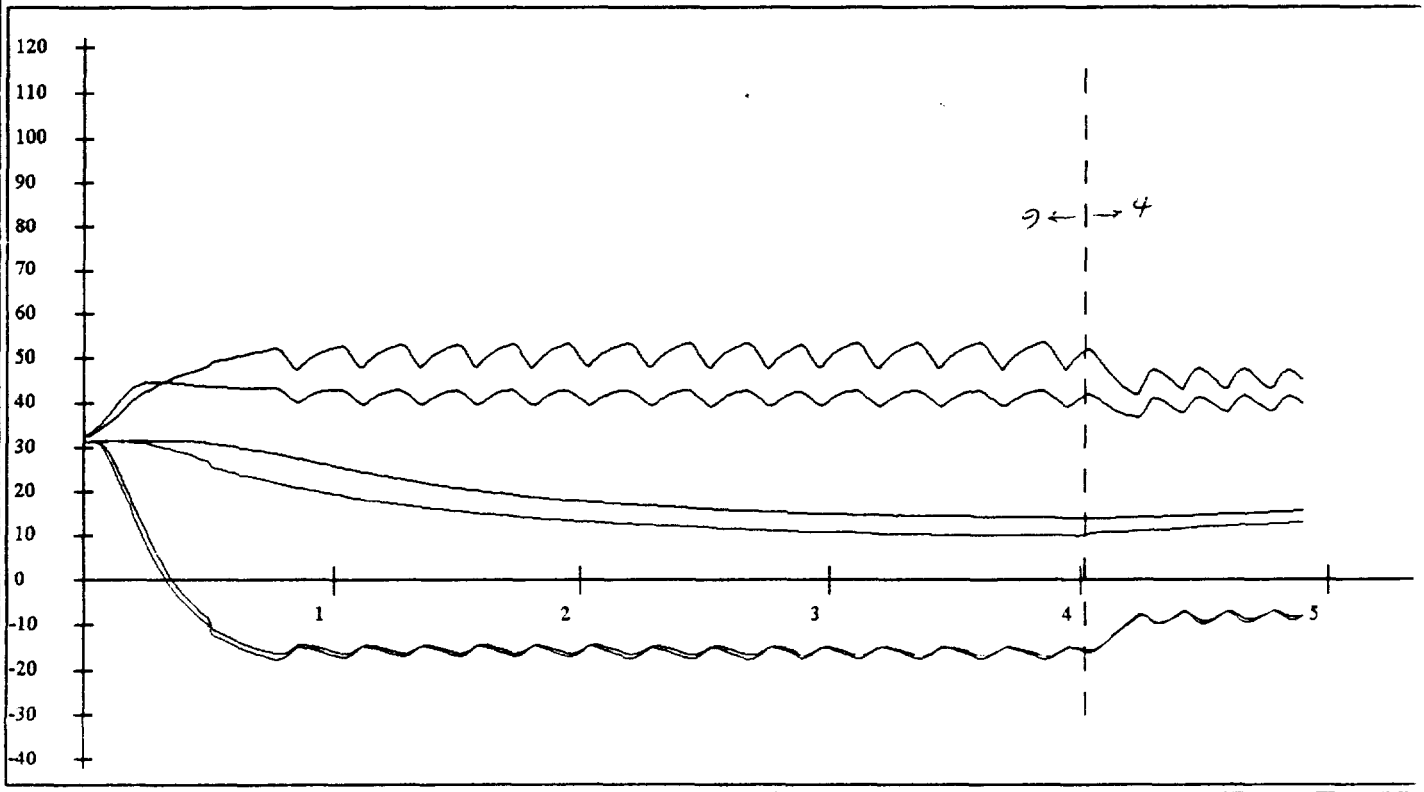
HR750618.D10

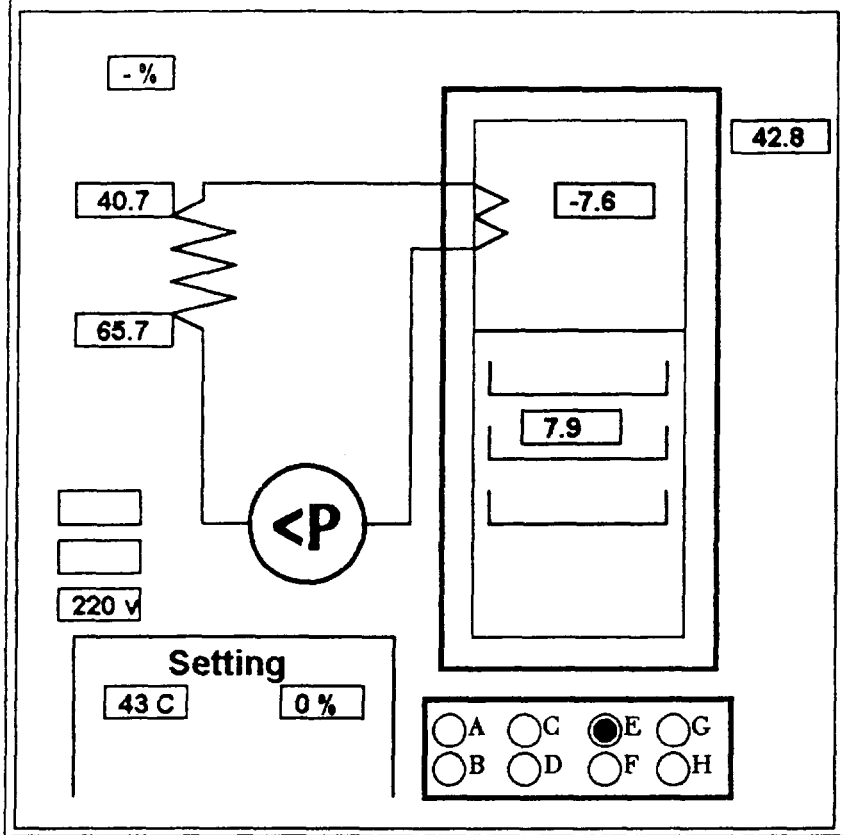
Product Name	**Fariz Iran**
Product Model	**FIR 13**
product. Capacity	**338 LI.**
Compresor Name	**ZANUSSI**
Compresor Model	**GL 80 AA**
Compresor Power	**1/5 HP**
Compresor Current	**1.2 A**
Thermost. position	**9 — 4**
Thermost. Type	**SEMI AUTO**
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



UNIDO Hotroom Test تست یخچال

Performance Test

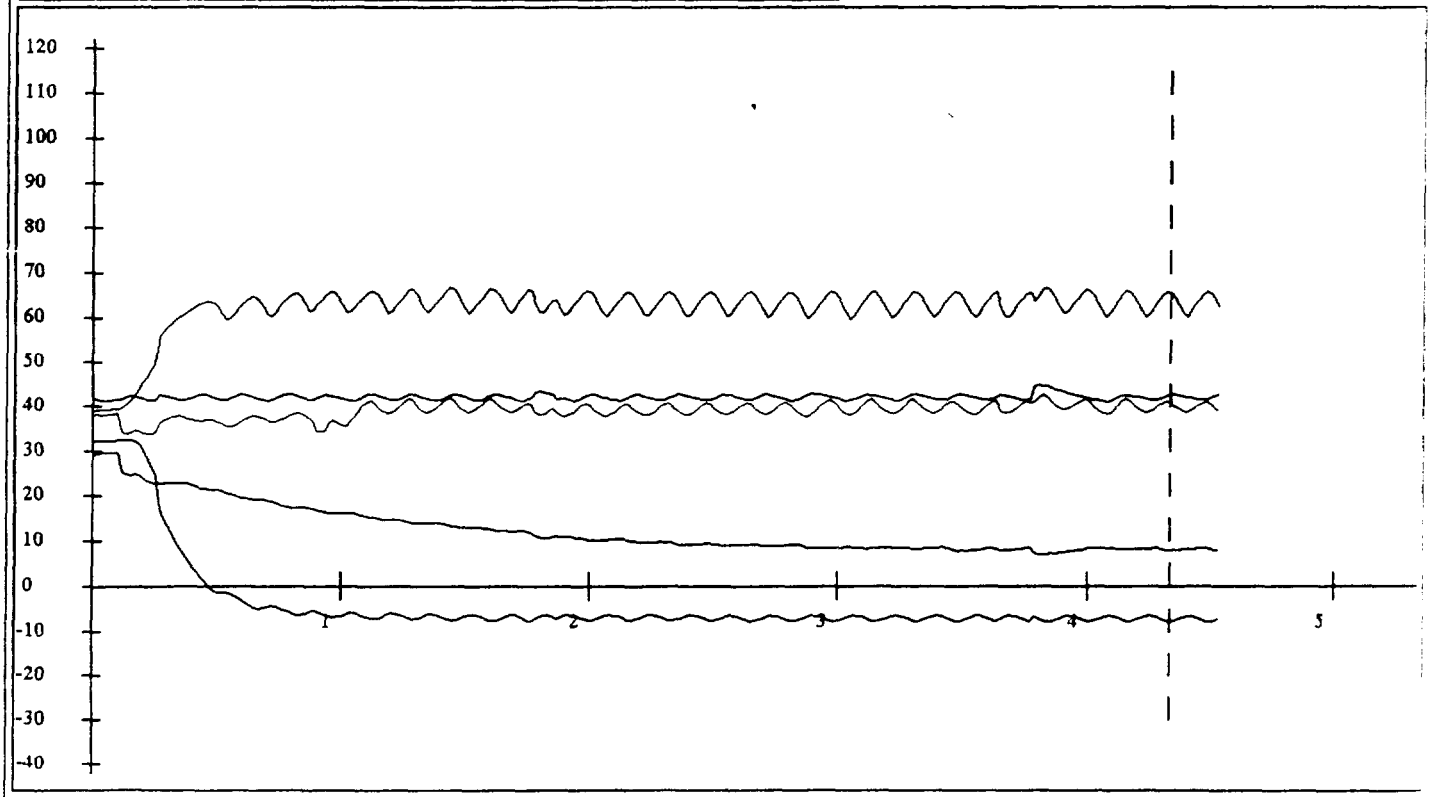


56

HR750522.D11

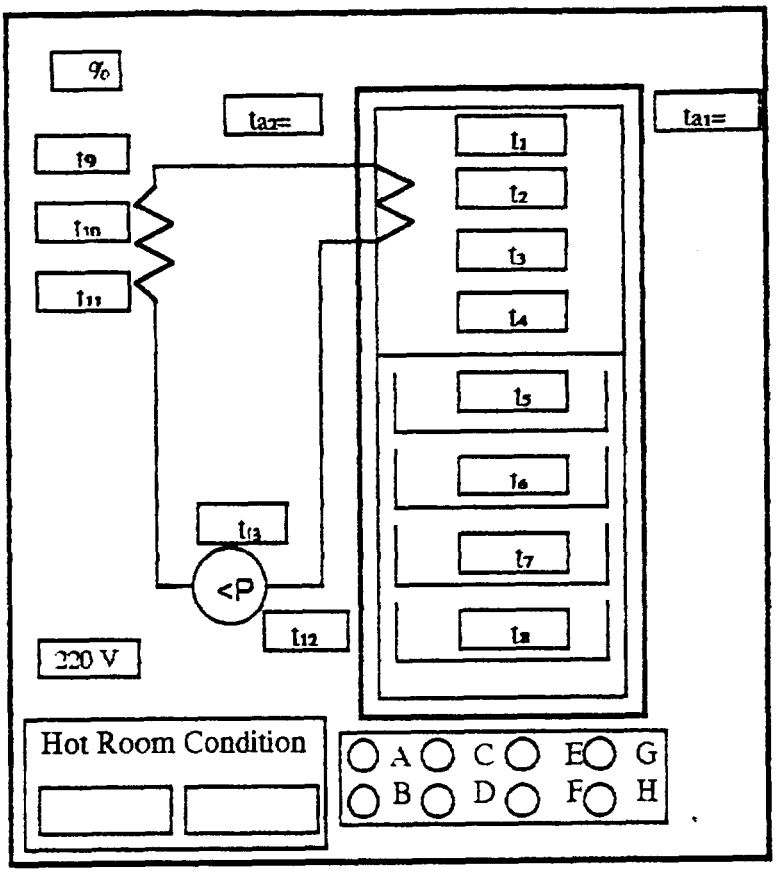
Product Name	FARIZIRAN(R)
Product Model	FIR 13
product. Capacity	318 Lit
Compresor Name	ZANUSSI
Compresor Model	GL80 AA
Compresor Power	1/5 Hp
Compresor Current	1.35 A
Thermost. position	5
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



57

Fariz Iran

Product Name	Refrigerator
Product Model	FIR13
Product Capacity	338 l.t.
Compressor Name	Zanussi
Compressor Model	GL80AA
Compressor Power	1/5 hp
Compressor Current	1.2 A
Thermostat Position	4 & 9
Thermostat Type	Semi Auto
Total Test Time	300 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature °C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-34	-21.3	-27.6	-30.6	-12.9				
Evap. Air Temp. (t_2)	-16.6	-16	-15.1	-15.6	-7.9				
Evap. Air Temp. (t_3)	-15.8	-15.5	-14.8	-15.2	-7.7				
Evap. Air Temp. (t_4)	-15.5	-15.3	-13	-15.2	-7.7				
Evap. Mean Temp.	-15.9	-15.6	-14.3	-15.3	-7.8				
Meat Tray (t_5)	-11.3	-12.9	-1.3	-13.4	-5.7				
Ref. Comp. Temp (t_6)	8.3	1.3	-1.3	-2.9	-4.6				
Ref. Comp. Temp (t_7)	19.6	13.4	10.8	10.1	13.1				
Ref. Mean Temp	5.5	0.6	2.7	-2	0.9				
Cellar Comp. Temp. (t_8)	26	17.9	15	14.1	15.7				
Cond. Outlet Temp. (t_9)	29.3	26.8	26.2	25.9	21.6				
Cond. Mid Temp. (t_{10})	43.1	40.8	40.6	41.5	39.8				
Cond. Inlet Temp. (t_{11})	52.4	49.9	50.2	51.3	44.9				
Comp. Suction Temp. (t_{12})	38	39.6	38.3	38.2	38.8				
Comp. Shell Temp. (t_{13})	65.7	66.7	65.5	66	60.4				

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c) Gadook

1 - Refrigerator Model R280

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	5	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-10.2	-12
Refrigerator Compartment Mean Temperature (◦ C)	+ 4.7	+5
Condenser Outlet Temperature (◦ C)	+45.8	----------
Compressor Discharge Temperature (◦ C)	+82.5	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+58.3	----------
Compressor Shell (◦ C)	+85.2	----------
Type of Compressor Zanussi Model GL 60 AA	----------	----------

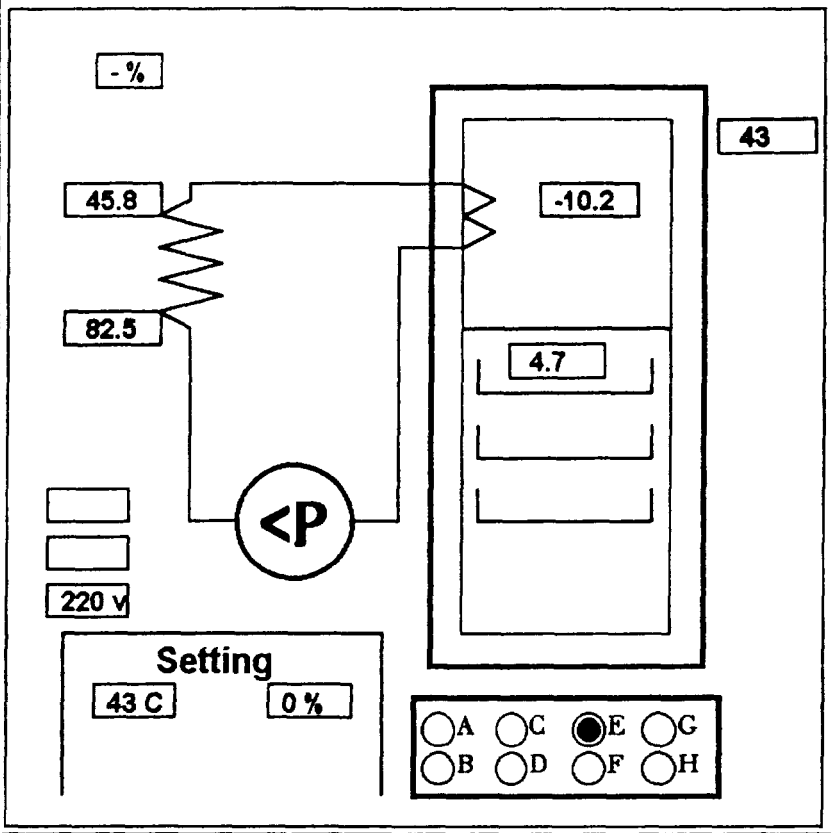
Conclusion

According to the above test results from cyclic run test at thermostat setting 5, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator internal design as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

UNIDO Kotroom Test تست یخچال

Performance Test

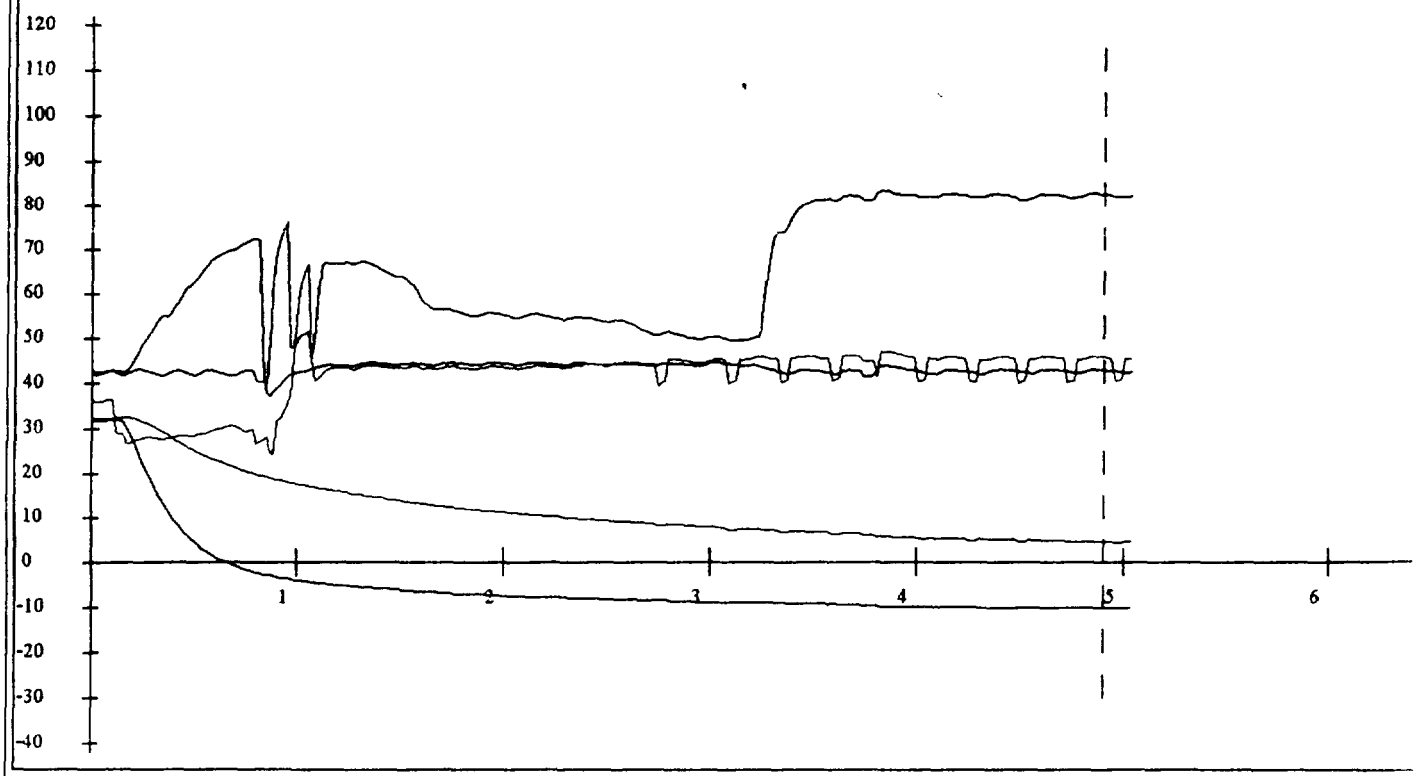


59

HR750518.D11

Product Name	Gadook (R)
Product Model	R 280
product. Capacity	301 Lit
Compresor Name	Zanussi
Compresor Model	GL 60 AA
Compresor Power	1/5 Hp
Compresor Current	1.25 A
Thermost. position	5
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



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2 - Freezer Model FU280

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	2	----------
Freezer Mean Air Temperature (◦ C)	-11.8	-18
Condenser Outlet Temperature (◦ C)	+55.9	----------
Compressor Discharge Temperature (◦ C)	+85.6	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+56.1	----------
Compressor Shell (◦ C)	+-----	----------
Type of Compressor Zanussi Model GL 80 AA	----------	----------

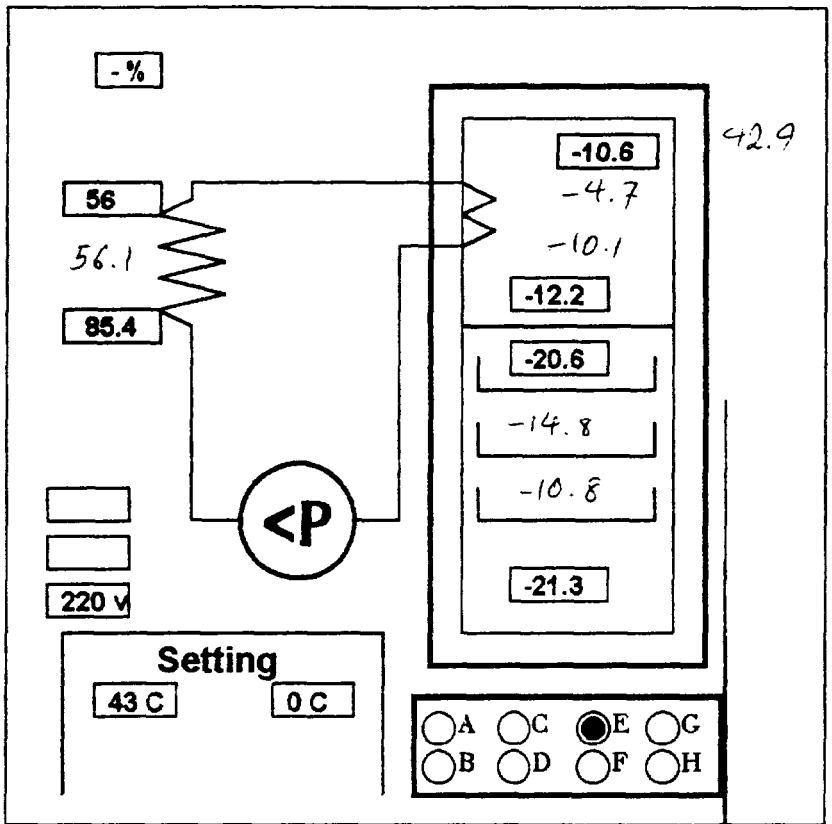
Conclusion

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer. Freezer was over loaded after 15 min and freezer after was started after three hours for getting test results. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Perform different performance tests in accordance with ISO standard 5155.

تست یخچال کارخانجات صنعتی آزمایش

Perfomance Test

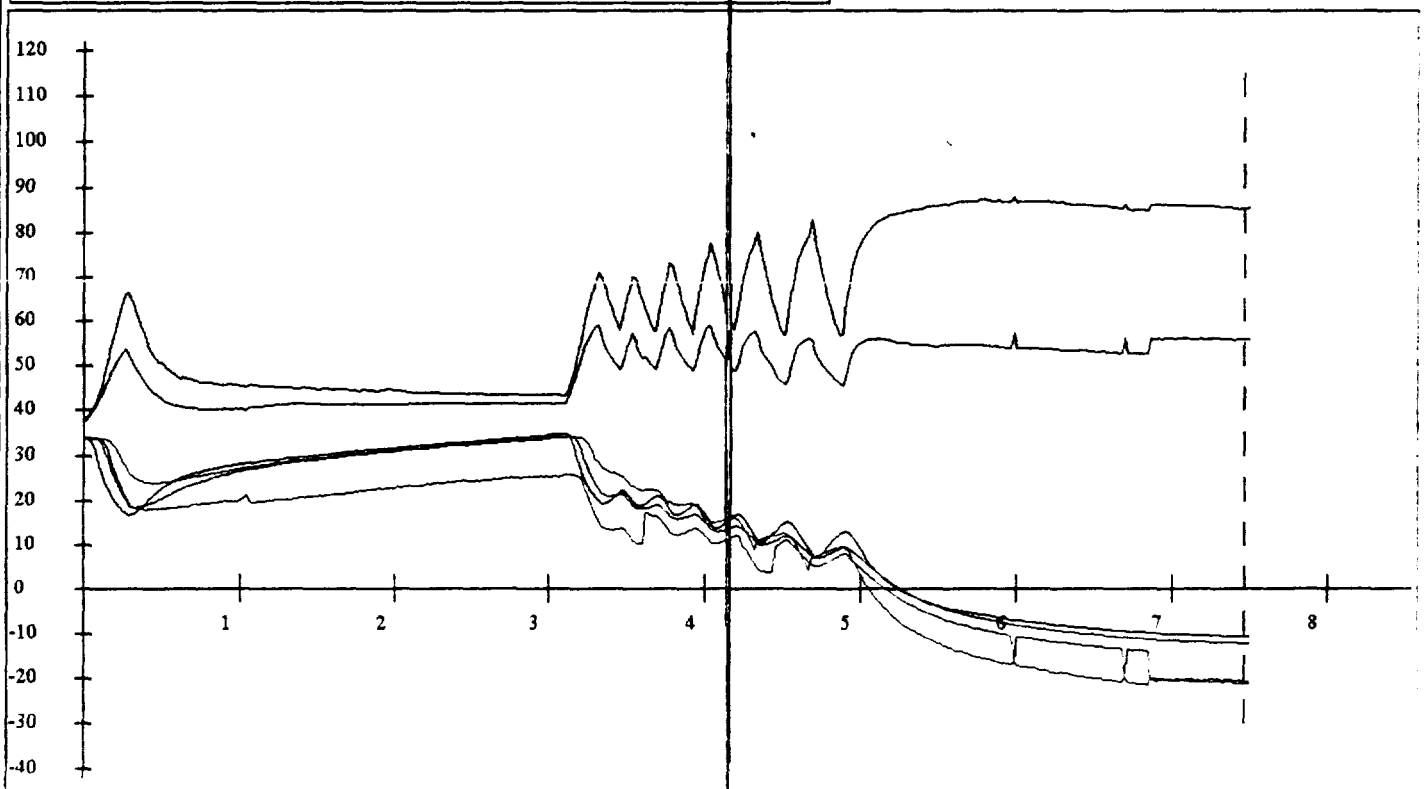


61

HR750607.D10

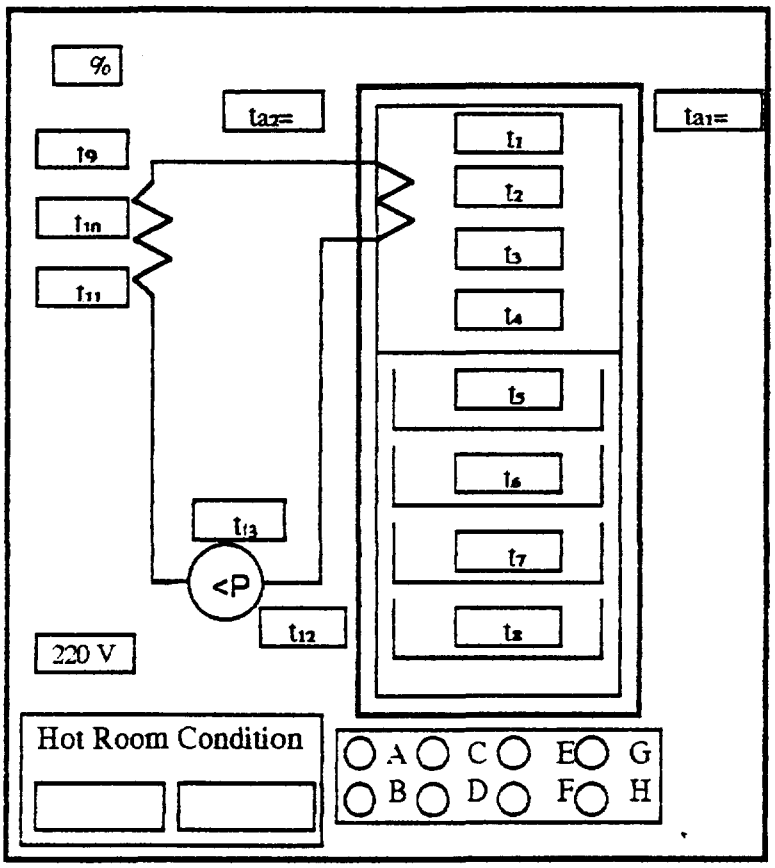
Product Name	Gadook
Product Model	FU-280
product. Capacity	301 LI.
Compresor Name	ZANUSSI
Compresor Model	GL 80 AA
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	2
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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GADOOK

Product Name	Freezer
Product Model	FU 280
Product Capacity	301 Lit.
Compressor Name	ZANUSSI
Compressor Model	GL80AA
Compressor Power	1/4 hp
Compressor Current	1.35 A
Thermostat Position	2
Thermostat Type	Semi-Auto
Total Test Time	

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	16.9	-	34.4	16.9	9.9	-7	-10.1	-10.6	
Evap. Air Temp. (t_2)	24.2	-	34.8	20.6	13.4	0.4	-4.1	-4.7	
Evap. Air Temp. (t_3)	20.1	-	34.3	16.7	9	-5.9	-9.5	-10.1	
Evap. Air Temp. (t_4)	19.3	-	34.2	15.1	7	-8.1	-77.6	-12.2	
Evap. Mean Temp.	-	-	-						
[illegible] (t_5)	17.[illegible]		25.9	12.1	4.7	-10.6	-20.3	-20.6	
Ref. Comp. Temp (t_6)	16.9	-	32.4	13.7	0.1	-14.3	-14.2	-14.8	
Ref. Comp. Temp (t_7)	20.7	-	34	18.5	8.6	-6.5	-10.1	-10.8	
Ref. Mean Temp	26.7	-	34.2	15.7	8.3	-17.2	-20.5	-21.3	
Cellar Comp. Temp. (t_8)									
Cond. Outlet Temp. (t_9)	53	-	43.4	58	55.1	54.1	56.1	55.9	
Cond. Mid Temp. (t_{10})	57.6	-	43.4	55.1	56.4	57.5	56.4	56.1	
Cond. Inlet Temp. (t_{11})	66.6	-	45.1	73.1	77.5	86.9	86.2	87.6	
Comp. Suction Temp.(t_{12})									
Comp. Shell Temp. (t_{13})									

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3 -Refrigerator - Freezer Model RF350

Summary Test Results (Continuous Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	3 & 7	----------
Evaporator Compartment Warmest Air Temperature (◦ C)	-16.9	-18
Refrigerator Compartment Lowest air Temperature (◦ C)	- 4.3	-5
Condenser Outlet Temperature (◦ C)	-40.1	----------
Compressor Discharge Temperature (◦ C)	-53.7	----------
Condenser Mid Point (1.3) Temperature (◦ C)	-40.4	----------
Compressor Shell (◦ C)	-71.2	----------
Type of Compressor Gold Star Model VR 75 LAEG	----------	----------

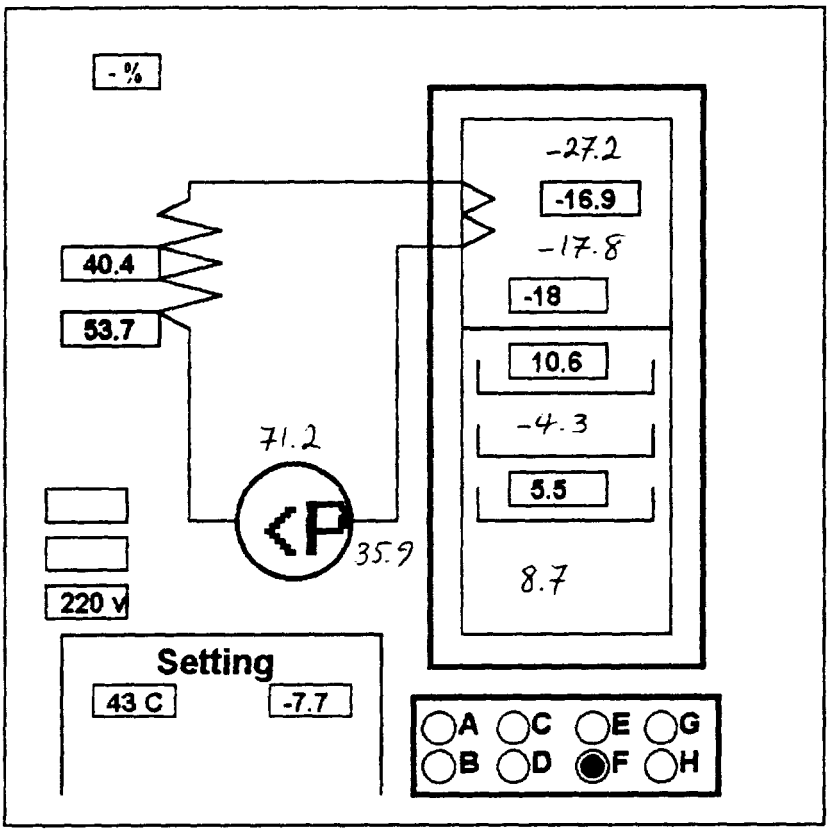
Conclusion

We got satisfactory results from continuois test run but according to the above test results from cyclicrun test at thermostat setting 3.5, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator internal design as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test

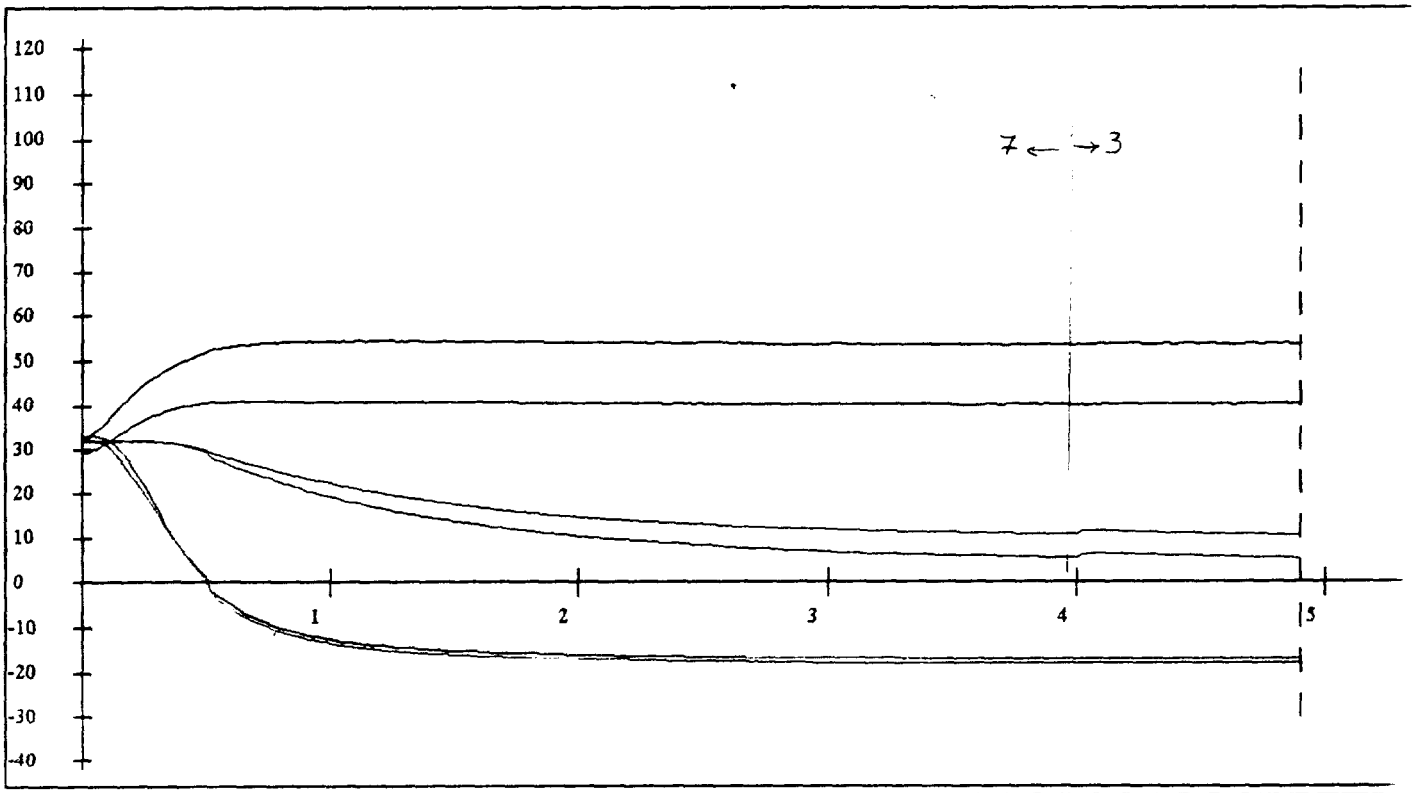


64

HR750618.D10

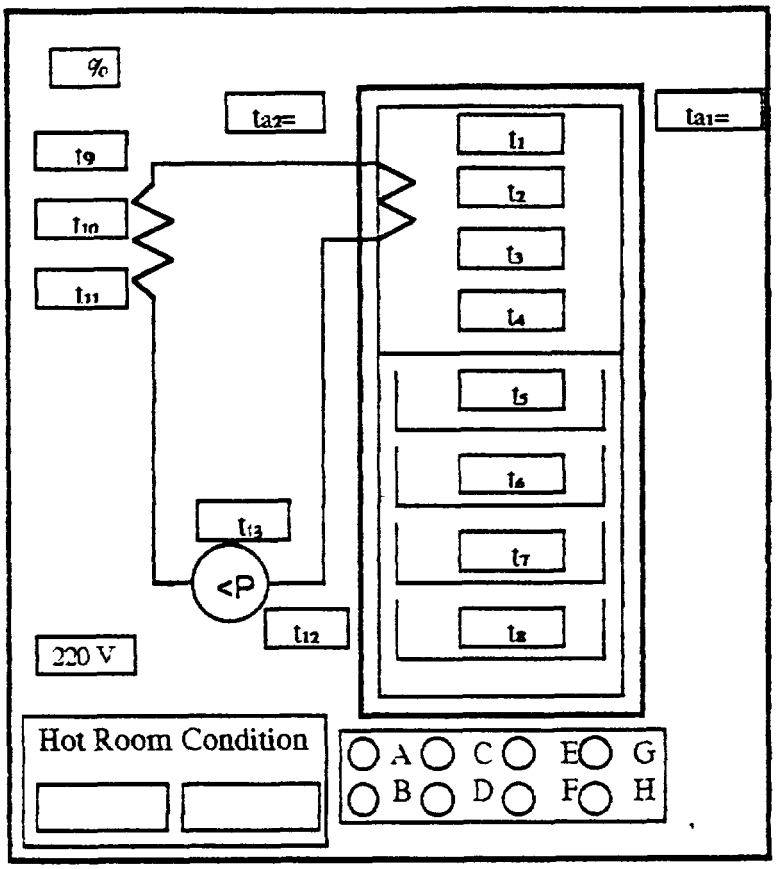
Product Name	Gadook
Product Model	RF 350
product. Capacity	358 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	7—3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



GADOOK 65

Product Name	Ref-Freezer
Product Model	RF350
Product Capacity	358 lit.
Compressor Name	GoldStar
Compressor Model	V75LAEG
Compressor Power	1/4 hp
Compressor Current	1.3 A
Thermostat Position	7 & 3
Thermostat Type	Semi Auto
Total Test Time	300 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-25.3	-26.7	-27.1	-27.3	-27.2				
Evap. Air Temp. (t_2)	-12.4	-15.9	-16.7	-17	-16.9				
Evap. Air Temp. (t_3)	-13.4	-16.7	-17.6	-17.8	-17.8				
Evap. Air Temp. (t_4)	-13.4	-16.9	-17.8	-18	-18				
Evap. Mean Temp.	-13	-16.5	-17.4	-17.6	-17.6				
Meat Tray (t_5)	22.4	14.8	11.9	10.8	10.6				
Ref. Comp. Temp (t_6)	12.5	3.4	-0.4	-2.6	-4.3				
Ref. Comp. Temp (t_7)	19.4	10.5	7	5.7	5.5				
Ref. Mean Temp	18.1	9.6	6.2	4.6	3.9				
Cellar Comp. Temp. (t_8)	25	15.8	10.9	8.9	8.7				
Cond. Outlet Temp. (t_9)									
Cond. Mid Temp. (t_{10})	41	40.7	40.4	40.3	40.4				
Cond. Inlet Temp. (t_{11})	54.4	54.1	53.2	53.6	53.7				
Comp. Suction Temp. (t_{12})	35.6	35.8	35.9	35.9	35.9				
Comp. Shell Temp. (t_{13})	71.4	71.7	71.3	71.2	71.2				

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d) Movalled

1-Freezer Model F 80

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting		----------
Evaporator Compartment Mean Air Temperature (◦ C)		-12
Refrigerator Compartment Mean Temperature (◦ C)		+5
Condenser Outlet Temperature (◦ C)		----------
Compressor Discharge Temperature (◦ C)		----------
Condenser Mid Point (1/3) Temperature (◦ C)		----------
Compressor Shell (◦ C)		----------
Type of Compressor	----------	----------

Conclusion

We did not received any prototype of Freezer Model R 80 until 9 September 1996. Therefore, no testing could be accomplished, accordingly

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2-Refrigerator - Freezer RF80

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	2	----------
Freezer Compartment Mean Air Temperature (◦ C)	- 6.3	-18
Refrigerator Compartment Mean Temperature (◦ C)	−10.1	−5
Condenser Outlet Temperature (◦ C)	− 55.5	----------
Compressor Discharge Temperature (◦ C)	−92.8	----------
Condenser Mid Point (1/3) Temperature (◦ C)	−62.4	----------
Compressor Shell (◦ C)	−92	----------
Type of Compressor Slovakia Model D15 7X-L1X	----------	----------

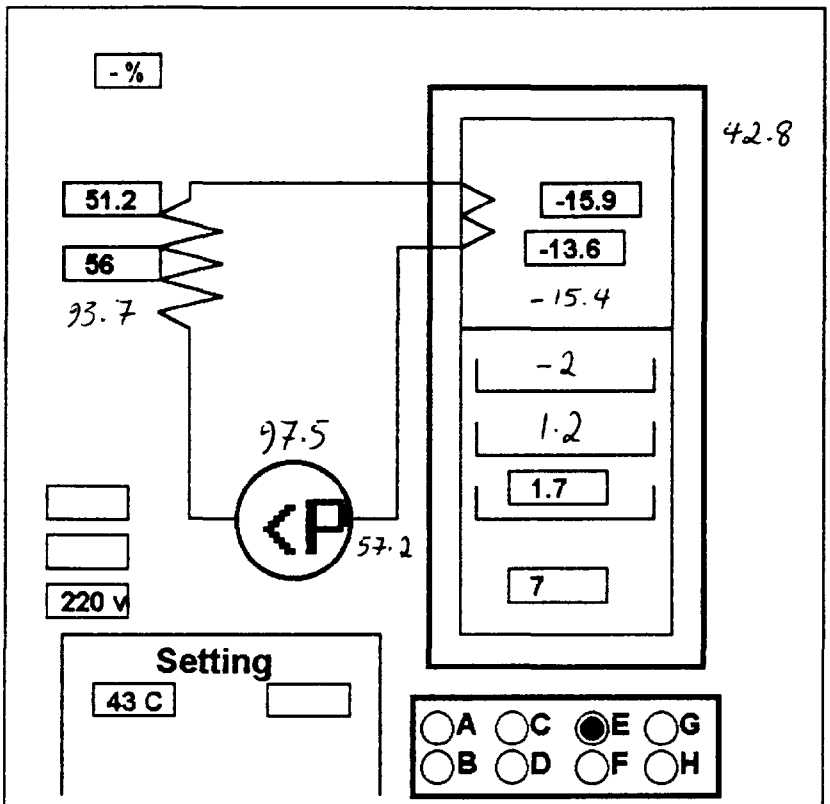
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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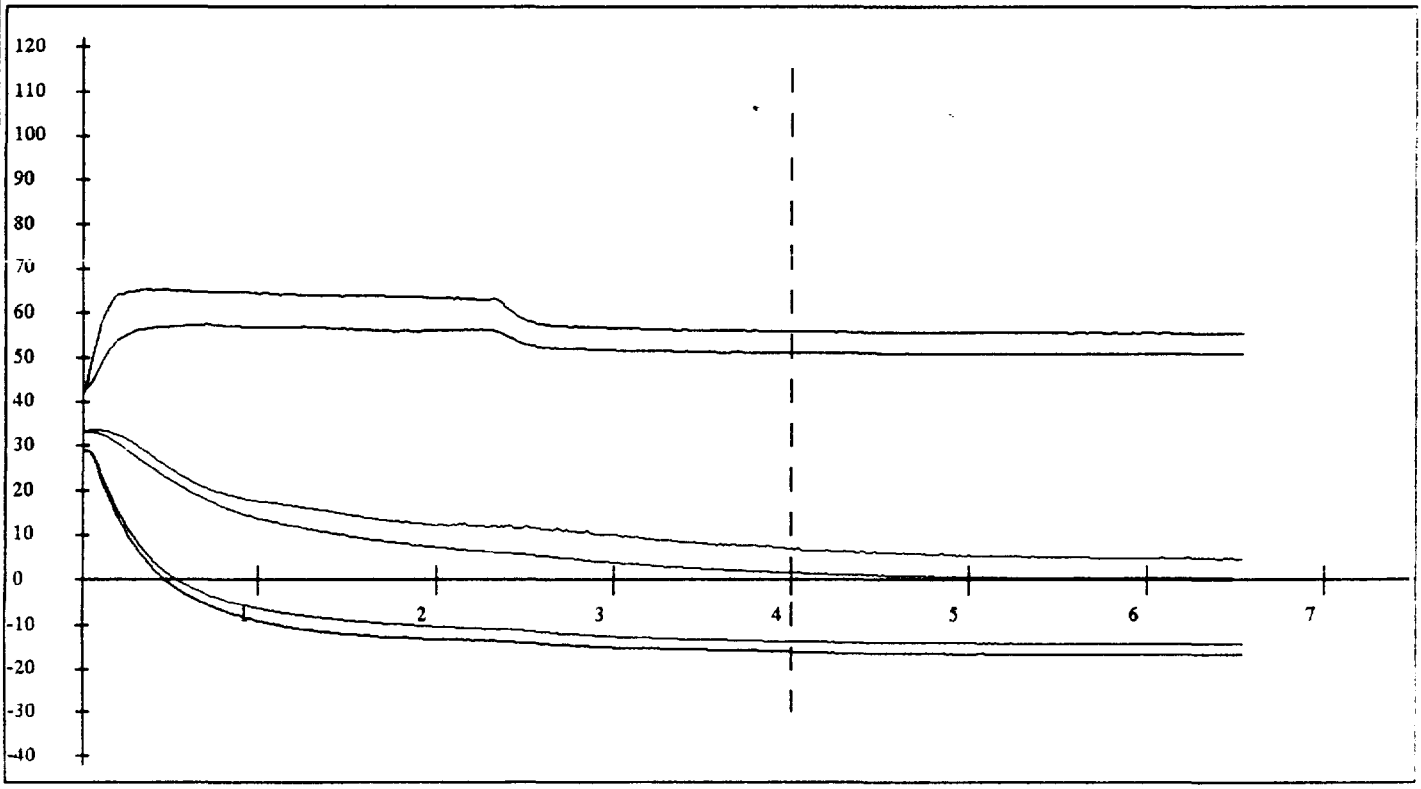
HR750612.D16

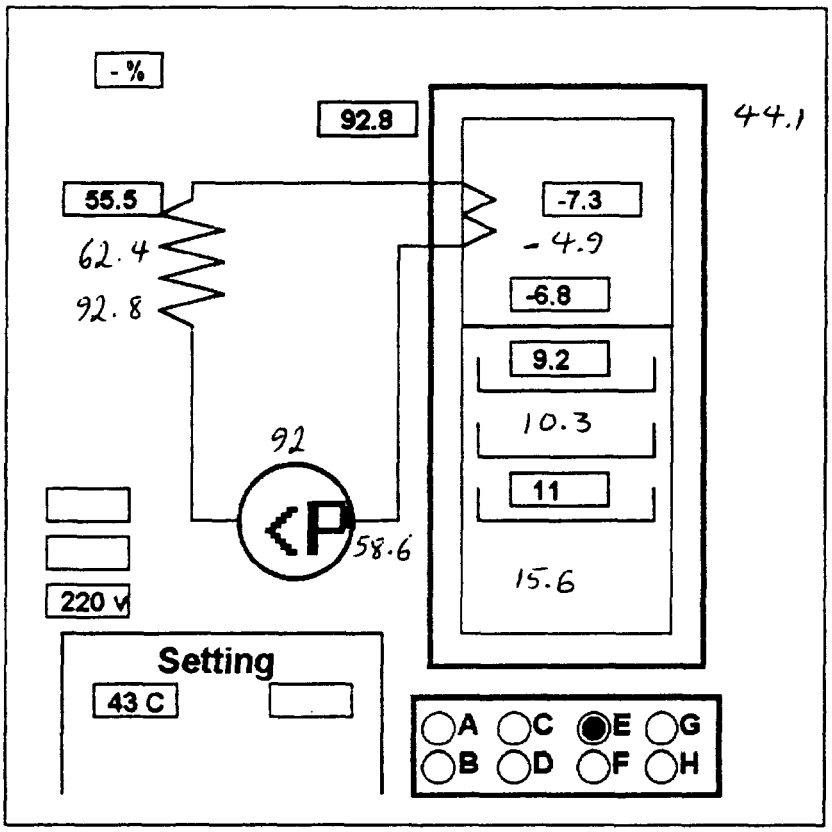
Product Name	Movalled
Product Model	RF 80
product. Capacity	234 Lit
Compresor Name	Slovakia
Compresor Model	D15 7X- L1X
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	7
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test

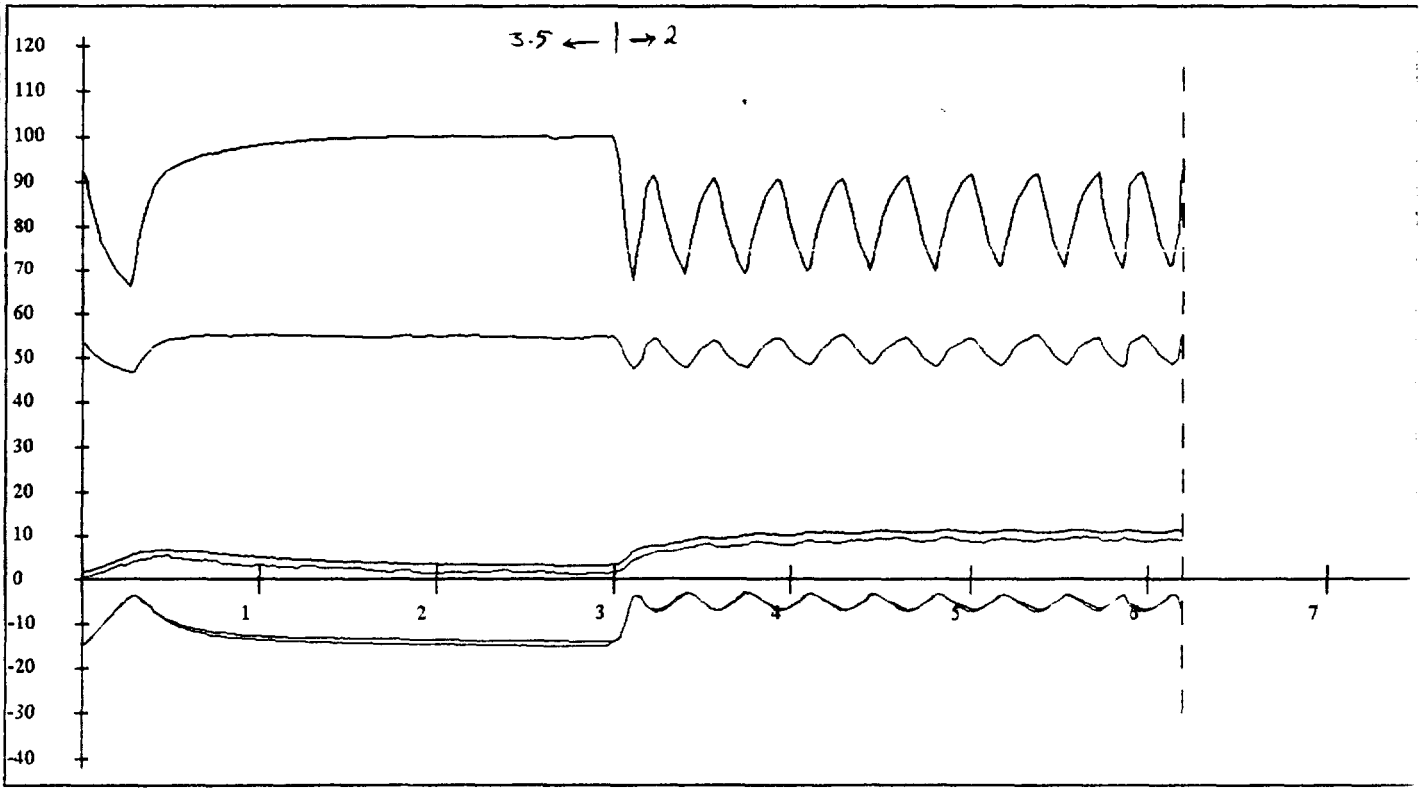


69

HR750613.D08

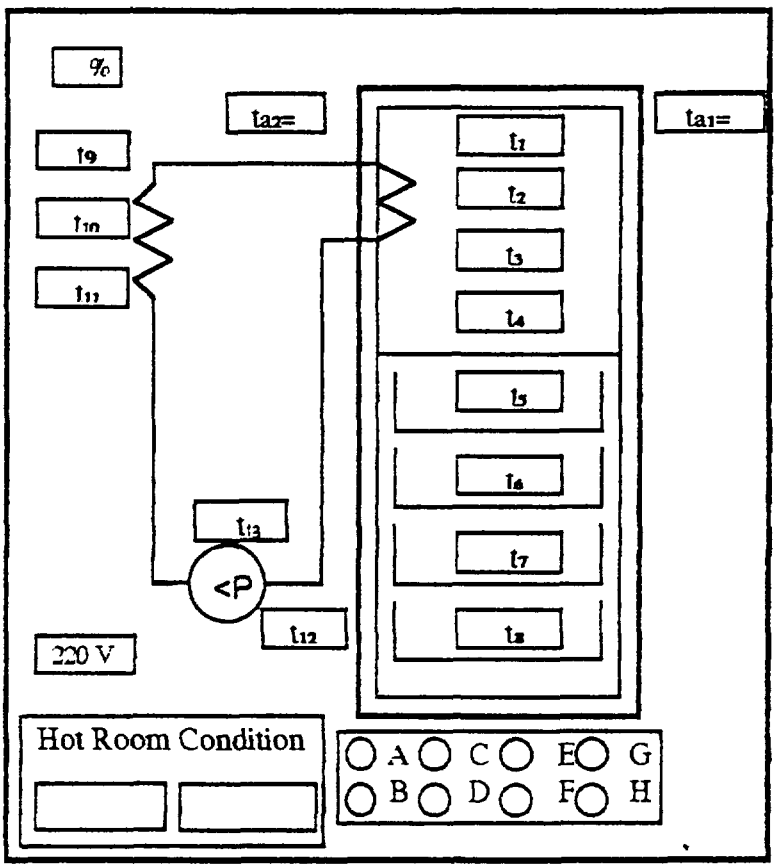
Product Name	Movalled
Product Model	RF 80
product. Capacity	234 Lit
Compresor Name	Slovakia
Compresor Model	D15 7X- L1X
Compresor Power	1/6 HP
Compresor Current	1.1 A
Thermost. position	3.5 | 2
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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Movalled

Product Name	Ref. Freezer
Product Model	RF80
Product Capacity	234 lit.
Compressor Name	slovakia
Compressor Model	D15-7X-L1X
Compressor Power	1/6 hp
Compressor Current	1.1 A
Thermostat Position	7
Thermostat Type	Semi Auto
Total Test Time	900 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	14	15
Evap. Inlet Temp. (t_1)	—	—	—	—	—	—	—	—	—
Evap. Air Temp. (t_2)	-8.9	-13	-14.9	-15.9	-16.4	-16.4	-16.4	-18.4	-16.5
Evap. Air Temp. (t_3)	-6.1	-10.1	-12.4	-13.6	-13.9	-14	-14	-15.7	-14
Evap. Air Temp. (t_4)	-7.6	-11.6	-14.2	-15.4	-15.9	-15.9	-15.9	-17.4	-15.4
Evap. Mean Temp.	-7.5	-11.56	-13.8	-15	-15.4	-15.4	-15	-17	-15.3
Meat Tray (t_5)	9.4	0.3	-2.6	-2	-5.1	-5.8	-6.1	-4	-2.2
Ref. Comp. Temp (t_6)	13.4	6.8	3.4	1.2	0.3	0.0	-0.1	-1.8	0.1
Ref. Comp. Temp (t_7)	13.9	7.3	3.9	1.7	0.8	0.5	0.4	-1.2	0.6
Ref. Mean Temp	12.2	4.8	1.6	0.3	-1.3	-1.8	-1.9	-2.3	-0.5
Cellar Comp. Temp. (t_8)	17.7	12.4	10.1	7	5.6	4.9	4.7	2.8	4.3
Cond. Outlet Temp. (t_9)	57	56.2	51.9	51.2	51	51.1	50.9	50.3	54.8
Cond. Mid Temp. (t_{10})	64.5	63.4	56.8	56	55.8	55.7	55.9	56.3	60.4
Cond. Inlet Temp. (t_{11})	98.8	102.8	95.6	13.7	93.7	93.5	93.7	93.2	98.4
Comp. Suction Temp.(t_{12})	60.1	60.9	58.1	57.2	57.1	57.2	57.2	56.3	55.9
Comp. Shell Temp. (t_{13})	96.2	101.2	99.3	97.5	97.1	98.1	98.3	95.7	100.5

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3- Refrigerator- Freezer Model RF85

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	2&5	----------
Freezer Mean Air Temperature (◦ C)	-15	-18
Refrigerator Compartment Mean Temperature (◦ C)	+ 6.2	+5
Condenser Outlet Temperature (◦ C)	+49.1	----------
Compressor Discharge Temperature (◦ C)	+81.9	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+55.5	----------
Compressor Shell (◦ C)	+85.4	----------
Type of Compressor Gold Star Model NR 62 LEAG	----------	----------

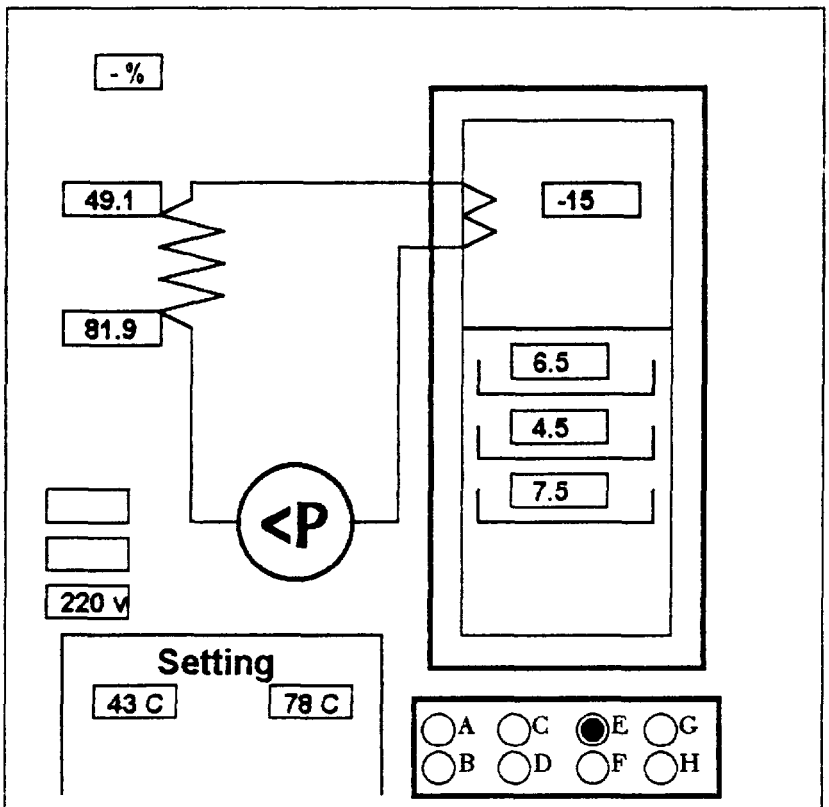
Evaluation

According to the above test results from cyclic run test at thermostat setting 2and 5, we did not get desired figures . We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components. the freezer compartment could be rated as Two Stars.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

تست یخچال کارخانجات صنعتی آزمایش

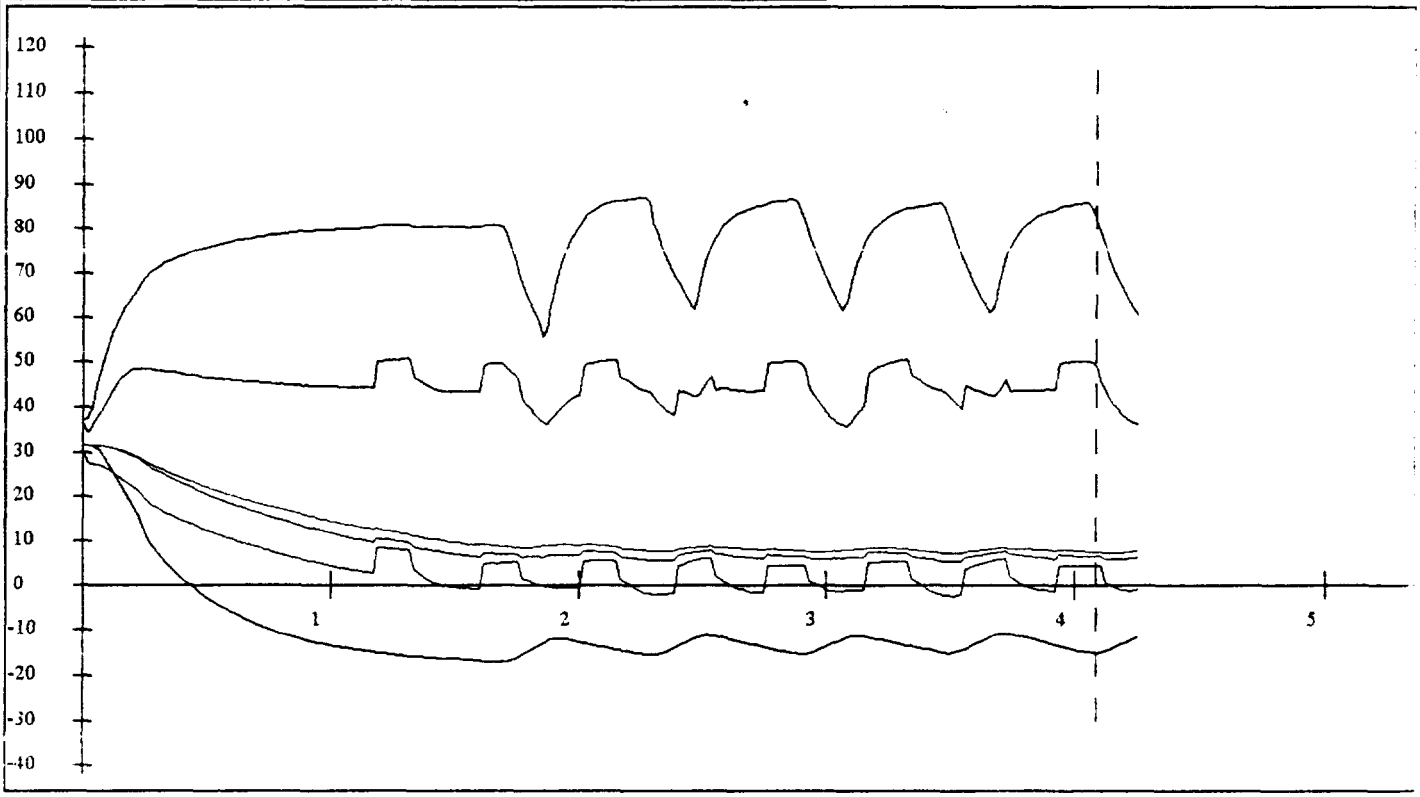
Perfomance Test



75/6/3 3:47:34 PM 72

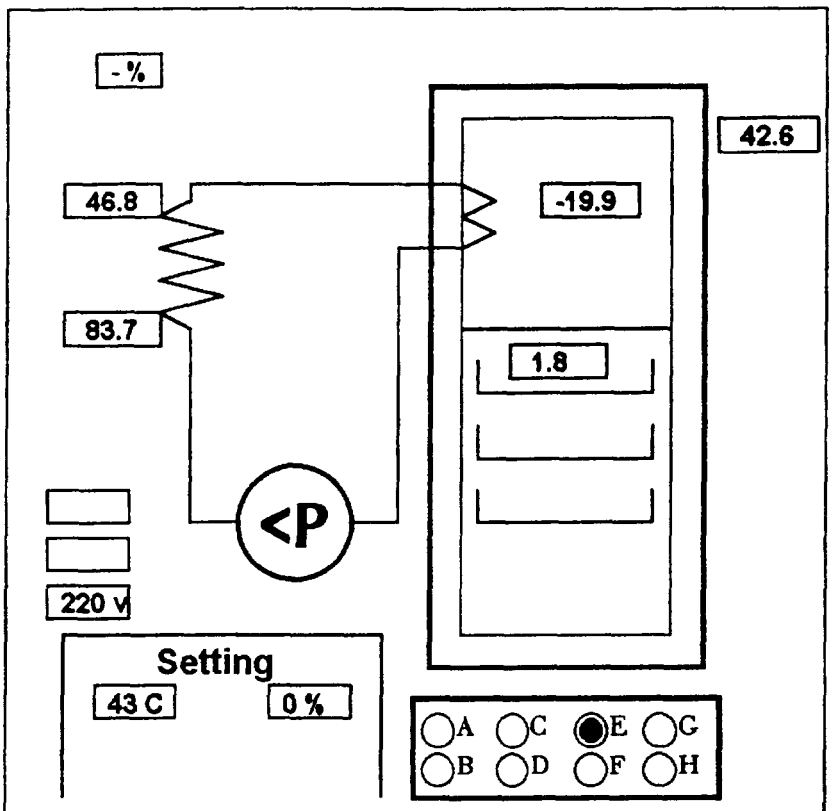
Product Name	MOVALLED
Product Model	RF85
product. Capacity	276 LI.
Compresor Name	GOLD STAR
Compresor Model	NR 62 LAEG
Compresor Power	1/5 Hp
Compresor Current	1.25 A
Thermost. position	2
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



UNIDO Hotroom Test تست یخچال

Performance Test



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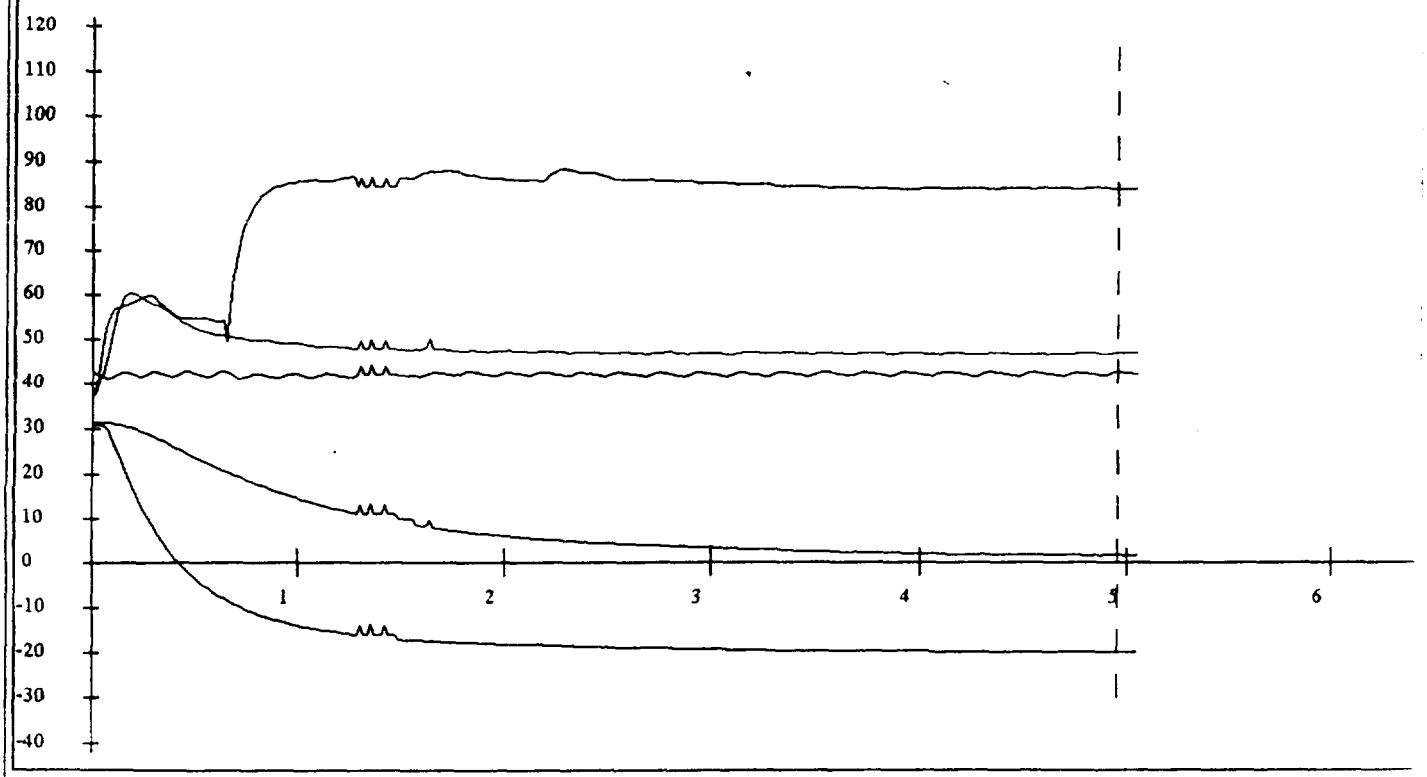
HR750523.D12

Product Name	MOVALLED
Product Model	RF 85
product. Capacity	276 LI.
Compresor Name	GOLD STAR
Compresor Model	NR 62 LAEG
Compresor Power	1.5 HP
Compresor Current	1.3 A
Thermost. position	5
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



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4 - Refrigerator Freezer Model RF14

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	3.5	----------
Evaporator Compartment Mean Air Temperature (◦ C)	- 8.2	-18
Refrigerator Compartment Mean Temperature (◦ C)	+ 5.6	-3
Condenser Outlet Temperature (◦ C)	-35.2	----------
Compressor Discharge Temperature (◦ C)	-46.2	----------
Condenser Mid Point (1.3) Temperature (◦ C)	-38	----------
Compressor Shell (◦ C)	-67.5	----------
Type of Compressor Gold Star Model VR 75 LAEG	----------	----------

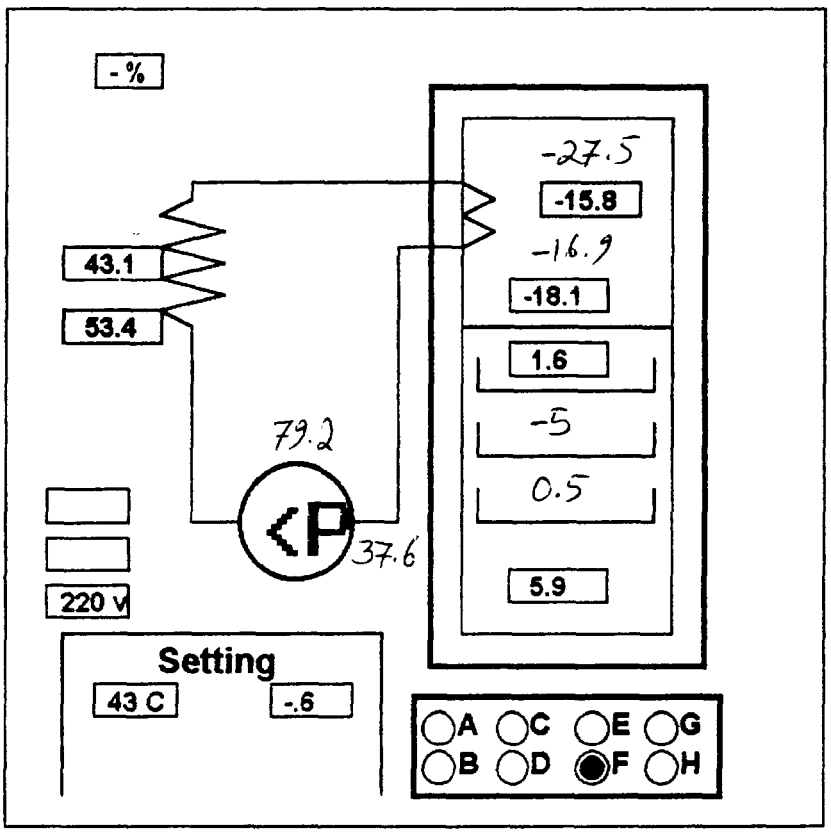
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test

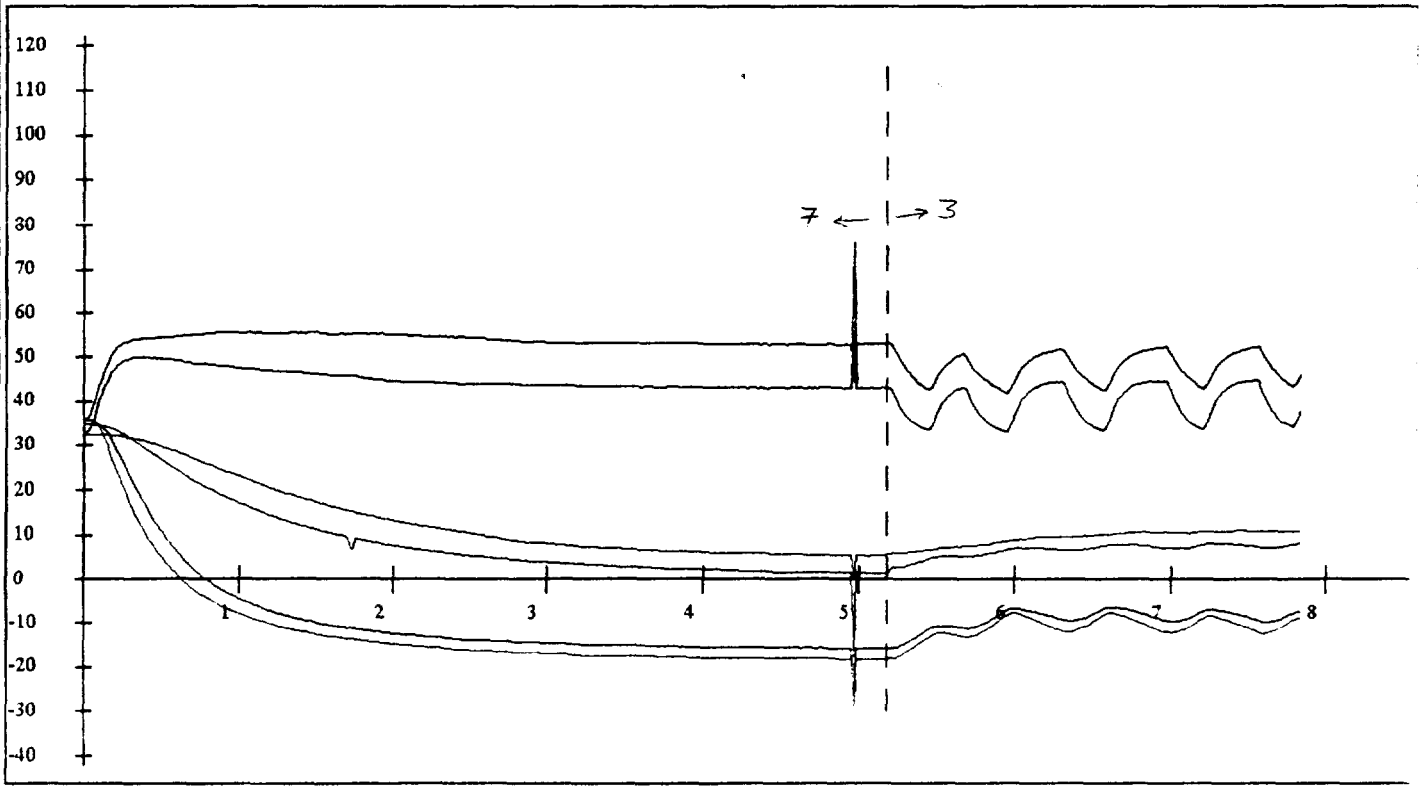


75

HR750615.D07

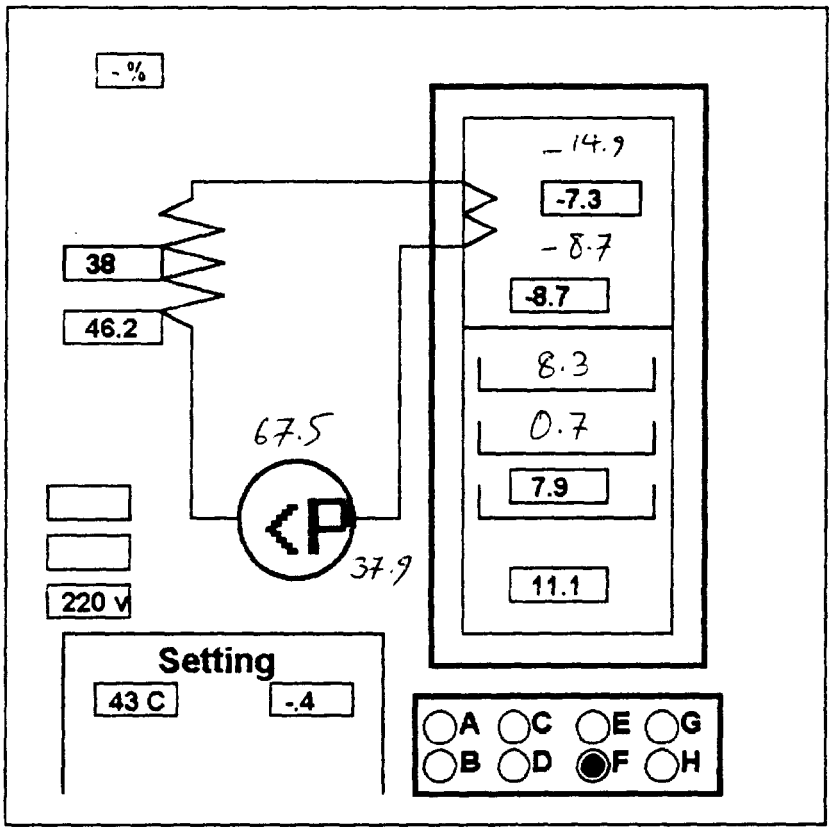
Product Name	Movalled
Product Model	RF 14
product. Capacity	304 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	7 / 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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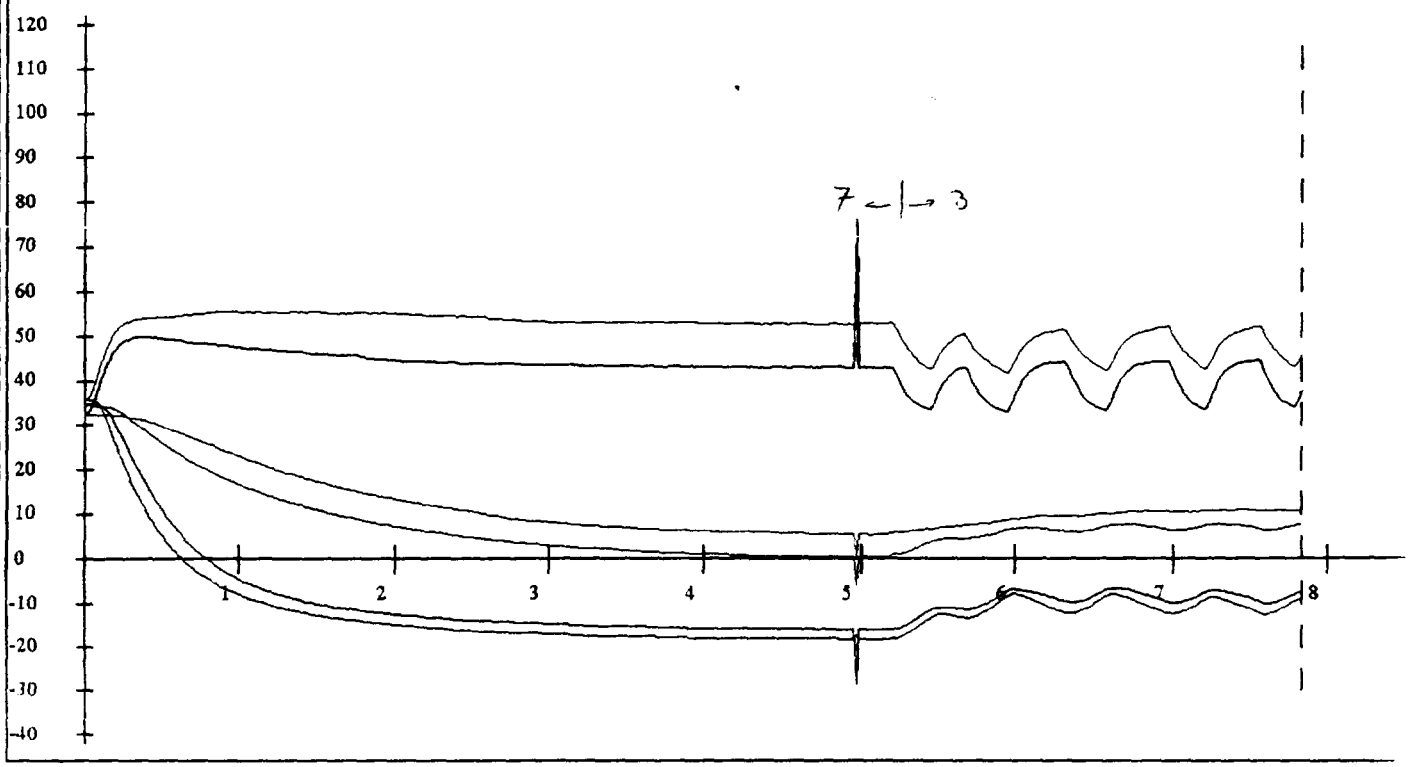
HR750615.D07

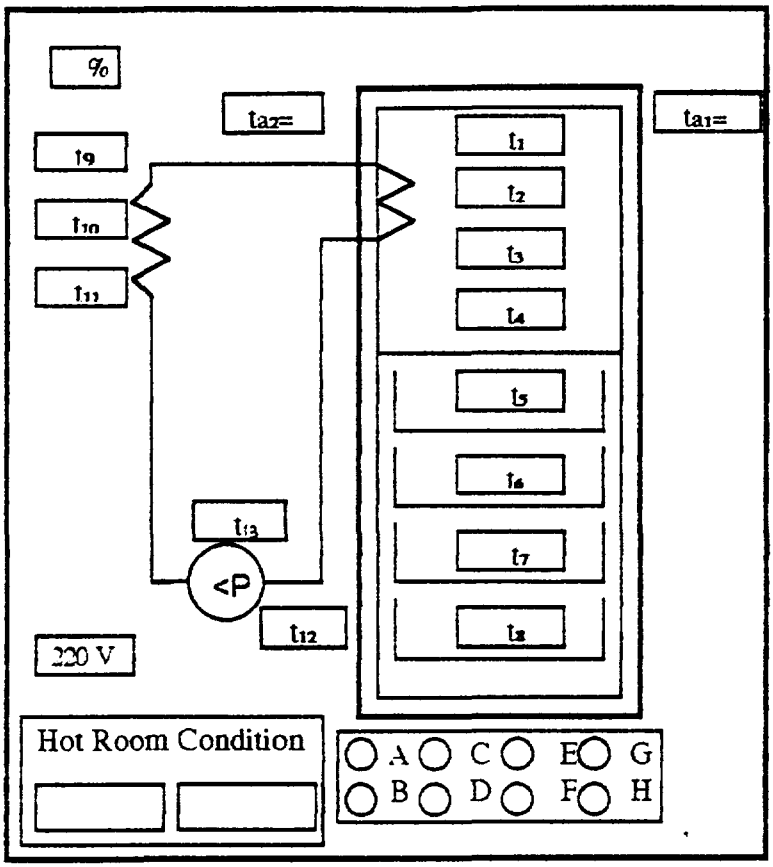
Product Name	Movalled
Product Model	RF 14
product. Capacity	304 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP
Compresor Current	1.3 A
Thermost. position	7 / 3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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Movalled

Product Name	Ref. Freezer
Product Model	RF 14
Product Capacity	304 lit.
Compressor Name	Gold Star
Compressor Model	U75LAEG
Compressor Power	1/4 hp
Compressor Current	1.3 A
Thermostat Position	7 & 3
Thermostat Type	Semi Auto
Total Test Time	

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-20.8	-25.1	-26.6	-27.3	-27.5	-14.1	-21.2	-14.9	
Evap. Air Temp. (t_2)	-4.4	-12.3	-14.6	-15.4	-15.7	-6.5	-9.5	-7.3	
Evap. Air Temp. (t_3)	-6.3	-13.5	-15.7	-16.6	-16.8	-8	-10.9	-8.7	
Evap. Air Temp. (t_4)	-7.8	-14.8	-16.9	-17.8	-18.1	-7.6	-12.1	-8.7	
Evap. Mean Temp.	-6.2	-13.5	-15.7	-16.6	-16.9	-7.3	-10.5	-8.2	
Meat Tray (t_5)	12.2	7.8	4.1	2.4	1.7	7.2	7.3	8.3	
Ref. Comp. Temp (t_6)	14	4.1	1.2	-1.3	-3.8	5.7	-16.7	0.7	
Ref. Comp. Temp (t_7)	16.7	7.4	3.2	1.4	0.6	6.9	6.7	7.9	
Ref. Mean Temp	15.9	6.4	2.9	0.8	-0.5	6.6	-0.9	5.6	
Cellar Comp. Temp. (t_8)	23.1	13.5	8.3	6.4	5.6	9.1	10.7	11.1	
Cond. Outlet Temp. (t_9)									
Cond. Mid Temp. (t_{10})	42.6	44.7	43.8	43.3	43.1	37.3	42	38	
Cond. Inlet Temp. (t_{11})	55.6	55.3	53.5	53.2	53.1	45.1	50.2	46.2	
Comp. Suction Temp. (t_{12})	36.6	37.8	37.7	37.6	37.6	37.4	37.6	37.4	
Comp. Shell Temp. (t_{13})	82.7	83.1	80.7	79.5	79.1	64.7	76	62.5	

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e) Pars Machine

1-Refrigertor Model PMR6

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	3&7	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-1.9	-12
Refrigerator Compartment Mean Temperature (◦ C)	- 5.9	+5
Condenser Outlet Temperature (◦ C)	+59	----------
Compressor Discharge Temperature (◦ C)	+76.4	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+58	----------
Compressor Shell (◦ C)	+87	----------
Type of Compressor Danfoss Model TL5G	----------	----------

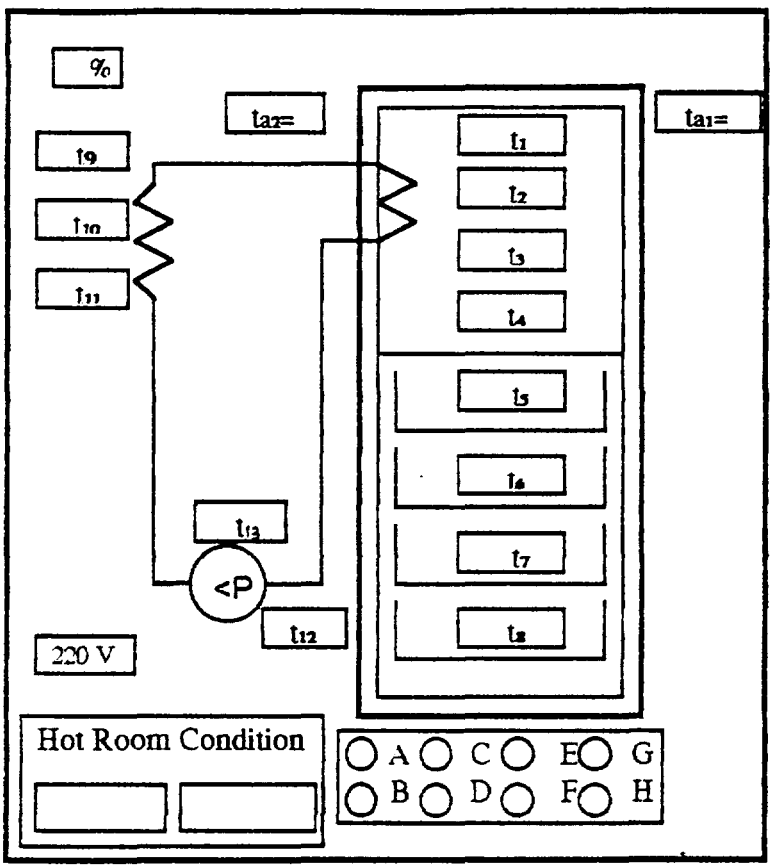
Evaluation

According to the above test results from cyclic run test at thermostat setting 3 and 7, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

AZMAYESH HOT ROOM TEST SHEET

Performance Test



Pars Machine 79

Product Name	REFRIGERATOR
Product Model	PMR6
Product Capacity	167 lit.
Compressor Name	Danfoss
Compressor Model	TL5G
Compressor Power	1/6 hp
Compressor Current	1.1A
Thermostat Position	3 & 7
Thermostat Type	Semi Auto
Total Test Time	375 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature °C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-9.4	-9.7	-9.6	-9.3	-9.6	-9.6			
Evap. Air Temp. (t_2)	-0.7	-2.8	-3.1	-3	-3.3	-3.3			
Evap. Air Temp. (t_3)	1.3	-1.1	-1.3	-1.1	-1.4	-1.3			
Evap. Air Temp. (t_4)	1.6	-0.6	-1	-0.6	-1.1	-1.1			
Evap. Mean Temp.	0.7	-1.5	-1.8	-1.5	-1.8	-1.9			
Meat Tray (t_5)	10.7	6.2	5.1	5.6	5.1	4.9			
Ref. Comp. Temp (t_6)	10	6.2	5.5	5.9	5.4	5.3			
Ref. Comp. Temp (t_7)	13.7	8.8	8	8.2	7.6	7.4			
Ref. Mean Temp	11.4	7.1	6.2	6.5	6.0	5.9			
Cellar Comp. Temp. (t_8)	13.9	7.5	6.3	6.9	6.2	6.1			
Cond. Outlet Temp. (t_9)	57.2	58.3	58.6	59.1	59	59			
Cond. Mid Temp. (t_{10})	50.2	57.6	57.8	58.1	58	58			
Cond. Inlet Temp. (t_{11})	69.2	74.2	74.9	75.9	75.9	76.4			
Comp. Suction Temp. (t_{12})									
Comp. Shell Temp. (t_{13})	83.2	85.1	86	86.4	86.8	87			

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2-Freezer 1072

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	4	----------
Freezer Mean Air Temperature (◦ C)	-9.6	-18
Condenser Outlet Temperature (◦ C)	+59	----------
Compressor Discharge Temperature (◦ C)	+76.8	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+57.3	----------
Compressor Shell (◦ C)	+79.5	----------
Type of Compressor Danfuss Model FR10G	----------	----------

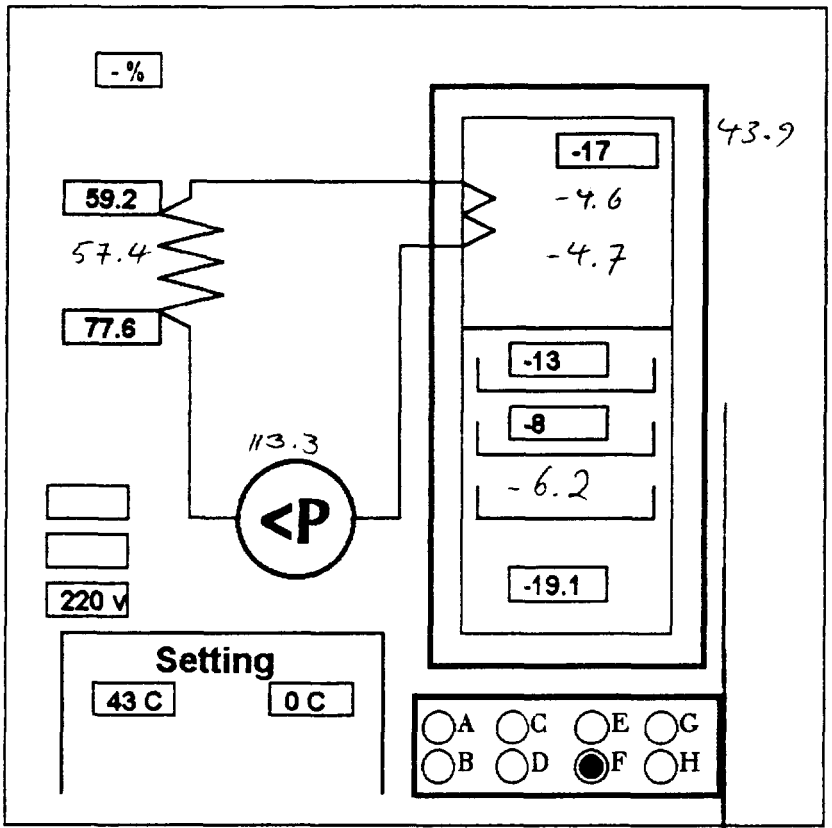
Evaluation

According to the above test results from cyclic run test at thermostat setting 5, we did not get desired figures from Freezer. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve model design and change refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 5155.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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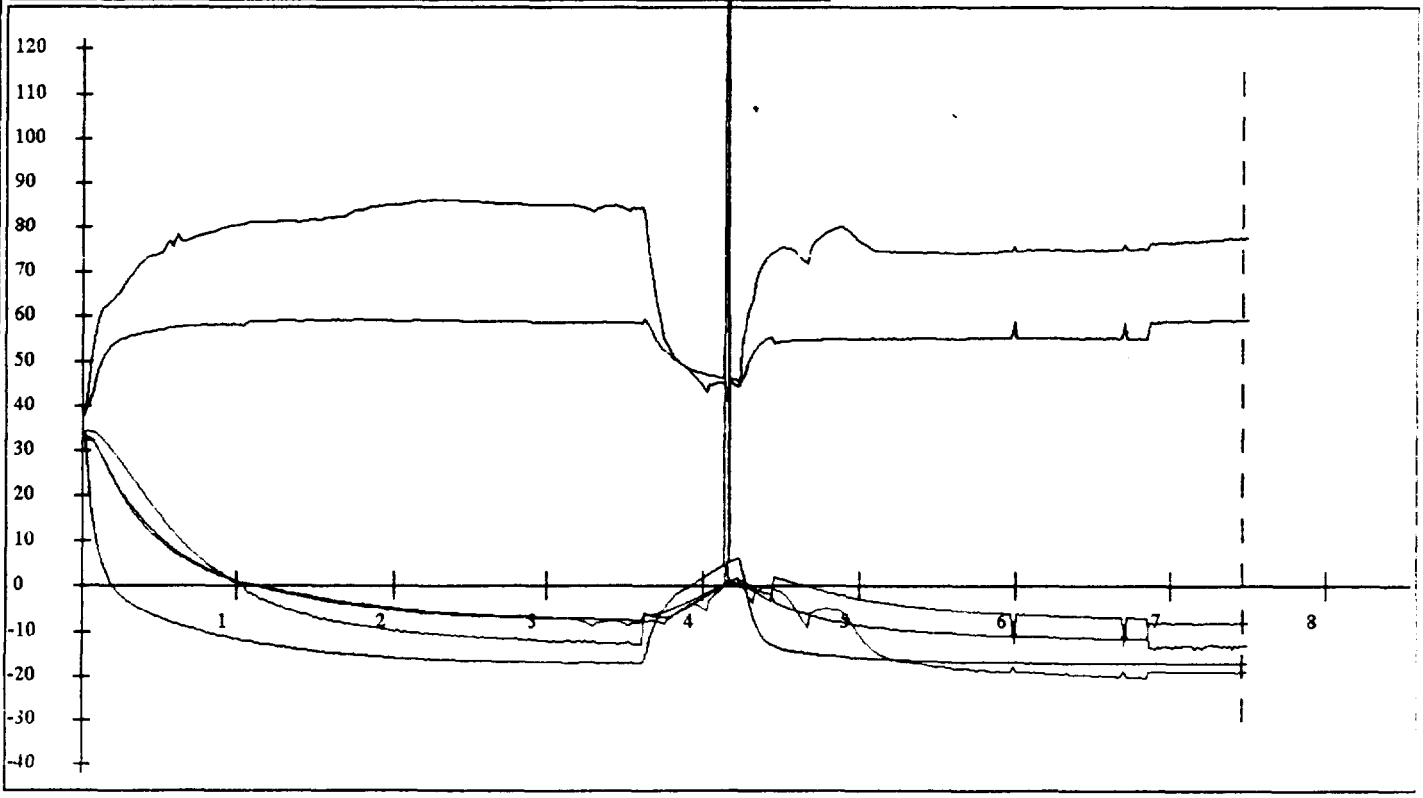
HR750607.D10

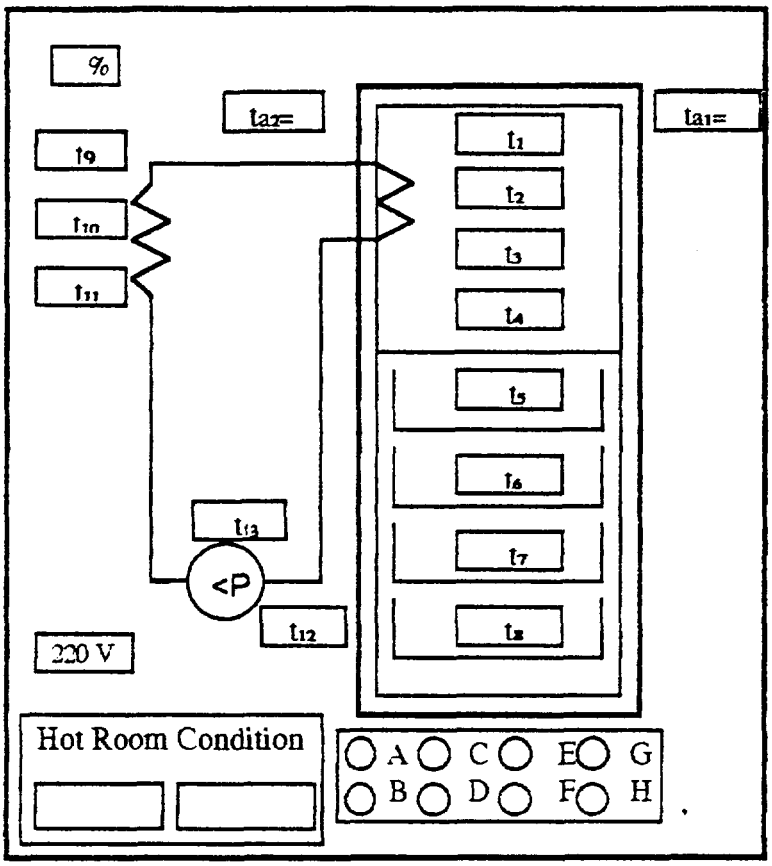
Product Name	Pars Machine
Product Model	1072
product. Capacity	290 LI.
Compresor Name	DANFOSS
Compresor Model	FR10G
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	2
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



Pars Machine 82

Product Name	Freezer
Product Model	1072
Product Capacity	290 lit.
Compressor Name	Danfoss
Compressor Model	FR10G
Compressor Power	1/4 hp
Compressor Current	1.35 A.
Thermostat Position	2 & 4
Thermostat Type	Semi Auto
Total Test Time	450 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-11.6	-15.6	-16.7	-17.1	-15.6	-16.8	-17		
Evap. Air Temp. (t_2)	9	-0.4	-3.3	-4	0.1	-3.6	-4.4		
Evap. Air Temp. (t_3)	8.7	-0.6	-3.3	-3.9	-0.1	-3.6	-4.5		
Evap. Air Temp. (t_4)	9.1	0.0	-2.7	-3.4	-0.1	-3.2	-4.1		
Evap. Mean Temp.	-	-	-	-	-	-	-		
(t_5)	0.5	-4.8	-11.9	-12.6	-2.8	-6.1	-13.3		
Comp. Temp (t_6)	0.9	-4.8	-6.8	-7.4	-8.5	-11	-8		
Comp. Temp (t_7)	5.2	-2.6	-4.9	-5.5	-2.9	-5.8	-6.2		
Ref. Mean Temp	-	-	-	-	-	-	-	-	
Comp. Temp. (t_8)	7.7	-5.2	-6.9	-7.8	-10.8	-19	-18.4		
Cond. Outlet Temp. (t_9)	58.4	57.1	58.7	58.6	55.3	55.5	59		
Cond. Mid Temp. (t_{10})	59.7	57.7	57.1	57	57.3	57	57.3		
Cond. Inlet Temp. (t_{11})	80.7	85.2	85.2	84.7	76.4	74.7	76.8		
Comp. Suction Temp.(t_{12})									
Comp. Shell Temp. (t_{13})									

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3- Refrigerator Model Damavand 15

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	2	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-7.9	-12
Refrigerator Compartment Mean Temperature (◦ C)	+ 8.1	+5
Condenser Outlet Temperature (◦ C)	+48.3	----------
Compressor Discharge Temperature (◦ C)	+66.3	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+56.5	----------
Compressor Shell (◦ C)	+86.6	----------
Type of Compressor danfoss Model FR6G	----------	----------

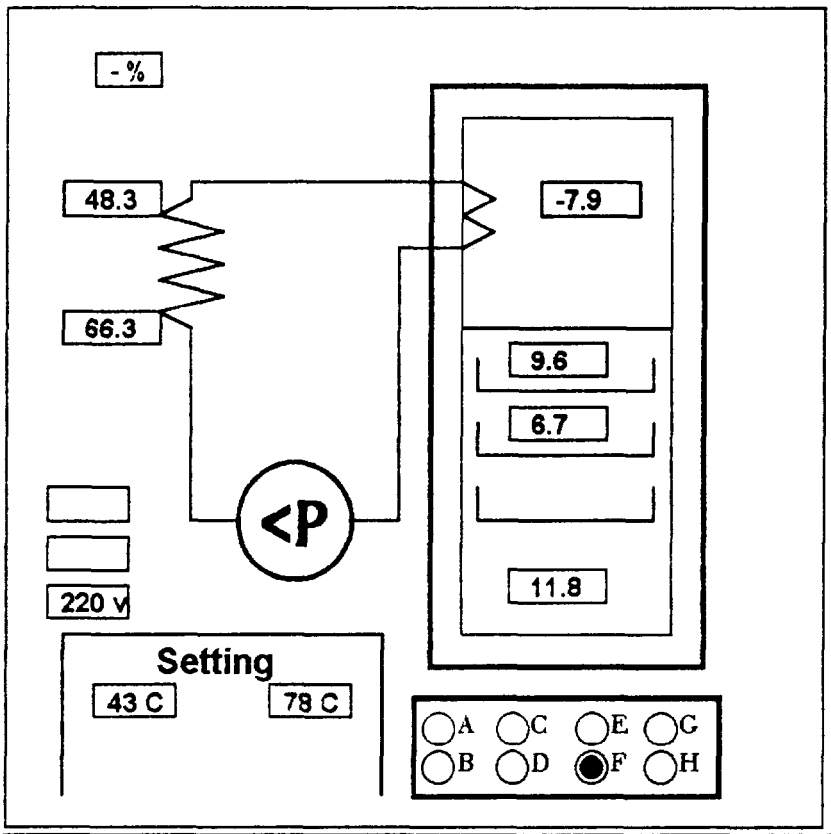
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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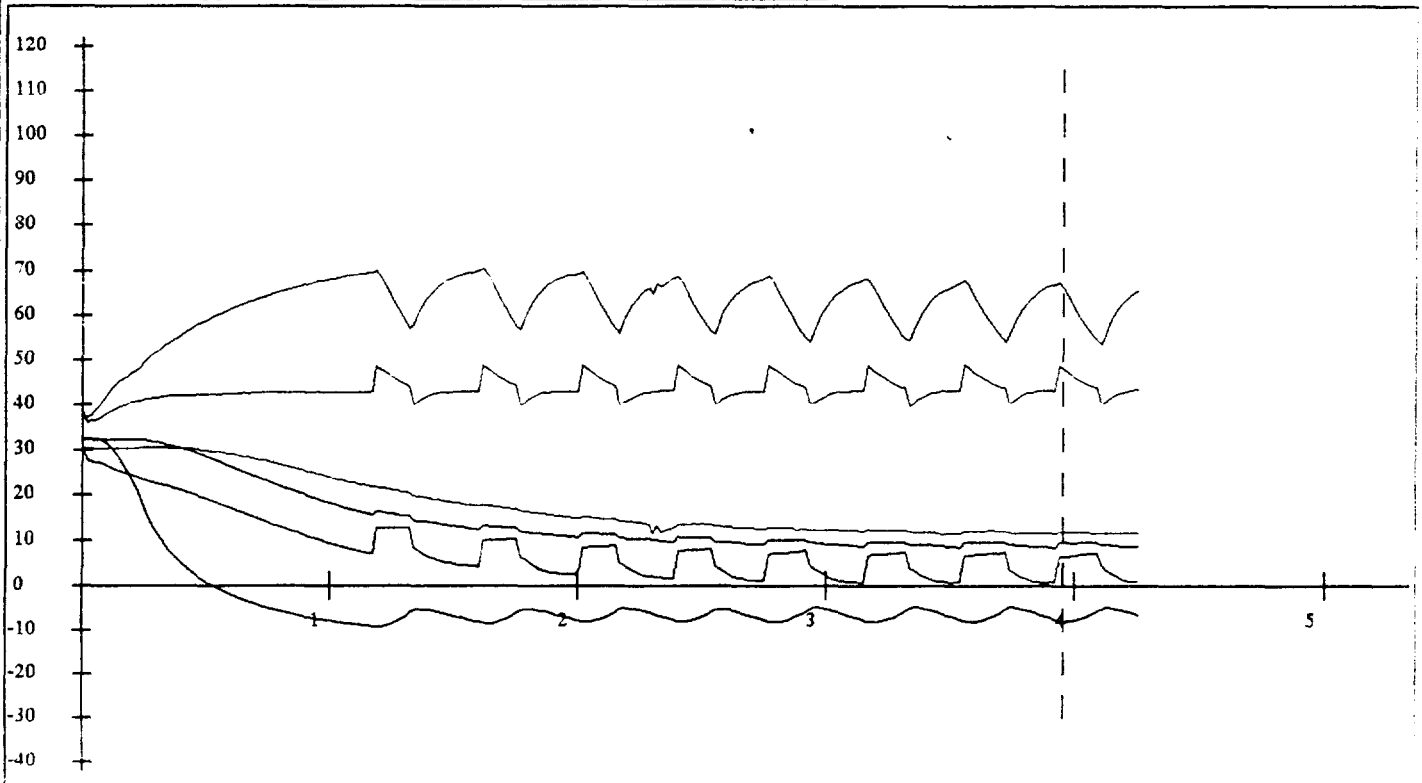
Product Name	PARSMACHIN
Product Model	DAMAVAND15
product. Capacity	380LI.
Compresor Name	DANFUSS
Compresor Model	FR6G
Compresor Power	1/5 Hp
Compresor Current	1.3 AMP.
Thermost. position	2
Thermost. Type	Semi auto
—	
Total Test Time	

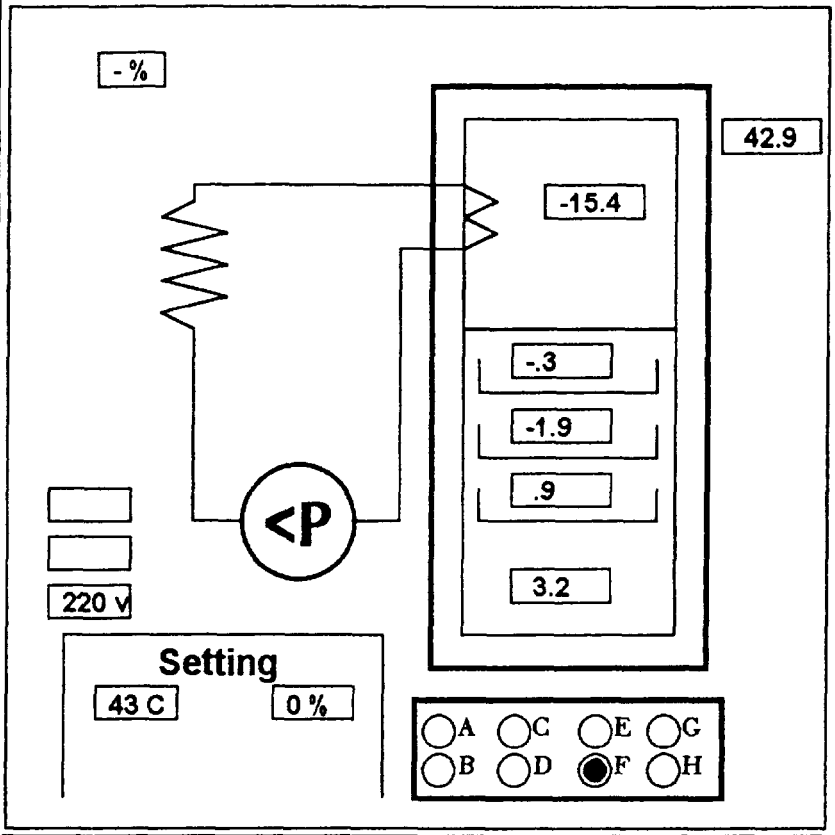
Percentage Working	
Energy Consumption	
Motor Winding Temp.	



UNIDO Hotroom Test

تست یخچال

Performance Test



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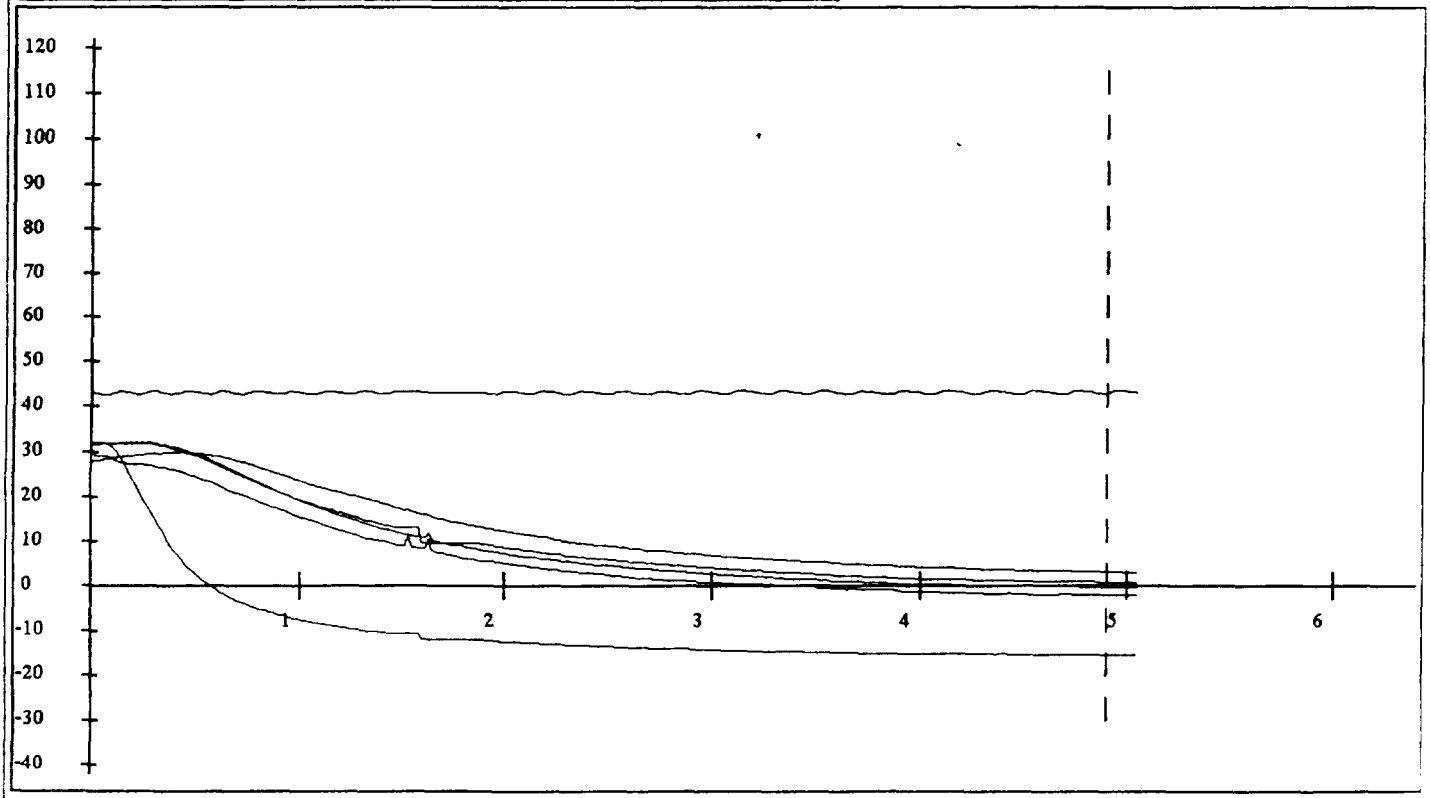
HR750523.D12

Product Name	PARSMACHIN
Product Model	DAMAVAND15
product. Capacity	380 LI.
Compresor Name	DANFUSS
Compresor Model	FR6G
Compresor Power	1/5 Hp
Compresor Current	1.3 A
Thermost. position	5
Thermost. Type	SEMI AUTO
—	
Total Test Time	

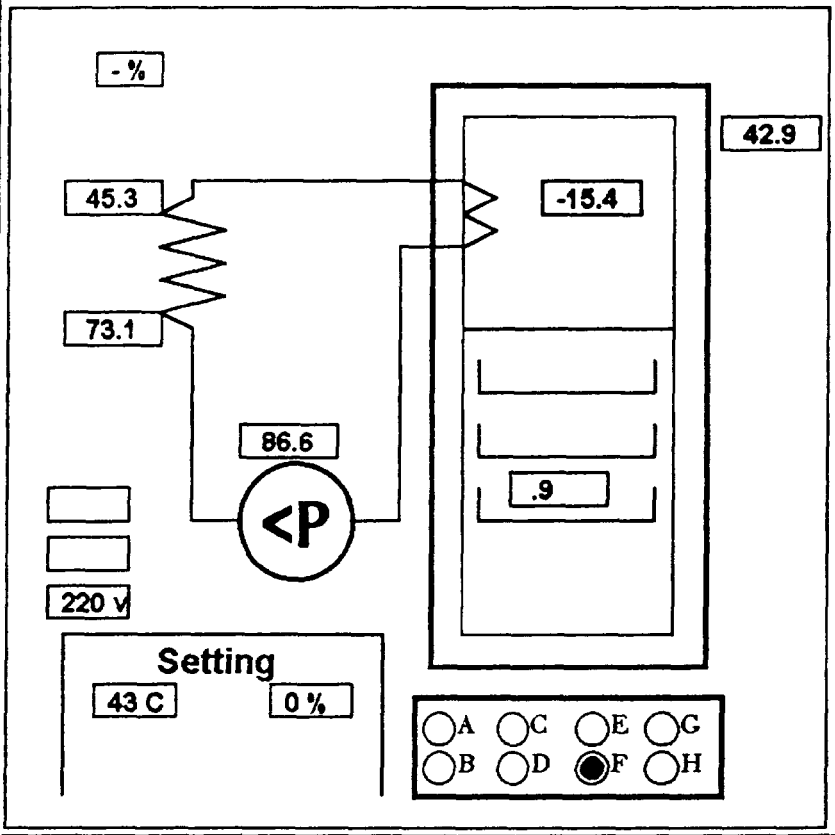
Percentage Working	
Energy Consumption	
Motor Winding Temp.	



UNIDO Hotroom Test

تست یخچال

Performance Test

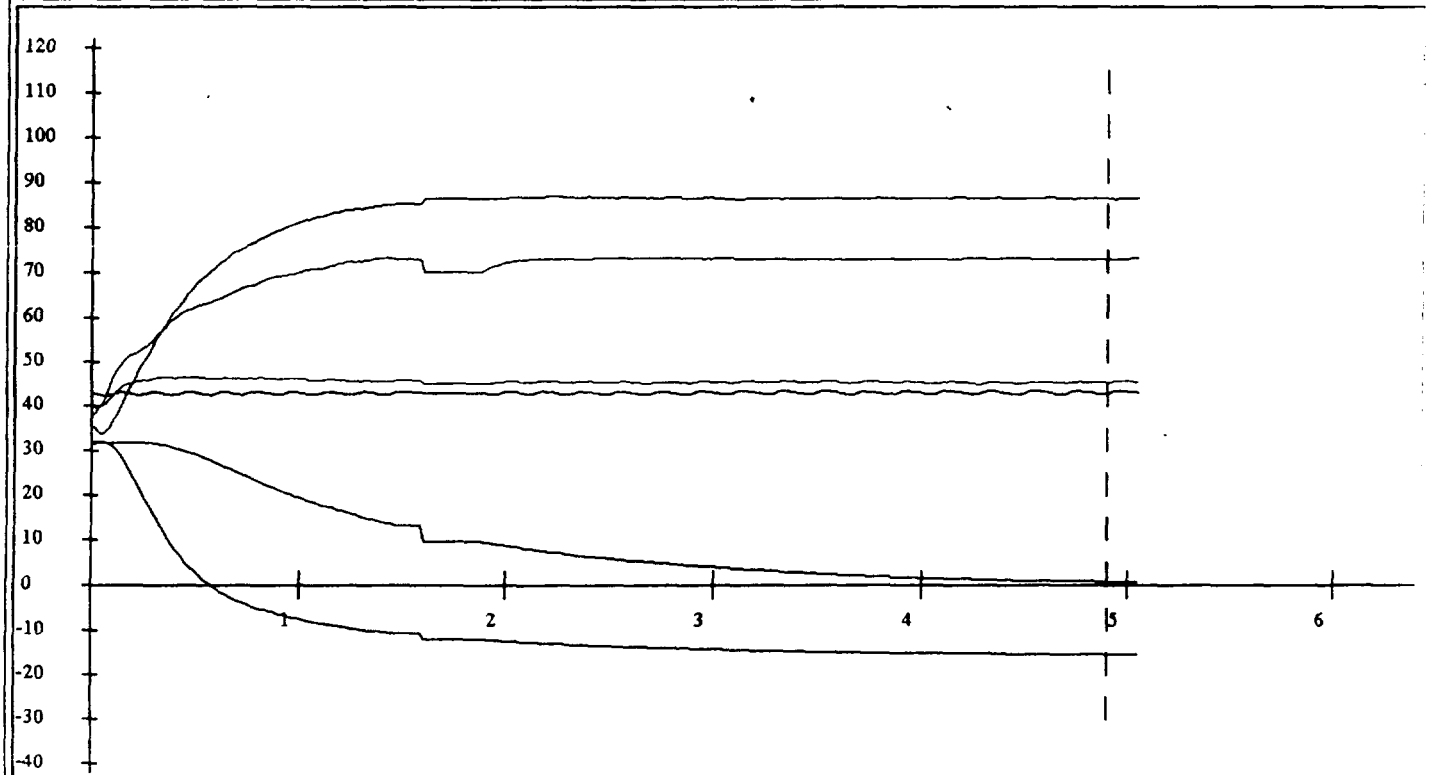


86

HR750523.D12

Product Name	PARSMACHIN
Product Model	DAMAVAND15
product. Capacity	380 LI.
Compresor Name	DANFUSS
Compresor Model	FR6G
Compresor Power	1/5 Hp
Compresor Current	1.3 A
Thermost. position	5
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



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4 - Refrigerator Model 1070

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	3	----------
Evaporator Compartment Mean Air Temperature (◦ C)	- 2.5	-12
Refrigerator Compartment Mean Temperature (◦ C)	- 7.3	-5
Condenser Outlet Temperature (◦ C)	-40.2	----------
Compressor Discharge Temperature (◦ C)	+52.7	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+40.2	----------
Compressor Shell (◦ C)	+62.8	----------
Type of Compressor Danfoss Model FR6G	----------	----------

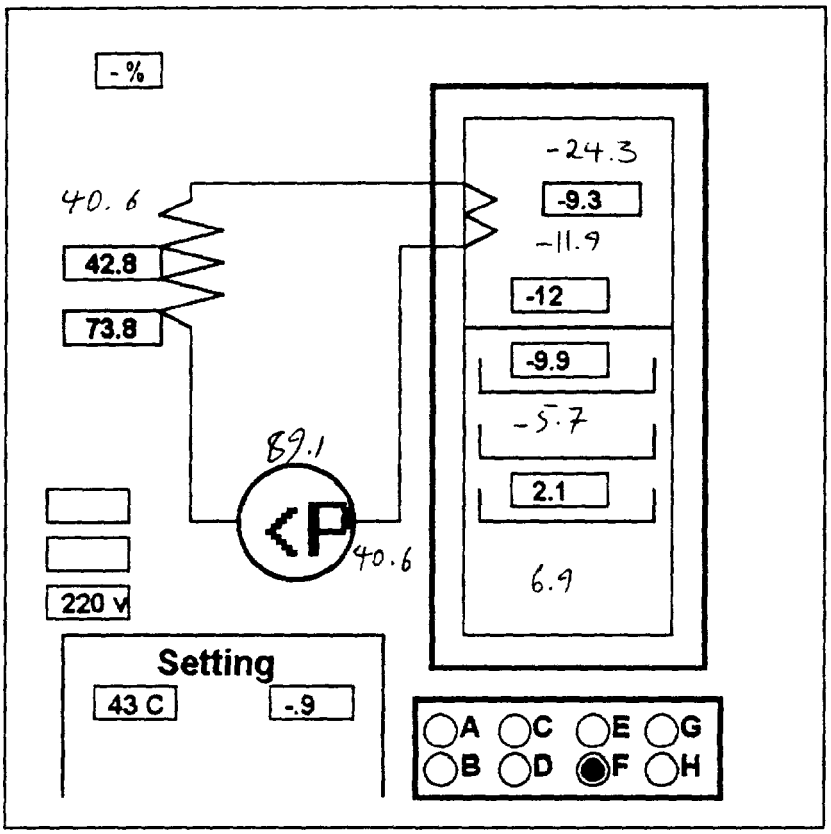
Evaluation

According to the above test results from cyclic run test at thermostat setting 3 we did not get desired figures from Freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve refrigerator design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 7371.

تست یخچال کارخانجات صنعتی آزمایش

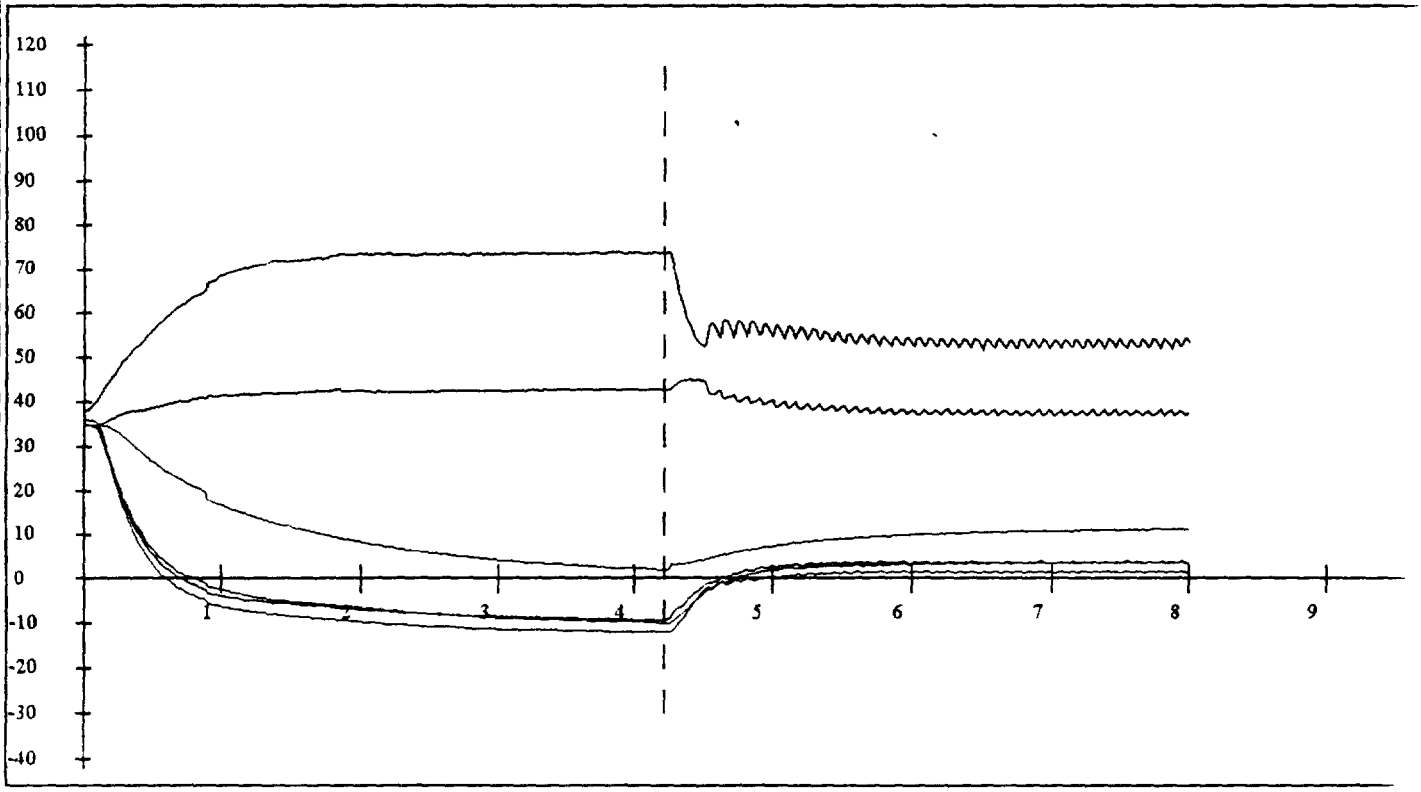
Performance Test



HR750614.D09 88

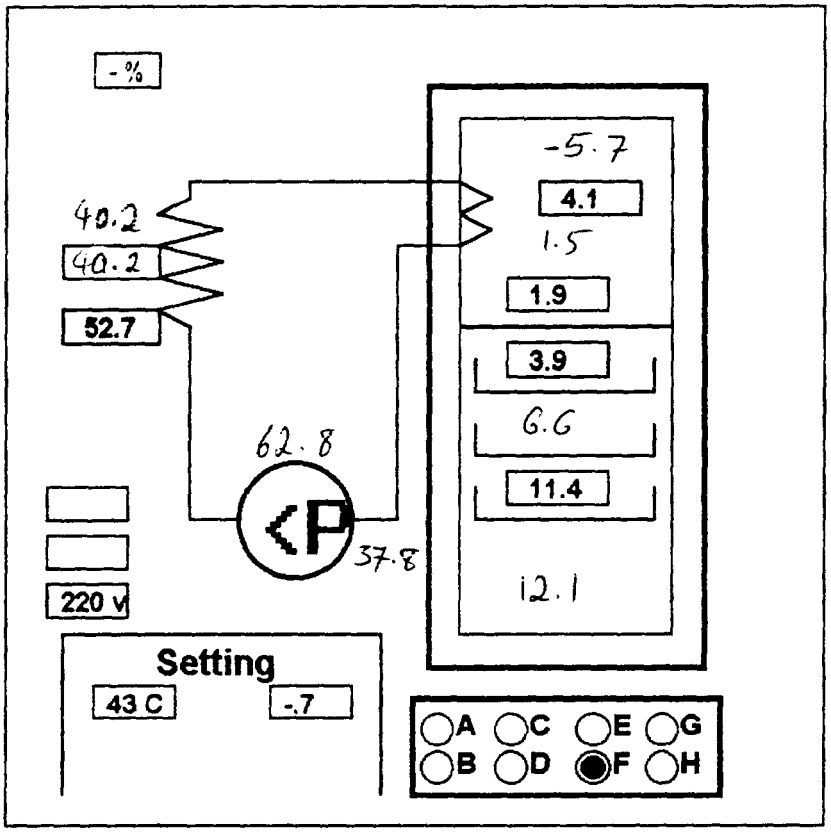
Product Name	Pars Machine
Product Model	1070
product. Capacity	289 LI.
Compresor Name	DANFOSS
Compresor Model	FR6G
Compresor Power	1/6 HP.
Compresor Current	1.1 A
Thermost. position	9
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Performance Test



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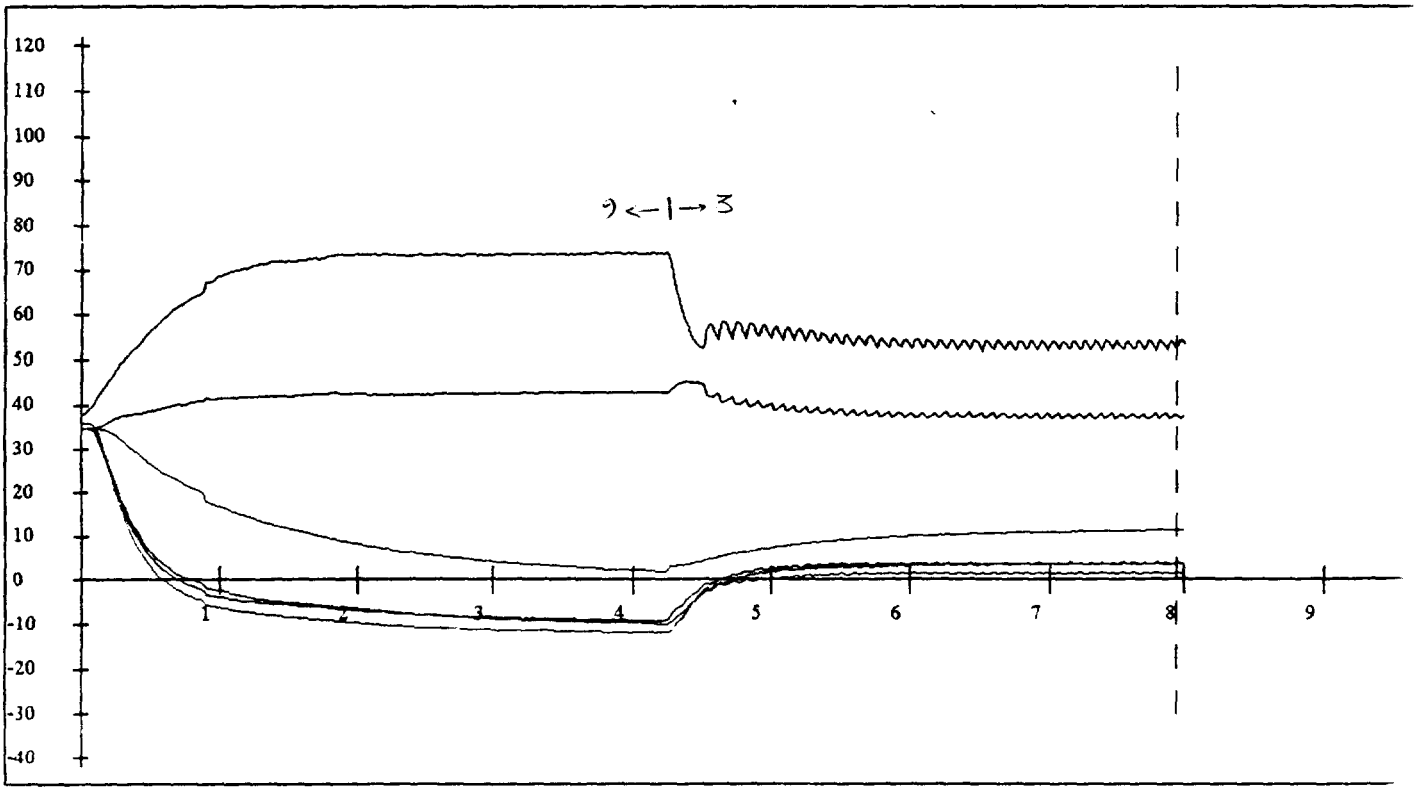
HR750614.D09

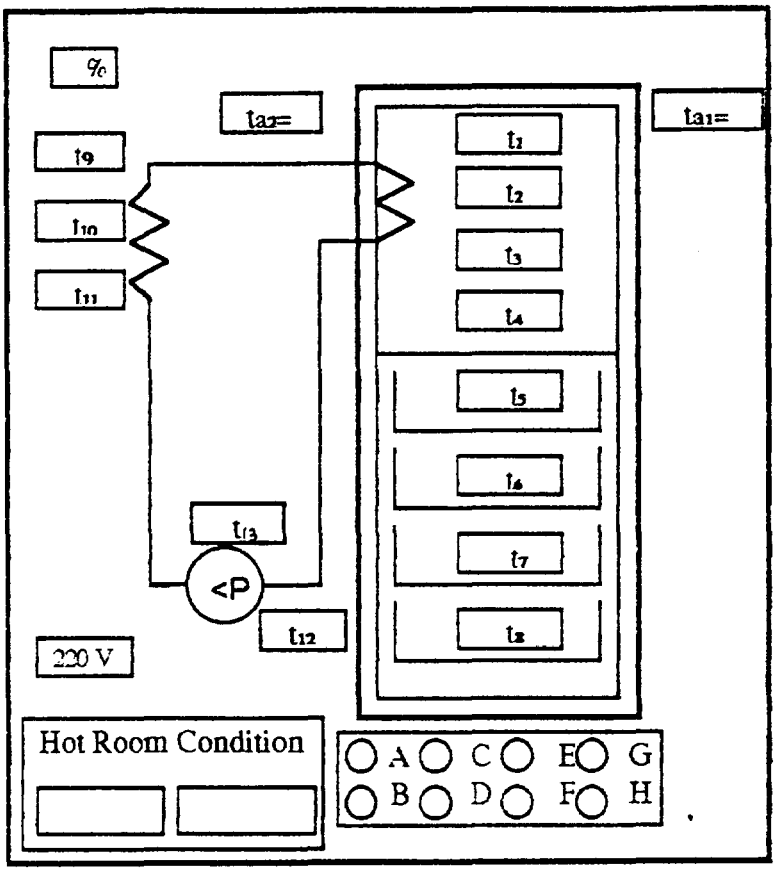
Product Name	Pars Machine
Product Model	1070
product. Capacity	289 LI.
Compresor Name	DANFOSS
Compresor Model	FR6G
Compresor Power	1/6 HP.
Compresor Current	1.1 A
Thermost. position	3
Thermost. Type	SEMI AUTO
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



Pars Machine 90

Product Name	Refrigerator
Product Model	1070
Product Capacity	289 lit.
Compressor Name	Danfoss
Compressor Model	FR6 G
Compressor Power	1/6 hp
Compressor Current	1.1 A
Thermostat Position	9 & 3
Thermostat Type	Semi Auto
Total Test Time	500 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-21.8	-23.6	-24.1	-24.1	-4.1	-4.7	-9.9	-5.1	
Evap. Air Temp. (t_2)	-3.8	-6.8	-8.5	-9.2	3.1	3.6	3.8	3.6	
Evap. Air Temp. (t_3)	-6.5	-9.8	-11.2	-11.8	0.4	1.3	1.4	1.2	
Evap. Air Temp. (t_4)	-6.2	-9.6	-11.3	-11.9	0.6	1.6	1.9	1.6	
Evap. Mean Temp.	-5.5	-8.7	-10.3	-11	1.4	2.2	8.1	2.1	
Meat Tray (t_5)	-2.4	-6.3	-8.7	-9.6	2.1	3.4	3.8	3.8	
Ref. Comp. Temp (t_6)	4.2	-1.5	-3.5	-4.4	1.8	0.0	5.3	2.3	
Ref. Comp. Temp (t_7)	16.8	8.4	4.3	2.4	7.5	10.1	11	11.4	
Ref. Mean Temp	6.2	1.2	-2.6	-4.5	3.8	4.5	6.7	5.8	
Cellar Comp. Temp. (t_8)	23.9	15	9.8	7.2	7.9	10.3	11.5	12.1	
Cond. Outlet Temp. (t_9)	41.7	42.6	42.6	42.9	40.4	35.4	41.3	37.7	
Cond. Mid Temp. (t_{10})	79.8	51.9	47.6	48.5	40.3	40	40.1	40.2	
Cond. Inlet Temp. (t_{11})	68.3	73.7	73.6	74	54.9	52.9	53.4	53.4	
Comp. Suction Temp. (t_{12})	41.1	40	40.5	42.9	40.4	38.3	37.2	37.7	
Comp. Shell Temp. (t_{13})	93.8	81.5	89.1	89.2	69.7	64.2	63.1	63.2	

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Pars Monark

1 - Refrigerator Model PMKR12

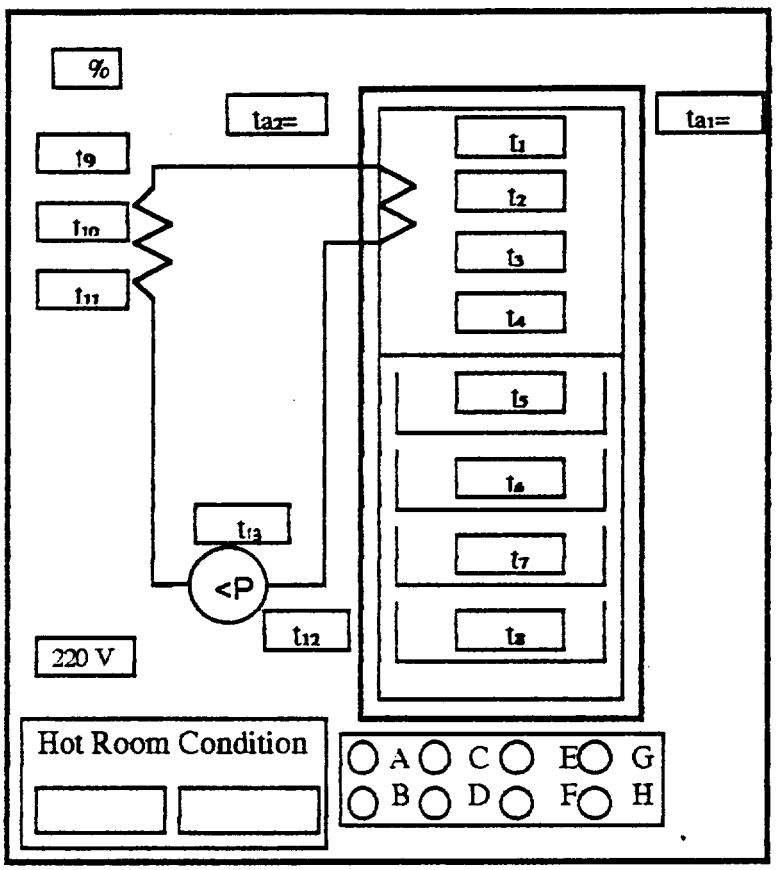
Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 7371
Thermostat Setting	3.5& 7	----------
Evaporator Compartment Mean Air Temperature (◦ C)	-13.1	-12
Refrigerator Compartment Mean Temperature (◦ C)	+ 5.5	+5
Condenser Outlet Temperature (◦ C)	+42.3	----------
Compressor Discharge Temperature (◦ C)	+65.6	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+54.5	----------
Compressor Shell (◦ C)	+79.4	----------
Type of CompressorDanfoss Model FR8.5G	----------	----------

Conclusion

According to the test results shown in the test sheets, the evaporator compartment of this refrigerator could be rated as Two Stars compartment and no significant problem appreared during the tests. The tests has been accomplished in accordance with ISO 7173

AZMAYESH HOT ROOM TEST SHEET

Performance Test



Pars Monark 92

Product Name	Refrigerator
Product Model	PMKR12
Product Capacity	280 Lit.
Compressor Name	Gold Star
Compressor Model	NR 2LAEG
Compressor Power	1/ hp
Compressor Current	1.2
Thermostat Position	3.5 & 7
Thermostat Type	Semi Auto
Total Test Time	480 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	4	5	6	7	8	9	10	11	
Evap. Inlet Temp. (t_1)	-13.2	-18.7	-20.1	-22.2	23.7	-23.9	-23.2	-23.3	
Evap. Air Temp. (t_2)	-7.6	-9.3	-11.9	-12.6	-12.8	-12.9	-12.8	-12.9	
Evap. Air Temp. (t_3)	-8.2	-8.8	-10.2	-12.2	-12.7	-13.2	-13.1	-13.2	
Evap. Air Temp. (t_4)	-7.9	-9.2	-11.3	-12.8	-13	-13	-13.2	-13.3	
Evap. Mean Temp.	-7.9	-9.1	-11.1	-12.5	-12.8	-13.0	-13.0	-13.1	
Meat Tray (t_5)	+9.5	8.2	7.2	6.2	4	4.3	4.2	4.2	
Ref. Comp. Temp (t_6)	10.1	9.3	9.1	8.1	6.7	5.9	5.3	5.4	
Ref. Comp. Temp (t_7)	11.2	9.4	8.7	7.7	6.1	5.8	5.4	5.6	
Ref. Mean Temp	10.6	9.3	8.9	7.9	6.4	5.8	5.3	5.5	
Cellar Comp. Temp. (t_8)	14.7	15.1	14.9	14.5	13.2	13.5	13.7	13.5	
Cond. Outlet Temp. (t_9)	44.1	45.2	45.6	46.7	44.1	43.3	42.4	42.3	
Cond. Mid Temp. (t_{10})	57.1	55.3	56.1	55.2	56.2	54.7	55.1	54.5	
Cond. Inlet Temp. (t_{11})	69.1	63.2	64.3	64.4	69.7	66.4	65.3	65.6	
Comp. Suction Temp.(t_{12})	42.2	43.7	44.1	45.2	43.4	43.5	43.2	43.7	
Comp. Shell Temp. (t_{13})	71.3	75.2	76.3	78.2	79.1	78.2	79.9	79.4	

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2 - Freezer Model PMKF7

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	3.5 & 7	----------
Freezer Mean Air Temperature (◦ C)	-6.3	-18
Condenser Outlet Temperature (◦ C)	-47.5	----------
Compressor Discharge Temperature (◦ C)	+85	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+52.5	----------
Compressor Shell (◦ C)	+90.7	----------
Type of Compressor Gold Star Model NR 52 LAEG	----------	----------

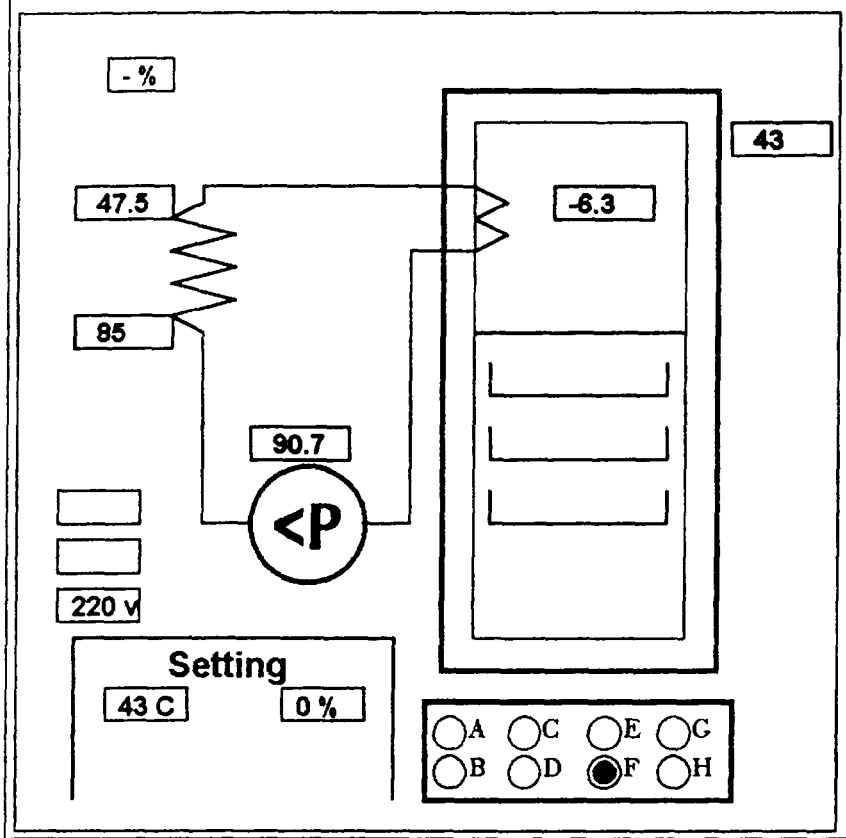
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, we did not get desired figures from Freezer. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improvefreezer design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 5155.

UNIDO Hotroom Test تست یخچال

Performance Test

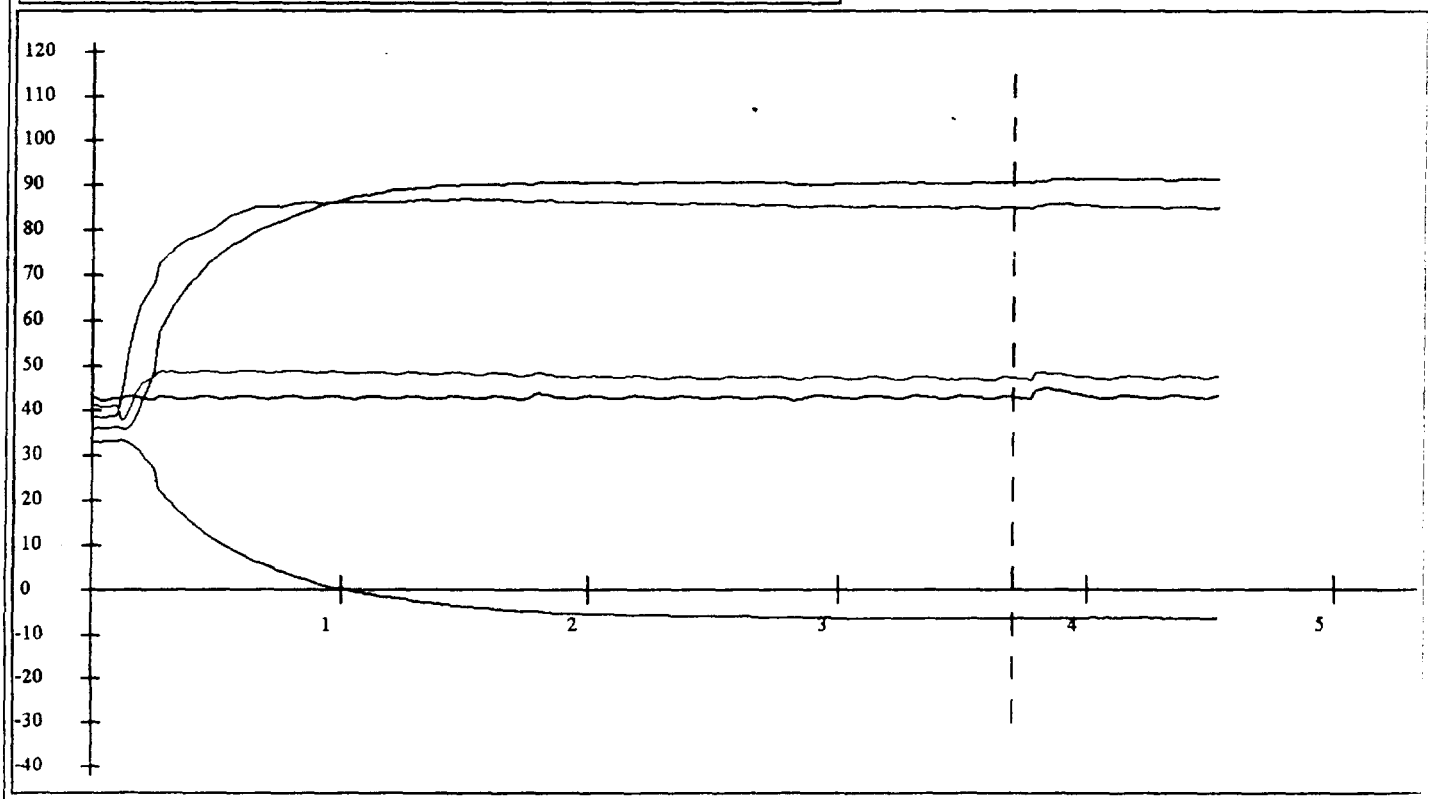


94

HR750522.D11

Product Name	MONARK(F)
Product Model	PMKF 7
product. Capacity	180 Lit
Compresor Name	GOLD STAR
Compresor Model	NR 52 LAEG
Compresor Power	1/5 Hp
Compresor Current	1.2 A
Thermost. position	5
Thermost. Type	-
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



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3 - Freezer Model PMKF12

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 5155
Thermostat Setting	2,3.5&7	----------
Freezer Mean Air Temperature (◦ C)	-14.2	-18
Condenser Outlet Temperature (◦ C)	+45.1	----------
Compressor Discharge Temperature (◦ C)	+70.1	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+62.4	----------
Compressor Shell (◦ C)	+79.4	----------
Type of Compressor Gold Star Model VR 75 LAEG	----------	----------

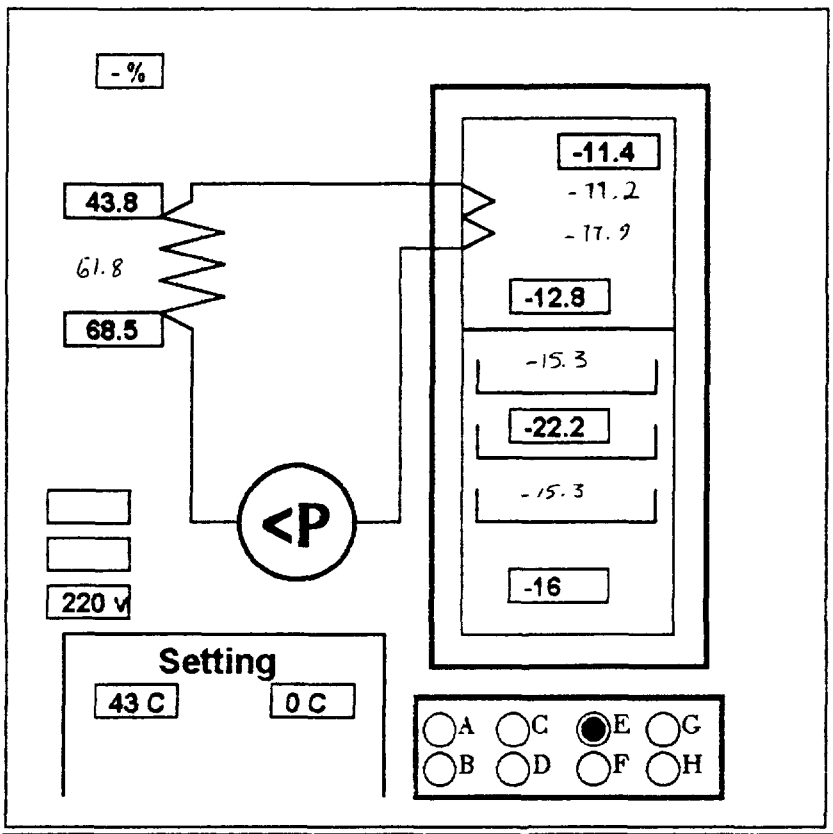
Evaluation

According to the above test results from cyclic run test at thermostat setting 2, 3.5 & 7, we did not get desired figures from Freezer. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve Freezer design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 5155.

تست یخچال کارخانجات صنعتی آزمایش

Perfomance Test

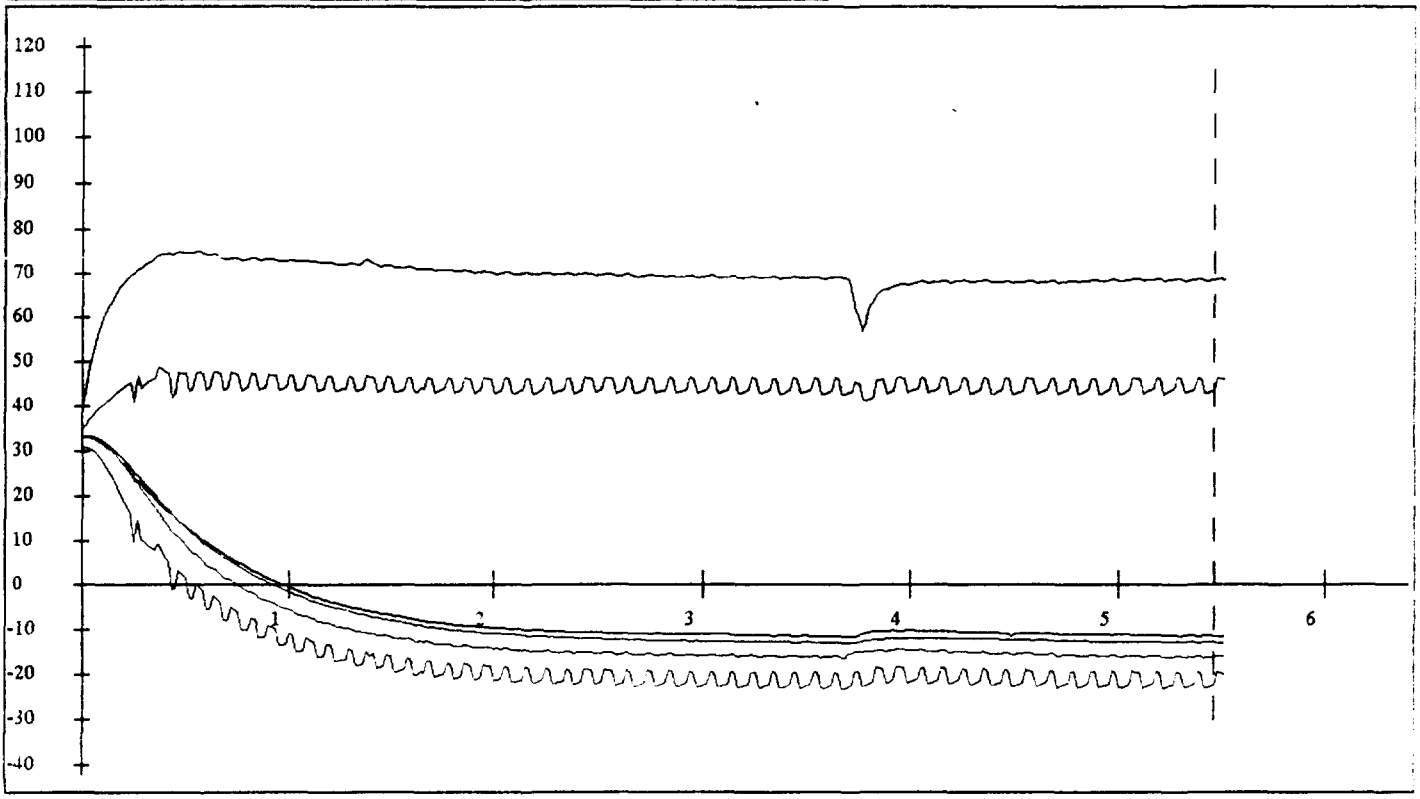


HR750604.D13

96

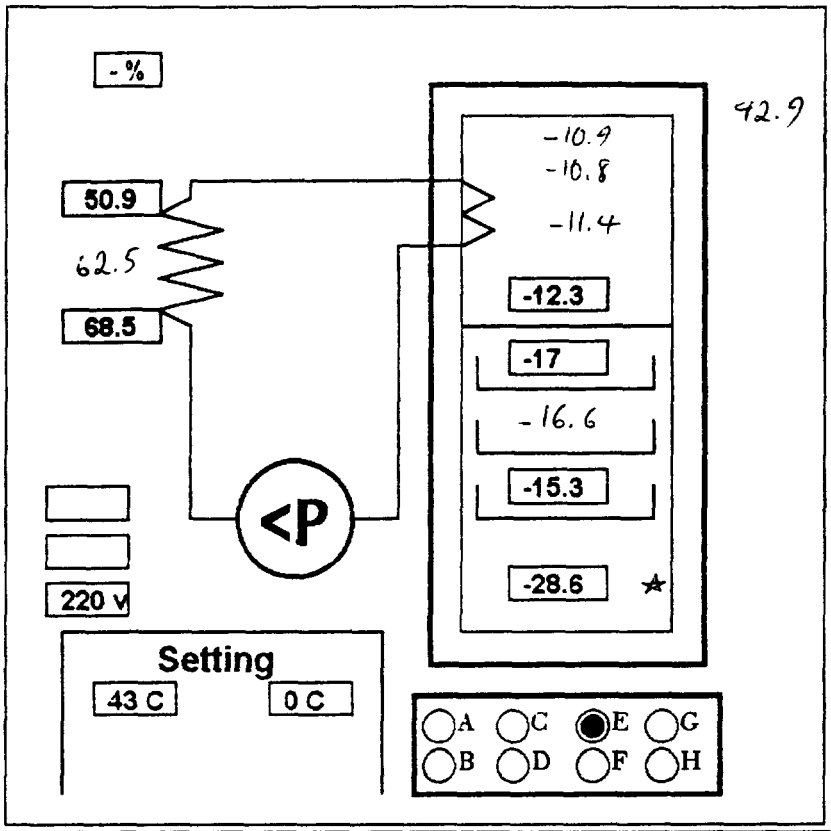
Product Name	MONARK
Product Model	PMKF12
product. Capacity	280 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	2
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

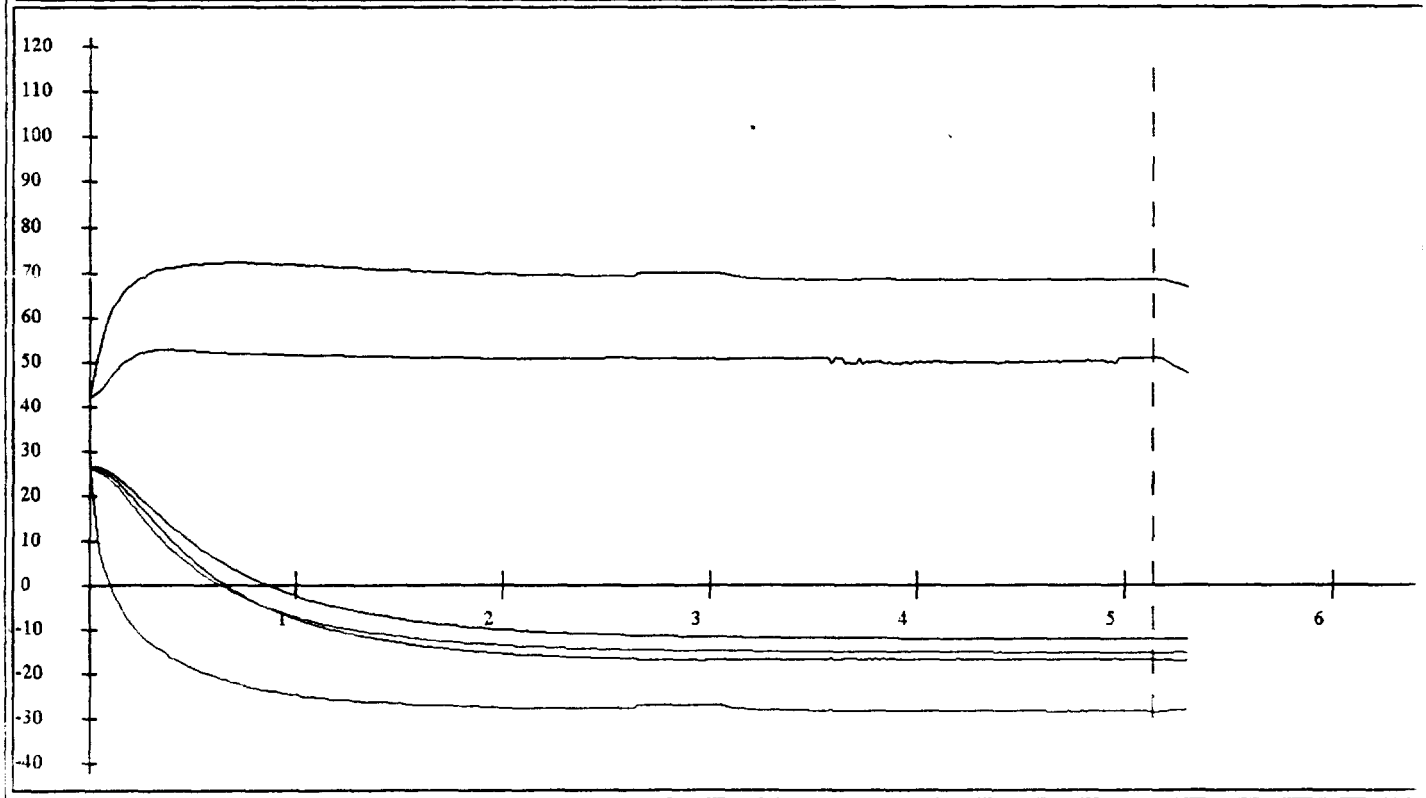
Perfomance Test



HR750606.D10 97

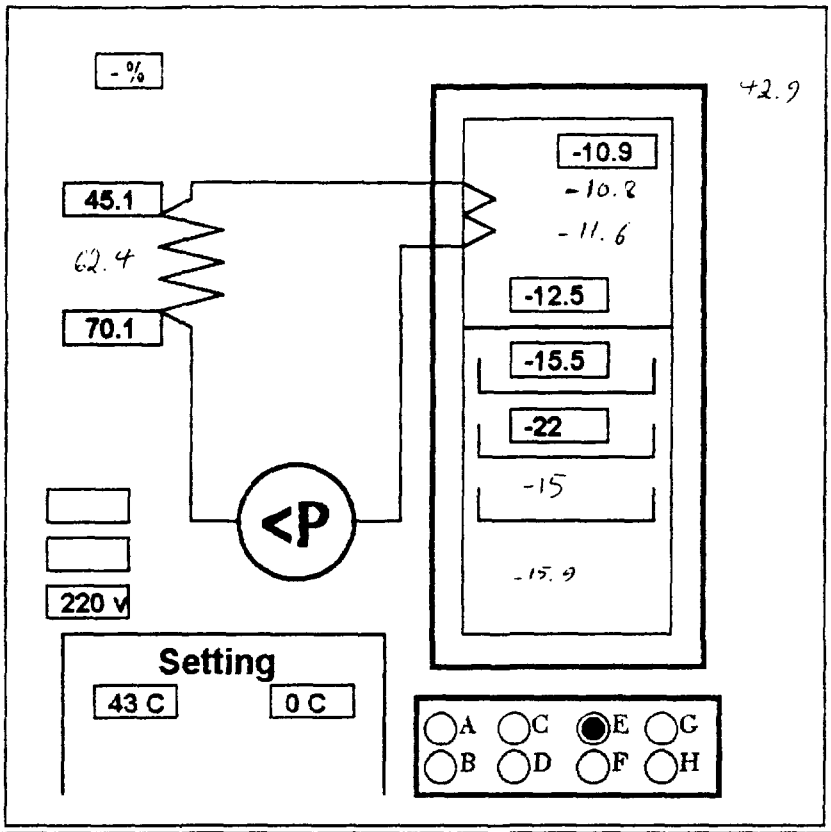
Product Name	MONARK
Product Model	PMKF12
product. Capacity	280 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	7
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



تست یخچال کارخانجات صنعتی آزمایش

Perfomance Test



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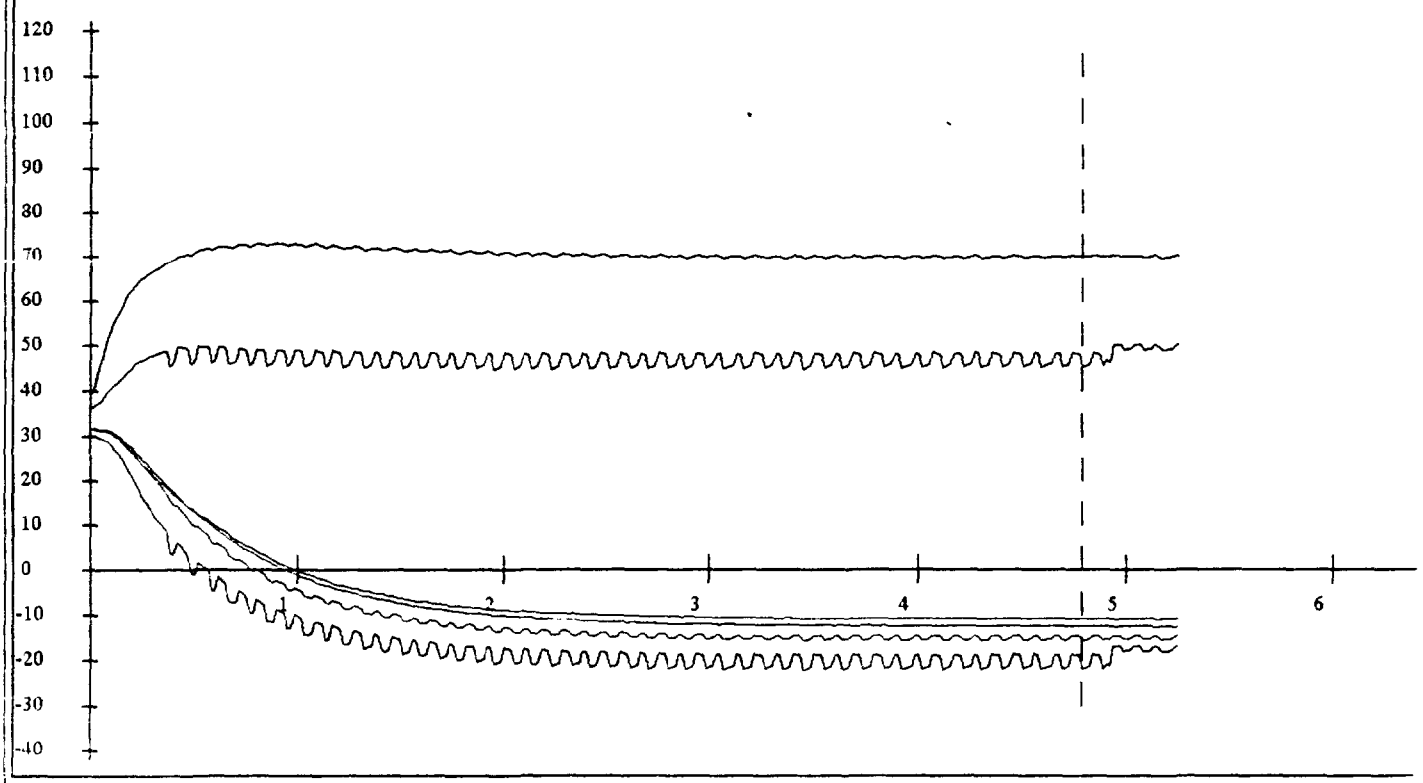
HR750605.D10

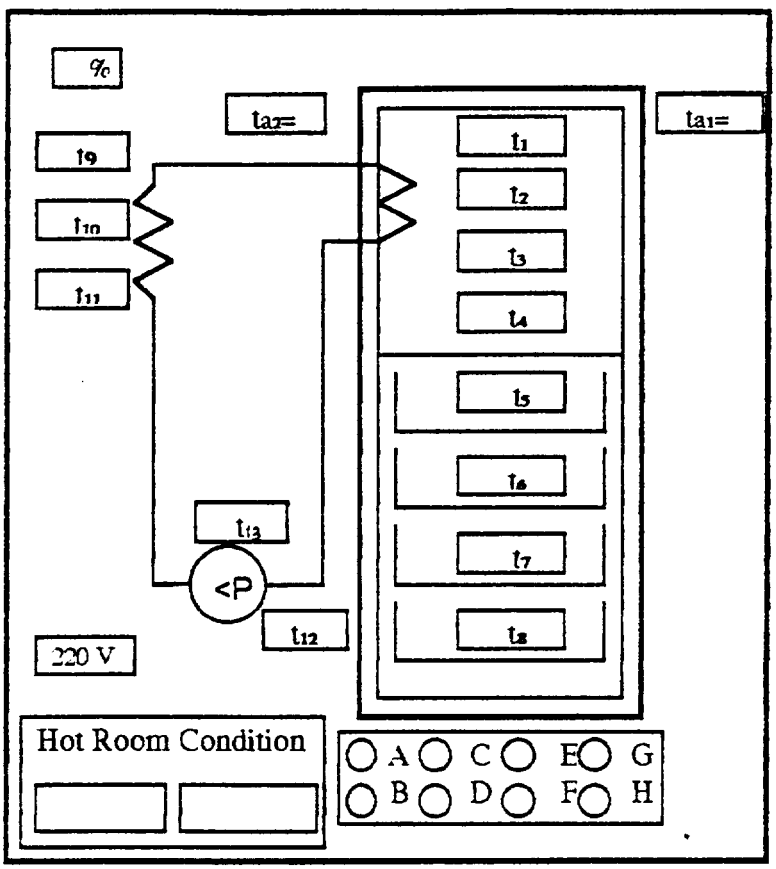
Product Name	MONARK
Product Model	PMKF12
product. Capacity	280 LI.
Compresor Name	GOLD STAR
Compresor Model	V 75 LAEG
Compresor Power	1/4 HP.
Compresor Current	1.35 AMP.
Thermost. position	3.5
Thermost. Type	Semi Auto
—	
Total Test Time	

Percentage Working	
Energy Consumption	
Motor Winding Temp.	



AZMAYESH HOT ROOM TEST SHEET

Performance Test



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Pars Monark

Product Name	Freezer
Product Model	PMKF12
Product Capacity	280 Lit.
Compressor Name	Gold Star
Compressor Model	NR 75 LAEG
Compressor Power	1/4 hp
Compressor Current	1.35 A
Thermostat Position	7
Thermostat Type	Semi Auto
Total Test Time	

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Time(Hrs) / Temperature ° C	1	2	3	4	5	6	7	8	9
Evap. Inlet Temp. (t_1)	-24.9	-27.6	27.1	-28 5	-28.5				
Evap. Air Temp. (t_2)	-1.6	-8.9	-10.9	-10.8	-10.9				
Evap. Air Temp. (t_3)	-1	-8.7	-10. 4	-10.7	-10.8				
Evap. Air Temp. (t_4)	-1.5	-9.2	-10.9	-11.3	-11.4				
Evap. Mean Temp.	—	—	—	—	—	—	—	—	—
Meat Tray (t_5)	-7.8	-15.5	-17.1	-16.9	-17				
Ref. Comp. Temp (t_6)	-8.9	-14.9	-16.2	-17.4	-16.6				
Ref. Comp. Temp (t_7)	-7.3	-14.9	-15.2	-15 3	-15.4				
Ref. Mean Temp	—	—	—	—	—	—	—	—	—
Cellar Comp. Temp. (t_8)	—	—	—	—	—				
Cond. Outlet Temp. (t_9)	51.6	50.9	50.7	50	50.9				
Cond. Mid Temp. (t_{10})	65.1	63.4	62.6	62.5	62.5				
Cond. Inlet Temp. (t_{11})	71.3	69.9	7 2	68.6	68.5				
Comp. Suction Temp.(t_{12})									
Comp. Shell Temp. (t_{13})									

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4 - Refrigerator - Freezer Model PKRF17

Summary Test Results (Cyclic Run)		
Condition	Reading Value	Rated Value ISO 8187
Thermostat Setting	3.5	----------
Freezer Compartment Mean Air Temperature (◦ C)	-17.8	-18
Refrigerator Compartment Mean Temperature (◦ C)	+6.6	+5
Condenser Outlet Temperature (◦ C)	+40.1	----------
Compressor Discharge Temperature (◦ C)	+70.6	----------
Condenser Mid Point (1/3) Temperature (◦ C)	+525	----------
Compressor Shell (◦ C)	+80.4	----------
Type of Compressor Zanussi Model GL99AA	----------	----------

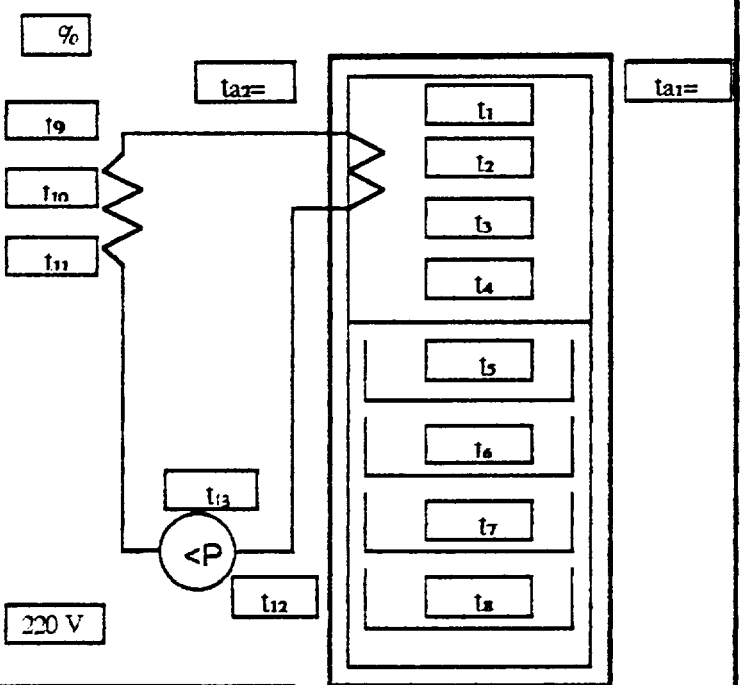
Evaluation

According to the above test results from cyclic run test at thermostat setting 2,4 & 7, we did not get desired figures from freezer and refrigerator compatments. We recommed to perform following tasks as required at the manufacturer plant in order to optimize refrigerant charge and/or select suitable components.

1 - Replace Compressor with a suitable compressor with desired cooling capacity.
2 - Optimize refrigerant charge.
3 - Perform condition test at different ambient temperature.
4 - Improve ref-freezer design and adjust refrigeration circuit components as required.
5 - Perform different performance tests in accordance with ISO standard 8187.

AZMAYESH HOT ROOM TEST SHEET

Performance Test



Hot Room Condition

A C E G
B D F H

Pars Monark 101

Product Name	Ref. Freezer
Product Model	PKRF17
Product Capacity	428 l.t
Compressor Name	Zanussi
Compressor Model	GL99AA
Compressor Power	1/3 hp
Compressor Current	2.1
Thermostat Position	3.5 & 7
Thermostat Type	Semi Auto
Total Test Time	320 min

Working Percentage	
Energy Consumption	
Motor Winding Temp.	

Temperature ° C \ Time(Hrs)	3	4	5	6	7	8	9		
Evap. Inlet Temp. (t_1)	-24.1	-25.2	-23.4	-22.4	-19.7	-20.1	-21.1		
Evap. Air Temp. (t_2)	-18.6	-19.1	18.1	17.1	-15.5	-16.9	-17.9		
Evap. Air Temp. (t_3)	-17.9	-19.0	18.3	16.9	-15.3	-16.5	-17.7		
Evap. Air Temp. (t_4)	-18.1	-19.2	17.9	17.3	-15.1	-17.3	-17.8		
Evap. Mean Temp.	-18.2	-19.1	-18.1	-17.1	-15.3	-16.9	-17.8		
Meat Tray (t_5)	—	—	—	—	—	—	—		
Ref. Comp. Temp (t_6)	7.4	7.9	6.9	6.2	6.5	6.6	6.3		
Ref. Comp. Temp (t_7)	7.5	7.5	7.3	6.4	5.9	6.4	6.4		
Ref. Mean Temp	7.4	7.7	7.1	6.3	6.2	6.5	6.6		
Cellar Comp. Temp. (t_8)	13	14.7	14.2	14.7	15.1	14.2	15.3		
Cond. Outlet Temp. (t_9)	42.1	43.2	44.1	43.2	44.2	42.1	+40.1		
Cond. Mid Temp. (t_{10})	54.1	53.9	54.1	53.7	52.3	52.7	52.5		
Cond. Inlet Temp. (t_{11})	71.7	72.2	70.3	71.2	70.7	70.3	70.6		
Comp. Suction Temp.(t_{12})	43.4	43.3	43.7	43.2	43.4	42.9	43.1		
Comp. Shell Temp. (t_{13})	84.1	82.1	85.1	84.2	82.1	83.1	80.4		