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SAHAND MINA ENGINEERING CO LTD.

UNIDO

Conversion and Development of Prototype from R12 to R134a Ozone Friendly Refrigerant System at
Avaj Sarma, Donyaae Mojdeh, Gasso, Roshan Companies

PROJECT NUMBERS
MP/IRA/01/140, 141, 143, 145

Contract Number
01/297
Final Report

April 2002

Sahandmina Engineering Company Ltd.

Final Report

PROJECTS NO.
MP/IRA/01/140, 141, 143, 145

Contract Number 01/297

Avaj Sarma, Gasso, Donyaye Mojdeh, and Roshan Companies

Introduction

We are delighted to submit to you herewith, our draft Final Report, concerning calculation and redesign of the prototypes that have been made the counterparts and they have been tested at counterparts hot chamber. These prototypes have been manufactured under our close engineering supervision and have been tested in accordance with appropriate ISO standard test procedure and relevant performance test characteristics for functionality and performance of the new Ozone friendly R134a refrigerant. Our preliminarily review of test results revealed that majorities of prototypes responded to the new R134a refrigerant functional behavior. The final assessment and evaluation of prototypes test results together with original copies of prototypes performance sheets will be submitted to you together with our final reports after UNIDO's approval of our this report and we hope that this

report could have satisfied the UNIDO in order to comply with our contract.

Synopsis

This report has been prepared based on the Contract between UNIDO and Sahandmina Engineering company.
This project will phase out the use of CFC-11 and CFC-12 in the production of Domestic/commercial refrigeration equipment at ***Avaj Sarma, Gasso, Donyaye Mojdeh, and Roshan Companies***. CFC-11, which is used, as a foam-blowing agent in the production of polyurethane foam will be replaced by **HCFC-141b** and CFC-12, which is used as the refrigerant in the cooling circuit of appliances, will be replaced by **HFC-134a**. The project includes the modification of all cooling equipment produced and the conversion of the production facilities. The model redesign element of the project includes testing, trial manufacture and reliability tests. The cost of converting foaming machines to use HCFC-141b will be covered by the counterpart organizations.

General Background

The objective of this project is to eliminate the use of CFC-11 and CFC-12 in the production of commercial and domestic refrigeration equipment at the ***Avaj Sarma, Gasso, Donyaye Mojdeh, and Roshan Companies***, through conversion to the use of HFC-134a refrigerant for the cooling system and HCFC-141b as blowing agent for the polyurethane insulation foam.

The same operating parameters and the same quality level is guaranteed on completion of the conversion process, but no increase in production capacity will be brought about by the project. The company involved is aware of the financial limitations of the funding process and is prepared to use its own funds to share some of the cost of the conversion process.

SECTOR BACKGROUND

Sahandmina Engineering Company Ltd.

The Islamic Republic of Iran ratified the Montreal Protocol in March 1990. Subsequently, Iran's Country Programme has outlined a plan for the reduction of the domestic use of ODS by 75% before 1999, and aims to be ODS free by 2005.

Based on the data provided by the Ozone Layer Protection Center/Department of Environment of Iran, the Refrigeration Sector in Iran is estimated to comprise of about 300 enterprises. The annual ODS consumption in the domestic and commercial refrigeration sectors is reported to be about 2,500 ODP MT as of 1998, representing the bulk of the overall ODS consumption in Iran. The domestic and commercial refrigeration sub-sector each contributes about 50% of the total ODS consumption in this sector. The average growth rate in this sector has been about 6.5% annually.

In the domestic refrigeration sub-sector, there are about 10 large manufacturers and about 15 medium-sized manufacturers, with a combined production of about 2 million units. In the commercial refrigeration sub-sector, there are about 30 relatively large-sized enterprises, and the remaining (estimated to be about 300) are small and medium sized. Due to the relatively unsophisticated technology and practices prevailing in the small and medium enterprises, and being unorganized, they will present a challenge to reach out to for purposes of participation in the Montreal Protocol programme for ODS phase-out.

There are two indigenous manufacturers of hermetic refrigeration compressors in Iran, which produce compressors suitable for domestic refrigeration appliances using CFC-12 technology. Their combined production is estimated to be about 800,000 units, which meets only a part of the domestic demand, the balance being imported. The hermetic and semi-hermetic compressors required by the commercial refrigeration sub-sector are predominantly imported.

The Ozone Layer Protection Center/Department of Environment is leading the efforts for ODS phase-out under the Montreal Protocol, in co-operation with the consuming and supplying industry and with the assistance of the implementing agencies. Complete ODS phase-out is targeted for 2005 except essential uses. The Refrigeration Sector has been identified as a priority sector for ODS phase-out.

In terms of technology and equipment employed the commercial refrigeration sector is very similar to the domestic appliance sector. The primary differences are in the scale of equipment is used, which is bigger in commercial applications, and the variety of products which are manufactured. Most companies manufacture several types of equipment from a wide ranges of applications, including the following:

- display and sales cabinets for supermarkets and individual suppliers of food,
- upright and chest freezers for commercial application,
- different sizes of drinking water coolers,
- blood cooling cabinets,
- milk coolers, water coolers,
- soft ice freezers,
- cooling chambers, cooling stores
- insulated panels for larger cold stores,
- window-type air conditioners and fan coil,
- refrigeration equipment for trucks

In common with the domestic refrigeration sub-sector ozone depleting substances are consumed in commercial applications for:

- Charging of new appliances with CFC-12, R-502 and R-22
- Refilling/topping up of appliances with CFC-12, R-502 and R-22 after repair work

- Insulation foam blowing using CFC-11

Counterpart Data

The baseline data for the company covered by this project contains:

- baseline production data
- baseline ODS consumption data
- baseline production equipment data

The ***Avaj Sarma, Gasso, Donyaye Mojdeh, and Roshan Companies,*** are manufacturers of commercial and domestic refrigerators and freezers. These enterprises are 100% indigenously owned by the same group people and report no exports and being financially sound.

PROJECT SUMMARY

The companies have recognized the need to comply with the Montreal Protocol and have agreed to participate in Iran's ODS phase-out programme. The company is committed to phase out CFCs by converting their foaming equipment to HCFC-141b and adopting HFC-134a as refrigerant. This project document describes the activities needed to carry out the phase out process. The conversion technology and expertise will be acquired from equipment, component and chemical suppliers and external foam and refrigeration experts. The impact on the plant/process due to the use of HCFC-141b as the blowing agent and HFC-134a as the refrigerant, would need to be addressed by implementing plant modifications and through the introduction of new equipment, components and processes, as below:

Refrigeration operation

The conversion to HFC-134a as the replacement for CFC-12 will involve the following changes:

- Compressors suitable for HFC-134a will be required. These will be available from existing suppliers.
- The chemical stability of HFC-134a and of the synthetic lubricants compatible with HFC-134a are highly sensitive to moisture and impurities in the system, as compared to CFC-12 system. The evacuation/charging process for HFC-134a and polyol-ester lubricant will need to ensure the required level of cleanliness and dryness in the system. To ensure this the following is proposed:
- The vacuum pumps will need to be suitable for use with HFC134a of the existing vacuum pumps, are replaced.
- The existing refrigerant charging units are not suitable for use with HFC - 134a and cannot be retrofitted, and will therefore be replaced with two charging units suitable for HFC-134a duty.

The design/sizing of the refrigeration system will need to be suitably changed, to ensure the viability of the process and to maintain the product standards for performance, such as:

1. Up sizing the condensers and re engineering evaporators and condensers, so as to ensure the levels of cleanliness and contamination that can be tolerated with HFC-134a

2. Lengthening of the capillary tubes.
3. Use of filter-dryers with finer pores, suitable for use with HFC-134a
4. The existing leak detectors are suitable for detecting CFC-12 only and will therefore need to be replaced with leak detectors suitable for detecting HFC-134a.
5. Provision for technical assistance from external international refrigeration experts and also from compressor suppliers will be required to be made to ensure smooth transition to the new technology and the successful implementation of the project.
6. In-house and field trials on prototypes of each model will be needed to be carried out, to establish performance and reliability with the HFC-134a based refrigeration systems.
7. The system dryness/cleanliness with the use of HFC-134a being of crucial nature, careful re-assessment of the production program, re-training/orientation of the staff for the new technology would be required.

Aim of the Project

The aim of the immediate project is to;

- Design, calculation for model redefinition.
- Testing prototypes for functionality and performance criteria.
- Redesign the cooling units of the all models so that they could run on the new Ozone friendly R134a instead of the ODP active CFC12.

Scope of the Contract

A study will be made for 8 models of commercial refrigerators made by ***Avaj Sarma, Gasso, Donyaye Mojdeh, and Roshan Companies***.to specify;

- Dimensional specification;
- Type and thickness of insulation
- Refrigeration unit component details
- Working performance
- Energy consumption

Selection of HFC 134a compatible components
Redesign of the refrigeration circuit as necessary
Specifying necessary changes in the cooling system if required
Preparation of the trial equipment one prototype per model
Testing of two prototypes for functionality and performance
Evaluation of the test results

Supply of the Material

Following components and material have been used to make prototypes .

- R134a Compressors
- R134a Refrigerant
- Refrigerant Accumulators
- Specially designed filter drier
- Specially designed evaporator and condenser

Activities

The activities for implementation of this contract could be summarized as below.

- Site survey of the counterpart premises in order to be familiar with the counterpart facility and production line and also define the prototypes for conversion.
- Site survey of the counterpart premises in order to collect necessary data for calculation of prototype.
- Preparation of Technical data sheet in order to define detail technical specification
- Review the existing technical drawing for the purpose of assessment of possible changes in the design criteria.
- Review each prototype refrigeration circuit for determination of cooling circuit components
- Review and assessment of design criteria following cooling circuit component in order to minimize possible changes and design improvement.
    - Compressor technical specification
    - Condenser type, material and design criteria
    - Evaporator type, material and design criteria
    - Capillary tube design, dimensions and material
    - Filter drier, size and material
    - Determination of R12 refrigerant charge for each prototype in order to adjust R134a charge weight
- Coordination with the counterparts for performing, performance test after completion of making prototypes
- Calculation of prototypes in order to determine the size of R134a compressor and implement necessary changes to the cooling circuits
- Preparation of Performance Test Results Sheet, in order to record all data obtained during functional test.
- Testing Prototypes at Hot Chamber.
- Evaluation of Performance test results.
- Corrective action on defective parts and components.
- Replacement of defected parts.
- Adjustment of refrigerant charge for each prototype.
- Assembly line preparation of trial test and production to fulfill R134a cleanliness requirement.

- On the job training to counterpart technical staff to operate new R134a equipment such as new refrigerant charger machine, new vacuum pump, and new leak detector.
- Coordination with equipment supplier to conduct suitable training program to the counterpart technical staff.
- Final visit of the counterpart to assure trial production of R134a products as foreseen in the project investment documents in case of new equipment availability.

Preparation of prototypes for performance test as

The prototypes shall be tested under designated ambient temperature mostly at
+ 32 C, the test performance revealed that no significant changes is necessary for refrigeration system circuit, because the original size of evaporator and condensers are much bigger than cooling requirements.

The adjustment will be applied to the mainly to the amount of refrigerant charge and length of capillary tube.

Each prototypes should under go for performance test at the following test criteria.
Pull down test at + 32 C
Continues run Test at = 32 C ambient temperature
Cyclic run test at + 32 C ambient temperature.
The test condition was selected in accordance with appropriate ISO test standards.

The material as sample for making prototypes are supplied mainly from local market, due to the limitation for purchasing R134a compressor from local market we had to contact several manufacturers to find out the technical specification for appropriate compressor.

The prices for material specially R134a and R141b blended polyol are much higher than R12 and R11,

Training

Before making prototypes we conducted a training course to train the technical staffs to make their own prototypes and also make them familiar with the new technology.

The following topics were thought during the theatrical training course.

- An orientation to UNIDO CFC phases out project.
- Montreal Protocol
- Ozone Layer and CFC side effect to Ozone layer
- Familiarization with new R134a Refrigerant, application, safety precaution, use and maintenance.
- Familiarization with the new vacuum and charging equipment, vacuum pump and charging board.
- Recovery and recycling of R12 refrigerant, and also R134a.
- Alternative for R11 and R12.
- Some explanation about R141b blowing agent,
- Selection of refrigeration components to be replaced with R12 refrigeration system.
- Calculation and redesign of prototypes

- Performance test
- Test results Evaluation.
- Refrigeration system adjustment
- Selecting Prototype Model
- Refrigeration System components Familiarization
- Refrigeration Load Calculation
- Thermostat Selection and Adjustment
- Refrigerant Charging Methods
- Testing Prototypes
- Analyzing Prototype Test Results

Making Prototypes

- Prototype Model Selection

- Refrigeration System Components Selection
  1- Defrost Type
  2- No-Frost Typ
- Familiarization with Refrigeration System Components
  1- Condenser
    a. Wire on Tube
    b. Tube welded on Plate
    c. Tune on Plate
    d. Tube in the Body
    e. Tube on the fins
  2- Capillary Tube
    a. Tube Length
    b. Tube Diameter
    c. Tube Material
  3- Expansion Valve
    a. Size
    b. Capacity
    c. Material
  4- Filter Direr
    a. Weight
    b. Material
    c. Model
  5- Evaporator
    a. Roll Bond
    b. Wire on Tube
    c. Tube welded on Plate
    d. Tune on Plate
    e. Tube in the Body
    f. Tube on the fins
- Refrigeration Load Calculation
  1- Aim of Calculation
    a. Model Re-Definition
    b. Model Improvement
    c. Model Modification
    d. Conversion of Prototype
    e. Model New Design
  2- Methods of Refrigeration Load Calculation

a. ASHREA
b. Manufacturer
c. Institutes and Universities

3- Different Elements Required for Calculation
   a. Heat Transfer
      Dimension, Insulation, Ambient, Working Condition
      Gasket, etc.
   b. Product Load
      Food, Material, Ice, Etc.
   c. Infiltration
      Door Opening, Air Replacement
   d. Miscellaneous devices and apparatus
      Light, Fan, Etc.

- Compressor

Cooling System (Static, Oil, Air)

1- Pressure
   a. LBP (Low Back Pressure)
   b. HBP (High Back Pressure)
   c. MBP (Medium Back Pressure)
2- Model
   a. Hermetic
   b. Semi-Hermetic
   c. Open
3- Type of Refrigerant
   a. R12
   b. R134a
   c. Isobutene
   d. Blend
4- Accessories
   a. Capacitor Type
   b. Starting Relay
   c. Voltage, Frequency and Current
   d. Electrical Circuit
5- Mounting Compressor
   a. Refrigerant Fellow Direction
   b. Top on the Roof

c. Bottom on Base
d. Double Compressor Mounted

6- Compressor Capacity
a. Watt
b. Horse Power
c. B.T.U/Hr
d. Kcal/Hr

7- Compressor Test Condition
CECOMAF

Evaporating Temp.	-25° C
Condensing Temp.	55° C
Ambiant Temp.	32° C
Suction Gas Temp.	32° C
Liquid Temp.	55° C
Volatage/Hertz	220V/50 Hz

Heat out Put= Capacity+Watt Consumption

ASHRAE

Evaporating Temp.	-23.3° C
Condensing Temp.	55° C
Ambiant Temp.	32° C
Suction Gas Temp.	32° C
Liquid Temp.	32° C
Volatage/Hertz	220V/50 Hz

Heat out Put= Capacity+Watt Consumption

ASHRAE to CECOMAF

Conversion of Capacity From CECOMAF into ASHRAE

R134a Multiply by 1.231
R22 Multiply by 1.097
R404 Multiply by 1.183
1 Watt = 0.86 Kcal/h
1 Watt = 3.41 BTU/h
1 Kcal/h = 1.0162 Watt
1 BTU/h = 0.293 Watt

8- Evaporating Temp. and Selection of Compressor

9- Thermostat
Thermostat Adjustment
a. Cut-in Time - 5 to -15 Compressor Connected
b. Cut-out time -15 to -25 Compressor Dis-Connected
c. Thermostat Setting, Max. Med, Min
d. Thermostat Temperature Difference

- Refrigerant Type

1- CFC- 12
2- HFC-134a
3- Isobutene, R-600
4- Blend, (Isobutene+ Propane)

- Methods of Refrigerant Charging
  1- Bottle, 13.5 Kg. Cylinder
  2- Portable Charger
  3- Production, Evacuation and Charging Equipment
- Refrigerant Charge Weight
  1- Experimental, trial and error
  2- Calculation
  3- Comparison with other Refrigerants
- Refrigeration Leak Detection Procedure
  1- Conventional Method, (water and Soap)
  2- Portable Electronic Leak Detector
  3- Production Electronic Leak Detector
  4- Nitrogen, and Helium Leak Detection Procedure

- Accuracy and Precision of Leak Detection Procedure
  5- Conventional Method, (water and Soap)
  6- Portable Electronic Leak Detector
  7- Production Electronic Leak Detector
  8- Nitrogen, and Helium Leak Detection Procedure
- Recovery
- Recycling
- Reclaiming

Testing Prototypes

- Test Prototypes with R12 Refrigerant to get desired test results.

- Hot Chamber Specification
- Placing Prototypes at Hot Chamber
- Mounting Sensors and their Place and Location
- Testing Condition
  1- Tropical "T" 43 °C
  2- Sub-Tropical 38 °C
  3- Normal 32 °C
  4- Sub-Normal 28 °C
  5- Cold 18 °C
  6- Relative Humidity
- Test Package
- « M » Package
- Meat
- Ice
- Different Tests
  1- Operational
  2- Performance
  3- Energy Consumption
  4- Ice Making
  5- Humidity
- Testing Procedure
  1- Pull Down
  2- Continuous Run
  3- Cyclic Run
- Duration of Test
- Reading Test Result
- Test Results Analysis

Conclusion

All prototypes were tested successfully at the counterparts premises. The test results have been evaluated for proper functioning of refrigeration system components specially R134a compressor. The main difficulties and problems during implementation of the contract were hot chamber design and performance. The hot chambers are being constructed locally and improper insulation and air distribution inside the hot room and soft ware affected the test performance quality.

Recommendation

An up to dated and user-friendly Testing system for the enterprises is recommended to be supplied to the counterparts, to improve quality of model redesign and performance test.

Kindest Regards

Sahandmina Engineering Company Limited

AVAJ SARMA

Setting

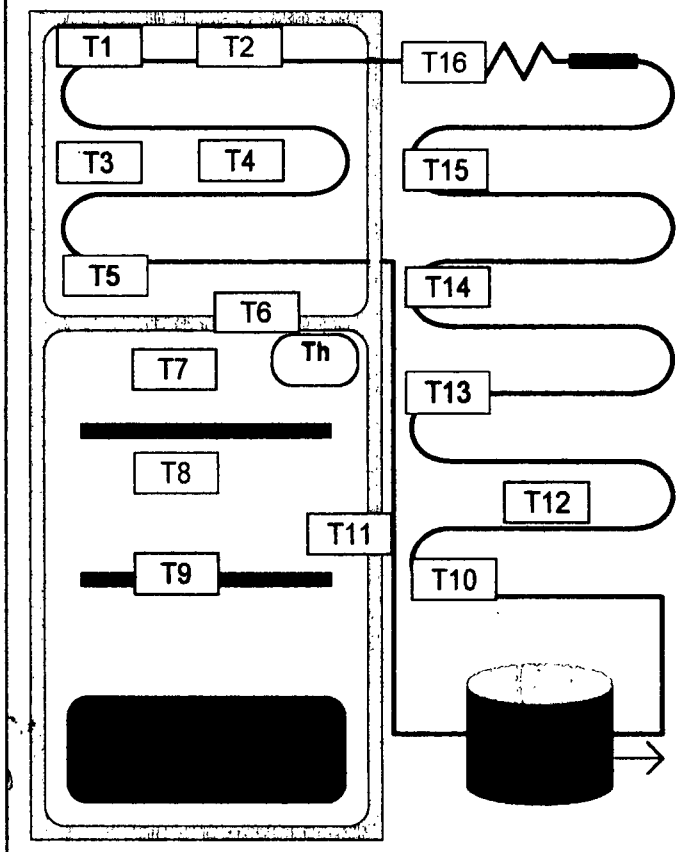
Test Date	Tue Feb 12-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	R-4060\23BAH80

Product Specification

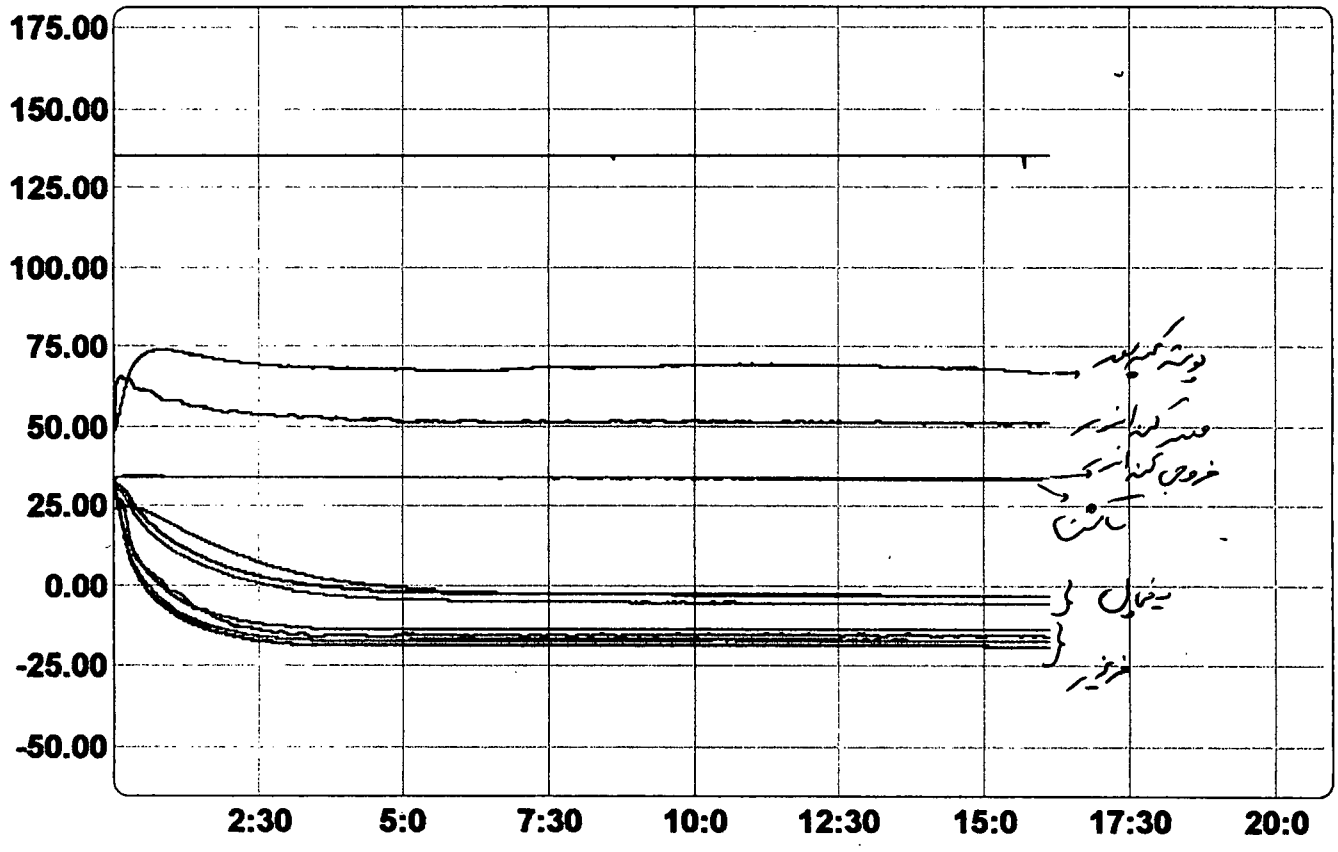
Product Type	40/60
Compressor Type	-
Refrigerant	R134 -
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	16:07
Working Time(h:m)	16:07
Working Percentage	100.0%
Energy Cons.(KWh)	2.544
Av. En. Cons.(KWh/Day)	3.788
No. of Thermostat	0
No. of Over Load	0



Tue Feb 12 -02



شماره: ....
تاریخ: ....
پیوست: ....

شرکت برودتی آوج سرما (سهامی خاص)

تولید کننده لوازم خانگی،
یخچال، یخچال فریزر و فریزر
ساید بای ساید

AVAJ SARMA Co.

Test : P.17

مدل / شماره فایل	40/60 / 23 Loh 80
دمای محیط / رطوبت نسبی	32 - 50
مصرف انرژی	2.544 KW/24
تعداد قطع و وصل	——
وات / آمپر	159 W - 1.4
ولتاژ / فرکانس	220 - 50
درصد کارکرد	%100
دمای فریزر	-17.1
" یخچال	-4.6
" سبزیجات	-3.5
" کمپرسور	+66.3
فشار / خروجی کندانسور	+51 - 35.3
فشار / خروجی اواپراتور	-15.9 / ~~-~~ -9.5
دمای سالن	
نوع کندانسور	O.C
نوع اواپراتور	Roll-bond
مقدار شارژ گاز	R134a
زمان کارکرد	967 min
درجه ترموستات	

زمان رسیدن دمای محفظه فریزر به دمای تعادلی شده به -18 = ——

" " " تازه به +5 = 110'

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Sale Office Tel : 3127668 - 352474 Fax : 354476

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تلفن دفتر مرکزی : ۷۵۲۳۶۴۹ - ۷۵۲۳۷۹۱ فاکس : ۷۵۲۶۷۴۷
تلفن دفتر فروش : ۳۱۲۷۶۶۸ - ۳۵۴۴۷۴ فاکس : ۳۵۴۴۷۶

AVAJ SARMA

Setting

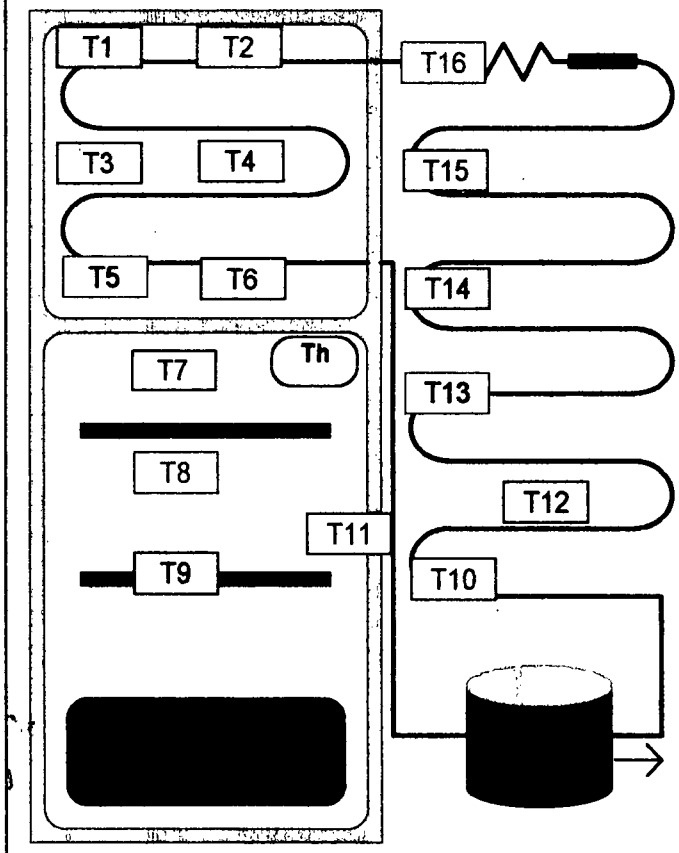
Test Date	Mon Jan 21-02
Test Type	Cycling
Hot Room Temp.	32
Hot Room Hum.	60
File Name	D:\F-13\1BAH80

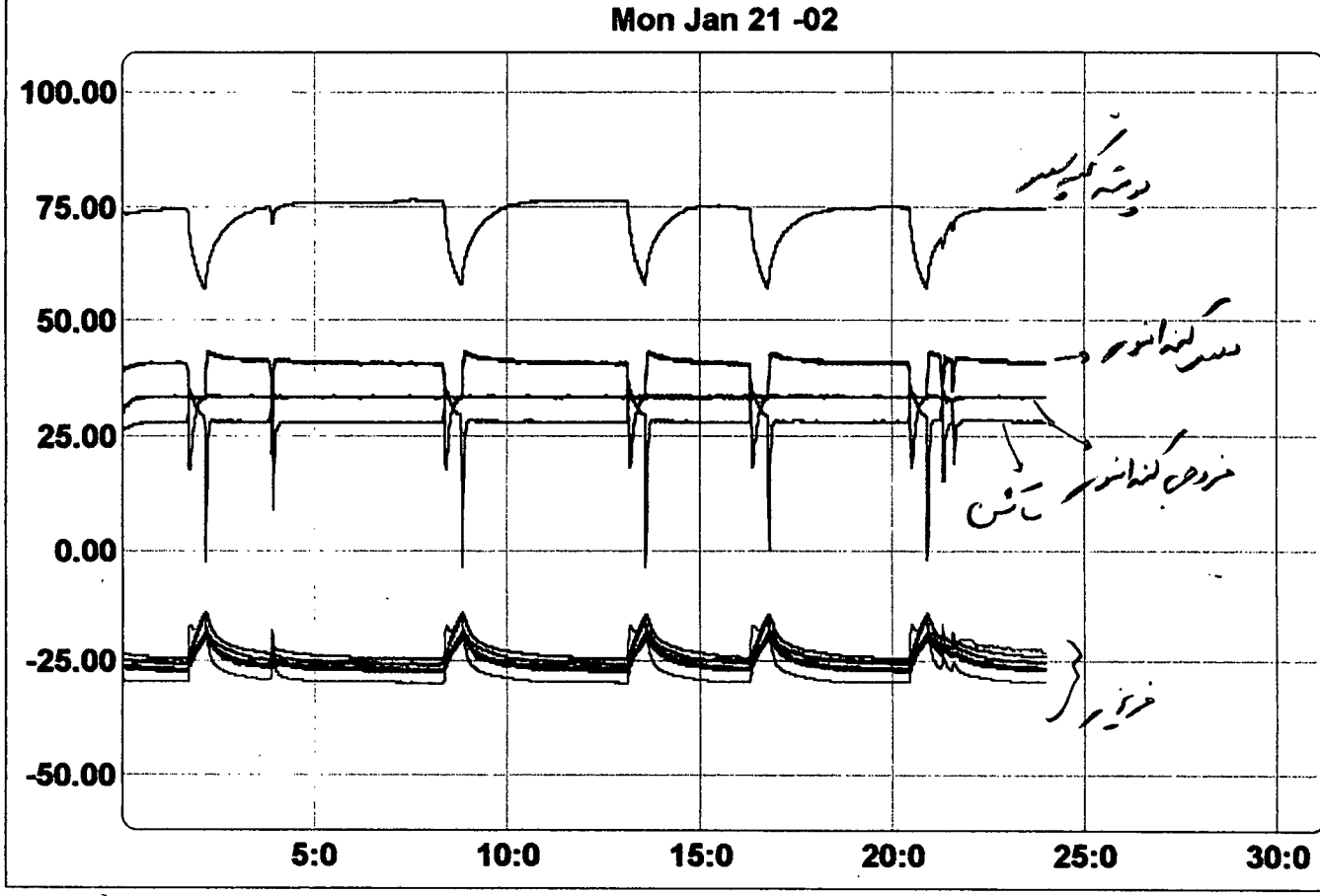
Product Specification

Product Type	F-13
Compressor Type	OA77 G17 GBX60 621a
Refrigerant	R134a-Charged by han
Cappil. Length	031
Evap. Volume	-
Condensor Length	12pass
Thermostat Type	1

Test Result

Total Test Time(h:m)	23:59
Working Time(h:m)	21:27
Working Percentage	89.5%
Energy Cons.(KWh)	2.578
Av. En. Cons.(KWh/Day)	2.580
No. of Thermostat	11
No. of Over Load	0





تولید کننده لوازم خانگی ،
یخچال ، یخچال فریزر و فریزر
ساید بای ساید

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

شماره : .....
تاریخ : .....
پیوست : .....

Test : Cycling

مدل / شماره فایل	F-13 / 1 Bah 80
حجم ناخالص / مفید	32 / 50
مصرف انرژی	2.578 KW/24h
تعداد قطعی و وصل	11
وات / آمپر	175W 1.2A
ولتاژ / فرکانس	220V - 50HZ
راندمان کمپرسور	89.5%
دمای فریزر	-26
" یخچال	—
" سبزیجات	—
" کمپرسور	+71.6
مصرف / فریزر کندانسور	
مصرف T / فریزر لوله اواپراتور	-27 / -22.1
دمای ساکشن	28
نوع کندانسور	0.C
نوع اواپراتور	
مقدار شارژ / گاز مبرد	R-134a
زمان کمپرسور	1439 min
درجه ترموستات	1

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تلفن دفتر مرکزی : ٧٥٢٣٦٤٩ - ٧٥٢٣٧٩١ فاکس : ٧٥٢٦٧٤٧
تلفن دفتر فروش : ٣١٢٧٦٦٨ - ٣٥٤٤٧٤ فاکس : ٣٥٤٤٧٦

AVAJ SARMA

Setting

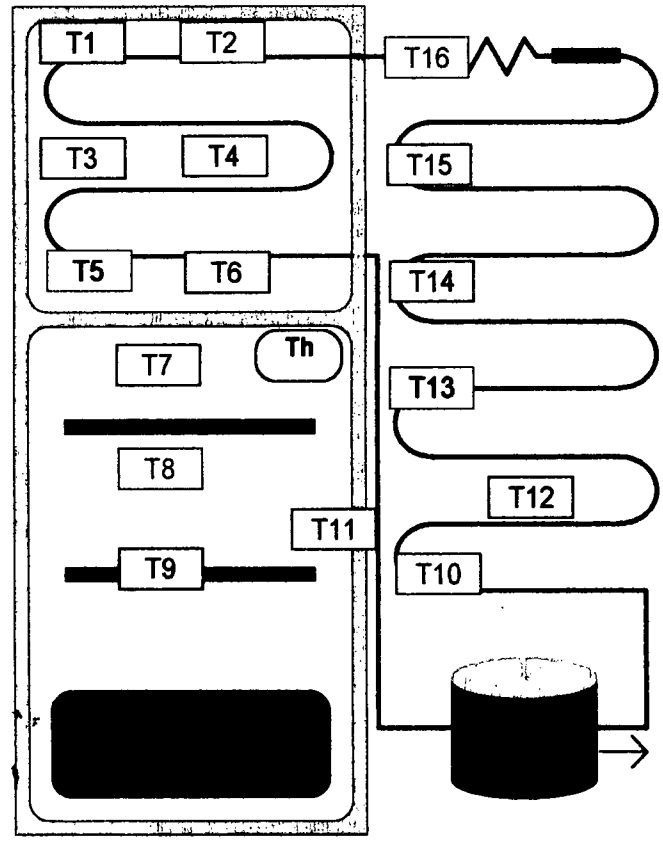
Test Date	Tue Feb 12-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	:\F-13\23BAH80

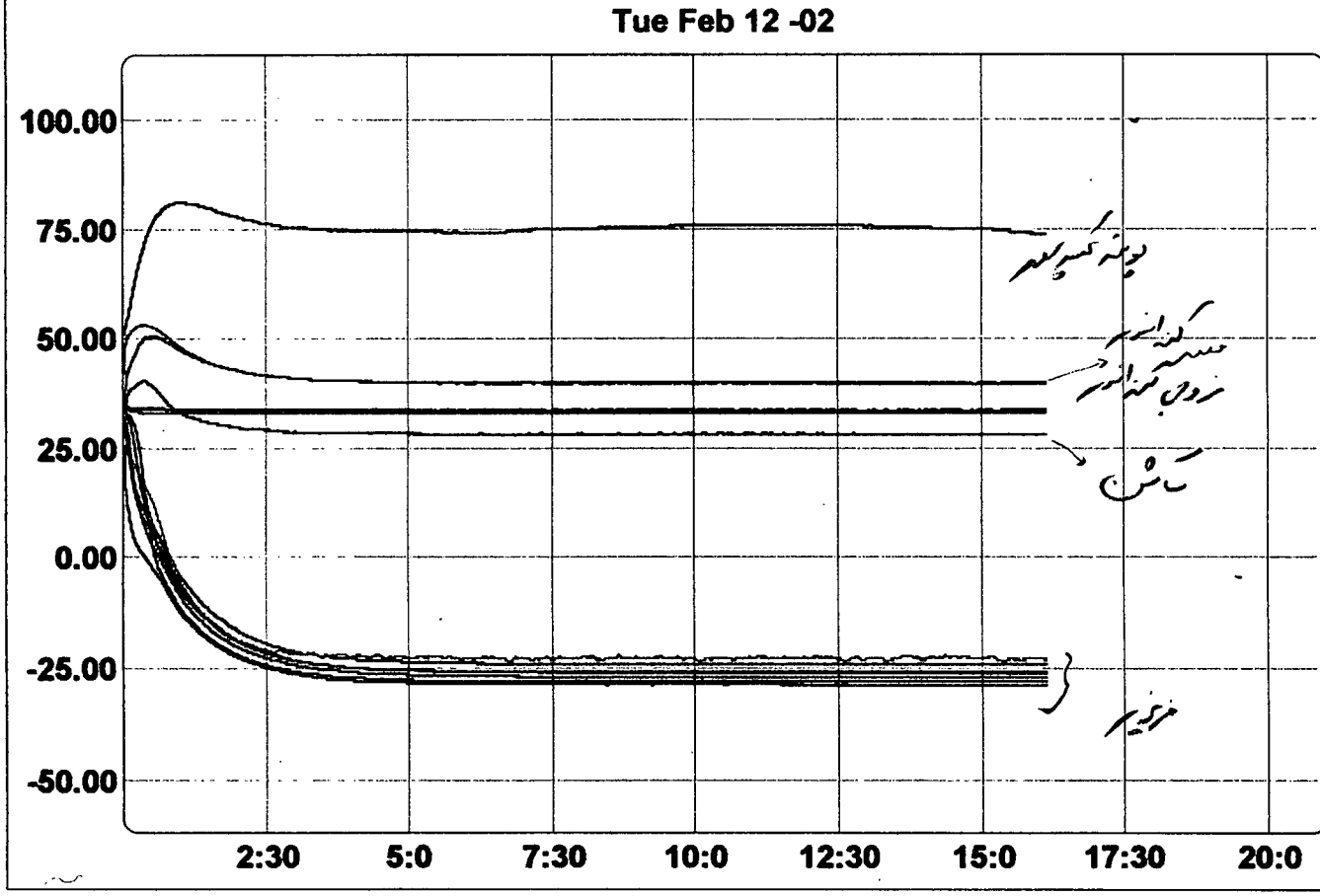
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	16:07
Working Time(h:m)	16:07
Working Percentage	100.0%
Energy Cons.(KWh)	1.972
Av. En. Cons.(KWh/Day)	2.937
No. of Thermostat	0
No. of Over Load	0





تولید کننده لوازم خانگی ،
یخچال ، یخچال فریزر و فریزر
ساید بای ساید

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

شماره : ....
تاریخ : ....
پیوست : ....

Test : P.D - Run

مدل / کد فایل	E-13 / 23 doh 80
دمای محیط / رطوبت نسبی	32 / 50
مصرف انرژی	1.972 kw/24h
تعداد قطع و وصل	—
وات / آمپر	119 - 1.1
ولتاژ / فرکانس	220 / 50
درصد کارکرد	100 %
دمای فریزر	-26
" یخچال	—
" سبزیجات	—
" کمپرسور	73.8
مسیر / خروجی کندانسور	39.6 / 39.7
مسیر / خروجی اواپراتور	-28.8 / -22.9
دمای ساکشن	28.1
نوع کندانسور	O.C
نوع اواپراتور	
مقدار / شارژ گاز	R134a
زمان کارکرد	967 min
درجه ترموستات	shorted

زمان رسیدن دمای منطقه نگهداری مواد ابتدای شروع به 18- = 120'

Central Office Tel : 7523649 - 7523791 Fax : 7526747
Sale Office Tel : 3127668 - 352474 Fax : 354476

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تلفن دفتر مرکزی : ۷۵۲۳۶۴۹ - ۷۵۲۳۷۹۱ فاکس : ۷۵۲۶۷۴۷
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AVAJ SARMA

Setting

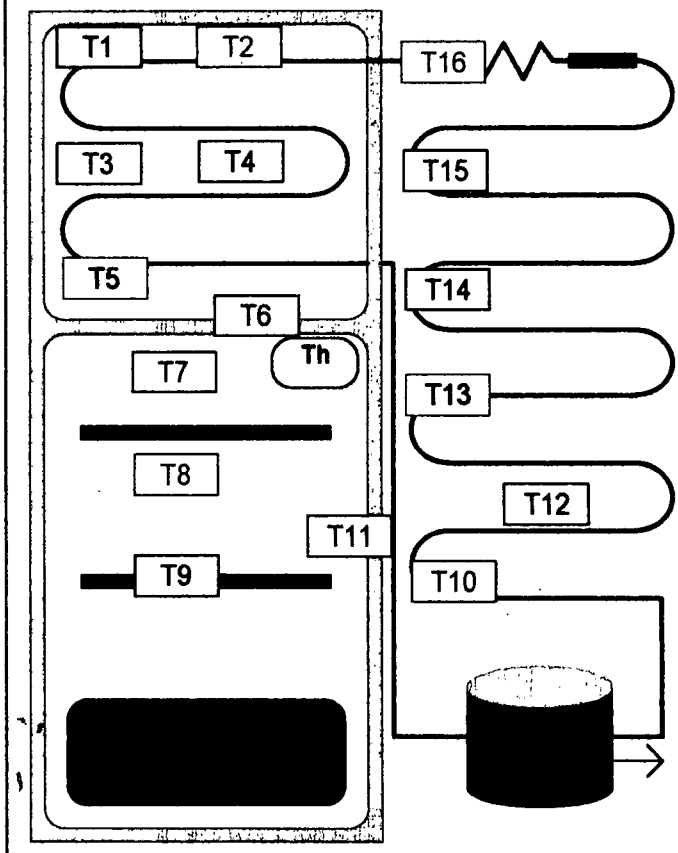
Test Date	Mon Jan 21-02
Test Type	Cycling
Hot Room Temp.	32
Hot Room Hum.	50
File Name	FR-4060\1BAH80

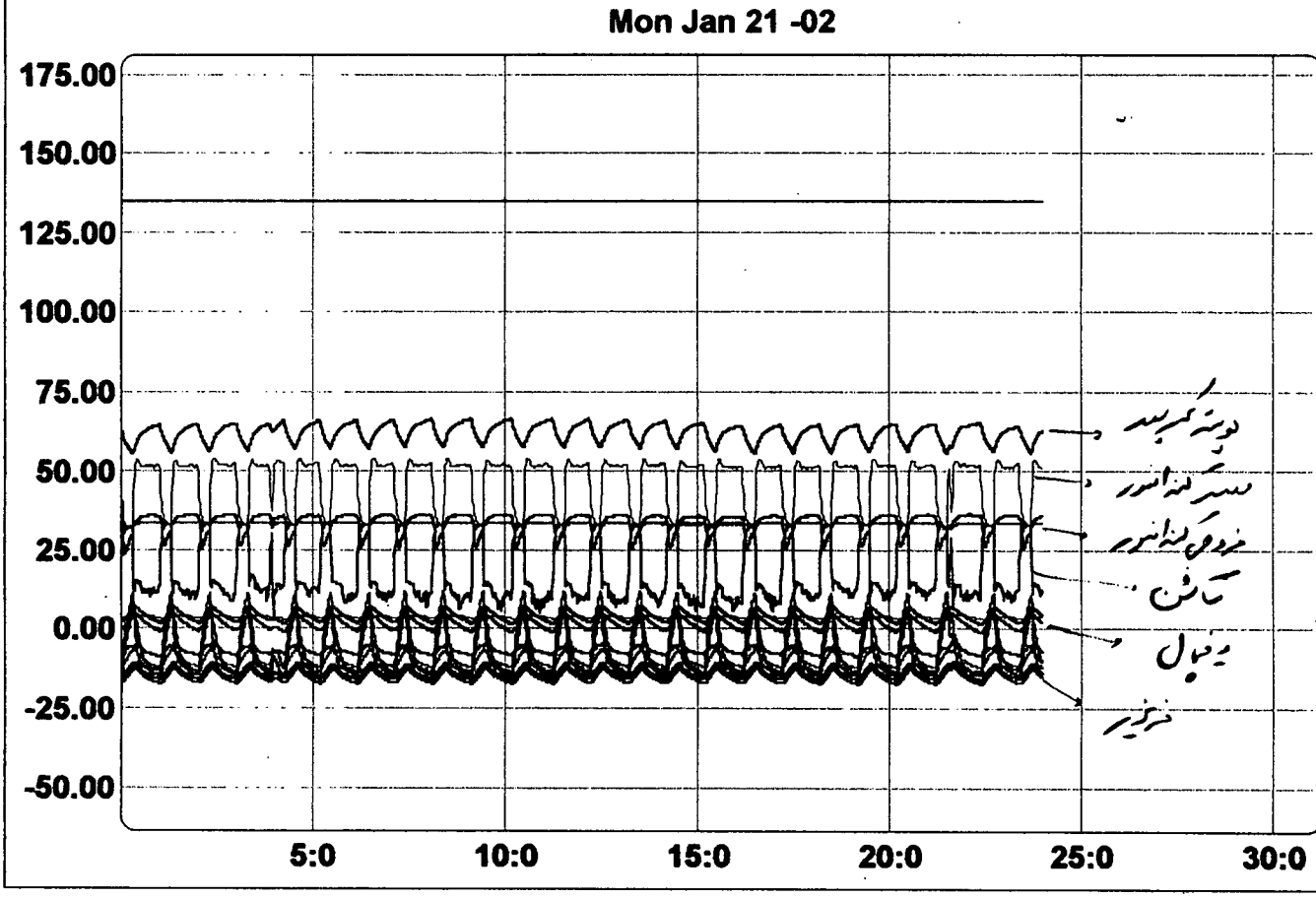
Product Specification

Product Type	40/60
Compressor Type	91 20G XOO 609b
Refrigerant	134a-Charged by hand
Cappil. Length	031-310cm
Evap. Volume	120cc
Condensor Length	12pass
Thermostat Type	2

Test Result

Total Test Time(h:m)	23:59
Working Time(h:m)	16:14
Working Percentage	67.7%
Energy Cons.(KWh)	2.947
Av. En. Cons.(KWh/Day)	2.949
No. of Thermostat	28
No. of Over Load	0





تولید کننده لوازم خانگی،
یخچال، یخچال فریزر و فریزر
ساید بای ساید

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

شماره : ....
تاریخ : ....
پیوست : ....

Test: Cycling

40/60 / 1 Bah 80	مدل / شماره سریال
32 - 50	دمای محیط / رطوبت نسبی
2.947 KW/24h	مصرف انرژی
28	تعداد قطع و وصل
180 - 1.4	وات / آمپر
220 - 50	ولتاژ / فرکانس
67.7%	درصد کارکرد
-15.4	دمای فریزر
+0.5	" یخچال
+3	" سبزیجات
+64.4	" کمپرسور
52.2 / 35.8	مسیر / خروجی کندانسور
-13.5 / -8.4	مسیر / خروجی اواپراتور
12.3	دمای ساکشن
O.C	نوع کندانسور
Roll-band	نوع اواپراتور
R-134a	استاندارد شارژ گاز
1439 min	زمان کارکرد
2	درجه ترموستات

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دفتر مرکزی : خیابان بهارستان، روبروی پمپ بنزین، بن بست معیلی، ساختمان ۴۶۱ طبقه سوم، شماره ۷
تلفن دفتر مرکزی : ۷۵۲۳۶۴۹ - ۷۵۲۳۷۹۱ فاکس : ۷۵۲۶۷۴۷
تلفن دفتر فروش : ۳۱۲۷۶۶۸ - ۳۵۲۴۷۴ فاکس : ۳۵۴۴۷۶

AVAJ SARMA

Setting

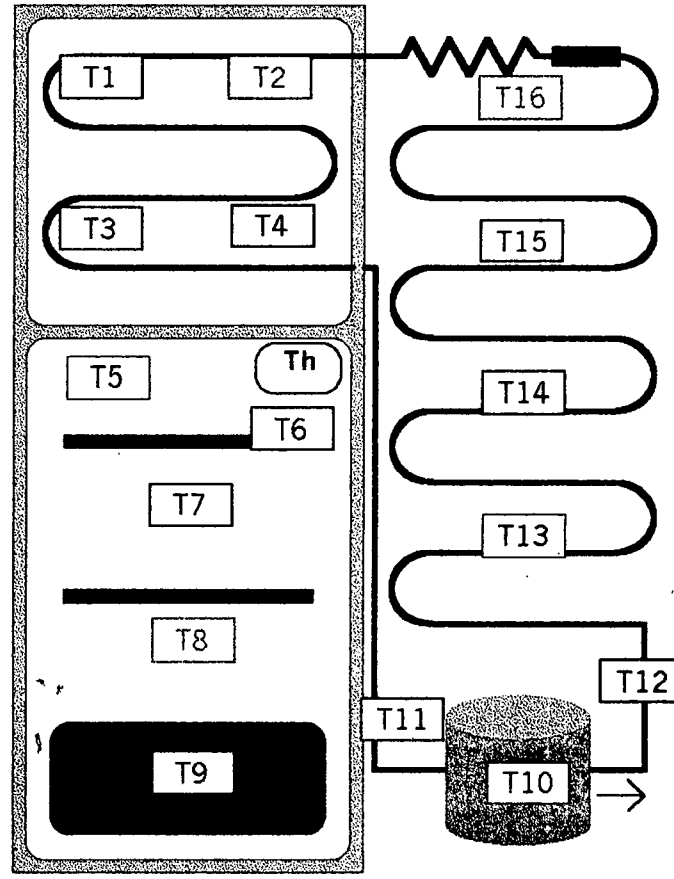
Test Date	Mon Jul 02-01
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	:\F-13\11TIR80

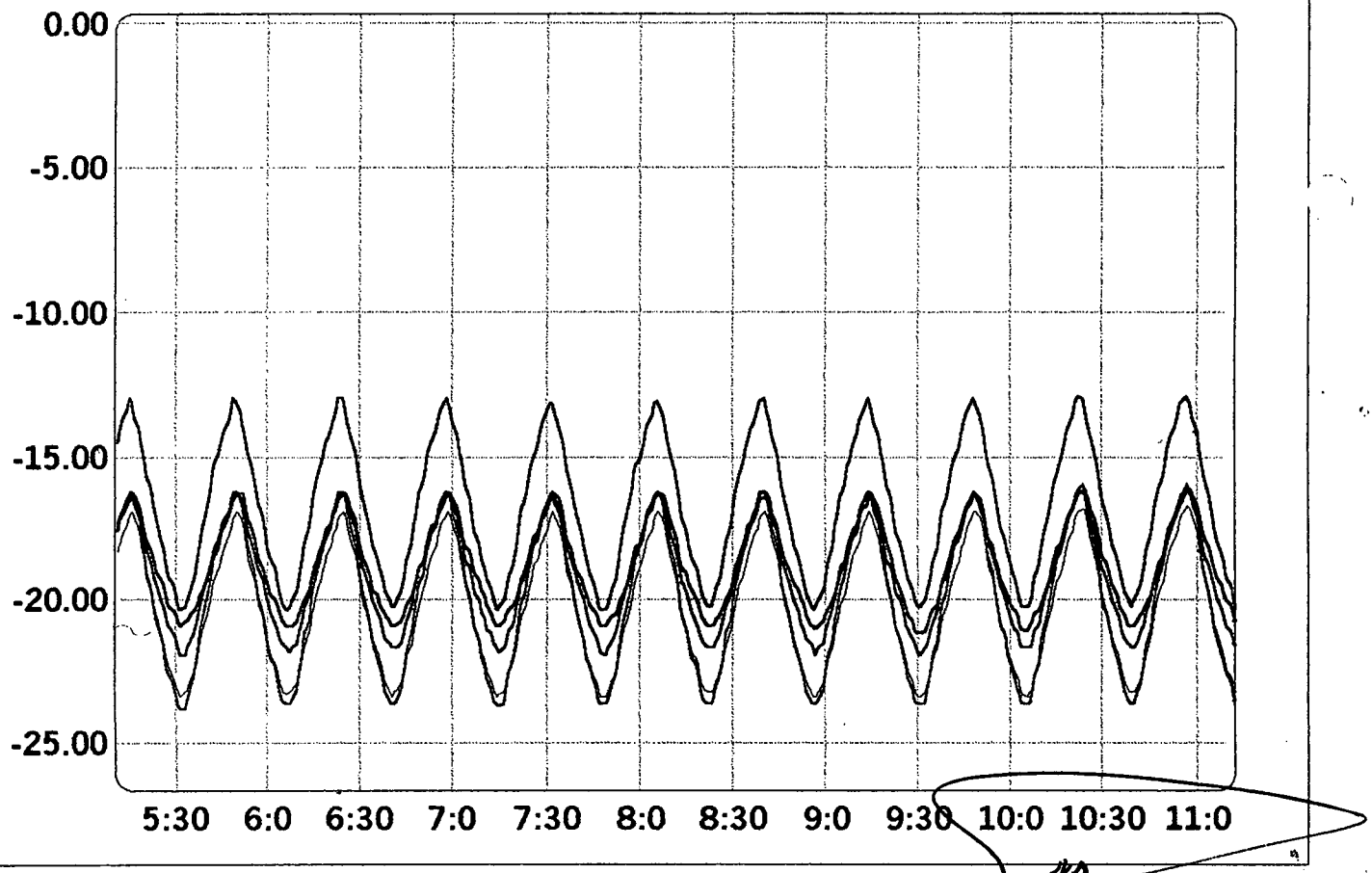
Product Specification

Product Type	F 13
Compressor Type	20 G-1/3 National
Refrigerant	210 gr
Cappil. Length	031
Evap. Volume	-
Condensor Length	1/3-6
Thermostat Type	1

Test Result

Total Test Time(h:m)	16:59
Working Time(h:m)	09:15
Working Percentage	54.6%
Energy Cons.(KWh)	1.581
Av. En. Cons.(KWh/Day)	2.234
No. of Thermostat	29
No. of Over Load	0





AVAJ SARMA

Setting

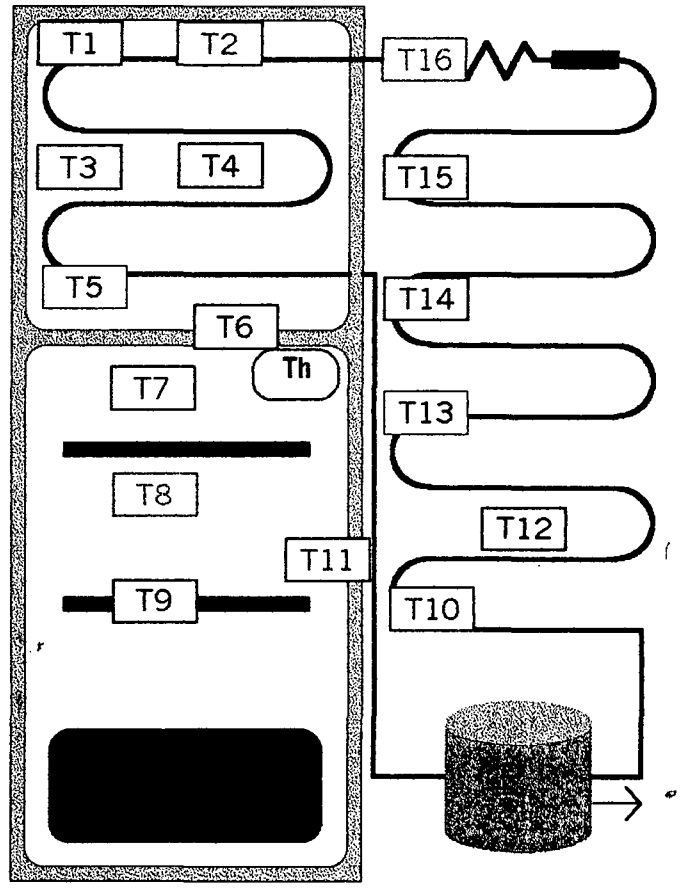
Test Date	Sun Sep 09-01
Test Type	with load
Hot Room Temp.	32
Hot Room Hum.	50
File Name	-4060\18SHA801

Product Specification

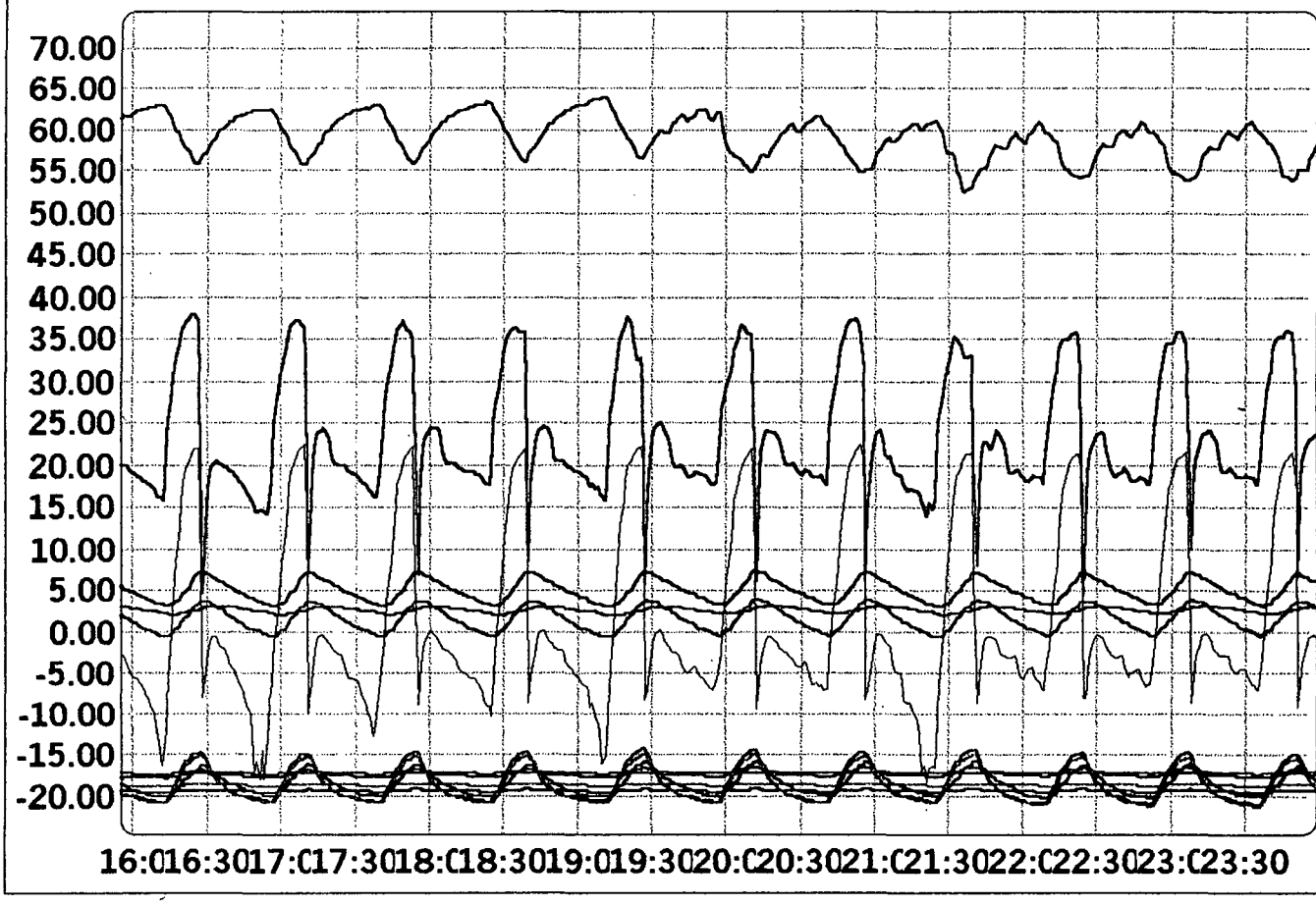
Product Type	40/60
Compressor Type	20g
Refrigerant	240gr
Cappil. Length	031
Evap. Volume	80cc
Condensor Length	12p
Thermostat Type	2

Test Result

Total Test Time(h:m)	23:59
Working Time(h:m)	16:41
Working Percentage	69.6%
Energy Cons.(KWh)	3.015
Av. En. Cons.(KWh/Day)	3.017
No. of Thermostat	31
No. of Over Load	0



Sun Sep 09 -01



تولید کننده لوازم خانگی ،
یخچال ، یخچال فریزر و فریزر
ساید بای ساید

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

شماره : .....
تاریخ : .....
پیوست : .....

تاریخ 80/11/2

1297

مدل F13	شماره فایل 1 bah 80	دما - رطوبت : 30.3°C
مصرف انرژی : 2.578 kwh	تعداد قطع و وصل : 11	ولتاژ - آمپر : 175 - 1.04
مقدار شارژ گاز R134a	درصد کارکرد : 89.5 %	ولتاژ - فرکانس : 50 - 220

	کندانسور		دمای کندانسور		دمای کابین فریزر
0.C	نوع	T_3 ورودی	41.6	T_9	-20.6
12 pass -	تعداد ردیف	T_4 خروجی	41.3	T_{10}	-23.4
				T_{11}	-23.6
	اواپراتور	T_7	32.8	T_{12}	-21.9
		دمای اواپراتور		T_{13}	-21.9
	نوع - حجم	T_{16} ورودی گاز	-26.8	T_{14}	-23.1
	تعداد ردیف - ابعاد				-22.41
	زمان رسیدن های حفظ نگهداری مواد غذایی منجمد به	T_8 خروجی گاز	-22.1		
	زمان رسیدهای حفظ نگهداری مواد غذایی تازه به +5	دمای ساکشن T_{15}	+27.5		

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تلفن دفتر مرکزی : ۷۵۲۳۶۴۹ - ۷۵۲۳۷۹۱ فاکس : ۷۵۲۶۷۴۷
تلفن دفتر فروش : ۳۱۲۷۶۶۸ - ۳۵۴۴۷۴ فاکس : ۳۵۴۴۷۶

تولید کننده لوازم خانگی ،
یخچال ، یخچال فریزر و فریزر
ساید بای ساید

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

شماره : .....
تاریخ : .....
پیوست : .....

تاریخ : 80/11/2 ۲۲:22

مدل 40x60	شماره فایل 1 bah 80	دما - رطوبت : 32°C
مصرف انرژی : 2.347 (kwh)	تعداد قطع و وصل : 28	وات - آمپر : 175 - 1.4
مقدار شارژ گاز : R134a	درصد کارکرد : 67.7 %	ولتاژ - فرکانس : 50-220

	کنداسور		دمای کنداسور	میانگین -15.52
0.C	نوع		T_{13} ورودی 5.1.7	T_8 -12.3
12 pass	تعداد ردیف		T_{14} خروجی 3.6	T_9 -16.2
Roll-bund	اواپراتور		دمای وسط اواپراتور	T_{10} -17.4
120 cc	نوع-حجم		T_{12} 65	T_{11} -16.2
	زمان رسیدن به دمای نگهداری مواد غذایی منجمد -18		T_6 ورودی -8.6	دمای کابین یخچال
			T_3 خروجی -13.8	T_4 بالا -15
	زمان رسیدن های نگهداری مواد غذایی تازه +5		دمای ساکشن	T_1 1.7 کابین T_2 -0.9
			T_{15} 12.4	T_5 سبزیجات 3

Kwh/24h

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دفتر مرکزی : خیابان ایاسان ، روبروی پمپ بنزین ، بن بست معینی ، ساختمان ۴۶۱ طبقه سوم ، شماره ۷
تلفن دفتر مرکزی : ۷۵۲۳۶۴۹ - ۷۵۲۳۷۹۱ فاکس : ۷۵۲۶۷۴۷
تلفن دفتر فروش : ۳۱۲۷۶۶۸ - ۳۵۴۴۷۴ فاکس : ۳۵۴۴۷۶

شماره: ....
تاریخ: ....
پیوست: ....

شرکت برودتی آوج سرما (سهامی خاص)

AVAJ SARMA Co.

تولید کننده لوازم خانگی،
یخچال، یخچال فریزر و فریزر
ساید بای ساید

Test ..P.D

تاریخ: ۸۰/۱۱/۱

مدل: F-13	شماره فایل: 29 May 80	دما ـ رطوبت: 32
مصرف انرژی: 2.528 kwh/24h	تعداد قطع و وصل: —	وات آمپر: 1.4 - 175
مقدار شارژ گاز: R 134 a	درصد کارکرد: %100	ولتاژ ـ فرکانس: 50 - 220

کندانسور		دمای کندانسور		دمای کابین فریزر	
نوع	O.C	T ورودی	+45.8	T_9	-22.9
		T خروجی	+45.5	T_{10}	-24.8
تعداد ردیف	12 pass	دمای [illegible]		T_{11}	-25.6
اواپراتور		T_7	-21	T_{12}	-24.7
		دمای لوله اواپراتور		T_{13}	-24.5
				T_{14}	-26.1
نوع ـ جسم		T_{16} ساکشن	-28.1	دمای کابین یخچال	۲۴٫۷ میانگین
تعداد ردیف ـ ابعاد		T_8 خروجی گاز	-22.1		
زمان رسیدن دمای نقطه تست سردترین به ‎-18	118'				
		دمای ساکشن			
زمان رسیدن دمای نقطه تست سردترین به +5		T_{15}	+30.9		

شارژ گاز بصورت دستی انجام گردید

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دفتر مرکزی: خیابان بهارستان، روبروی پمپ بنزین، بن بست معیلی، ساختمان ٤٦١ طبقه سوم، شماره ۷
تلفن دفتر مرکزی: ۷۵۲۳۶٤۹ - ۷۵۲۳۷۹۱ فاکس: ۷۵۲٦۷٤۷
تلفن دفتر فروش: ۳۱۲۷٦٦۸ - ۳۵۲٤۷٤ فاکس: ۳٥٤٤۷٦

شماره: ....
تاریخ: ....
پیوست: ....

شرکت برودتی آوج سرما (سهامی خاص)
AVAJ SARMA Co.

تولید کننده لوازم خانگی ،
یخچال ، یخچال فریزر و فریزر
ساید بای ساید

Test: D.12

تاریخ: ۸۰/۱۱/۱

مدل: 40/60	شماره فایل: 29 Day 80	دما - رطوبت: 32
مصرف انرژی: 3.371 (KWh/24h)	تعداد قطع و وصل: —	وات - آمپر: 1.4 - 175
مقدار شارژ گاز: R134a	درصد کارکرد: 100%	ولتاژ - فرکانس: 220 - 50

کندانسور		دمای کندانسور		دمای کابین فریزر	
نوع	0.C	ورودی T_{13}	+55	T_8	-13.3
		خروجی T_{14}	+42.5	T_9	-17.3
تعداد ردیف	12 pass	دمای کمپرسور		T_{10}	-18.3
		T_{12}	75	T_{11}	-16.9
اواپراتور		دمای اواپراتور			
نوع کمپرسور	120 cc	ورودی T_6	-18.8	دمای کابین یخچال	میانگین 1/45
زمان رسیدن دمای محفظه فریزر به دمای ۱۸- درجه	به ۱۸- دقیقه	خروجی T_3	-15.9	بالا T_4	-16.4
				پایین T_1	-2.5
				T_2	-5
زمان رسیدن دمای محفظه یخچال به دمای تازه ۵+	118'	دمای اتاق			
		T_{15}	+4.4	سبزیجات T_5	-2.6

مشاهده شد گاز به صورت دستی (تخمینی) شارژ گردید

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Gasso Co.

BASET P.N.

Setting

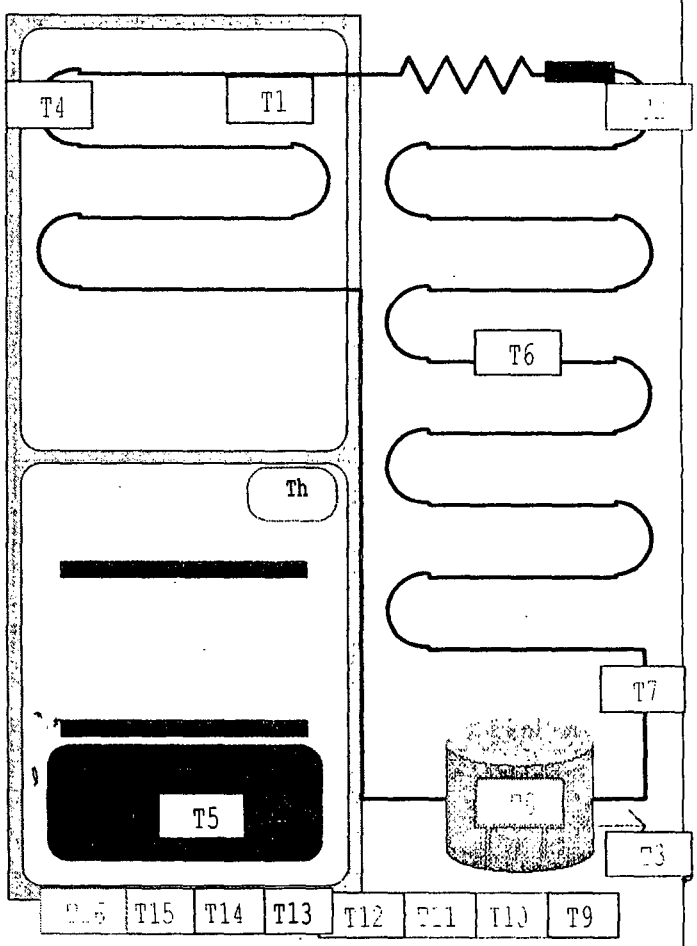
Test Date	Sun Apr 21-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50%
File Name	:\UNIDO\ZARIF6

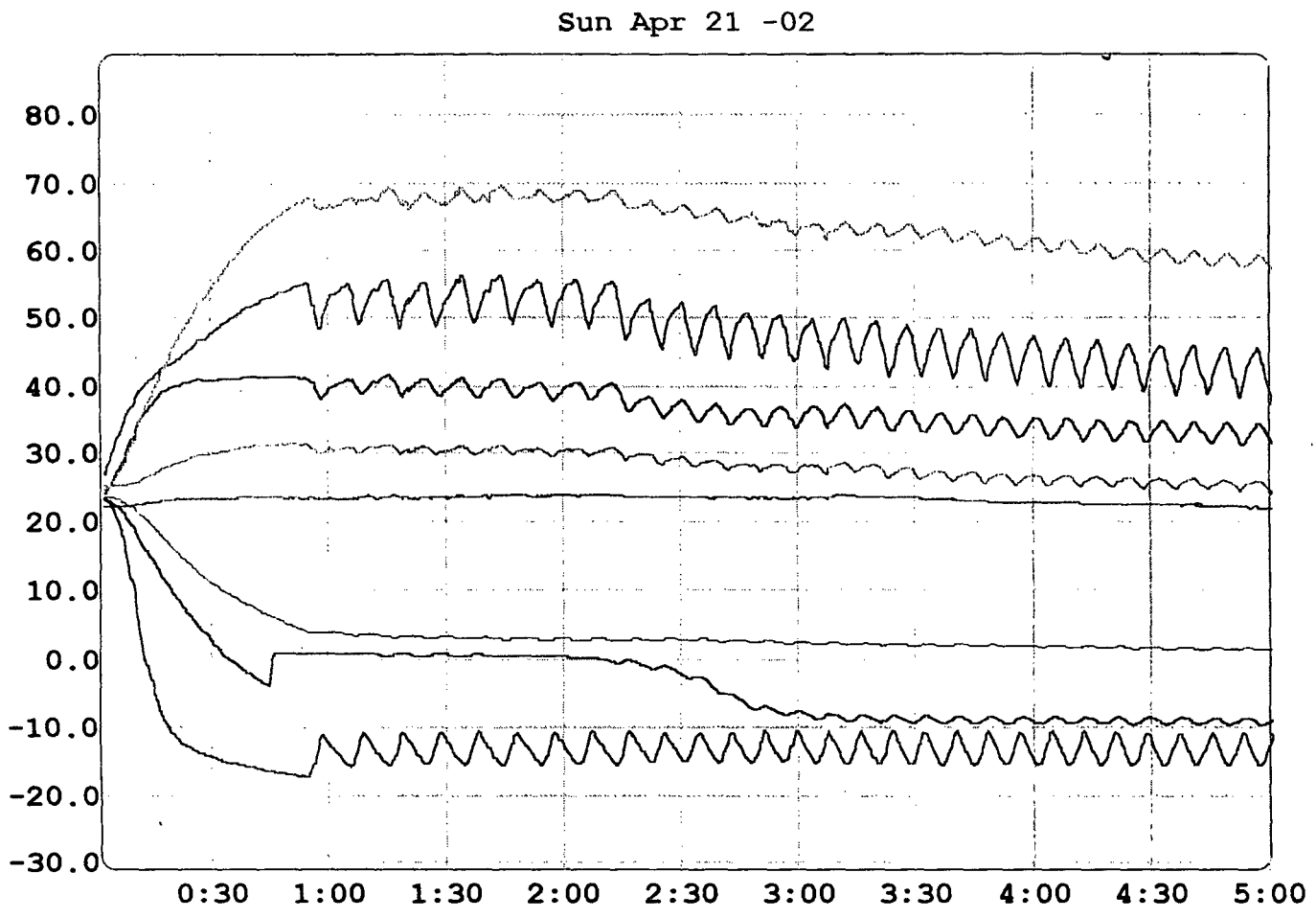
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	16:59
Working Time(h:m)	14:42
Working Percentage	86.6%
Energy Cons.(KWh)	0.0000
Av. En. Cons.(KWh/Day)	0.000
No. of Thermostat	1566
No. of Over Load	0





Gasso G. **BASET P.N.**

Setting

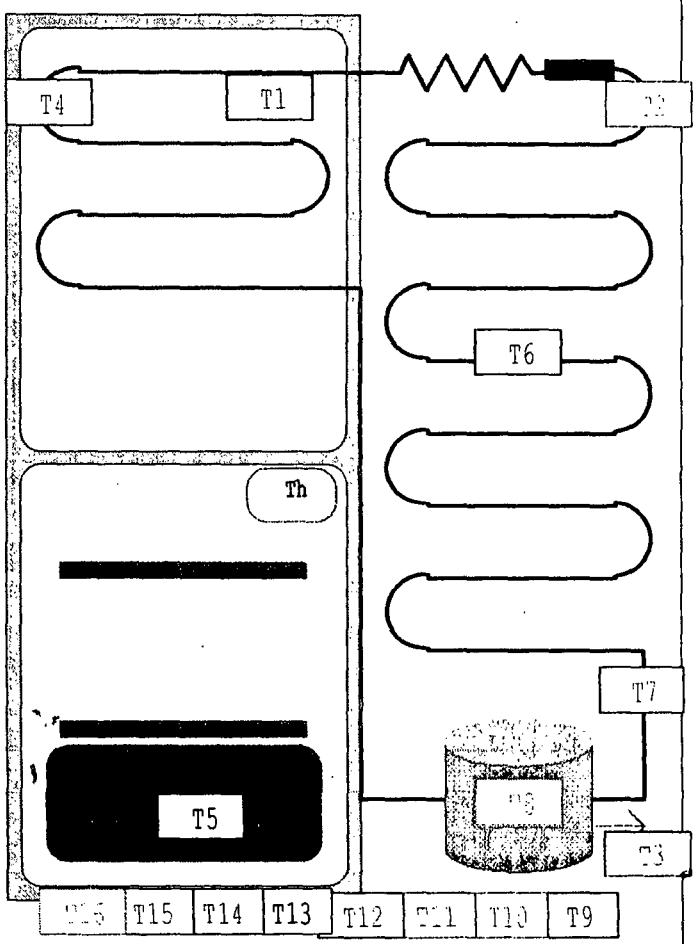
Test Date	Sun Apr 21-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50%
File Name	:\UNIDO\ZARIF6

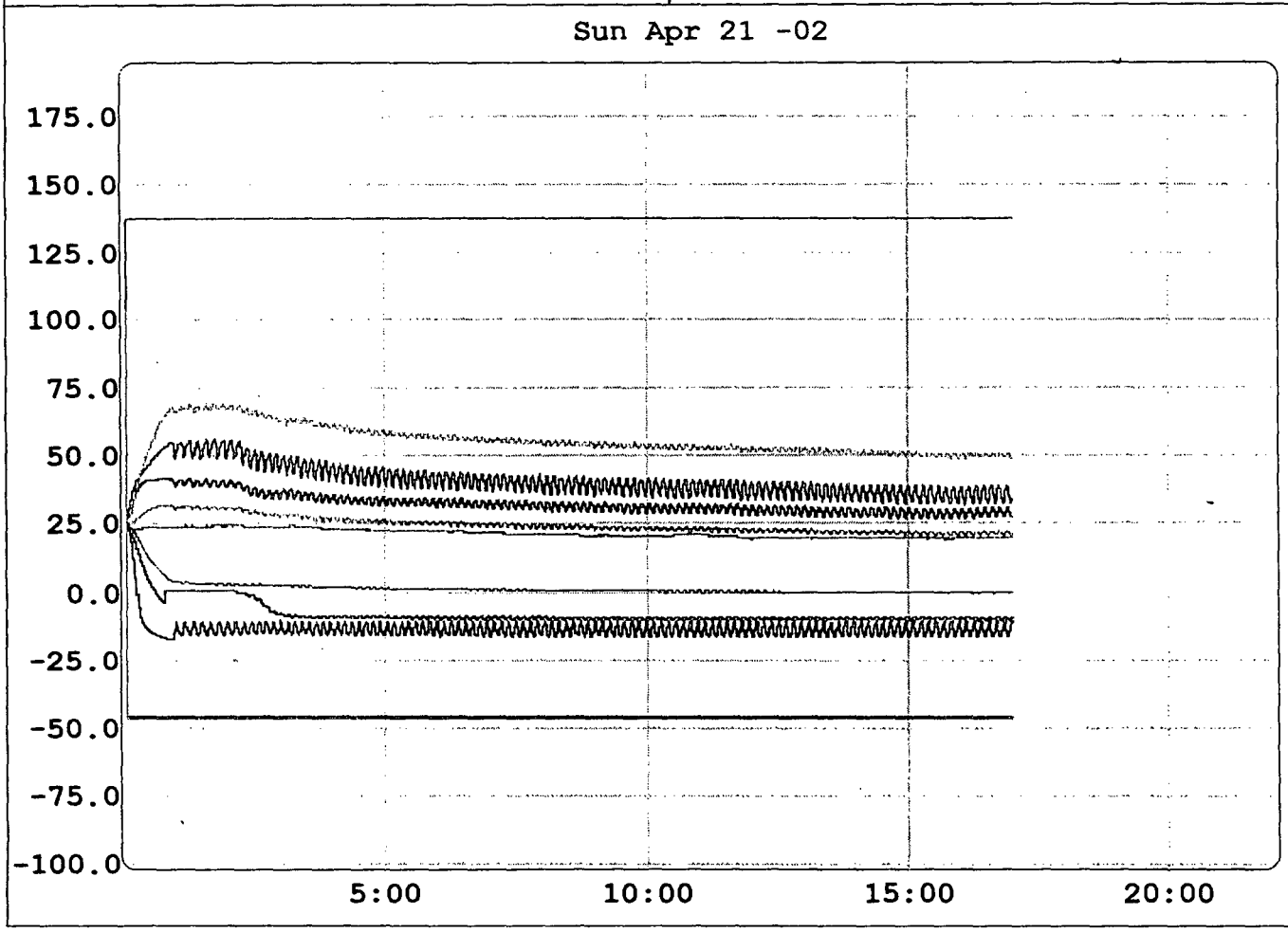
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	16:59
Working Time(h:m)	14:42
Working Percentage	86.6%
Energy Cons.(KWh)	0.0000
Av. En. Cons.(KWh/Day)	0.000
No. of Thermostat	1566
No. of Over Load	0

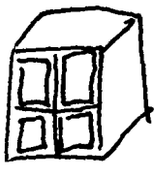




Product Technical Specification

Description	Specification
Company Name	Gasso Co ltd
Product Name	Water coolr
Product Model	Model GW -45
Product Application	Drinking Water
Operating Temperature	7°c
Climatic Condition	Max 38°c
Product Overall Dimension WxLxH mm	600x400x1200
Freezer Compartment Overall Dimension and Wall Thickness	
Refrigerator Compartment Overall Dimension and Wall Thickness	50 lit CapacityOf Tank With 50mm Isolation
Product Shape, Double Doors, Upright, Chest, etc	Chest
Freezer Internal Net Volume	
Refrigerator Net Volume	
Product Net Volume	
Product Inside Temperature C	7°c
Water Storage Tank Capacity, Water Cooler	50 Lit
Type of Water Storage Tank Cylinder, Cubic, etc.	Cylinder
Water Fellow per hour for water cooler	45 Lit
Water Storage Tank Dimension	
Water Outlet Temperature	7°c
Water Inlet Temperature	20 To 26°c
Freezer Inside Temperature	45 cm x 38Ø
Refrigerator Inside Temperature	
Evaporating Temperature	-5 c°
Foam Insulation Thickness mm Side Walls, Top, Bottom, Door, Back Panel	30 mm
Type of PU Foam	Poly Urtane
Foam Density, Kg/Cu. Mt.	40
Foam Mixture, Percentage Pol% + R11% + Isocyanate%	50% +55%+ 20% R11
Total amount of Foam Injection, Kg	3.4kg in 550x500x500mm Container
Refrigerant Type	R12
Refrigerant Charge Weight Gr	350 gr

Type of Compressor, Hermetic, Semi Hermetic, Open	Hermetic
Compressor Cooling System Static, Oil Cooled, Fan Cooled	Fan cooled
Compressor Cooling Capacity Watt	850 W
Compressor input Power, Watt	600 W
Compressor Model Number	Cs12B
Compressor Manufacturer	Danffos
Compressor Mounting Place Top, Bottom, Front, Back	Bottom
Condenser Type, Static, Fan Cooled	Fan Cooled
Condenser Dimension, Length, Inside Tube Diameter,	325x44x325mm 3/8 in
Condenser Material, Aluminum, Copper, Copper Coated, etc,	Al - Cu
Condenser mounting Place, Back Wall, Top, Bottom	Bottom
Evaporator Type, Fin and Tube, Roll Bond, Wire and Tube, etc.	Shell & Tube
Evaporator Dimension, Length, Surface Area, Inside Tube Diameter	400mm
Evaporator Material, Aluminum, Copper, Copper Coated, etc,	Copper Tube
Dryer Type,	Cartrig
Dryer Material, Weight and Size	MolecularSive - 30gr- 1/4 in
Capillary Tube Diameter and Length	0.054 in- 6.4 ft Length



Product Technical Specification

Description	Specification
Company Name	Gasso Co Ltd
Product Name	Closed Cabinet Display
Product Model	MRG
Product Application	Catering & Kitchen
Operating Temperature	2°c
Climatic Condition	38°c Max
Product Overall Dimension WxLxH mm	1500x800x2050
Freezer Compartment Overall Dimension and Wall Thickness	
Refrigerator Compartment Overall Dimension and Wall Thickness	1400x700x1700
Product Shape, Double Doors, Upright, Chest, etc	Upright four Doors
Freezer Internal Net Volume	
Refrigerator Net Volume	58 Cu ft
Product Net Volume	
Product Inside Temperature C	2°c
Water Storage Tank Capacity, Water Cooler	
Type of Water Storage Tank Cylinder, Cubic, etc.	
Water Fellow per hour for water cooler	
Water Storage Tank Dimension	
Water Outlet Temperature	
Water Inlet Temperature	
Freezer Inside Temperature	
Refrigerator Inside Temperature	2°c
Evaporating Temperature	- 5c
Foam Insulation Thickness mm Side Walls, Top, Bottom, Door, Back Panel	50mm all
Type of PU Foam	Pply Urtane
Foam Density, Kg/Cu. Mt.	
Foam Mixture, Percentage Pol% + R11% + Isocyanate%	50+50+ 20% R11
Total amount of Foam Injection, Kg	15 Kg
Refrigerant Type	R12
Refrigerant Charge Weight Gr.	650gr

0.00128 W/mt°C 25°C

Type of Compressor, Hermetic, Semi Hermetic, Open	Hermetic
Compressor Cooling System Static, Oil Cooled, Fan Cooled	Fan cooled
Compressor Cooling Capacity Watt	950W
Compressor input Power, Watt	850 W
Compressor Model Number	Sc21 B
Compressor Manufacturer	Danffos
Compressor Mounting Place Top, Bottom, Front, Back	Top
Condenser Type, Static, Fan Cooled	Fan Cooled
Condenser Dimension, Length, Inside Tube Diameter,	325 x 66 x325mm
Condenser Material, Aluminum, Copper, Copper Coated, etc,	Aluminum - Copper
Condenser mounting Place, Back Wall, Top, Bottom	Top
Evaporator Type, Fin and Tube, Roll Bond, Wire and Tube, etc.	F Fin & Tube
Evaporator Dimension, Length, Surface Area, Inside Tube Diameter	560 x300x 100
Evaporator Material, Aluminum, Copper, Copper Coated, etc.	Aluminum fin copper Tube
Dryer Type,	Cartrig
Dryer Material, Weight and Size	Molecular Sive to gr
Capillary Tube Diameter and Length	0.54 inϕ-5.7 ftLength

Donyaye Mojdeh

Mozhdeh

R-12

Setting

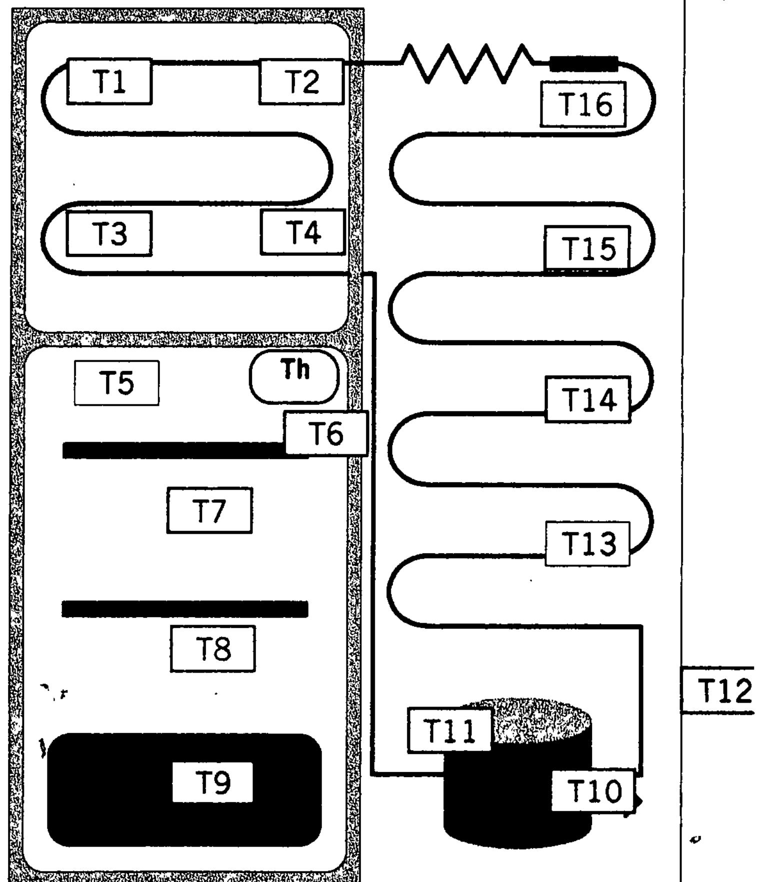
Test Date	Sat May 12-01
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test1

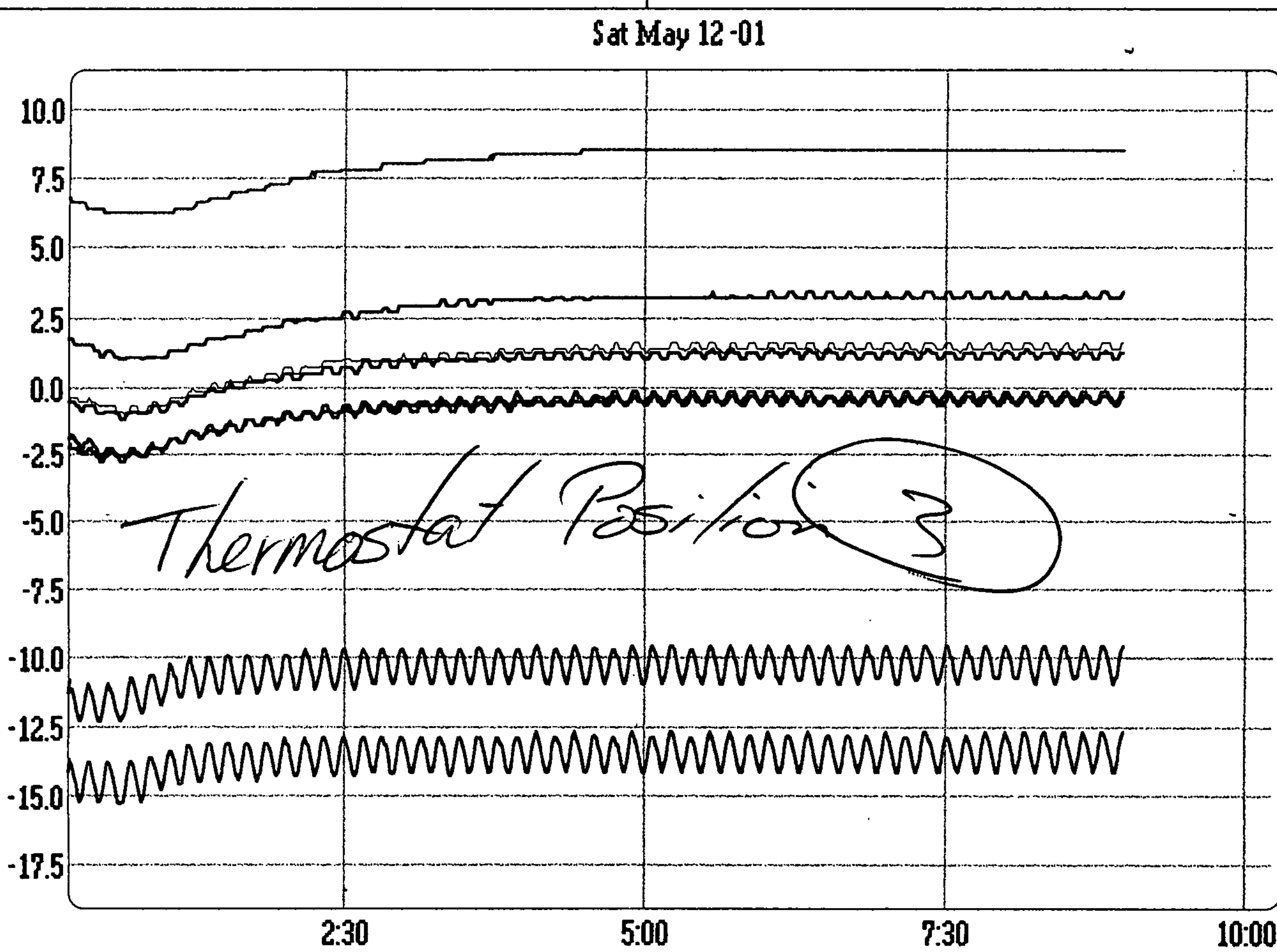
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	08:59
Working Time(h:m)	05:33
Working Percentage	61.8%
Energy Cons.(KWh)	0.9975
Av. En. Cons.(KWh/Day)	2.665
No. of Thermostat	55
No. of Over Load	0





Mozhdeh

Setting

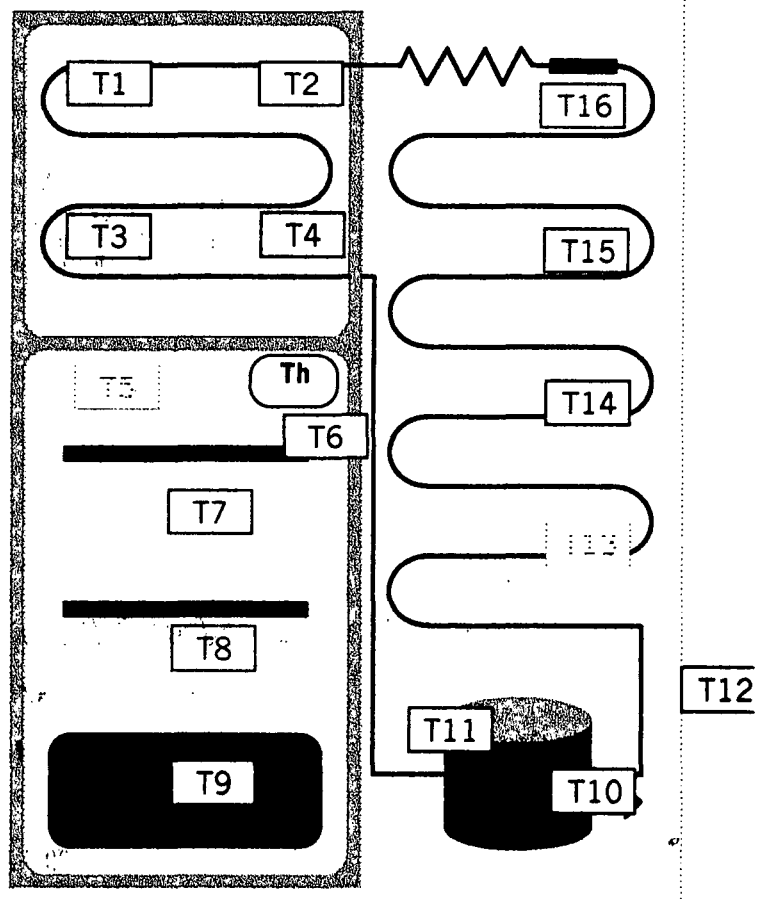
Test Date	Tue Apr 10-01
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test1

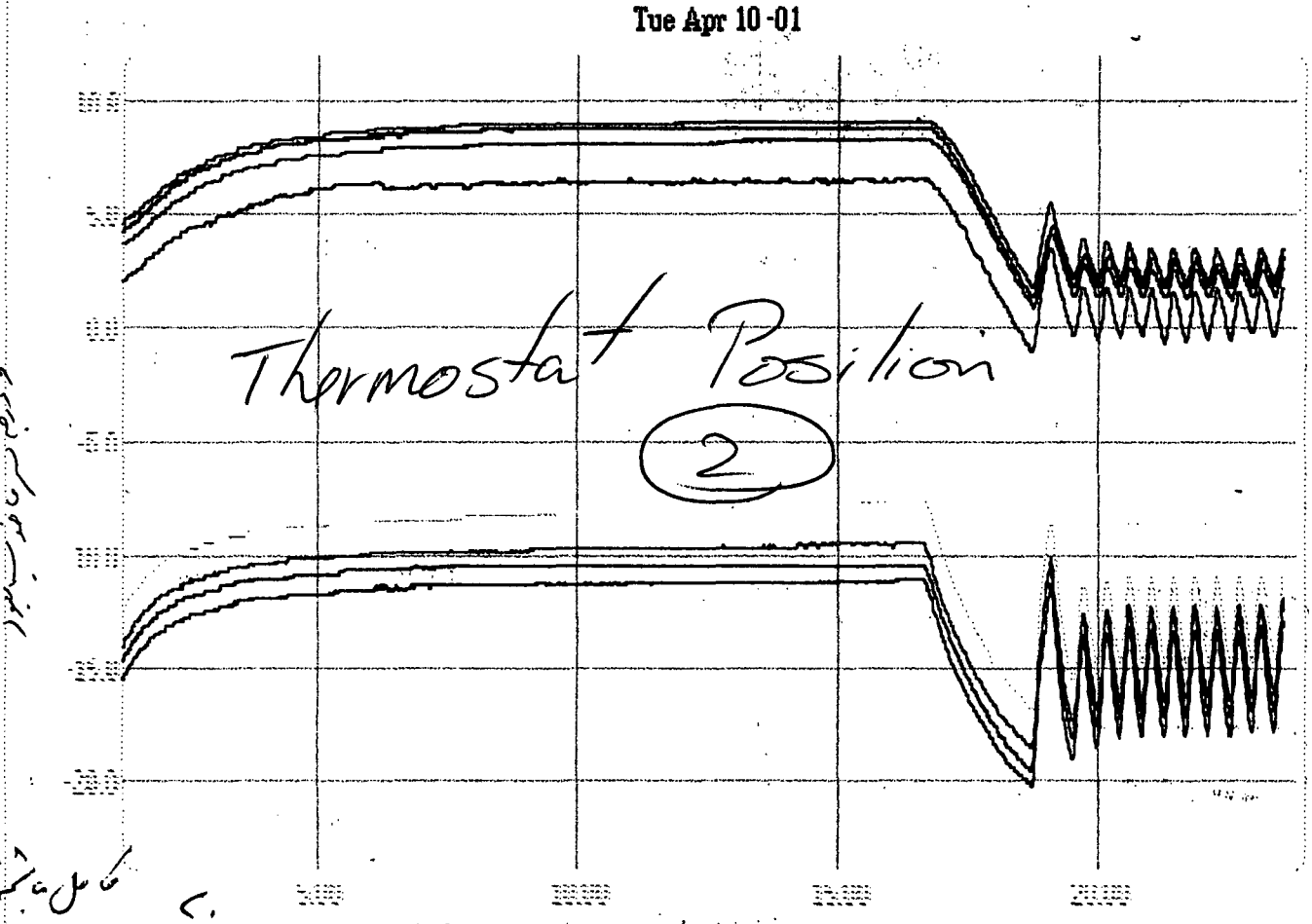
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	23:33
Working Time(h:m)	21:41
Working Percentage	92.0%
Energy Cons.(KWh)	4.585
Av. En. Cons.(KWh/Day)	4.673
No. of Thermostat	11
No. of Over Load	0





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Mozhdeh

Setting

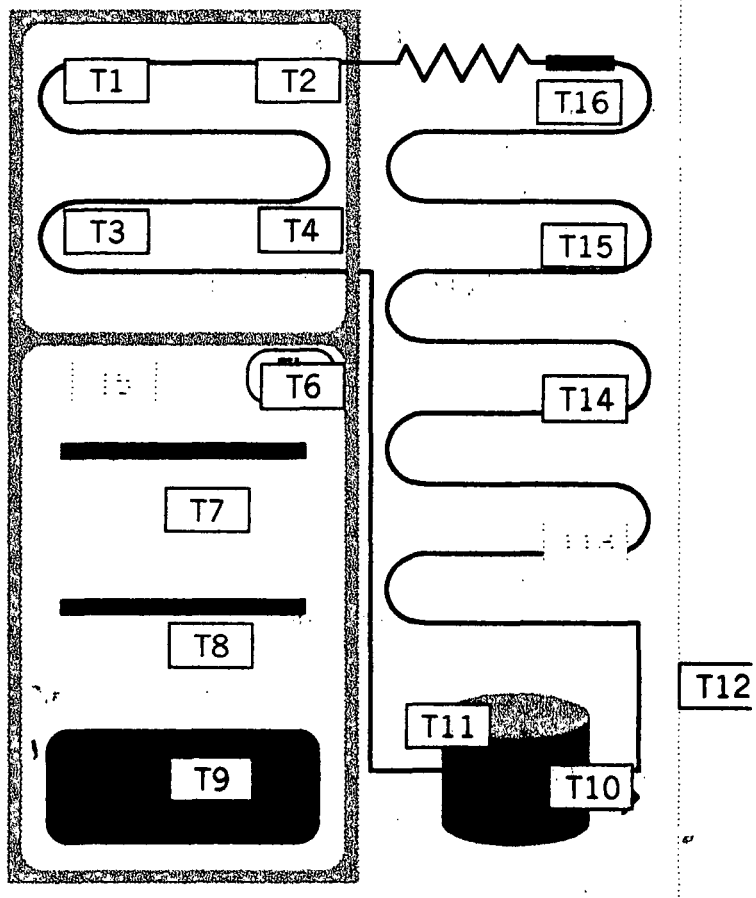
Test Date	Mon Apr 09-01
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test2

Product Specification

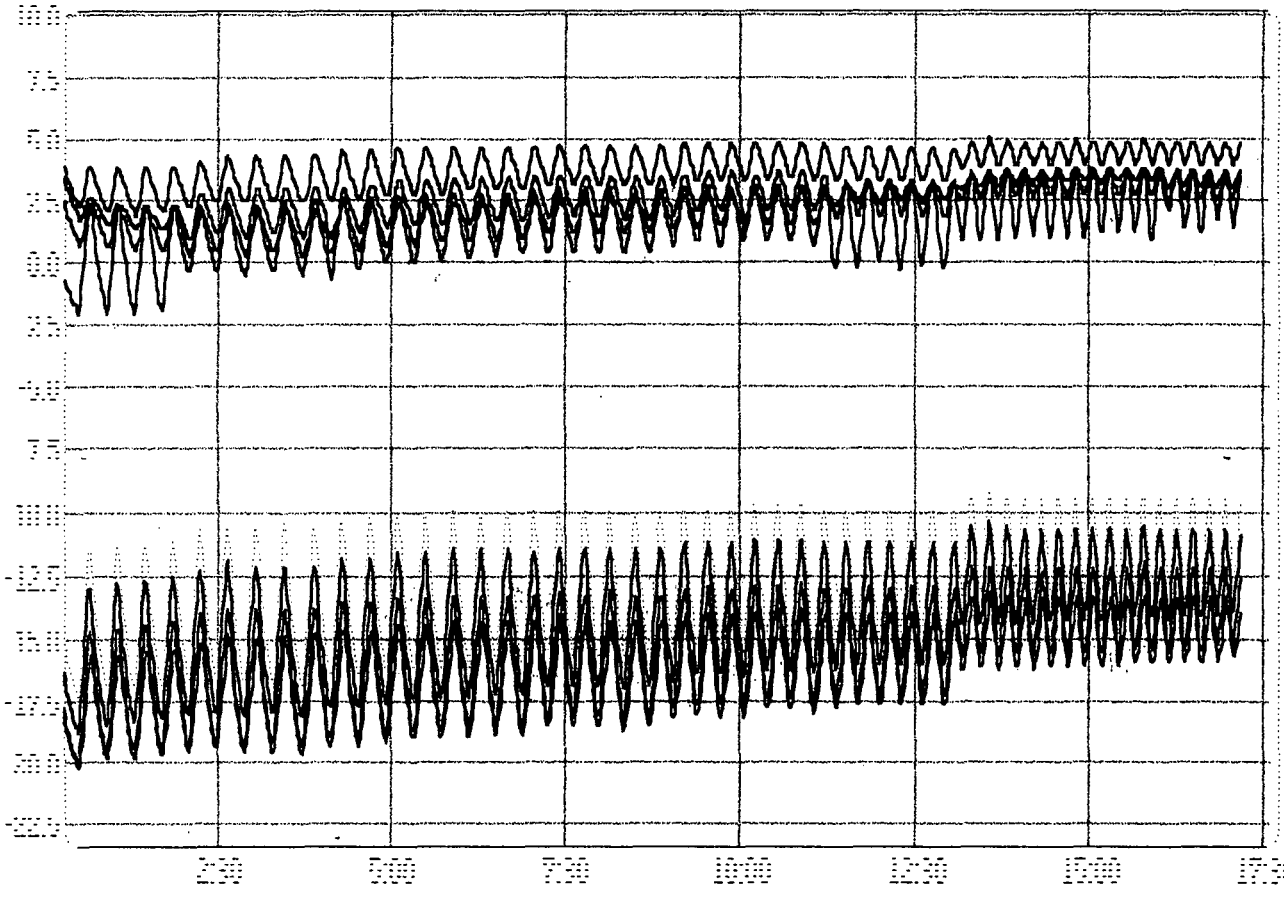
Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	17:10
Working Time(h:m)	09:58
Working Percentage	58.0%
Energy Cons.(KWh)	2.216
Av. En. Cons.(KWh/Day)	3.098
No. of Thermostat	52
No. of Over Load	0



Mon Apr 09 -01



Mozhdeh

Setting

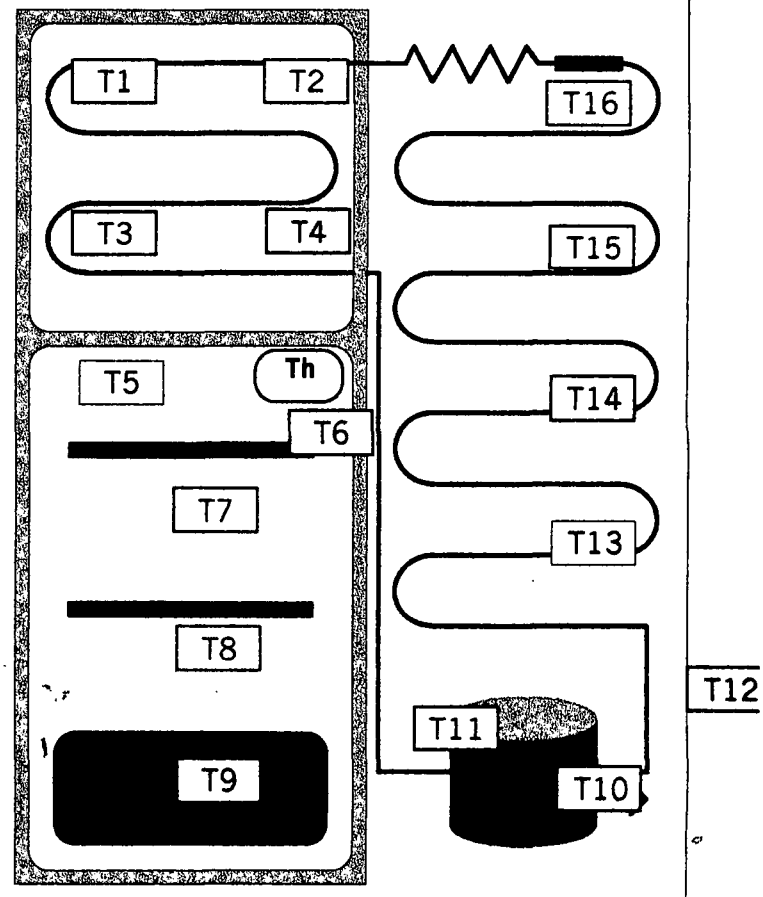
Test Date	Mon Jan 28-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test1

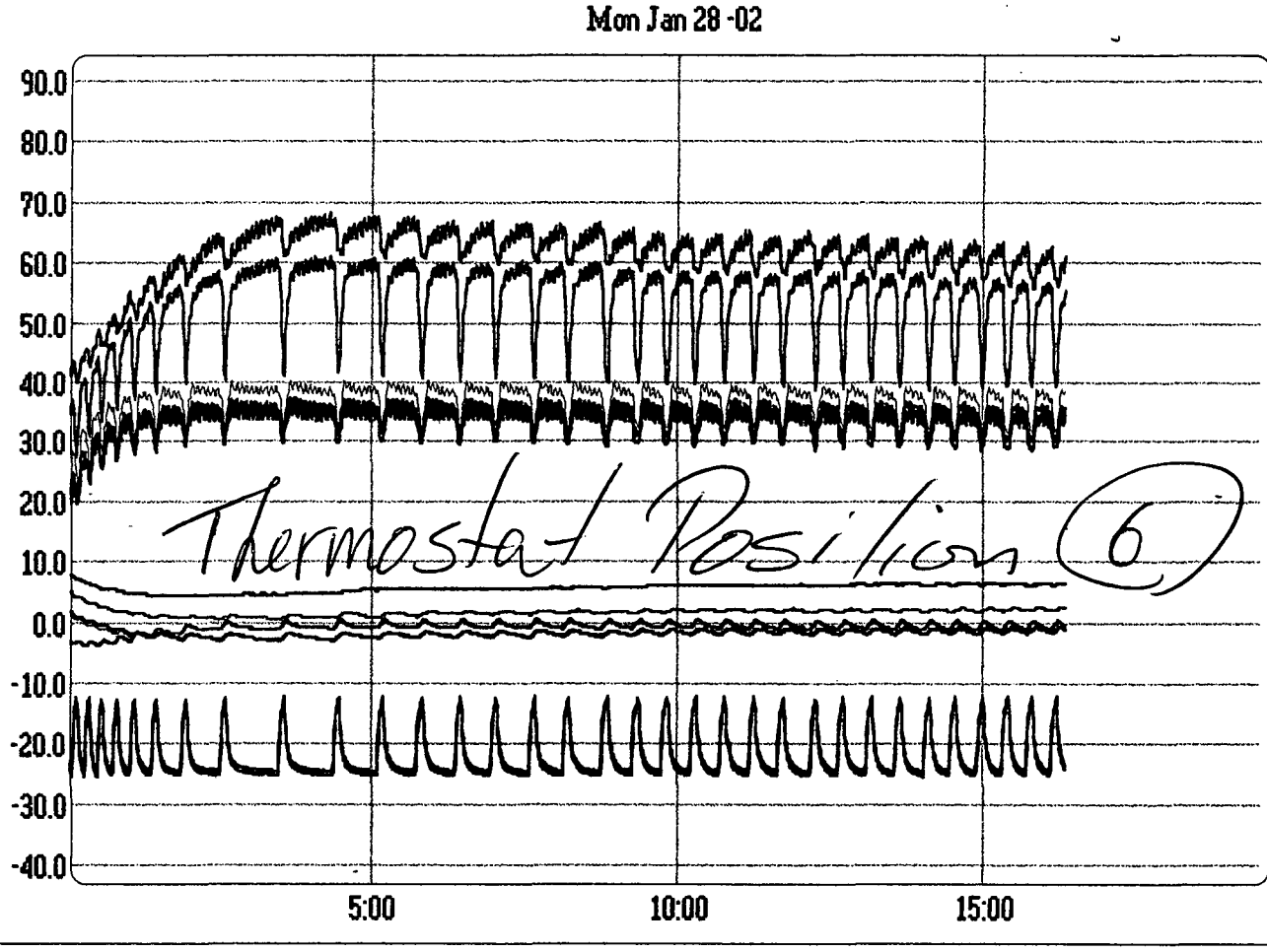
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	16:25
Working Time(h:m)	13:15
Working Percentage	80.8%
Energy Cons.(KWh)	1.779
Av. En. Cons.(KWh/Day)	2.601
No. of Thermostat	33
No. of Over Load	0





Mozhdeh

Setting

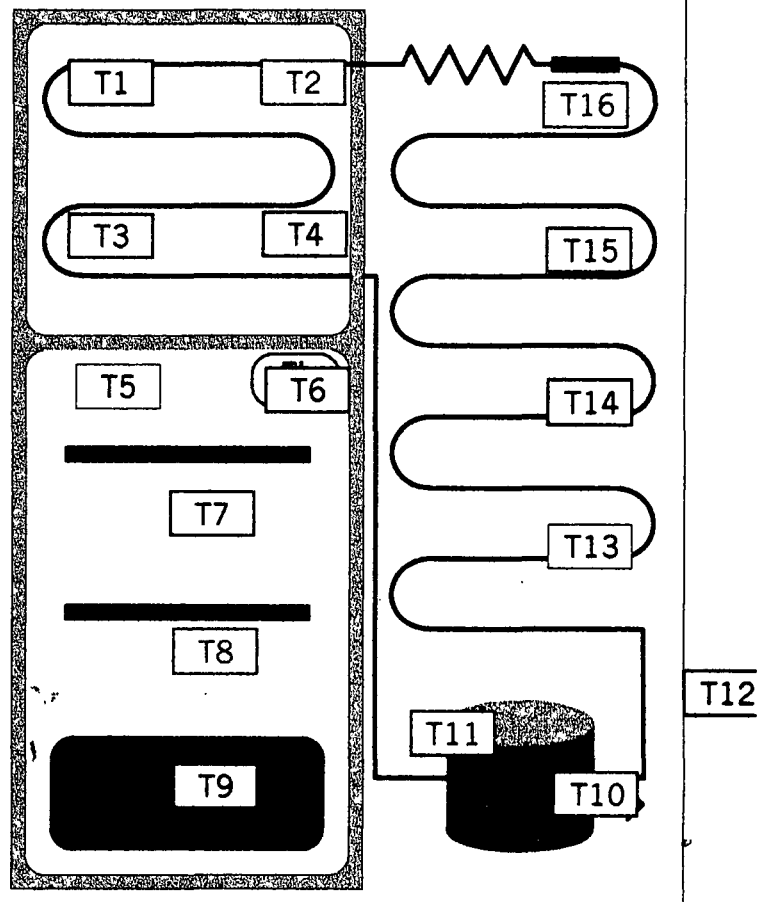
Test Date	Tue Feb 05-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test2

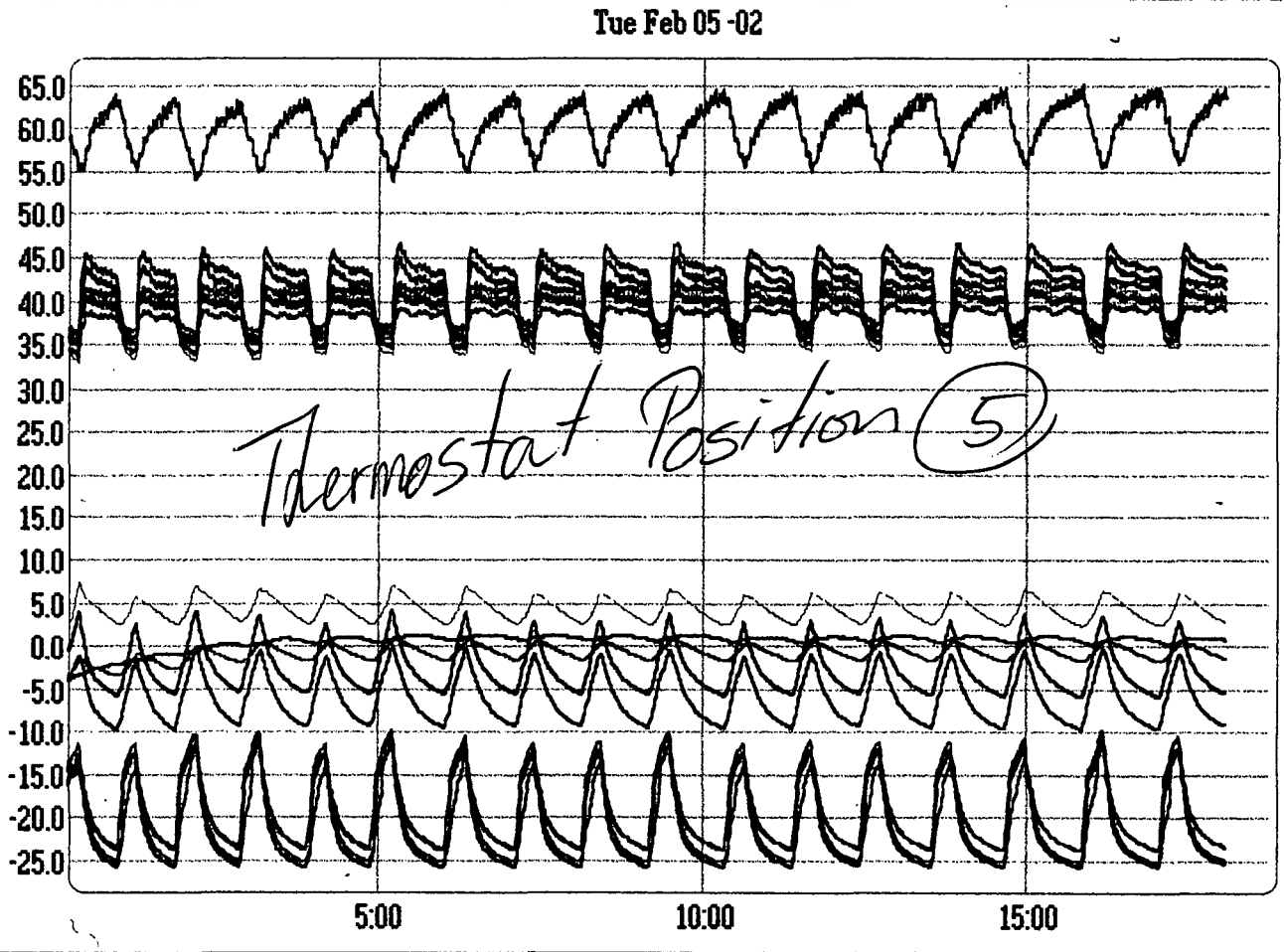
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	18:04
Working Time(h:m)	12:51
Working Percentage	71.1%
Energy Cons.(KWh)	2.671
Av. En. Cons.(KWh/Day)	3.548
No. of Thermostat	16
No. of Over Load	0





Mozhdeh

Setting

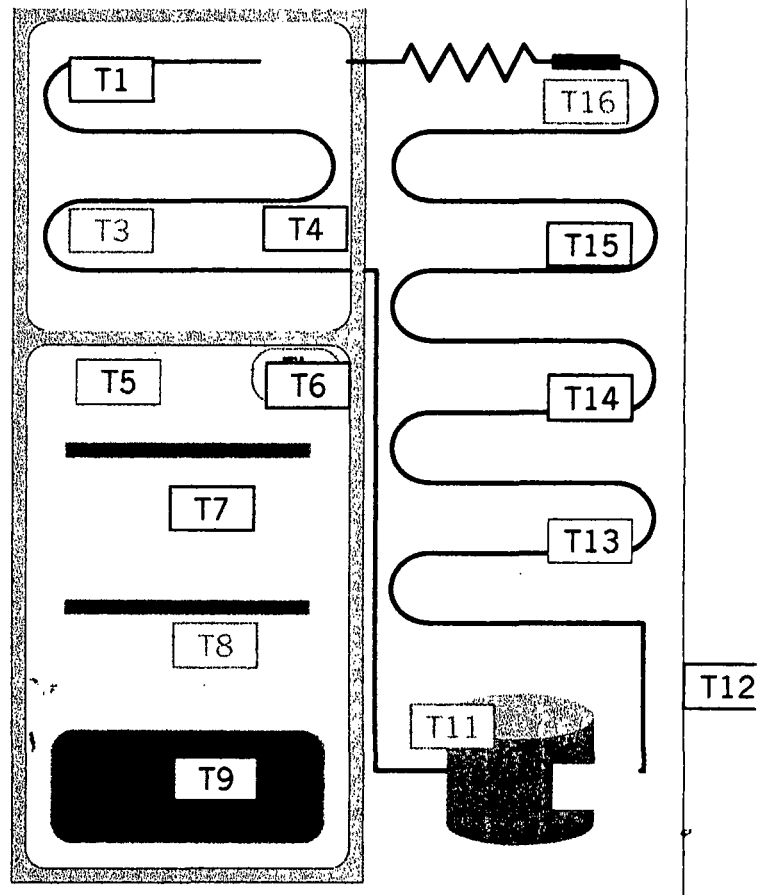
Test Date	Tue Feb 05-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test2

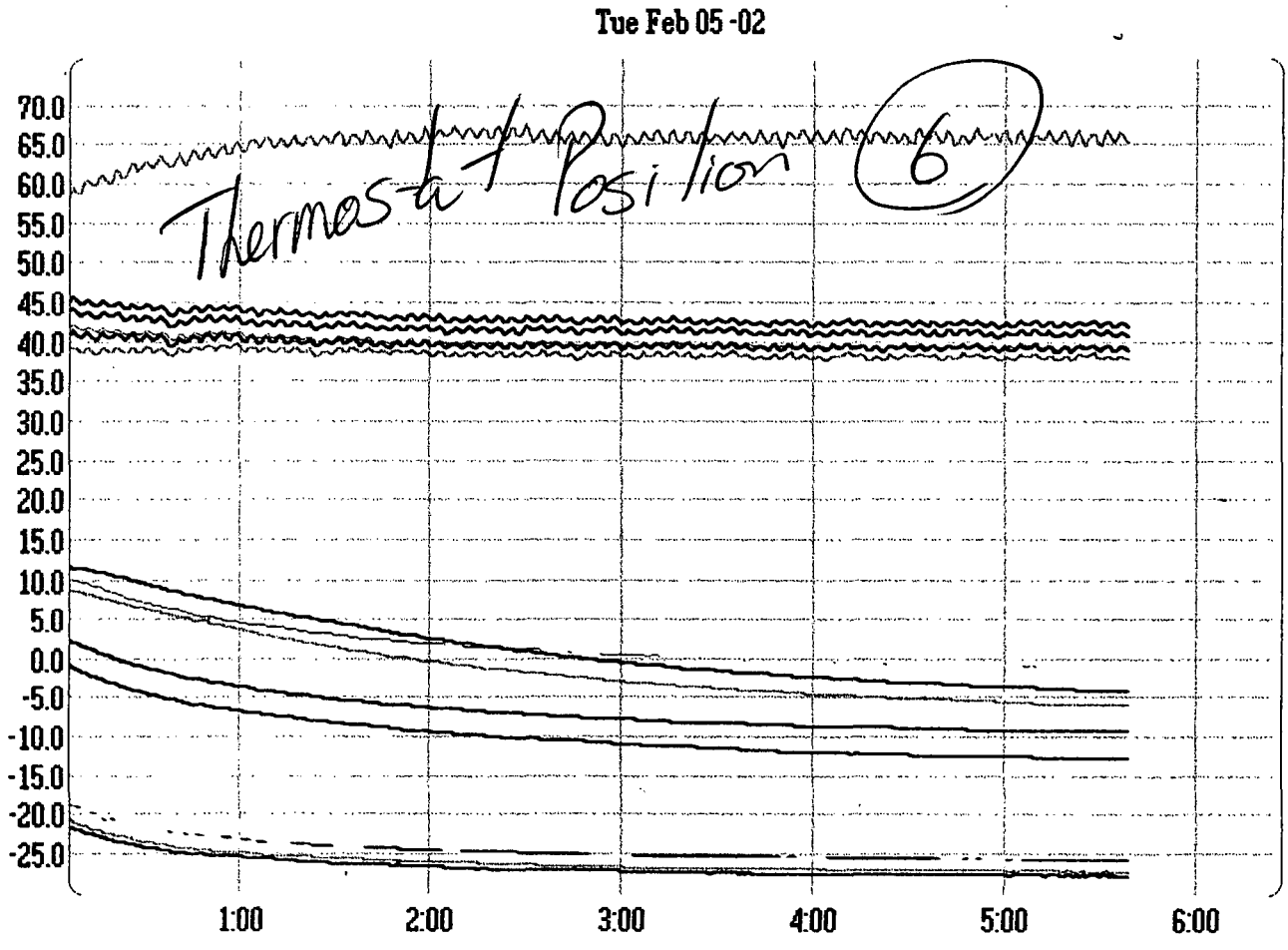
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	05:40
Working Time(h:m)	05:40
Working Percentage	100.0%
Energy Cons.(KWh)	0.9778
Av. En. Cons.(KWh/Day)	4.141
No. of Thermostat	0
No. of Over Load	0





Mozhdeh

Setting

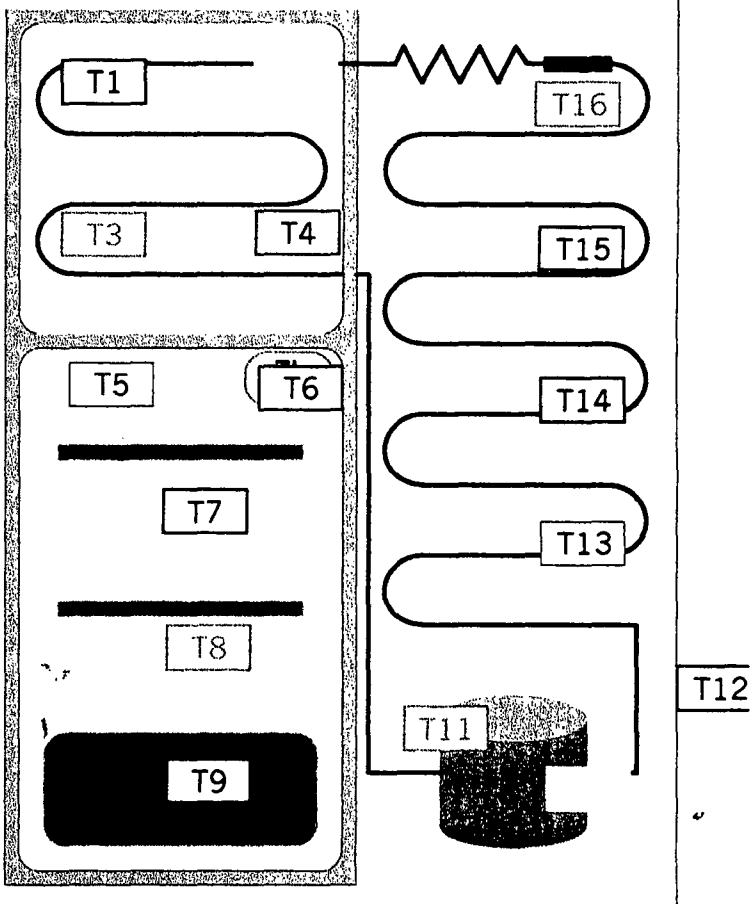
Test Date	Mon Feb 04-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test2

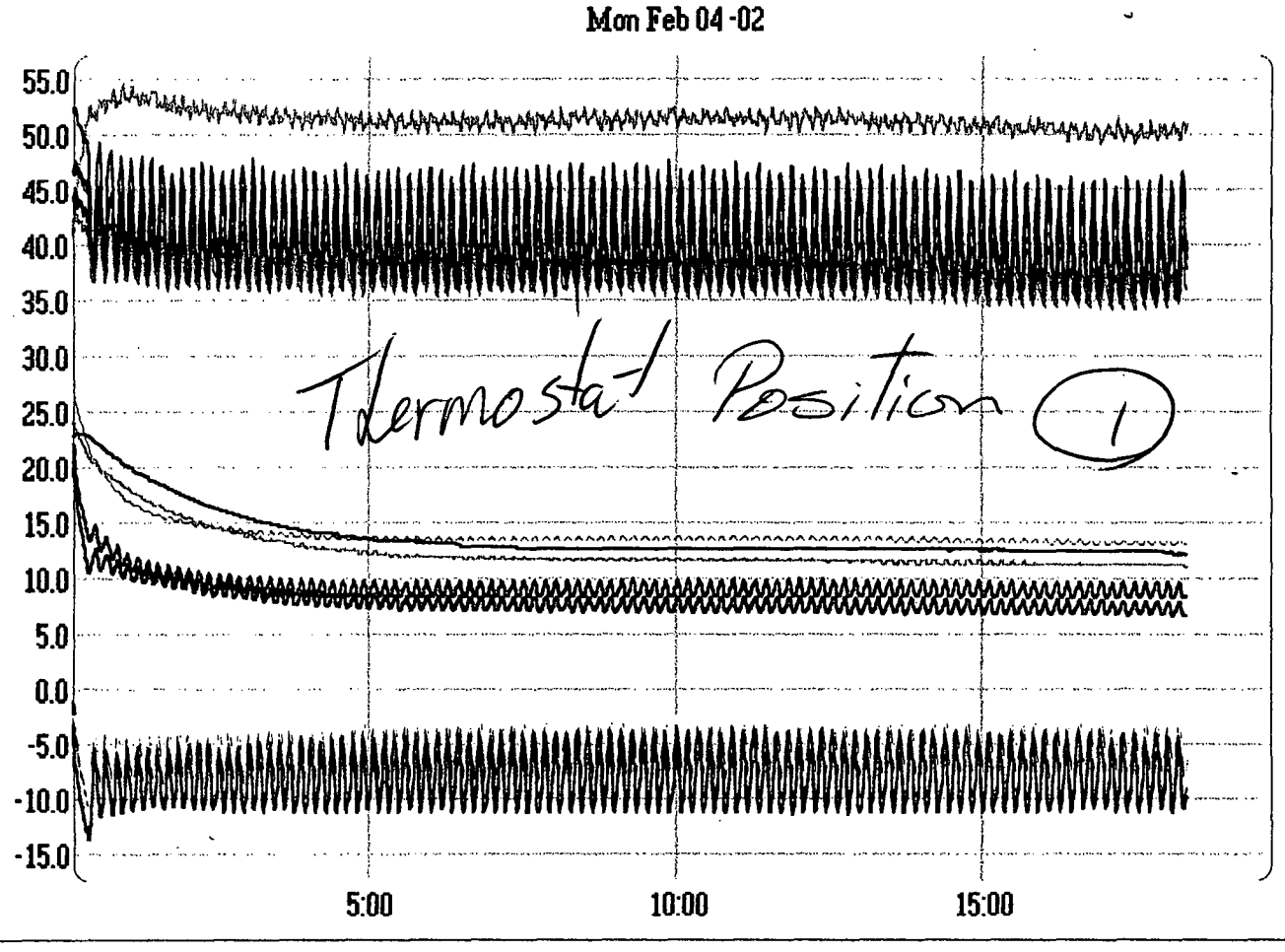
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	18:39
Working Time(h:m)	06:35
Working Percentage	35.4%
Energy Cons.(KWh)	2.376
Av. En. Cons.(KWh/Day)	3.058
No. of Thermostat	104
No. of Over Load	0





Mozhdeh

Setting

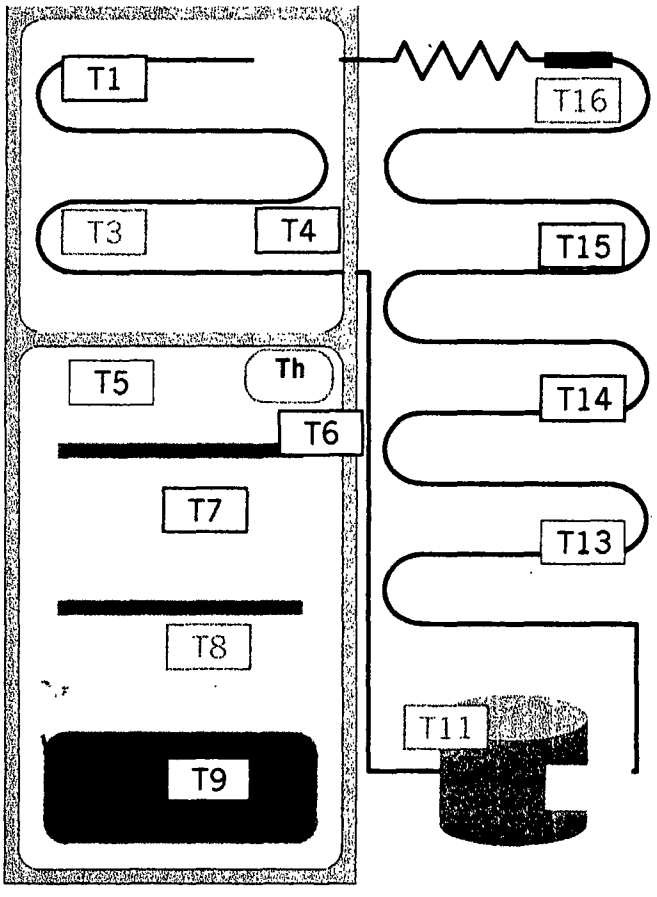
Test Date	Mon Feb 04-02
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	test1

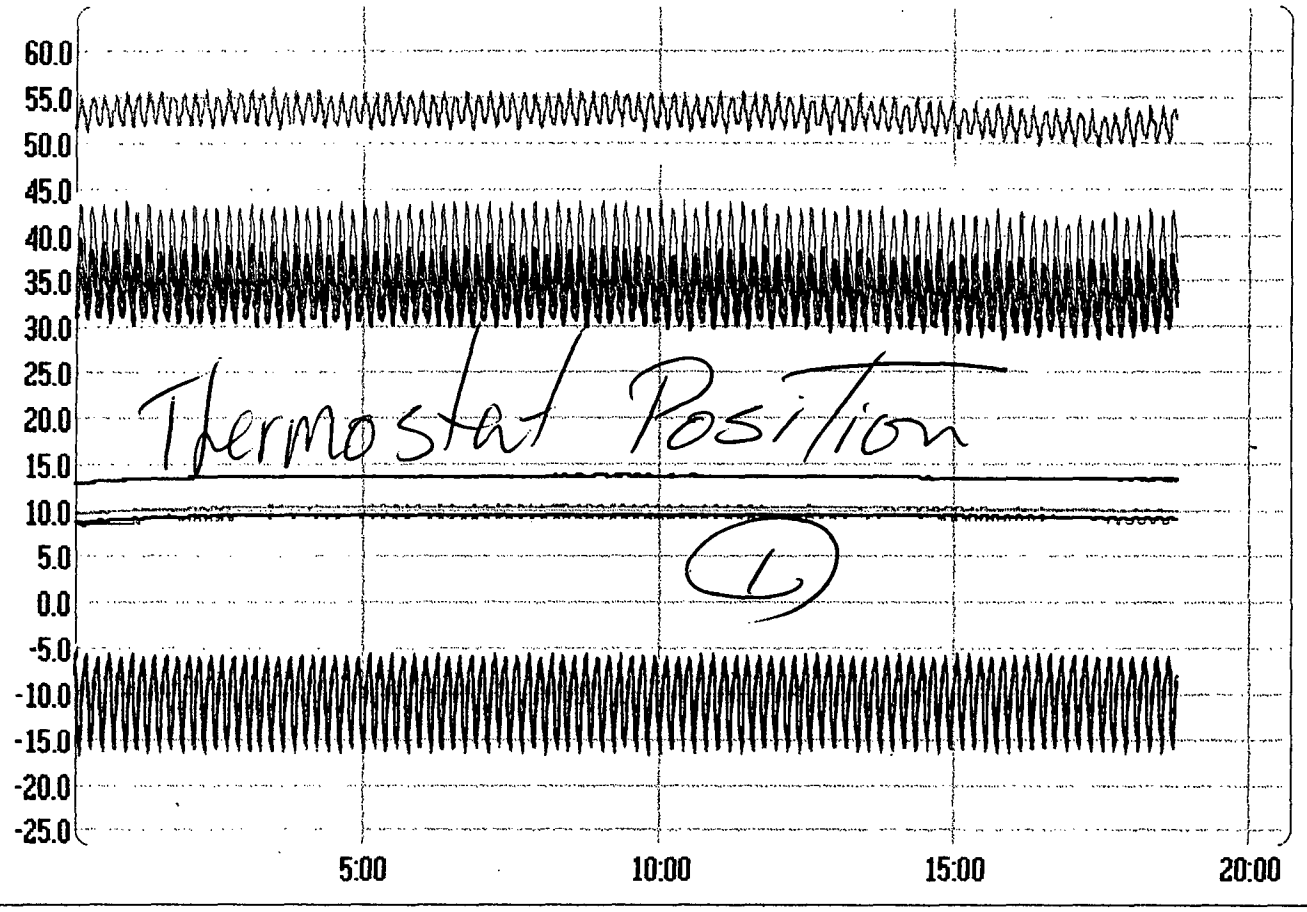
Product Specification

Product Type	-
Compressor Type	-
Refrigerant	-
Cappil. Length	-
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	18:48
Working Time(h:m)	07:16
Working Percentage	38.7%
Energy Cons.(KWh)	1.252
Av. En. Cons.(KWh/Day)	1.598
No. of Thermostat	97
No. of Over Load	0





دنیای مرده ۱۹/۸/۸۰

1

Freezer & Refrigerator 20

Product Technical Specification

Description	Specification
Company Name	DONYAYE MOTDEH Co.
Product Name	Freezer & Refrigerator
Product Model	40 X 60
Product Application	X
Operating Temperature	39 Centigrade
Climatic Condition	N
Product Overall Dimension WxLxH mm	65 X 200 Cent.
Freezer Compartment Overall Dimension and Wall Thickness	65 X 98 Cent.
Refrigerator Compartment Overall Dimension and Wall Thickness	65 X 102 Cent.
Product Shape, Double Door [illegible]	(STAND)
Freezer Internal Net Volume	67 Liter
Refrigerator Net Volume	208 Liter
Product Net Volume	410 Liter
Product Inside Temperature C	-24 & +3 Cent
Water Storage Tank Capacity, Water Cooler	/
Type of Water Storage Tank Cylinder, Cubic, etc.	/
Water Fellow per hour for water cooler	/
Water Storage Tank Dimension	/
Water Outlet Temperature	/
Water Inlet Temperature	/
Freezer Inside Temperature	about -24 Cent
Refrigerator Inside Temperature	about +3 Cent
Evaporating Temperature	/
Foam Insulation Thickness mm Side Walls, Top, Bottom, Door, Back Panel	Side Wall 60 mm, Bottom 40 mm, Top 40 mm, Door 50 mm, Back 60 mm
Type of PU Foam	LPC
Foam Density, Kg/Cu. Mt.	/
Foam Mixture, Percentage Pol% + R11% + Isocyanate%	55 & 45
Total amount of Foam Injection, Kg	12 Kg.
Refrigerant Type	Frion 12
Refrigerant Charge Weight Gr	320 Gr.

Freezer & Refrigerator 20

Type of Compressor Hermetic, Semi Hermetic, Open	Hermetic
Compressor Cooling System Static Oil Cooled, Fan Cooled	Oil Cooled
Compressor Cooling Capacity Watt	*
Compressor Input Power, Watt	x
Compressor Model Number	1/3 & 1/4
Compressor Manufacturer	National
Compressor Mounting Place Top, Bottom, Front, Back	Back / Bottom
Condenser Type Static, Fan Cooled	Static
Condenser Dimension, Length, Inside Tube Diameter	Lenth 140 X 50 Cent. Inside Tube 6 Cent.
Condenser Material Aluminum, Copper, Copper Coated, etc.	Aluminum . e.t.c
Condenser mounting Place Back Wall, Top, Bottom	Back Wall
Evaporator Type Fin and Tube, Roll Bond, Wire and Tube etc.	Wire & Tube Roll Band
Evaporator Dimension Length, Surface Area, Inside Tube Diameter	150 X 50 Cent.
Evaporator Material Aluminum, Copper, Copper Coated, etc.	Aluminum . e.t.c
Dryer Type	x
Dryer Material, Weight and Size	x
Capillary Tube Diameter and Length	x

۸۰/۸/۱۹ دنیای مژده

1

Refrigerator 12

Product Technical Specification

Description	Specification
Company Name	DONYAYE MOJDEH Co.
Product Name	Refrigerator
Product Model	(12 Foot)
Product Application	X
Operating Temperature	32 Centigracle
Climatic Condition	N
Product Overall Dimension WxLxH mm	63 X 165 Cent.m
Freezer Compartment Overall Dimension and Wall Thickness	/
Refrigerator Compartment Overall Dimension and Wall Thickness	/
Product Shape, Double D...	(STAND)
Freezer Internal Net Volume	/
Refrigerator Net Volume	about 265 Liter
Product Net Volume	about 280 Liter.
Product Inside Temperature C	about 3 Centg
Water Storage Tank Capacity, Water Cooler	/
Type of Water Storage Tank Cylinder, Cubic, etc.	/
Water Fellow per hour for water cooler	/
Water Storage Tank Dimension	/
Water Outlet Temperature	/
Water Inlet Temperature	/
Freezer Inside Temperature	/
Refrigerator Inside Temperature	about ±3 Centg
Evaporating Temperature	about -19 " "
Foam Insulation Thickness mm Side Walls, Top, Bottom, Door, Back Panel	Side Walls 40mm Bottom — Top 40mm Door 40 mm Back 40 mm
Type of PU Foam	IPC
Foam Density, Kg/Cu. Mt.	/
Foam Mixture, Percentage Pol% + R11% + Isocyanate%	%55 & %45
Total amount of Foam Injection, Kg	8.600 Kg
Refrigerant Type	Frion 12
Refrigerant Charge Weight Gr	280 Gr.

Refrigerator 12 — 2

Type of Compressor Hermetic, Semi Hermetic, Open	Hermetic
Compressor Cooling System: Static, Oil Cooled, Fan Cooled	Oil Cooled
Compressor Cooling Capacity Watt	/
Compressor Input Power, Watt	/
Compressor Model Number	1/5 & 1/6
Compressor Manufacturer	National
Compressor Mounting Place Top, Bottom, Front, Back	Back / Bottom
Condenser Type Static, Fan Cooled	Static
Condenser Dimension, Length, Inside Tube Diameter	Lenght 6 Cent.m Inside Tube 90 x 50 Cent.m
Condenser Material, Aluminum, Copper, Copper Coated, etc.	Aluminum . e.t.c.
Condenser mounting Place, Back Wall, Top, Bottom	Back Wall
Evaporator Type, Fin and Tube, Roll Bond, Wire and Tube etc.	Roll Band e.t.c
Evaporator Dimension, Length, Surface Area, Inside Tube Diameter	48 x 23 Cent.m
Evaporator Material Aluminum, Copper, Cooper Coated, etc.	Aluminum - e.t.c
Dryer Type	x
Dryer Material, Weight and Size	x
Capillary Tube Diameter and Length	x

Roshan

Test Sheet

Roshan

Setting

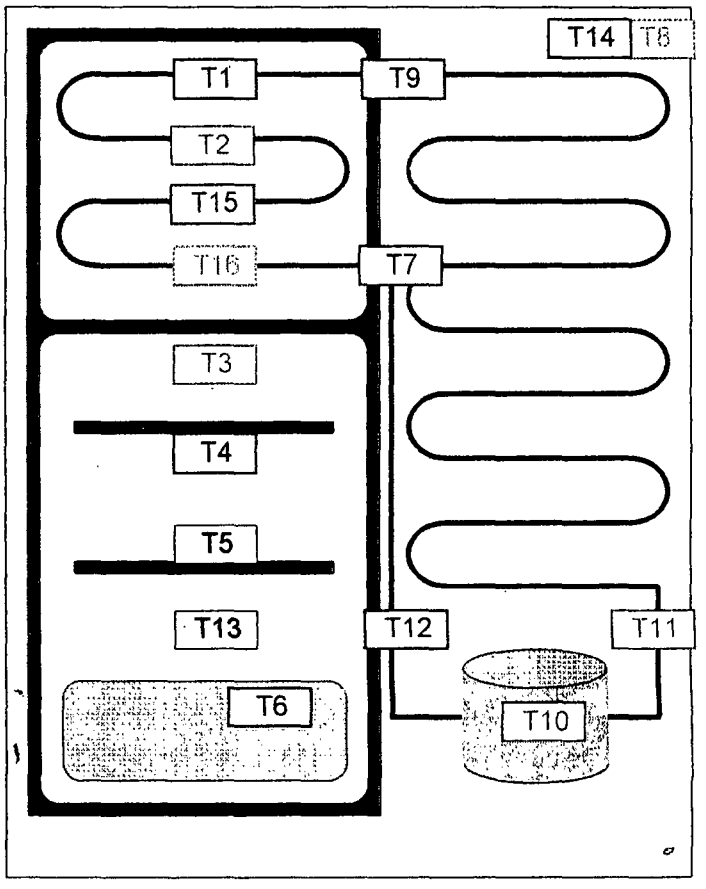
Test Date	Thu Feb 07-02
Hot Room Temp.	32.0 (E-E)
Hot Room Hum.	60.0% (E)
File Name	406032A4

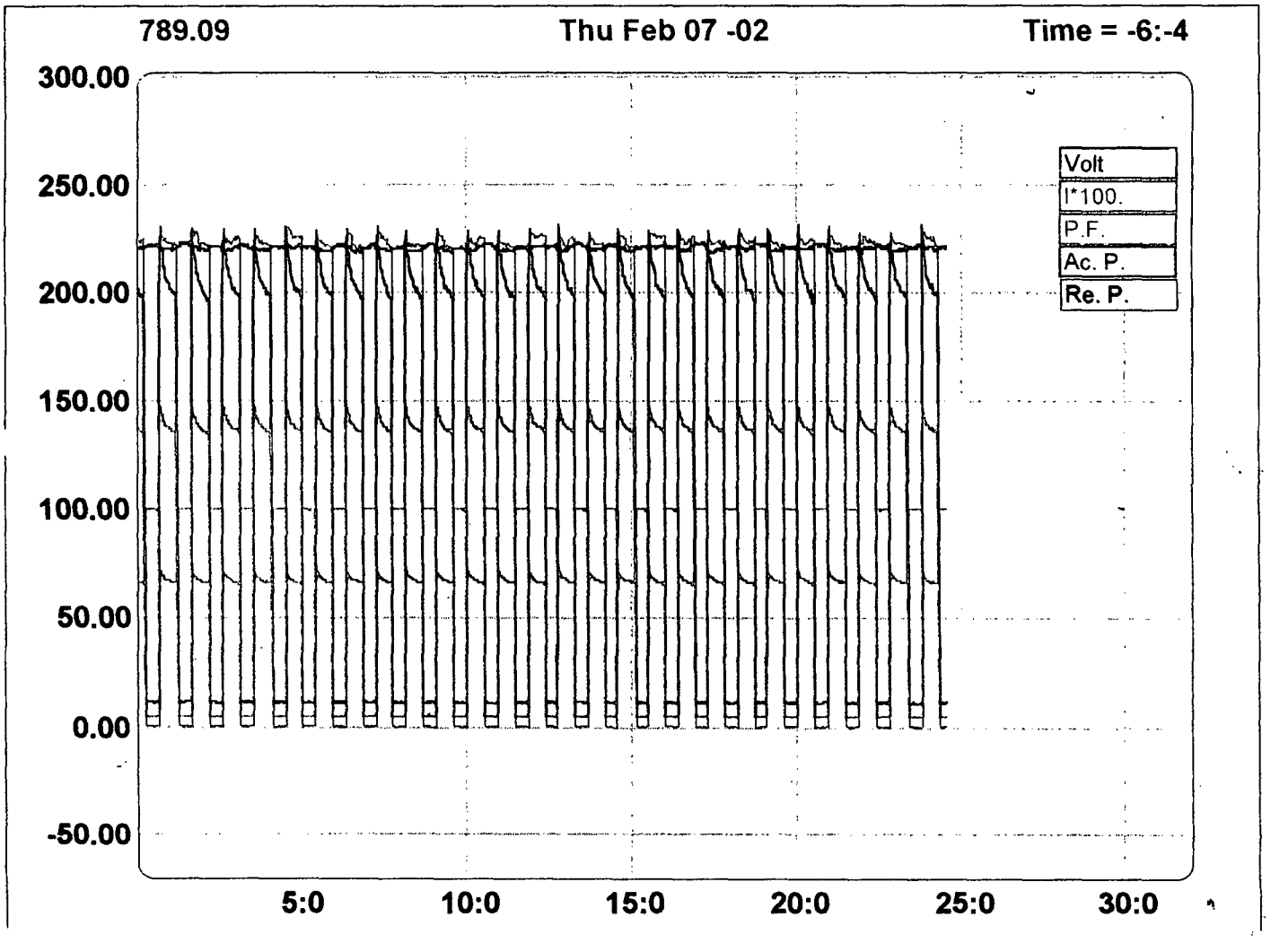
Product Specification

Refrigerator Type	RF 6040
Compressor Type	Necchi 10K
Gas Weight	250 gr
Cappil. Length	
Evap. Volume	
Condens. Length	

Test Result

Test Time (m)	1474
Work. Time (m)	828
Duty Cycle	56.2%
Energy Con.(wH)	3002.22
No. of Therm.	27
No. of Over Load	0





Roshan Test Sheet Roshan

Setting

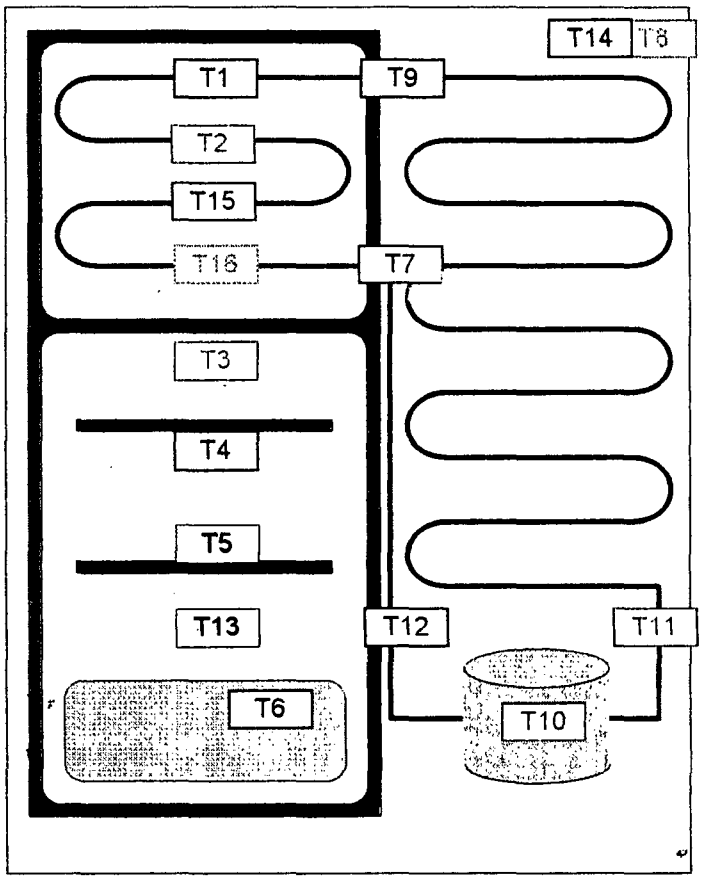
Test Date	Thu Feb 07-02
Hot Room Temp.	32.0 (E-E)
Hot Room Hum.	60.0% (E)
File Name	406032A4

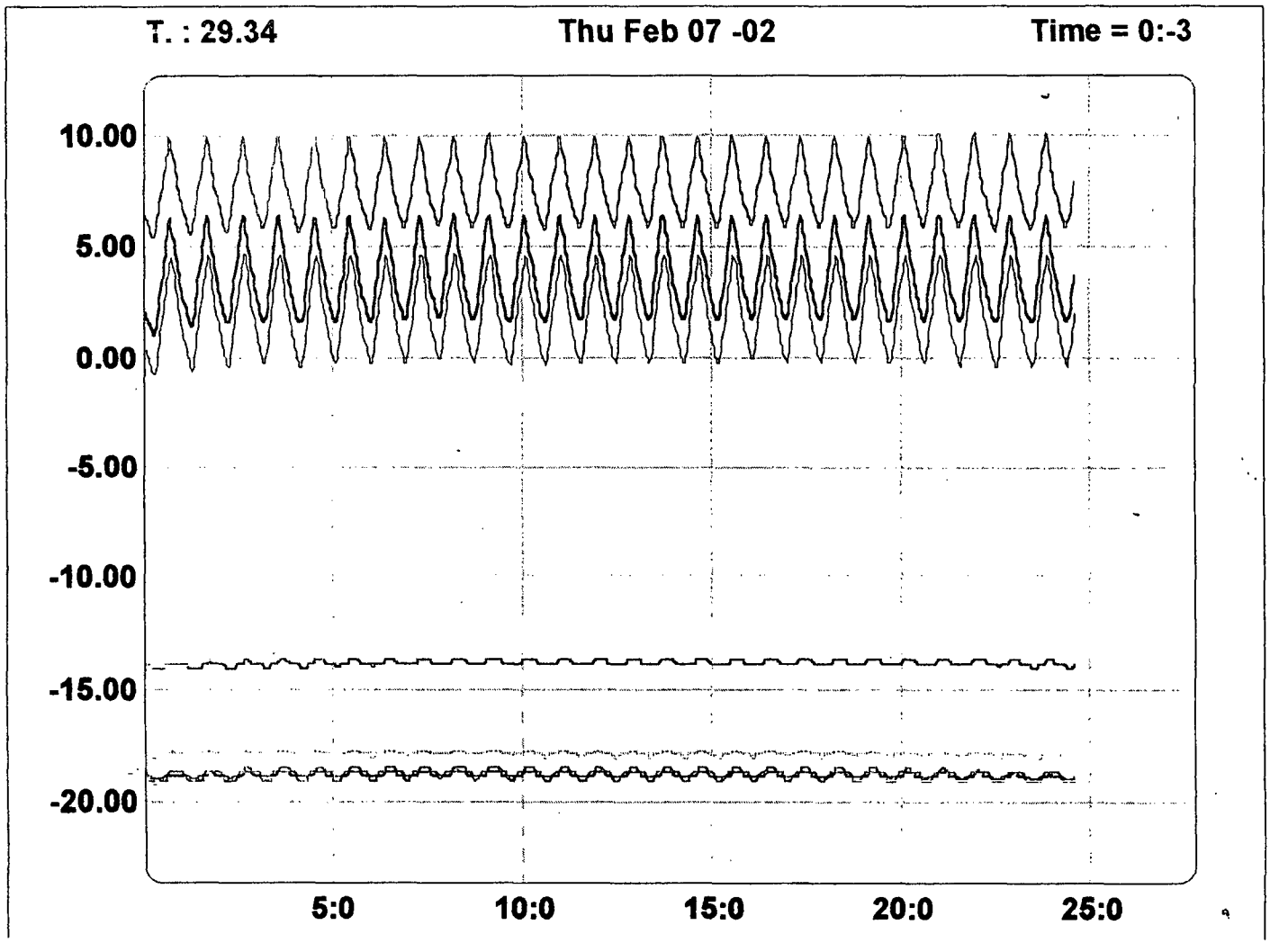
Product Specification

Refrigerator Type	RF 6040
Compressor Type	Necchi 10K
Gas Weight	250 gr
Cappil. Length	
Evap. Volume	
Condens. Length	

Test Result

Test Time (m)	1474
Work. Time (m)	828
Duty Cycle	56.2%
Energy Con.(wH)	3002.22
No. of Therm.	27
No. of Over Load	0





Product Technical Specification		
Description	*Specification*	
Company Nam	Roshan Ind. Group	
Product Name	ROSHAN	
Product Mode	RF 70 30	RF 60 40
Product Appli n	Household	
Operating Ten ature	+18 +43	+16 +32
Climatic Cond	Tropical	Normal
Product Overa mension Wx1-xh mm	63 x 67 x 185	64 x 67 x 195
Freezer Comp and Overall Dimension and Wall Thickne	32x52x40 6cm	50x46x77 7cm
Refrigerator C artment Overall Dimension an Wall Thickne	56x48x110 4cm	52x48x88.5 4 cm
Product Shap uble Doors upright, chest, etc	Double Doors	Double Doors
Freezer intern volume	98 litr	75 litr
Refrigorator n lume	219 litr	166 litr
Product net vo e	317 litr	241 litr
Product inside perature C		-
Water Storage kCapacity, Water Cooler		-
Type of Wate rage Tank Cylinder, Cubic, etc		-
Water Fellow hour For Water Cooler		-
Water Storage k Dimension		-
Water Outlet perature		-
Water Inlet Te rature		-
Freezer Inside perature	-20 t -18c	-20 t -18c
Refrigerator I Temperature	t_{Av} - 5 c	
Evaporating T erature		
Foam Insulatio thickness mm Side Walls, Top, Bottom, , Back Panel	6 7	3-5 6
Type Of PU F	Cold Rigid Foam	
Foam Density /CU.Mt	32- 33 Kg/m^3	
Foam Mixture centage Pol%/R11%/ yanate%		
Total amount oam Injection, Kg	8	9
Refrigerant Ty	R12	
Refrigerant Ch Weight Gr	280gr	270gr

24.2
109.4

Product Technical Specification			
Description		***Specification***	
Type of compre	Hermetic, Semi	Hermetic	
hermetic, open			
Compressor Coo	System Static, Oil	Oil cooled	
Cooled, fan Cool			
Compressor Cool	Capacity Watt	230 W	
Compressor Inpu	wer, Watt	207 W	
Compressor Mo	mber	FN- 91F-20G	
Compressor Man	turer	Matsushita	
Compressor Mou	place Top , Bottom	Bottom	
Front , Back			
Condenser Type		Static	
Static, Fan cooled			
Condenser Dimen	, Length, inside	16.67_m $\phi 5_{mm}$	
Tube Diameter			
Condenser Materi		Steel Copper Coated	
Aluminum, Copper	opper Coated, etc		
Condenser mounti	place	Back wall	
Back Wall, Top, B	m		
Evaporator Type		F: Tube& Plate	F: Wire& Tube
Fin and Tube, Roll	d, Wire and Tube, etc	R: Roll Bond	R: Roll Bond
Evaporator Dimen	Length, Surface Area,	20_m	22_m
inside Tube		$\phi 6.6_{mm}$	$\phi 6.6_{mm}$
Diameter			
Evaporator Materi		CU- Al	Al
Aluminum, copper	ted, etc		
Dryer Type		XH5	
Dryer Material, We	and Size	15g	
Capillary Tube Dia	er and Length	$\phi 0.78_{mm}$ 2.9_m	

Roshan

Test Sheet

Roshan

Setting

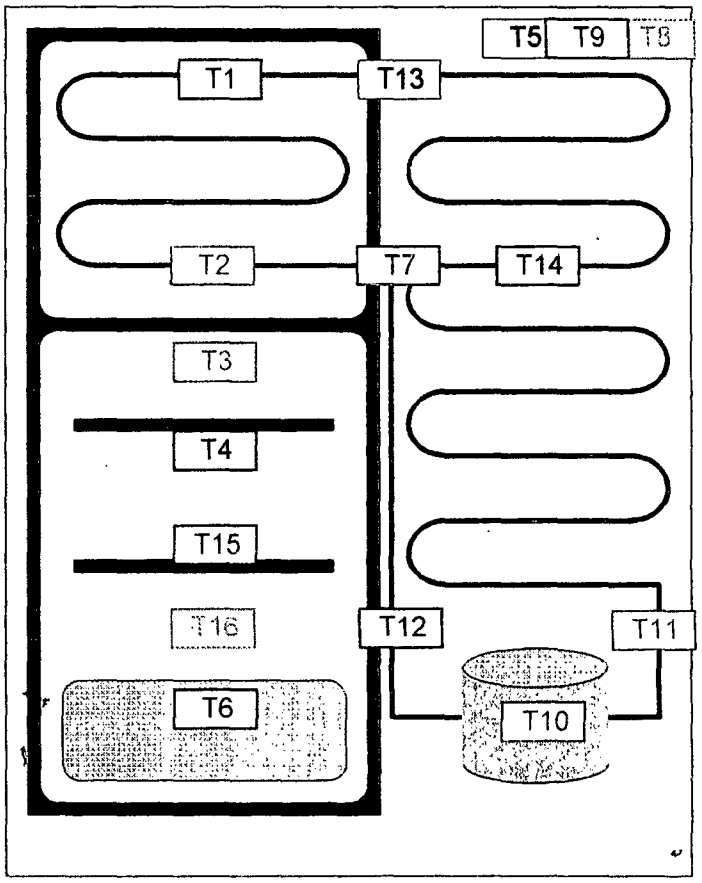
Test Date	Thu Feb 07-02
Hot Room Temp.	32.0 (E-E)
Hot Room Hum.	60.0% (E)
File Name	307032A2

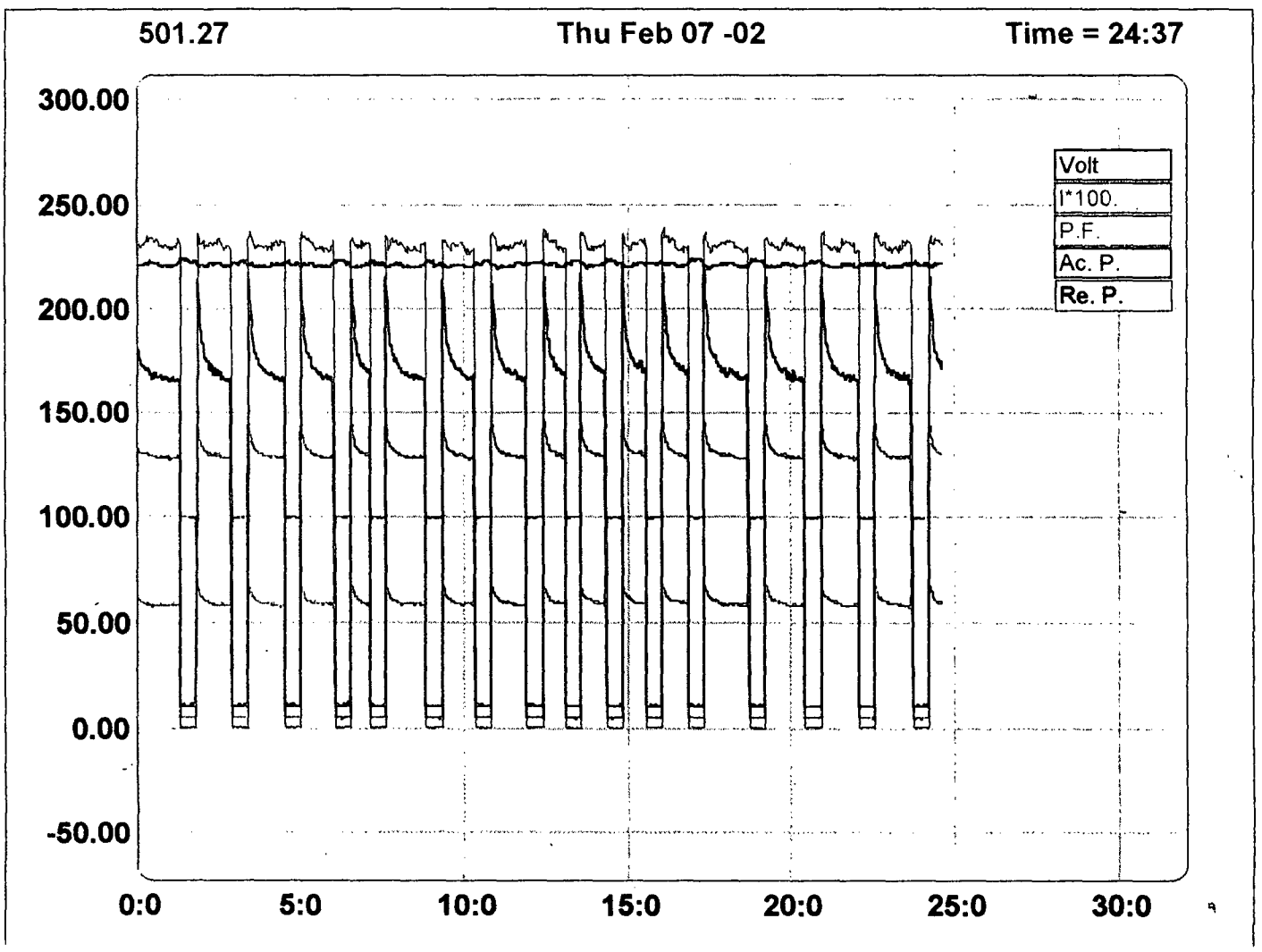
Product Specification

Refrigerator Type	RF 7030
Compressor Type	Necchi 9K
Gas Weight	250 gr
Cappil. Length	
Evap. Volume	
Condens. Length	

Test Result

Test Time (m)	1475
Work. Time (m)	999
Duty Cycle	67.7%
Energy Con.(wH)	3019.11
No. of Therm.	16
No. of Over Load	0





Roshan Test Sheet Roshan

Setting

Test Date	Thu Feb 07-02
Hot Room Temp.	32.0 (E-E)
Hot Room Hum.	60.0% (E)
File Name	307032A2

Product Specification

Refrigerator Type	RF 7030
Compressor Type	Necchi 9K
Gas Weight	250 gr
Cappil. Length	
Evap. Volume	
Condens. Length	

Test Result

Test Time (m)	1475
Work. Time (m)	999
Duty Cycle	67.7%
Energy Con.(wH)	3019.11
No. of Therm.	16
No. of Over Load	0