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SAHANDMINA ENGINEERING CO LTD.

UNIDO

CONVERSION AND DEVELOPMENT OF PROTOTYPES INTO R134A OZONE FRIENDLY REFRIGERATION SYSTEM AT BAREZ HIMALIA

PROJECT NUMBER
MP/IRA/60/111

Contract Number
2000/195

Final Report

May 2001

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شرکت مهندسی سهند مینا (با مسئولیت محدود)
SAHAND MINA ENGINEERING CO.LTD.

Our Ref.: شماره: Date: تاریخ :

Final Report

PROJECT NO. MP/IRA/00/111

Contract Number 2000/195

Barez Himalia Company

Introduction

Please find below our Final Report, concerning calculation and redesign of the prototypes that have been made the counterparts and they have been tested at counterpart hot chamber. These prototypes have been manufactured under our close engineering supervision and will be 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. We hope that this report could have satisfied the UNIDO in order to comply with our contract. Three prototypes have been made by Barez Himalia Ind. Company and they have been tested at hot chamber successfully.

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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 commercial refrigeration equipment at Barez Himalia Ind. Company. 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 Barez-Himalia and Himalia Co. located in Shahrake Pardis ,near Tehran, Iran, 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 must be 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.

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SECTOR BACKGROUND

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 240) 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.

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The ODS phase-out activities in this sector in Iran began in 1993. Since then, 7 investment projects in the domestic refrigeration sub-sector (amounting to a phase-out of 1,130 ODP MT) and 6 investment projects in the commercial refrigeration sub-sector (amounting to a phase-out of 321 ODP MT) have been approved.

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.

UNIDO has recently completed a detailed study of the commercial refrigeration sub-sector, which identified more than 240 companies currently operating in this sector. Consequently new figures of the consumption of CFCs in this sector have been determined.

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,

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- 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 Barez-Himalia Co. and Himalia Co. are manufacturers of commercial and domestic refrigerators and freezers; Barez-Himalia Co. is located in Tawosieh, near Tehran and Himalia Co is located in Simin Dasht, near Tehran. These enterprises are 100% indigenously owned by the same group people and report no exports and being financially sound.

The Barez-Himalia Co. was established and commenced production in 1980 and employs about 128 persons. Barez-Himalia and Himalia have two main product lines producing: 12 cubic ft refrigerators 12 and 14 cubic ft. refrigerator / freezers, freezers, 16 cubic ft chest freezers for commercial applications and display cabinets of varying sizes. Production breakdown depends on the market at any one time.

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One low-pressure foam dispenser, locally made capacity 40 kg/min (installed 1992) serving the foaming operation for doors with one mixing head and day tank. One low-pressure foam dispenser, locally made, capacity 60 kg/min (installed 1991) serving the foaming operation for cabinets and chest freezers and commercial refrigerators with one mixing head and day tanks. Assorted fixtures (about 14) for foaming of the various refrigerator models. The baseline molded foam density is about 30 kg/cum for domestic and commercial refrigerators.

The Himalia Co. was established and commenced production in 1982 and employs about 105 persons. The Himalia Co. has one main product line producing: of 12 cu ft refrigerators, 12,14 and 17 cu ft. refrigerator/freezers, chest freezers, freezers for commercial application, display cabinet and some industrial refrigeration installations. Production breakdown depends on the market at any one time.

One low-pressure foam dispenser, locally made capacity 40 kg/min (installed 1992) serving the foaming operation with one mixing head and day tank. Assorted fixtures (about 10) for foaming of the various refrigerator models. The baseline molded foam density is about 30 kg/cum for domestic and commercial refrigerators.

In the 12 months from 20 March 1998 to 20 March 1999 the Himalia companies produced a total of 28,000 refrigerators, 13,600 refrigerators/freezers,7,600 freezers, 4,700 Chest freezers and 2,400 commercial refrigeration appliances in 12 models. The annexes to this document include detailed breakdown of production and ODS consumption as follows:

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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, 13 will be retrofitted and three replaced.

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The existing three 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

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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 and ing 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 4 models of commercial refrigerators made by Himalia Ind. Co. 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

In this report we will describe the activities achieved during execution of the contract for implementation of the project.

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- 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.

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.

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- 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
- Heat Load Calculation
- Thermostat Selection and Adjustment
- Refrigerant Charging Methods
- Testing Prototypes
- Analyzing Prototype Test Results

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Making Prototypes

- Prototype Model Selection

- Refrigeration System Components Selection

  1- Defrost Type
  2- No-Frost Type

- 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

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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

1- Cooling System

a. Static
b. Oil
c. Air

2- Pressure

a. LBP (Low Back Pressure)
b. HBP (High Back Pressure)
c. MBP (Medium Back Pressure)

3- Model

a. Hermetic
b. Semi-Hermetic

c. Open

4- Type of Refrigerant

a. R12
b. R134a
c. Isobutene
d. Blend

5- Accessories

a. Capacitor Type
b. Starting Relay
c. Voltage, Frequency and Current
d. Electrical Circuit

6- Mounting Compressor

a. Refrigerant Fellow Direction
b. Top on the Roof
c. Bottom on Base
d. Double Compressor Mounted

7- Compressor Capacity

a. Watt
b. Horse Power
c. B.T.U/Hr
d. Kcal/Hr

8- 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

9- Evaporating Temp. and Selection of Compressor

10- Thermostat

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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

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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

Our Ref.: شماره: Date: تاریخ :

- 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 Results
- Test Results Analysis

تهران ،خیابان شریعتی ، بالاتر از میرداماد ساختمان ۱۲۸۰ آپارتمان شماره ۱۲ کد پستی ۱۹۵۵۸ تلفن : ۲۲۵۰۳۳۰ ، ۲۲۷۴۹۳۶ نمابر: ۲۲۷۴۹۳۶
No 12, Building 1280,Shariati Ave.,Tehran 19558 Iran. Tel.:+98 21 225 03 30 Tel.Fax :+98 21 227 49 36
e.mail, sahandmina@hotmail. com

جدول تست RUN محصولات شرکت بـــارز(هیمالیا)

نام و مدل محصـــول	متوسط دمای فریزر (°C)	متوسط دمای یخچال (°C)	ورودی اواپراتور یخچال (°C)	خروجی اواپراتور یخچال (°C)	ورودی اواپراتور فریزر (°C)	خروجی اواپراتور فریزر (°C)	لولهٔ ساکشن (°C)	ورودی کندانسور (°C)	وسط کندانسور (°C)	خروجی کندانسور (°C)	پوستهٔ کمپرسور (°C)	آمپر مصرفی (A)	وات مصرفی (W)
یخچال فریزر COM465	-27	-1	-21	-10	-29.6	-30.5	+34.5	+66	---	+38.5	+52.3	1.5	140
فریزر ۷ کشو F270	-28	---	---	---	-30	-29.6	+29	+76	+38	+37.5	+71	1.5	135
یخچال بامحفظهٔدوستاره R345	-28.6	-.6	---	---	-28.8	-28.3	+29.5	+78	+40	+39	+76	1	110

یخچال فریزر مدل : COM 465

محل قرار گیری سنسور SENSOR POSITION	شمارهٔ سنسور SENSOR NO.
Refrigerator Ambient	T 1
Refrigerator Ambient	T 2
Refrigerator Ambient	T 3
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 4
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 5
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 6
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 7
Evaporator . Input (In Refrigerator)	T 8
Evaporator . Output (In Refrigerator)	T 9
Thermostat Position	T 10
Suction Line	T 11
Condenser . Input	T 12
Evaporator . Input (In Freezer)	T 13
Evaporator . Output (In Freezer)	T 14
Condenser . Output	T 15
Compressor Shell	T 16

Temperature Table of 11-29S1 (Sat Feb 17)

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16
07:30	1.2	-1.2	-2.5	-24.0	-28.1	-28.3	-28.4	-21.1	-9.5	-24.2	34.5	66.3	-29.5	-30.4	38.9	52.3
08:00	1.2	-1.2	-2.5	-24.0	-28.1	-28.3	-28.4	-21.1	-9.5	-24.2	34.5	66.4	-29.5	-30.4	38.8	52.3
08:30	1.0	-1.4	-2.7	-24.0	-28.1	-28.4	-28.5	-21.3	-9.7	-24.2	34.5	66.1	-29.5	-30.4	38.8	52.1
09:00	1.0	-1.4	-2.7	-24.0	-28.1	-28.5	-28.4	-21.3	-9.7	-24.2	34.5	66.3	-29.5	-30.5	38.9	52.3
09:30	1.0	-1.4	-2.7	-24.2	-28.1	-28.5	-28.5	-21.3	-9.7	-24.2	34.5	66.3	-29.5	-30.6	38.8	52.1
10:00	1.0	-1.5	-2.7	-24.2	-28.2	-28.5	-28.6	-21.3	-9.7	-24.2	34.4	66.1	-29.7	-30.6	38.9	52.1
10:30	0.9	-1.5	-2.7	-24.2	-28.2	-28.5	-28.6	-21.3	-9.7	-24.4	34.5	66.1	-29.7	-30.6	38.7	52.1
11:00	0.8	-1.5	-2.7	-24.2	-28.3	-28.5	-28.6	-21.3	-9.7	-24.4	34.5	66.2	-29.7	-30.6	38.7	52.3
11:30	0.8	-1.5	-2.7	-24.2	-28.3	-28.5	-28.6	-21.3	-9.7	-24.2	34.5	65.9	-29.7	-30.6	38.7	51.9
12:00	0.8	-1.5	-2.7	-24.3	-28.3	-28.5	-28.6	-21.4	-9.7	-24.4	34.4	65.9	-29.7	-30.6	38.7	52.1
12:30	0.9	-1.5	-2.7	-24.4	-28.3	-28.7	-28.6	-21.3	-9.5	-24.2	34.4	65.7	-29.7	-30.7	38.7	51.8
13:00	1.0	-1.5	-2.7	-24.4	-28.3	-28.7	-28.6	-21.3	-9.5	-24.2	34.4	65.7	-29.7	-30.8	38.7	51.9
13:30	1.0	-1.4	-2.7	-24.4	-28.3	-28.7	-28.7	-21.5	-9.5	-24.2	34.5	65.9	-29.7	-30.8	38.7	52.1
14:00	1.0	-1.5	-2.7	-24.4	-28.3	-28.6	-28.6	-21.4	-9.5	-24.2	34.4	65.9	-29.7	-30.8	38.7	51.9
14:30	1.0	-1.4	-2.7	-24.4	-28.3	-28.7	-28.6	-21.3	-9.5	-24.2	34.4	65.7	-29.7	-30.8	38.7	51.9
15:00	1.0	-1.4	-2.7	-24.4	-28.3	-28.7	-28.7	-21.5	-9.5	-24.2	34.4	65.7	-29.7	-30.7	38.7	51.8
15:30	1.0	-1.4	-2.7	-24.4	-28.3	-28.7	-28.7	-21.5	-9.5	-24.2	34.5	65.9	-29.7	-30.8	38.7	52.1
16:00	1.0	-1.4	-2.5	-24.4	-28.3	-28.7	-28.7	-21.5	-9.3	-24.1	34.5	65.9	-29.7	-30.8	38.7	51.9
16:30	1.0	-1.4	-2.5	-24.4	-28.3	-28.7	-28.6	-21.5	-9.3	-24.1	34.5	65.9	-29.7	-30.8	38.7	52.1
17:00	1.0	-1.4	-2.5	-24.4	-28.3	-28.7	-28.6	-21.3	-9.3	-24.1	34.5	65.9	-29.7	-30.8	38.7	51.8
17:30	1.0	-1.4	-2.5	-24.3	-28.3	-28.6	-28.6	-21.4	-9.3	-24.1	34.5	65.9	-29.7	-30.7	38.7	51.9
18:00	1.0	-1.2	-2.5	-24.4	-28.3	-28.7	-28.7	-21.3	-9.3	-24.1	34.5	66.1	-29.7	-30.8	38.7	51.9
18:30	1.0	-1.2	-2.5	-24.4	-28.3	-28.7	-28.6	-21.3	-9.3	-23.9	34.5	65.9	-29.7	-30.8	38.7	51.9
19:00	1.0	-1.2	-2.5	-24.4	-28.3	-28.7	-28.6	-21.3	-9.3	-23.9	34.5	65.9	-29.7	-30.8	38.7	51.9

Run - Con 465

Temperature Table of 11-29S1 (Sat Feb 17)

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
00:01	33.8	34.2	33.7	33.6	33.7	33.5	33.5	33.7	33.7	33.6	32.8	32.9	34.0	34.0	32.9	32.9
00:10	33.6	34.1	33.6	33.2	31.9	31.5	31.0	33.4	33.4	33.4	38.0	38.0	10.9	32.9	36.7	32.9
00:20	33.4	34.0	33.3	22.9	13.3	10.9	12.1	29.6	32.0	30.2	40.3	48.8	-2.9	14.6	40.3	36.9
00:30	32.7	33.2	32.5	8.8	-3.3	-4.3	-3.7	22.6	27.8	23.9	41.9	56.7	-8.9	-4.3	43.0	42.2
00:40	30.7	30.5	29.1	-0.8	-10.0	-10.5	-10.3	-0.1	17.4	3.7	39.4	61.9	-13.0	-14.8	43.5	45.8
00:50	27.9	27.1	25.4	-6.1	-13.9	-14.6	-14.4	-4.7	11.5	-5.9	38.1	64.6	-16.3	-18.2	42.8	48.2
01:00	25.2	24.4	22.6	-9.9	-16.8	-17.3	-17.2	-6.9	8.6	-9.6	37.4	66.1	-18.7	-20.5	42.1	49.6
01:10	22.8	21.8	20.1	-12.4	-18.7	-19.2	-19.2	-8.5	6.1	-11.6	36.9	67.0	-20.5	-22.1	41.5	50.7
01:20	20.9	19.8	18.0	-14.4	-20.3	-20.8	-20.8	-9.9	5.2	-13.4	36.7	67.4	-22.1	-23.4	41.1	51.3
01:30	19.1	18.0	16.2	-16.0	-21.6	-22.1	-22.0	-11.3	4.1	-14.1	36.5	67.5	-23.3	-24.7	40.8	51.8
01:40	17.5	16.3	14.6	-17.5	-22.6	-23.0	-23.1	-12.4	3.0	-15.2	36.3	67.6	-24.3	-25.5	40.5	51.9
01:50	16.0	14.8	13.2	-18.6	-23.3	-23.9	-23.8	-13.3	2.0	-16.3	36.2	67.9	-25.0	-26.3	40.3	52.1
02:00	14.8	13.4	11.8	-19.3	-24.0	-24.6	-24.5	-14.2	0.9	-17.0	36.0	67.7	-25.7	-26.8	40.1	52.5
02:10	13.5	12.1	10.5	-20.0	-24.8	-25.1	-25.2	-14.9	0.0	-17.9	35.8	67.7	-26.3	-27.4	39.9	52.8
02:20	12.5	10.8	9.3	-20.6	-25.1	-25.5	-25.5	-15.6	-1.1	-18.5	35.8	67.5	-26.6	-27.7	39.7	52.7
02:30	11.4	9.9	8.2	-21.1	-25.5	-25.8	-25.9	-16.0	-1.8	-19.0	35.6	67.5	-27.0	-28.1	39.7	52.8
02:40	10.5	8.8	7.4	-21.5	-25.9	-26.2	-26.2	-16.5	-2.3	-19.4	35.4	67.5	-27.3	-28.4	39.6	52.8
02:50	9.6	7.9	6.4	-21.8	-26.1	-26.4	-26.4	-17.0	-3.2	-20.3	35.4	67.5	-27.5	-28.6	39.6	52.8
03:00	8.8	7.0	5.6	-22.0	-26.4	-26.5	-26.6	-17.4	-3.9	-20.8	35.4	67.5	-27.7	-28.8	39.6	53.0
03:10	8.0	6.3	4.9	-22.4	-26.5	-26.9	-27.0	-17.7	-4.3	-21.0	35.3	67.4	-28.1	-29.0	39.4	53.0
03:20	7.4	5.5	4.2	-22.6	-26.7	-27.1	-27.1	-18.3	-4.8	-21.4	35.3	67.4	-28.1	-29.2	39.4	53.1
03:30	6.8	5.0	3.5	-22.7	-26.9	-27.1	-27.1	-18.5	-5.3	-21.7	35.2	67.4	-28.2	-29.3	39.4	53.2
03:40	6.4	4.4	2.9	-22.9	-27.1	-27.2	-27.3	-18.6	-5.5	-21.7	35.2	67.2	-28.4	-29.3	39.3	53.0
03:50	5.8	3.9	2.4	-22.9	-27.1	-27.4	-27.5	-19.0	-5.9	-22.1	35.1	67.2	-28.6	-29.5	39.2	52.8
	Refrigerator ambient			Freezer ambient				R.evap. in	R.evap out	TH	suc. Line	Cond. in	F.evap. in	F.evap out	Cond. out	Comp. Shell

Pull down - Com495

Min Max Temperature Table of 11-1951 (Wed Feb 07)

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
02:02	4.9	2.4	0.1	-20.0	-22.4	-23.5	-20.9	-20.9	-13.6	-19.2	35.3	67.6	-26.3	-24.5	40.1	86.6
02:41	9.4	8.2	7.2	-18.8	-21.6	-21.9	-20.8	6.0	7.0	4.4	35.6	36.3	-15.0	-17.3	36.2	60.7
03:43	4.9	2.6	0.3	-20.0	-22.4	-23.5	-20.9	-20.8	-13.2	-19.2	35.1	67.4	-26.4	-24.5	39.9	86.4
04:22	9.6	8.2	7.2	-18.8	-21.6	-21.9	-20.8	6.0	7.0	4.4	35.3	36.2	-15.1	-17.2	36.2	60.6
05:24	5.1	2.8	0.5	-20.0	-22.4	-23.5	-20.9	-20.8	-13.4	-19.2	35.1	67.4	-26.3	-24.5	40.1	86.4
06:02	9.6	8.2	7.2	-18.8	-21.6	-21.9	-20.8	6.0	7.0	4.4	35.6	36.3	-15.1	-17.3	36.2	60.6
07:03	5.1	2.7	0.5	-19.8	-22.4	-23.4	-21.0	-20.8	-13.6	-19.2	35.3	67.5	-26.3	-24.5	40.1	86.4
07:41	9.6	8.2	7.2	-18.8	-21.6	-21.8	-20.8	6.2	7.0	4.4	35.8	36.3	-15.1	-17.2	36.3	60.9
08:43	5.1	2.8	0.5	-19.8	-22.4	-23.3	-20.9	-20.6	-13.4	-19.2	35.1	67.5	-26.3	-24.5	40.1	86.4
09:21	9.6	8.2	7.2	-18.8	-21.6	-21.8	-20.8	6.2	7.0	4.4	35.6	36.3	-15.1	-17.2	36.2	60.7
10:23	4.9	2.6	0.3	-20.0	-22.4	-23.5	-20.9	-20.8	-13.6	-19.2	35.1	67.5	-26.3	-24.5	40.1	86.4
11:02	9.4	8.2	7.2	-18.8	-21.6	-21.9	-20.8	6.2	7.0	4.4	35.6	36.3	-15.1	-17.3	36.2	60.6
12:03	5.0	2.6	0.3	-19.8	-22.4	-23.4	-21.0	-20.8	-13.3	-19.2	35.1	67.4	-26.3	-24.5	40.1	86.2
12:41	9.5	8.2	7.2	-18.8	-21.6	-21.8	-20.8	6.0	7.0	4.4	35.7	36.3	-15.1	-17.3	36.2	60.6
13:42	4.9	2.6	0.3	-19.8	-22.4	-23.3	-20.9	-20.8	-13.6	-19.2	35.1	67.2	-26.3	-24.5	39.9	86.0
14:21	9.5	8.2	7.2	-18.8	-21.6	-21.8	-20.7	6.2	7.0	4.4	35.4	36.2	-15.1	-17.2	36.0	60.4
15:18	5.3	3.0	0.5	-19.8	-22.4	-23.3	-20.9	-20.8	-13.2	-19.4	34.9	66.8	-26.3	-24.5	39.9	85.5
15:56	9.6	8.4	7.4	-18.8	-21.6	-21.7	-20.6	6.2	7.0	4.4	35.3	36.2	-15.1	-17.1	36.0	60.3
16:57	5.1	2.8	0.3	-19.8	-22.4	-23.3	-20.9	-20.8	-13.4	-19.4	35.0	67.1	-26.3	-24.5	40.0	86.0
17:36	9.6	8.2	7.2	-18.8	-21.6	-21.7	-20.6	6.1	7.0	4.4	35.4	36.3	-15.1	-17.1	36.0	60.4
18:37	4.9	2.6	0.3	-19.8	-22.4	-23.3	-20.9	-20.8	-13.6	-19.4	35.1	67.4	-26.3	-24.5	40.1	86.2
19:16	9.5	8.2	7.2	-18.8	-21.6	-21.7	-20.6	6.2	7.0	4.4	35.4	36.3	-15.1	-17.2	36.0	60.4
20:17	4.9	2.6	0.3	-19.8	-22.4	-23.3	-20.9	-20.8	-13.4	-19.4	35.1	67.3	-26.3	-24.5	40.1	86.2
20:55	9.6	8.2	7.2	-18.8	-21.6	-21.7	-20.6	6.2	7.0	4.4	35.8	36.5	-15.0	-17.1	36.3	60.7

M. Package

Cycling - Com 465

Com465

Himalia

Setting

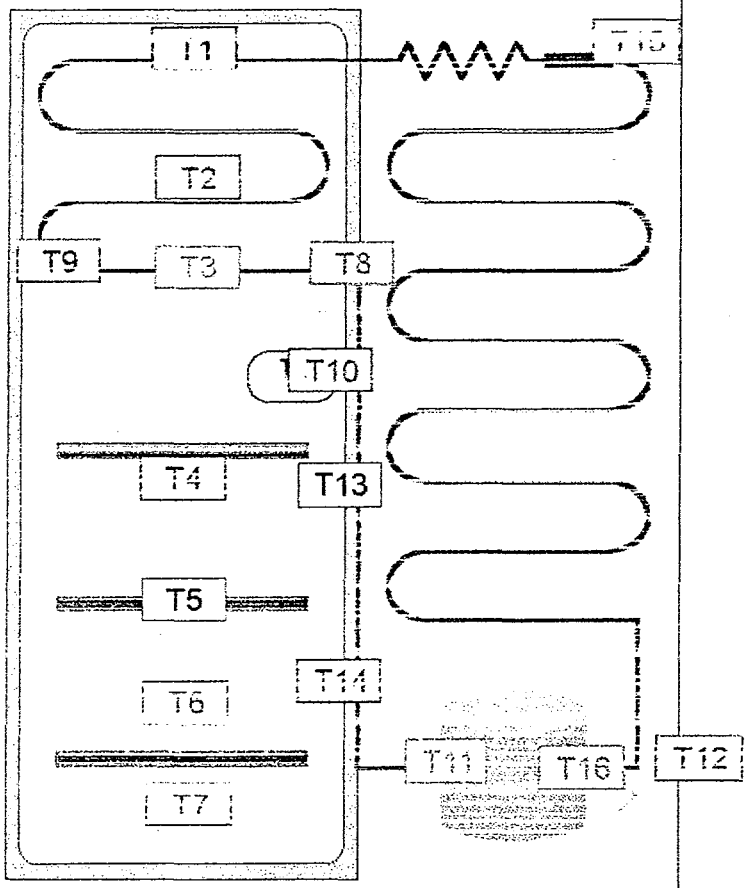
Test Date	Wed Feb 07-01
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	COM465\11-19S1

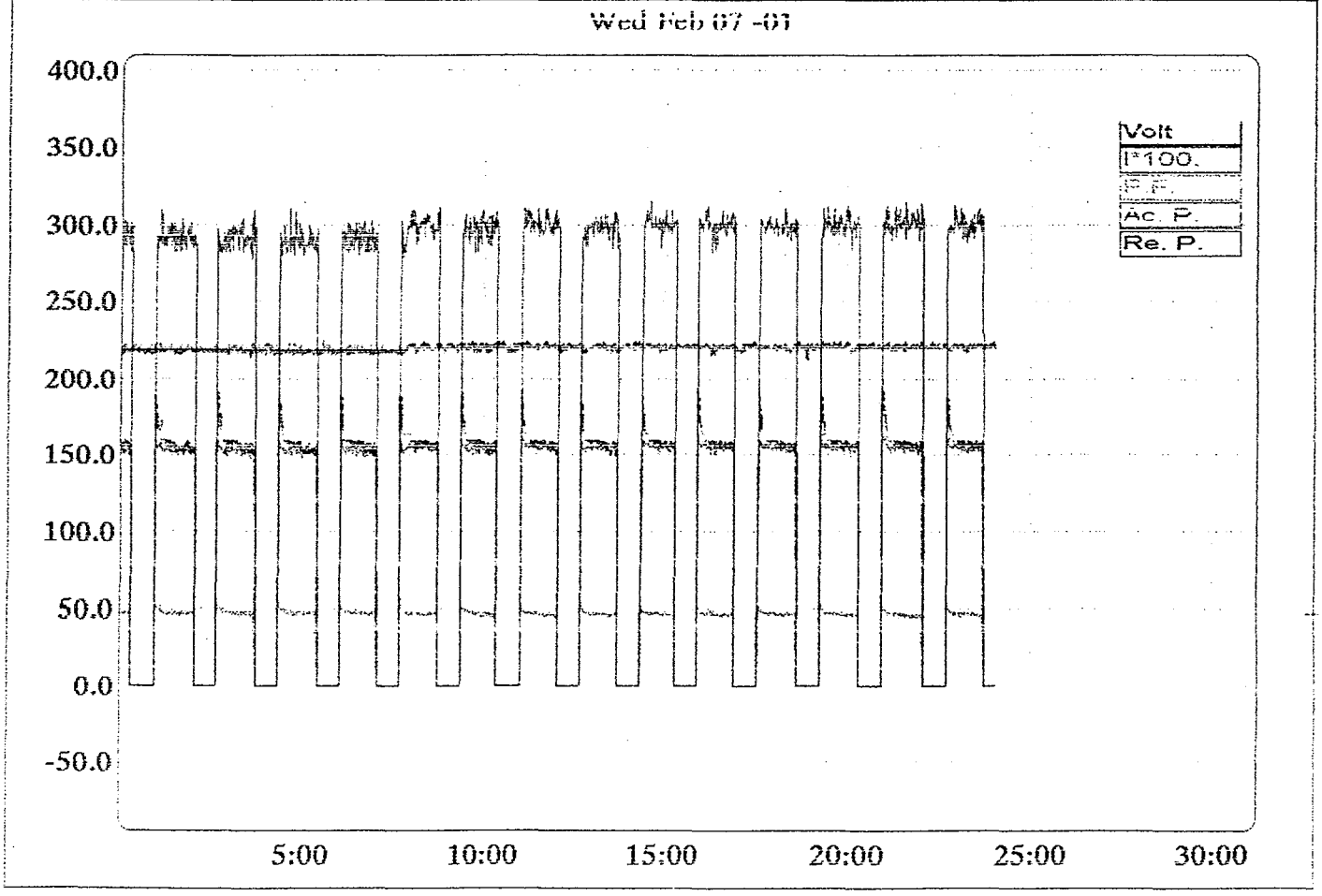
Product Specification

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

Test Result

Total Test Time(h:m)	23:59
Working Time(h:m)	14:44
Working Percentage	61.4%
Energy Cons.(KWh)	2.335
Av. En. Cons.(KWh/Day)	2.338
No. of Thermostat	15
No. of Over Load	0

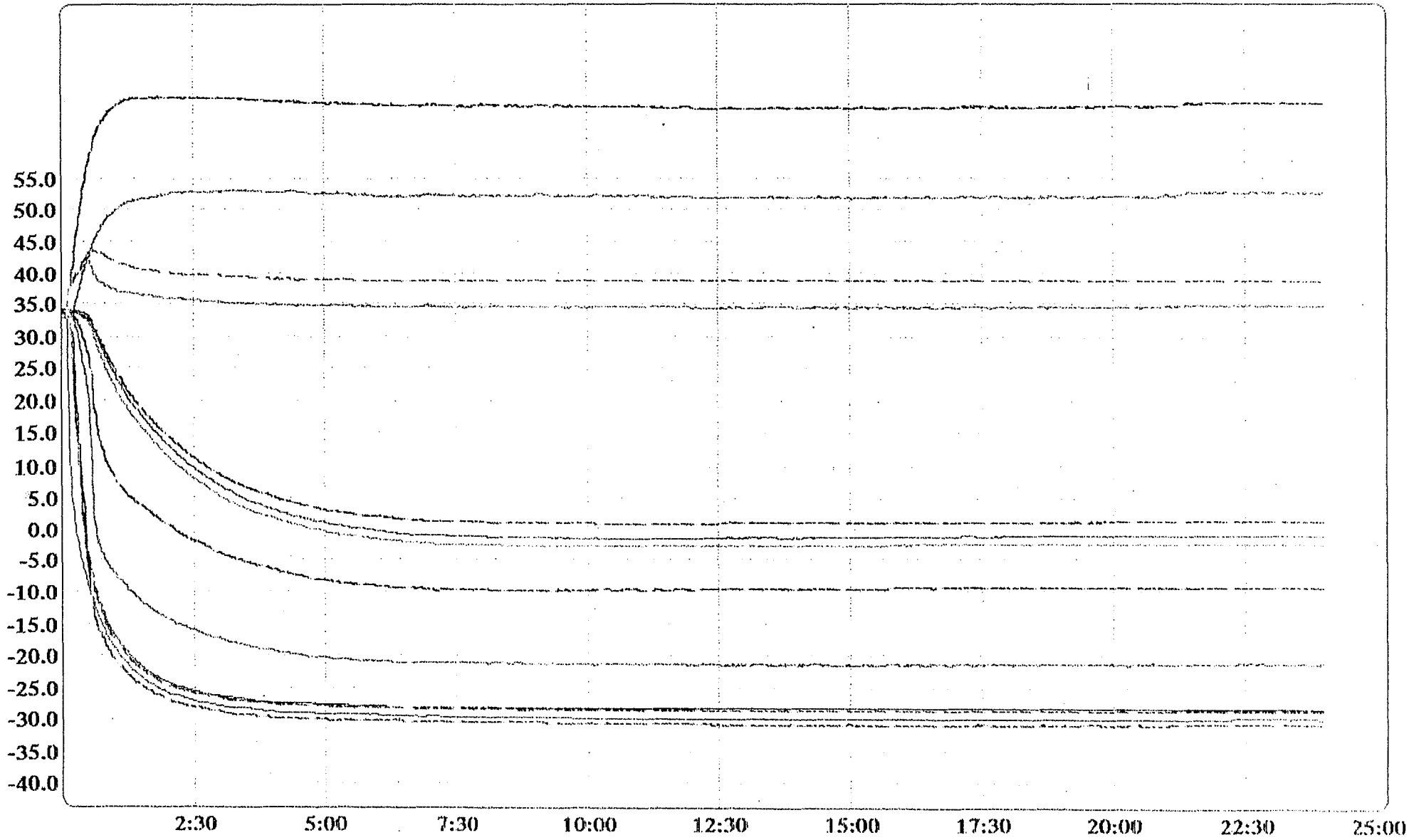




Com 465

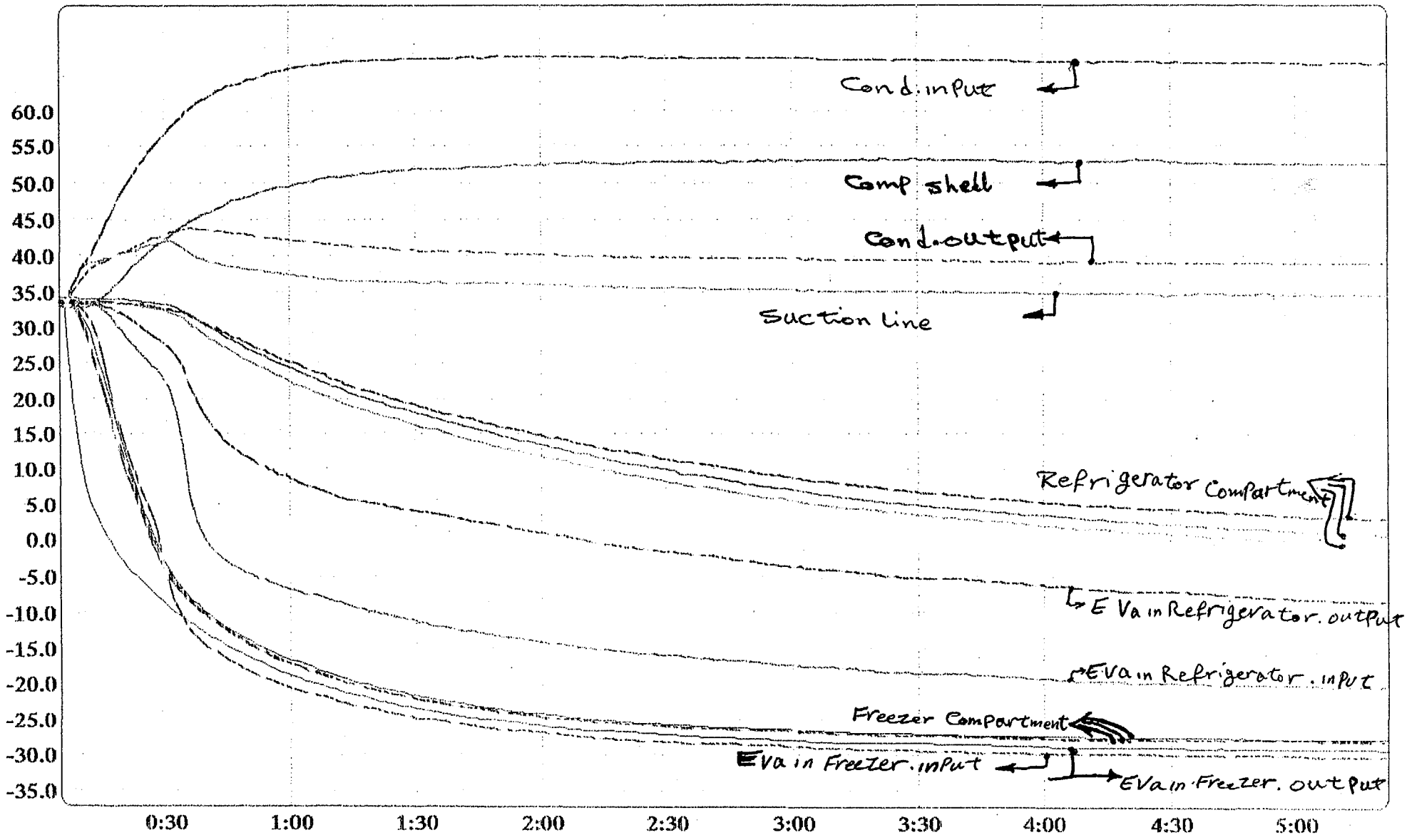
Himalia P.D & Run

Sat Feb 17 -01



Com465 Himalia P.D

Sat Feb 17 -01

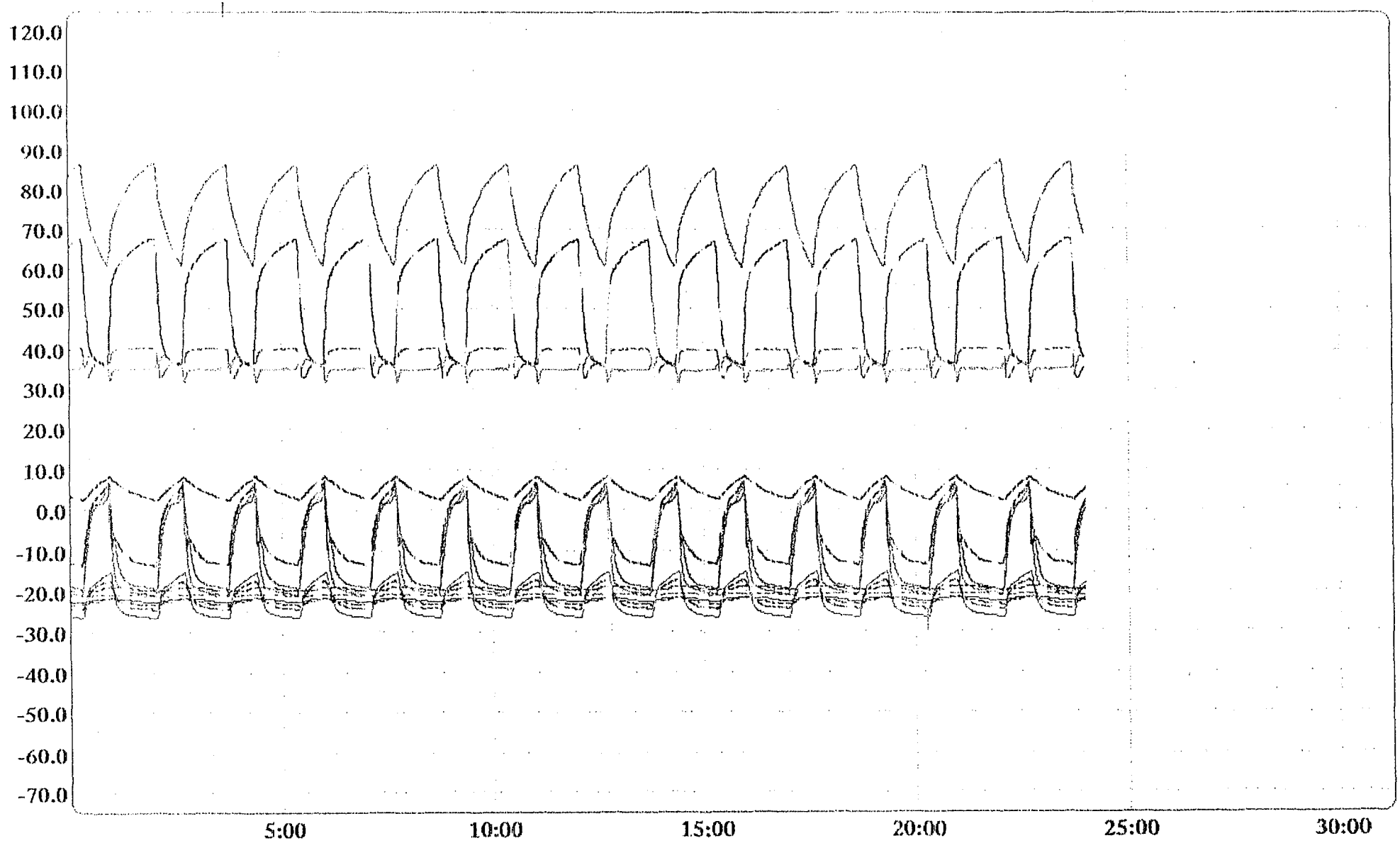


Com 465

Himalia

Cycling

Wed Feb 07 - 01



فریزر ۷ کشو مدل : F 270

محل قرار گیری سنسور SENSOR POSITION	شمارهٔ سنسور SENSOR NO.
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 1
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 2
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 3
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 4
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 5
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 6
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 7
Evaporator . Input	T 8
Evaporator . Output	T 9
Thermostat Position	T 10
Suction Line	T 11
Condenser . Input	T 12
Condenser	T 13
Condenser	T 14
Condenser . Output	T 15
Compressor Shell	T 16

Min Max Temperature Table of 9 2653 (Sat Dec 16)

F270

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
03:31	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.6	-27.8	42.0	28.4	41.7	31.9	34.5	34.0
03:38	-18.3	-20.0	-22.6	-21.1	-22.4	-22.1	-21.6	-22.5	-21.3	-23.1	33.4	33.3	29.5	31.9	32.7	31.8
03:50	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.6	-27.8	42.0	28.0	41.3	31.9	34.3	33.8
03:59	-18.3	-20.0	-22.5	-21.1	-22.4	-22.1	-21.6	-22.1	-20.4	-22.6	33.9	33.3	29.7	31.9	32.5	31.5
04:10	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.4	-27.8	42.0	28.2	41.5	31.9	34.1	33.8
04:18	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.5	-21.4	-22.9	33.2	33.1	29.3	31.9	32.6	31.7
04:28	-18.3	-20.1	-23.0	-21.2	-22.8	-22.1	-22.2	-26.5	-26.6	-27.7	42.0	28.0	41.1	31.9	34.3	33.8
04:38	-18.3	-20.0	-22.5	-21.0	-22.4	-22.1	-21.6	-22.1	-20.2	-22.4	34.1	33.3	29.7	31.9	32.3	31.5
04:49	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.4	-27.8	41.8	28.4	41.5	32.1	34.3	33.8
04:57	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.5	-21.6	-22.9	33.0	33.1	29.3	31.9	32.7	31.8
05:08	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.5	-26.6	-27.8	41.9	28.0	41.1	32.1	34.5	33.8
05:17	-18.3	-20.0	-22.5	-21.1	-22.4	-22.1	-21.6	-22.1	-20.2	-22.4	34.1	33.3	29.7	31.9	32.4	31.5
05:29	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.4	-27.8	41.8	28.4	41.5	32.1	34.4	33.8
05:36	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.5	-21.4	-22.9	33.0	33.1	29.3	31.9	32.7	31.8
05:47	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.6	-27.8	41.9	28.0	41.3	31.9	34.3	33.8
05:56	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.3	-20.5	-22.6	33.9	33.1	29.5	31.9	32.5	31.5
06:08	-18.3	-20.1	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.4	-27.8	41.8	28.4	41.5	31.9	34.3	33.8
06:15	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.5	-21.4	-23.1	33.2	33.1	29.3	31.9	32.7	31.7
06:26	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.5	-26.4	-27.6	42.0	28.0	41.1	32.1	34.3	33.8
06:35	-18.3	-20.0	-22.5	-21.2	-22.4	-22.1	-21.6	-22.1	-20.0	-22.4	34.1	33.2	29.7	31.9	32.5	31.5
06:47	-18.3	-20.0	-23.0	-21.2	-22.8	-22.1	-22.2	-26.7	-26.4	-27.6	41.8	28.4	41.5	32.0	34.3	34.0
06:54	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.5	-21.4	-22.9	33.0	33.1	29.3	31.9	32.7	31.8
07:06	-18.3	-20.0	-23.0	-21.2	-23.0	-22.1	-22.2	-26.7	-26.6	-27.9	41.8	28.2	41.3	32.1	34.3	33.8
07:14	-18.3	-20.0	-22.6	-21.2	-22.4	-22.1	-21.6	-22.3	-20.9	-22.9	33.7	33.1	29.3	31.9	32.5	31.7

Cyc Dig

F270

Temperature Table of 11-16S4 (Mon Feb 05)

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
00:00	32.3	31.5	33.0	33.0	32.2	29.6	30.7	32.6	32.6	33.8	33.4	33.3	33.9	31.6	33.5	32.5
00:05	31.5	30.8	32.4	32.1	31.3	28.7	29.8	31.0	14.0	33.1	35.5	41.1	40.9	38.9	37.4	32.1
00:10	25.4	25.9	27.7	27.0	25.4	21.6	25.8	25.2	3.4	28.2	35.1	48.9	43.4	42.1	37.4	39.5
00:15	19.5	18.3	20.7	19.6	18.3	14.4	19.9	17.5	1.4	21.6	34.6	57.4	47.3	43.6	38.6	44.7
00:20	14.3	9.9	12.6	11.6	11.4	10.0	11.8	8.4	-3.7	14.4	34.4	64.4	51.3	45.0	40.6	49.8
00:25	9.2	4.7	6.3	5.3	3.6	4.2	4.8	2.7	-5.3	8.4	34.6	69.7	54.3	45.5	42.7	54.5
00:30	4.9	0.5	1.5	0.4	-2.1	-2.5	-1.8	-6.2	-6.8	-0.3	32.7	74.1	56.3	45.1	45.4	58.3
00:35	1.2	-3.0	-2.3	-3.3	-6.0	-6.7	-6.0	-10.0	-9.1	-6.8	30.2	76.2	56.2	44.2	45.0	61.1
00:40	-1.9	-5.7	-5.3	-6.3	-9.1	-9.6	-9.0	-12.5	-11.2	-10.7	28.4	77.6	55.8	43.1	44.1	63.4
00:45	-4.6	-8.2	-7.7	-8.6	-11.4	-11.9	-11.3	-14.3	-13.1	-12.8	27.2	78.4	55.4	42.3	43.6	65.1
00:50	-6.9	-10.3	-9.7	-10.5	-13.3	-13.9	-13.2	-15.9	-14.6	-14.9	26.5	79.1	54.9	41.6	42.9	66.5
00:55	-8.8	-12.0	-11.5	-12.3	-14.9	-15.3	-14.6	-17.3	-16.3	-16.3	26.1	79.4	54.2	41.0	42.4	67.2
01:00	-10.6	-13.4	-12.9	-13.7	-16.3	-16.6	-15.9	-18.4	-17.5	-17.7	25.8	79.8	53.5	40.3	41.8	68.1
01:05	-12.1	-14.8	-14.3	-15.0	-17.6	-17.9	-17.2	-19.5	-18.7	-18.8	25.9	79.8	52.9	40.0	41.5	68.8
01:10	-13.4	-16.0	-15.4	-16.1	-18.7	-19.1	-18.4	-20.5	-19.6	-19.8	25.9	79.8	52.2	39.6	41.1	69.4
01:15	-14.6	-17.1	-16.4	-17.2	-19.7	-20.2	-19.4	-21.4	-20.6	-20.9	25.9	79.8	51.5	39.1	40.8	69.9
01:20	-15.7	-17.9	-17.4	-18.1	-20.7	-21.0	-20.3	-22.2	-21.5	-21.6	26.1	79.7	50.8	38.6	40.3	70.2
01:25	-16.8	-18.8	-18.3	-18.9	-21.5	-21.9	-21.2	-23.0	-22.3	-22.4	26.1	79.6	50.1	38.1	39.9	70.4
01:30	-17.6	-19.7	-19.0	-19.7	-22.4	-22.6	-21.9	-23.5	-23.0	-23.1	26.5	79.2	50.0	38.0	39.7	70.8
01:35	-18.4	-20.3	-19.7	-20.4	-22.9	-23.3	-22.6	-24.1	-23.5	-23.7	26.8	79.1	49.6	37.7	39.5	70.9
01:40	-19.1	-20.9	-20.4	-21.0	-23.6	-23.9	-23.1	-24.7	-24.0	-24.3	27.4	79.0	49.2	37.5	39.4	71.5
01:45	-19.7	-21.6	-20.9	-21.7	-24.2	-24.5	-23.8	-25.2	-24.7	-24.8	27.5	79.1	49.1	37.3	39.2	71.5
01:50	-20.3	-22.1	-21.5	-22.3	-24.7	-25.1	-24.4	-25.7	-25.1	-25.3	27.7	79.2	48.8	37.2	39.2	71.6
01:55	-20.8	-22.6	-22.0	-22.6	-25.2	-25.5	-24.7	-26.1	-25.6	-25.8	27.5	79.1	48.6	37.1	39.0	71.7

P.D

Temperature Table of 11-16S1 (Mon Feb 05)

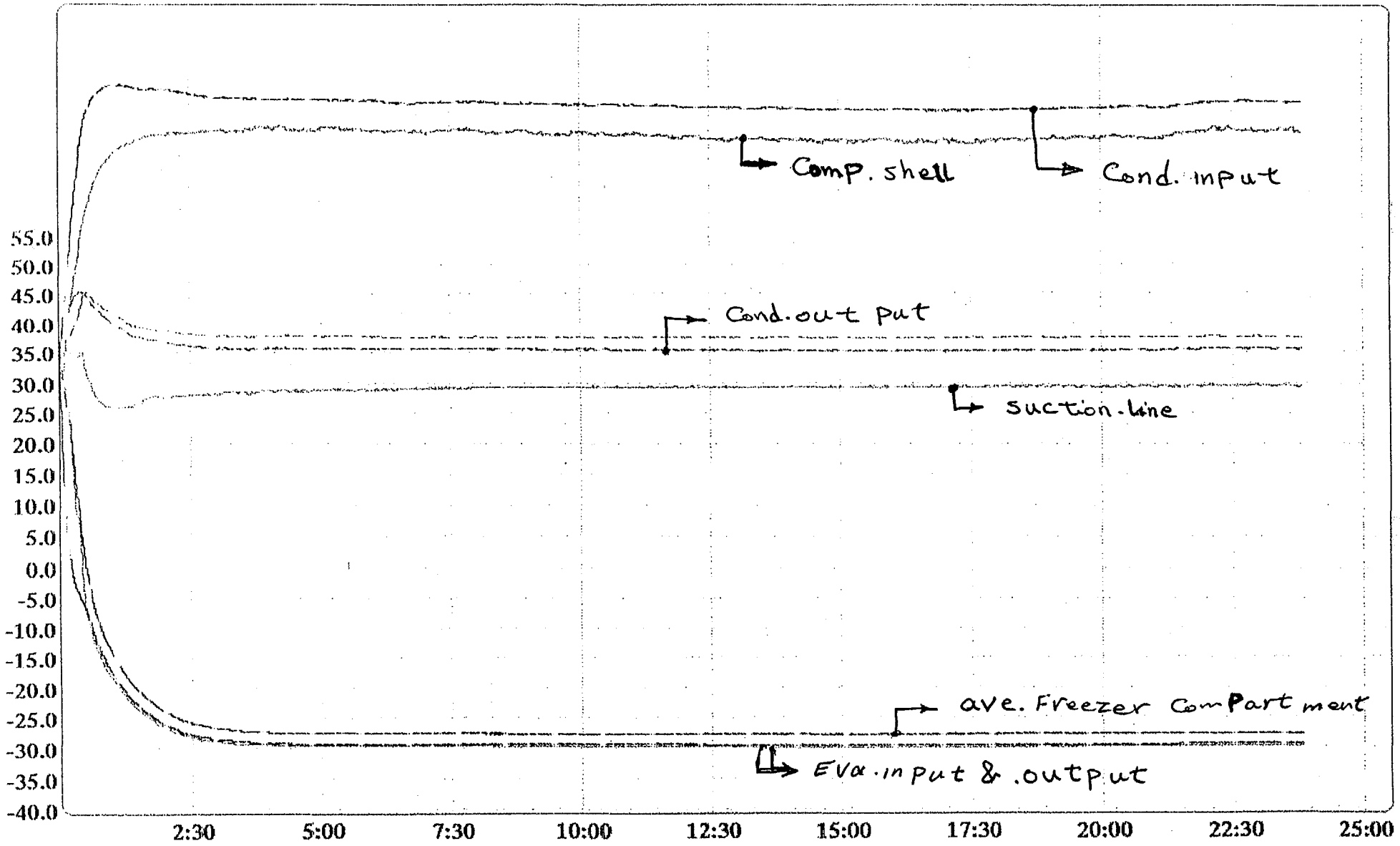
F270

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
07:30	-25.6	-26.8	-26.2	-26.8	-29.4	-29.5	-28.8	-29.6	-29.4	-29.6	29.1	76.9	45.5	35.8	37.8	72.5
08:10	-25.6	-26.9	-26.2	-26.8	-29.5	-29.5	-28.8	-29.7	-29.5	-29.6	29.1	77.0	45.3	35.8	37.8	72.2
08:50	-25.7	-27.0	-26.3	-26.8	-29.5	-29.6	-28.8	-29.8	-29.5	-29.6	29.1	76.8	45.5	35.8	37.8	72.4
09:30	-25.7	-27.0	-26.4	-26.8	-29.5	-29.6	-28.8	-29.8	-29.5	-29.6	29.2	76.7	45.2	35.7	37.8	71.6
10:10	-25.8	-27.0	-26.4	-27.0	-29.5	-29.6	-28.8	-29.8	-29.5	-29.6	29.1	76.5	45.2	35.6	37.8	72.0
10:50	-25.8	-27.0	-26.4	-27.0	-29.5	-29.6	-28.9	-29.8	-29.5	-29.7	29.3	76.4	45.2	35.6	37.7	71.6
11:30	-25.8	-27.0	-26.4	-27.0	-29.5	-29.6	-28.9	-29.8	-29.5	-29.7	29.3	76.6	45.2	35.6	37.8	71.6
12:10	-25.8	-27.0	-26.4	-27.0	-29.6	-29.6	-28.9	-29.8	-29.5	-29.8	29.3	76.1	44.8	35.6	37.6	71.5
12:50	-25.8	-27.1	-26.4	-27.0	-29.7	-29.8	-28.9	-29.9	-29.6	-29.8	29.3	76.1	44.8	35.6	37.6	70.8
13:30	-25.9	-27.2	-26.4	-27.0	-29.7	-29.8	-28.9	-29.9	-29.6	-29.8	29.1	75.9	44.8	35.4	37.5	71.3
14:10	-25.9	-27.2	-26.4	-27.0	-29.7	-29.8	-28.9	-30.0	-29.6	-29.8	29.3	75.9	44.6	35.4	37.6	70.8
14:50	-25.9	-27.2	-26.5	-27.1	-29.7	-29.8	-28.9	-30.0	-29.6	-29.8	29.3	75.9	44.6	35.4	37.6	70.8
15:30	-25.9	-27.2	-26.5	-27.2	-29.7	-29.8	-28.9	-30.0	-29.6	-29.9	29.3	75.7	44.5	35.3	37.4	70.8
16:10	-25.9	-27.2	-26.6	-27.1	-29.7	-29.8	-29.0	-30.0	-29.6	-29.9	29.3	75.9	44.5	35.4	37.4	70.6
16:50	-25.9	-27.2	-26.4	-27.1	-29.7	-29.8	-28.9	-30.0	-29.6	-29.8	29.1	75.7	44.5	35.3	37.4	70.4
17:30	-25.9	-27.2	-26.5	-27.0	-29.7	-29.8	-29.1	-30.0	-29.6	-29.8	29.3	75.7	44.5	35.4	37.6	70.4
18:10	-25.9	-27.1	-26.4	-27.0	-29.7	-29.8	-29.0	-30.0	-29.6	-29.8	29.5	75.8	44.6	35.4	37.6	70.9
18:50	-25.9	-27.2	-26.4	-27.0	-29.7	-29.8	-28.9	-29.9	-29.6	-29.8	29.5	75.9	44.6	35.4	37.6	71.1
19:30	-25.9	-27.0	-26.4	-27.0	-29.7	-29.7	-28.9	-29.9	-29.6	-29.8	29.5	76.2	44.8	35.6	37.6	71.3
20:10	-25.8	-27.0	-26.4	-27.0	-29.6	-29.6	-28.9	-29.8	-29.6	-29.8	29.3	76.2	45.0	35.5	37.6	71.5
20:50	-25.8	-27.0	-26.4	-27.0	-29.7	-29.6	-28.9	-29.9	-29.6	-29.8	29.5	76.4	44.8	35.6	37.6	71.2
21:30	-25.8	-27.0	-26.4	-27.0	-29.5	-29.6	-28.9	-29.8	-29.5	-29.8	29.4	76.6	45.4	35.8	37.8	72.2
22:10	-25.8	-27.0	-26.4	-26.9	-29.5	-29.6	-28.9	-29.8	-29.5	-29.6	29.5	77.1	45.7	35.9	37.9	73.1
22:50	-25.8	-27.0	-26.4	-26.9	-29.5	-29.6	-28.9	-29.8	-29.5	-29.6	29.5	77.3	45.5	35.6	37.8	72.4

Run

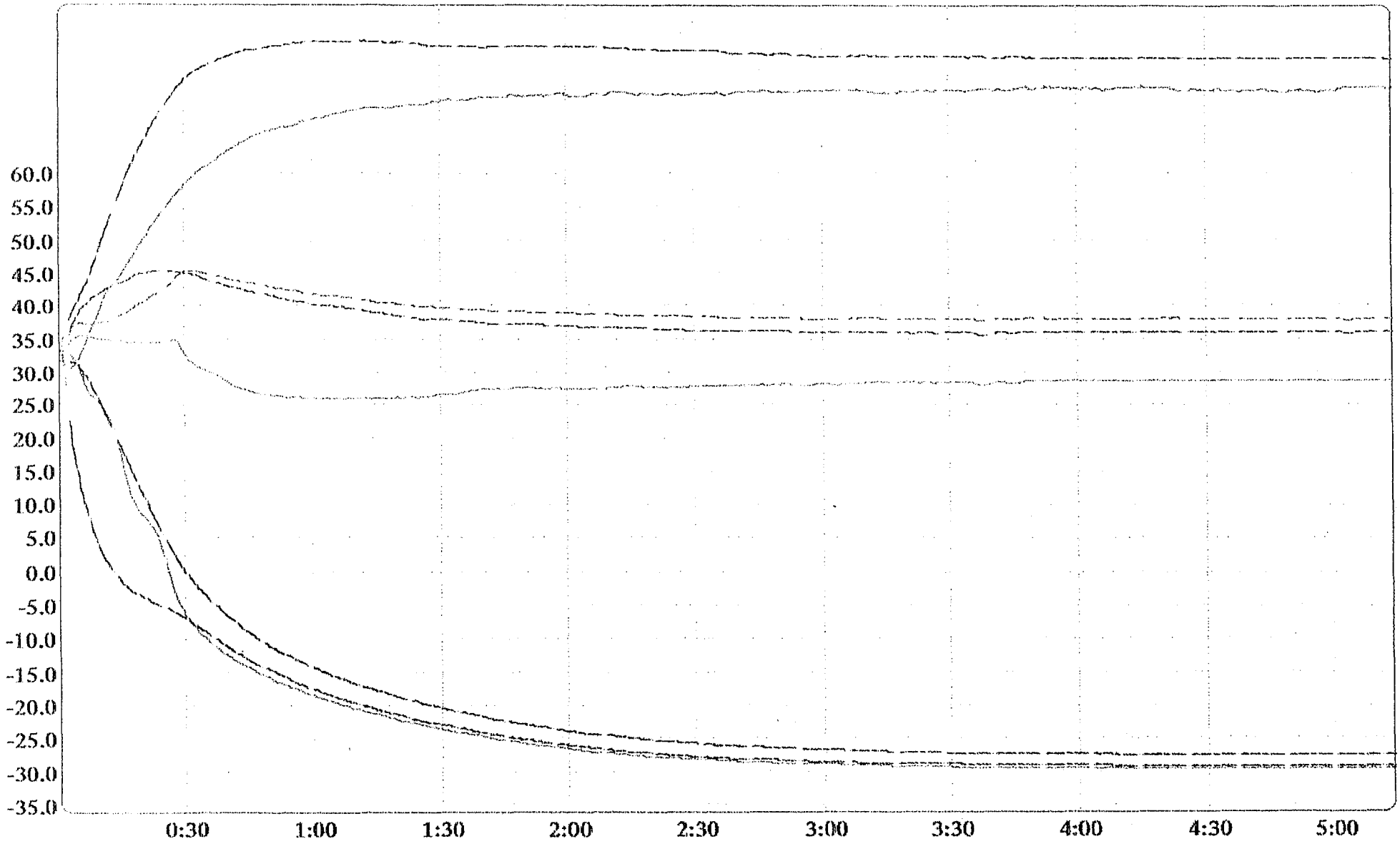
F 270 Himalia P.D. & Run

Mon Feb 05 -01



F270 Himalia P.D &

Mon Feb 05 -01

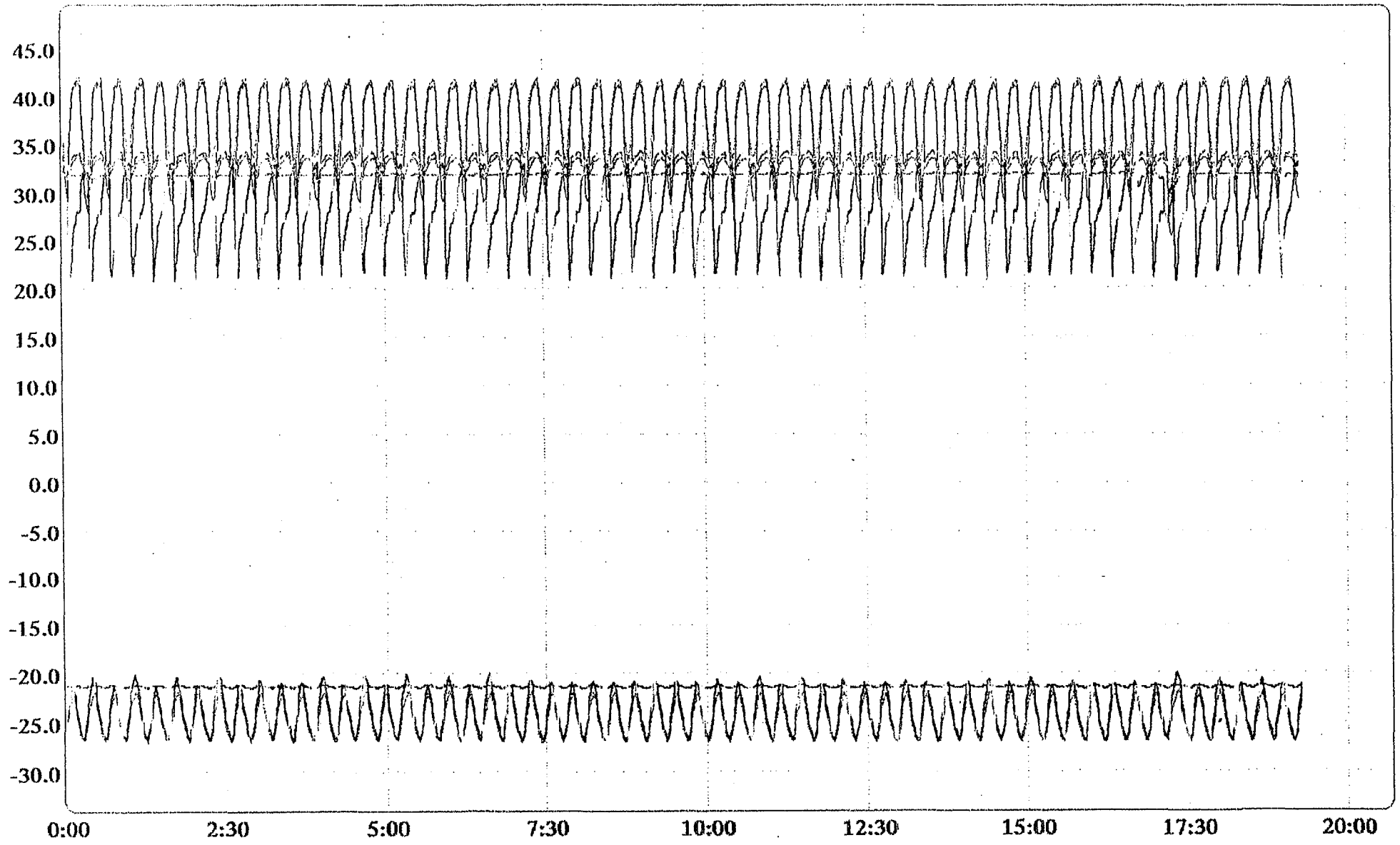


F270

Himalia

Cycling

Sat Dec 16 -00



F270 Himalia

Setting

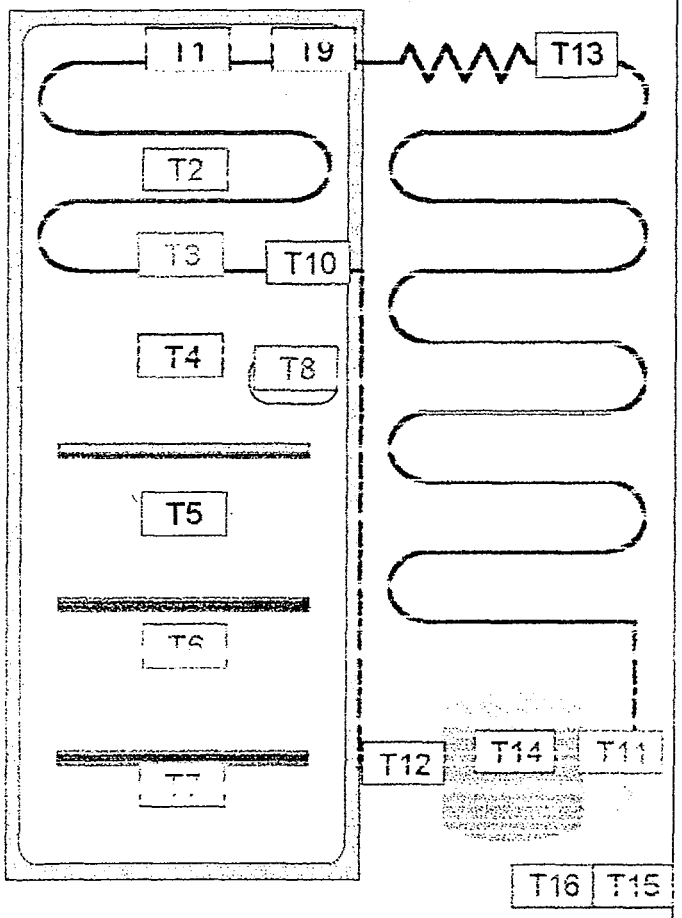
Test Date	Sat Dec 16-00
Test Type	-
Hot Room Temp.	32
Hot Room Hum.	50
File Name	4A\F270\9-26S3

Product Specification

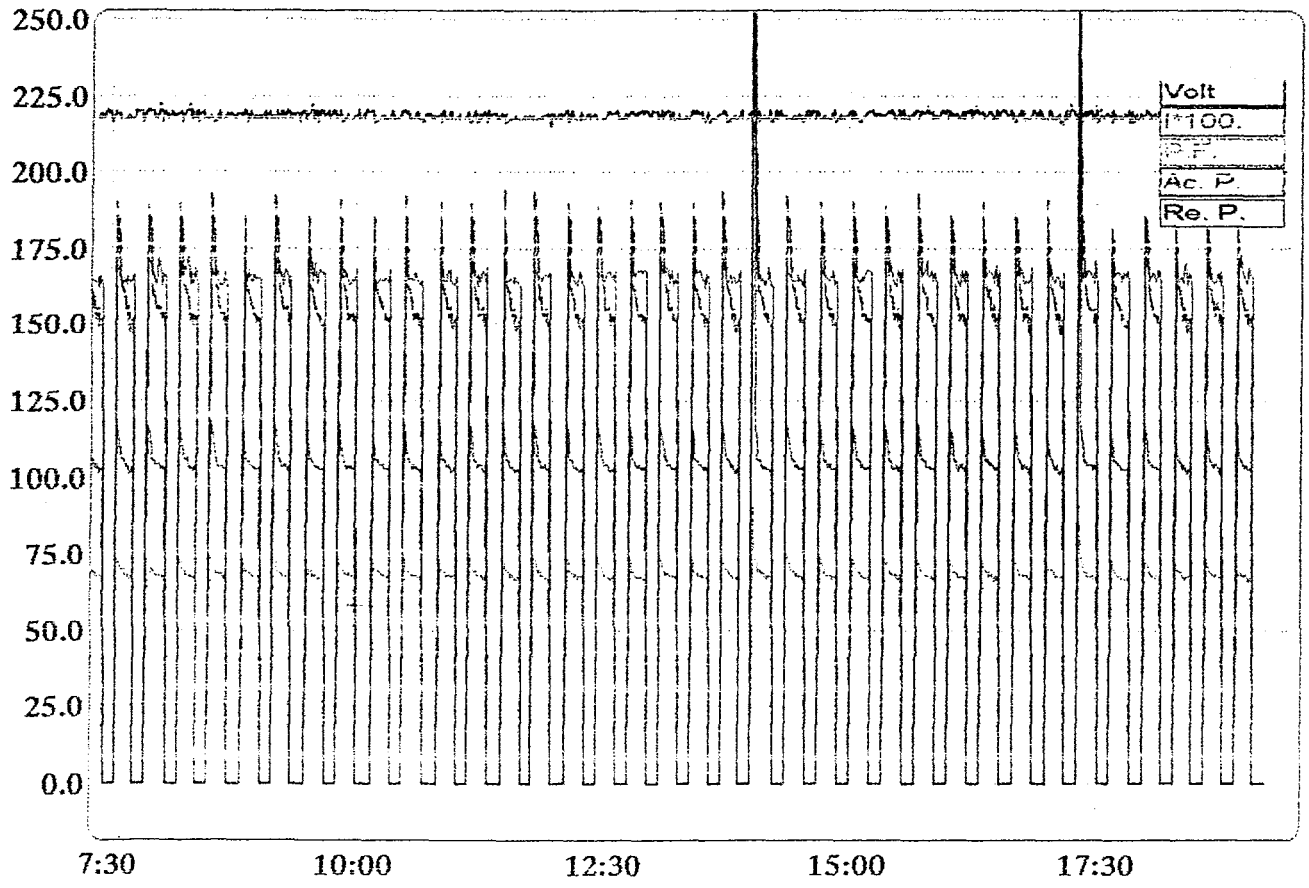
Product Type	f270
Compressor Type	gold star-VC75LAEG
Refrigerant	R134a
Cappil. Length	.031- 375 cm
Evap. Volume	-
Condensor Length	-
Thermostat Type	-

Test Result

Total Test Time(h:m)	11:59
Working Time(h:m)	06:51
Working Percentage	57.3%
Energy Cons.(KWh)	1.1243
Av. En. Cons.(KWh/Day)	2.255
No. of Thermostat	59
No. of Over Load	0



Sat Dec 16 -00



یخچال با محفظهٔ دو ستاره مدل : R345

محل قرار گیری سنسور SENSOR POSITION	شمارهٔ سنسور SENSOR NO.
Evaporator . Input	T 1
Evaporator . Output	T 2
Thermostat Position	T 3
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 4
Freezer Ambient (P.D&Run Test)/ M.Package (Cyc. Test)	T 5
	T 6
Refrigerator Ambient	T 7
Refrigerator Ambient	T 8
Refrigerator Ambient	T 9
Cellar Compartment	T 10
Suction Line	T 11
Condenser . Input	T 12
Condenser	T 13
Condenser	T 14
Condenser . Output	T 15
Compressor Shell	T 16

Temperature Table of 11-24S2 (Mon Feb 12)

R345

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
08:20	-28.6	-28.3	-28.0	-28.5	-29.0	-13.8	0.7	-0.4	-0.9	3.6	29.5	77.9	49.3	38.8	39.4	75.9
08:50	-28.6	-28.3	-28.0	-28.5	-29.0	-13.8	0.7	-0.5	-1.1	3.5	29.7	78.1	49.4	39.3	39.7	75.9
09:20	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.5	-0.5	-1.1	3.3	29.7	78.0	49.4	39.3	39.7	75.7
09:50	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.5	-0.5	-1.2	3.3	29.7	78.1	49.6	39.0	39.5	75.7
10:20	-28.8	-28.5	-28.0	-28.6	-29.0	-14.0	0.5	-0.7	-1.2	3.3	29.7	77.9	49.4	39.0	39.5	75.9
10:50	-28.7	-28.5	-28.0	-28.5	-29.0	-14.0	0.5	-0.7	-1.2	3.1	29.7	77.9	49.4	39.1	39.5	75.7
11:20	-28.8	-28.5	-28.0	-28.6	-29.0	-14.0	0.5	-0.7	-1.2	3.1	29.5	77.9	49.4	39.0	39.5	75.7
11:50	-28.8	-28.5	-28.1	-28.7	-29.2	-14.0	0.5	-0.7	-1.2	3.1	29.5	77.9	49.2	39.0	39.5	75.7
12:20	-28.6	-28.5	-28.1	-28.7	-29.2	-14.0	0.5	-0.7	-1.2	3.1	29.6	77.9	49.4	39.1	39.6	75.7
12:50	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.3	-0.7	-1.3	3.1	29.7	78.1	49.6	39.1	39.7	75.9
13:20	-28.7	-28.3	-28.0	-28.5	-29.0	-14.0	0.3	-0.7	-1.2	3.1	29.5	78.0	49.6	39.0	39.5	75.9
13:50	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.3	-0.7	-1.4	3.1	29.7	78.2	49.6	39.1	39.7	75.9
14:20	-28.6	-28.5	-28.0	-28.5	-29.0	-14.0	0.5	-0.7	-1.2	3.1	29.9	78.0	49.4	39.1	39.7	75.9
14:50	-28.6	-28.5	-28.0	-28.5	-29.0	-14.0	0.5	-0.7	-1.2	3.1	29.9	78.1	49.4	39.1	39.7	76.1
15:20	-28.6	-28.5	-28.0	-28.5	-29.0	-14.0	0.5	-0.7	-1.2	3.1	29.9	78.2	49.4	39.3	39.7	75.9
15:50	-28.6	-28.3	-27.8	-28.5	-28.8	-14.0	0.5	-0.7	-1.2	3.1	29.9	78.6	49.7	39.3	40.1	76.3
16:20	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.5	-0.6	-1.2	3.3	29.7	78.3	49.9	39.3	39.9	76.3
16:50	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.5	-0.5	-1.2	3.3	29.7	78.4	49.6	39.1	39.7	76.1
17:20	-28.6	-28.3	-28.0	-28.5	-29.0	-14.0	0.5	-0.7	-1.2	3.3	30.1	78.4	49.9	39.3	40.1	76.3
17:50	-28.6	-28.3	-27.8	-28.5	-28.8	-14.0	0.5	-0.6	-1.2	3.3	29.9	78.6	50.3	39.3	39.9	76.8
18:20	-28.6	-28.3	-27.8	-28.5	-28.9	-13.9	0.5	-0.7	-1.2	3.3	29.9	78.8	50.1	39.3	39.9	76.6
18:50	-28.6	-28.3	-27.8	-28.5	-28.8	-14.0	0.5	-0.5	-1.1	3.3	29.9	78.6	49.9	39.5	40.1	76.5
19:20	-28.6	-28.3	-27.8	-28.3	-28.8	-14.0	0.5	-0.5	-1.1	3.3	29.9	78.8	50.1	39.5	40.1	76.6
19:50	-28.6	-28.3	-27.8	-28.5	-28.8	-13.9	0.5	-0.5	-1.1	3.3	29.9	78.7	50.3	39.1	39.9	76.6

Run

Temperature Table of 11-24S2 (Mon Feb 17)

R345

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
00:01	31.4	31.6	31.7	31.6	26.7	31.3	31.3	31.3	32.7	30.1	30.6	28.8	30.4	30.6	32.0	30.8
00:05	31.1	30.8	31.6	31.5	29.9	31.3	31.3	31.3	32.6	30.1	30.6	28.8	30.3	30.6	32.1	30.8
00:10	31.4	31.3	31.6	31.5	31.1	31.3	31.3	31.3	32.6	30.1	30.6	28.8	30.3	30.6	32.1	31.0
00:15	31.6	31.5	31.6	31.3	31.3	31.1	31.3	31.3	32.6	30.1	30.6	30.6	30.8	30.6	32.6	30.9
00:20	11.0	15.6	22.9	9.7	12.0	29.9	31.1	30.9	32.0	30.1	32.9	56.1	48.0	48.0	41.5	33.6
00:25	-5.0	1.1	0.7	-5.3	-7.4	25.5	30.6	30.4	31.1	30.1	34.5	57.8	50.6	49.8	44.9	41.8
00:30	-10.5	-8.1	-10.2	-12.5	-14.4	20.6	29.7	29.5	29.7	30.0	33.1	60.5	49.9	47.2	43.1	48.5
00:35	-14.9	-13.5	-14.8	-15.8	-17.6	15.9	28.8	28.5	28.1	29.7	32.3	63.5	50.1	45.8	42.1	53.6
00:40	-17.5	-16.7	-17.2	-17.9	-19.3	11.9	27.6	27.1	26.4	29.5	32.0	66.3	50.5	44.9	41.7	57.9
00:45	-18.9	-18.3	-18.5	-19.0	-20.4	8.7	26.4	25.7	24.8	29.1	31.6	68.7	51.3	44.2	41.5	61.2
00:50	-19.9	-19.3	-19.3	-19.9	-21.1	6.3	25.2	24.4	23.2	28.5	31.6	70.9	51.5	43.8	41.3	63.9
00:55	-20.6	-20.2	-20.1	-20.6	-21.8	4.4	23.9	23.2	22.1	28.0	31.6	72.6	51.6	43.7	41.2	66.4
01:00	-21.1	-20.9	-20.6	-21.1	-22.2	3.0	22.9	21.9	20.7	27.3	31.5	74.2	52.2	43.4	41.3	68.3
01:05	-21.7	-21.3	-21.1	-21.4	-22.5	1.9	21.8	20.9	19.8	26.5	31.5	75.4	52.7	43.3	41.5	69.9
01:10	-22.0	-21.8	-21.4	-22.0	-22.9	0.9	20.8	19.9	18.8	25.8	31.5	76.5	52.7	43.1	41.3	71.3
01:15	-22.4	-22.2	-21.8	-22.3	-23.2	0.0	19.9	18.8	17.9	24.9	31.5	77.4	52.9	43.1	41.5	72.6
01:20	-22.7	-22.5	-22.2	-22.6	-23.6	-0.9	18.9	17.9	17.0	24.2	31.3	78.1	53.0	43.0	41.3	73.4
01:25	-23.1	-22.9	-22.5	-22.9	-23.9	-1.5	18.0	17.1	16.1	23.4	31.3	78.6	53.2	42.9	41.3	74.3
01:30	-23.3	-23.2	-22.7	-23.2	-24.1	-2.1	17.3	16.2	15.4	22.7	31.3	79.1	53.2	42.7	41.3	75.0
01:35	-23.6	-23.4	-23.0	-23.6	-24.3	-2.6	16.6	15.5	14.7	22.0	31.1	79.5	53.0	42.6	41.2	75.6
01:40	-23.9	-23.7	-23.2	-23.7	-24.6	-3.3	15.8	14.8	14.0	21.3	31.1	79.8	53.2	42.3	41.0	75.9
01:45	-24.1	-23.9	-23.4	-23.9	-24.8	-3.8	15.2	14.1	13.3	20.6	30.9	80.2	53.0	42.1	41.3	76.5
01:50	-24.5	-24.1	-23.7	-24.3	-25.0	-4.3	14.5	13.5	12.6	19.9	31.1	80.3	53.0	41.7	41.2	76.8
01:55	-24.6	-24.3	-23.9	-24.4	-25.1	-4.7	13.8	12.8	12.0	19.2	30.9	80.3	53.2	41.7	41.2	77.0

P.D

Himalia R 345

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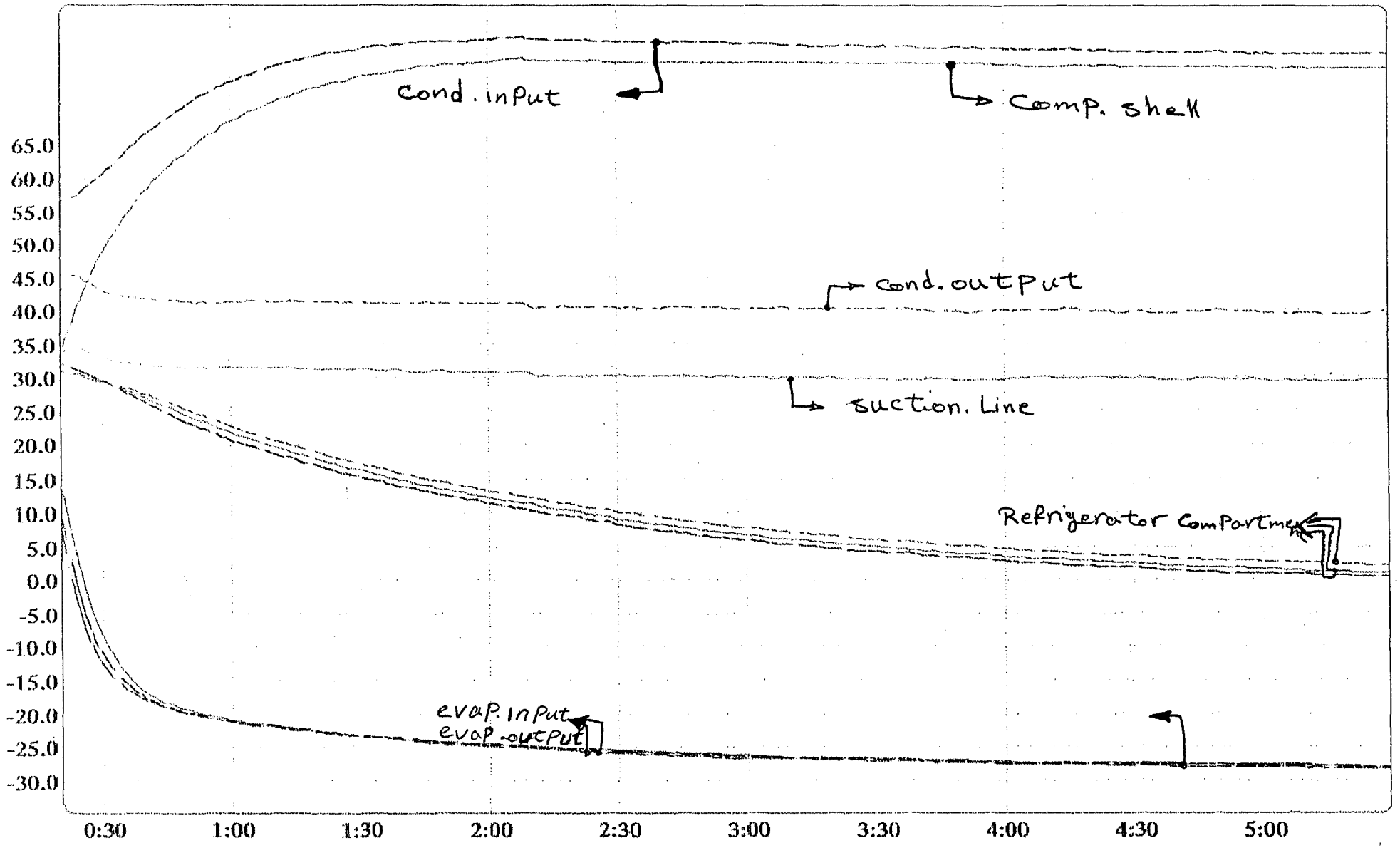

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