# Haier SERVICE MANUAL

### Model 1U68RENFRA-C



### **MWARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or Repair the product or products dealt with in this service information by anyone else could result in serious injury or death

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Haier Group

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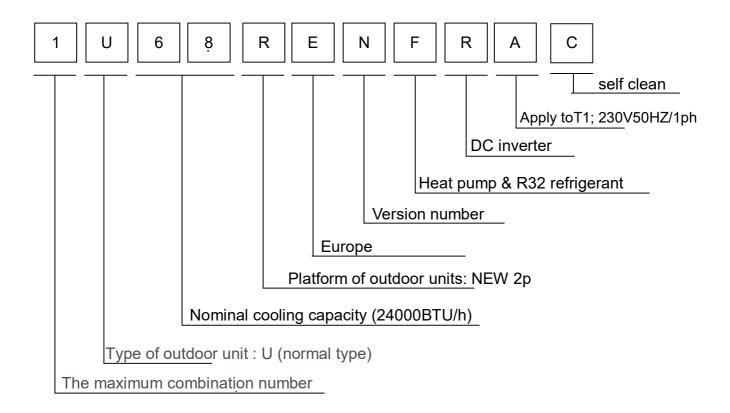
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### 1.Introduction

### 1.1 Model name explanation





#### 1.2 Safety Cautions

Be sure to read the following safety cautions before conducting repair work.

The caution items are classified into "Warning" and "Caution". The "Warning" items are especially important since they can lead to death or serious injury if they are not followed closely. The "Caution" items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety

caution items described below.

About the pictograms

- This symbol indicates a prohibited action.
   The prohibited item or action is shown inside or near the symbol.
- This symbol indicates an action that must be taken, or an instruction.

  The instruction is shown inside or near the symbol.

After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates Normally, and explain the cautions for operating the product to the customer.

#### 1.2.1 Embedded wire checking before installation

Check the embedded wire diameter suitable to request:

(Power supply from indoor:  $2.5 \text{kw} \ge 1.0 \text{mm}^2 3.5 \text{kw}, 5 \text{kw} \ge 1.5 \text{mm}^2 7 \text{kw} \ge 1.0 \text{mm}^2$ ; Power supply from outdoor  $\ge 1.0 \text{mm}^2$ )

Check the embedded wire are four roots, L/N/COM/GND; GND is needed, if not, thunder or high voltage wave from power grid will impact to the performance

Using a multi-meter to test short circuit of the four roots wires, make sure no short circuit happen.





#### 1.2.2 Caution in Repair

#### Warning

Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair.

Working on the equipment that is connected to a power supply can cause an electrical shook.

If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.





If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas .The refrigerant gas can cause frostbite.	$\bigcirc$
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the	
refrigerant gas completely at a well-ventilated place first.	
If there is a gas remaining inside the compressor , the refrigerant gas or cooling machine oil discharges	
when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	0
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit.	<b>A</b>
Be sure to discharge the capacitor completely before conducting repair work . A charged capacitor can	
cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug.	
Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or	()
fire.	

Warning	
Do not repair the electrical components with wet hands . Working on the equipment with wet hands can cause an electrical shock	$\bigcirc$
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	$\bigcirc$
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shock.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	$\bigcirc$
Be sure to check that the cooling cycle section has cooled down sufficiently before conducting repair	
work. Working on the unit when the cooling cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	0



### 1.2.3 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to	
conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can	
cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to	
withstand the weight of the equipment.	
If the installation site does not have sufficient strength and if the installation work is not conducted	
securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame.	For
Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting	integral
in injury.	units only
Re sure to install the product securely in the installation frame mounted on a window frame	For
Be sure to install the product securely in the installation frame mounted on a window frame.	integral
If the unit is not securely mounted, it can fall and cause injury.	units only

Warning	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work.  Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals.  Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable.  If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable.  Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	$\bigcirc$
Do not mix air or gas other than the specified refrigerant (R-410A / R22) in the refrigerant system.  If air enters the cooling system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak.  If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters,	0





stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it.  If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks.  If a combustible gas leaks and remains around the unit, it can cause a fire.	$\bigcirc$
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	

### 1.2.4 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way.  If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them.  Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	0

Warning	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances since it can cause an electrical shock, excessive heat generation or fire.	$\bigcirc$



Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the	
soldered or crimped terminals are secure. Improper installation and connections can cause excessive	
heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can	
cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 M	
ohm or higher.	
Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair.	
Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

#### 1.2.5 Using Icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below:

#### 1.2.6 Using Icons List

Icon	Type of Information	Description
Note	Note	A "note" provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
1 Caution	Caution	A "caution" is used when there is danger that the reader, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.
<b>Marning</b>	Warning	A "warning" is used when there is danger of personal injury.
L	Reference	A "reference" guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.



# 2.Specifications

NOMINAL DISTRIBUTION SYSTEM VOLTAGE		
Phase	1	1
Frequency	Ḥz	50
Voltage	V	230

NOMINAL CAPACITY and NOMINAL INPUT			
	Cooling	heating	
Canacity rated	KW	7.0	8.1
Capacity rated	Btu/h	23880	27640
Power Consumption(Rated)	KW	2.16	2.18
SEER/SCOP	W/W	7.1/A++	4.0/A+
Annual energy consumption	KWh	350	1963
Moisture Removal m³/h 2.8*10 - ³			

TECHNICAL SPECIFICATIONS-UNIT			
Dimensions	H*W*D	mm	890×353×697
Packaged Dimensions	H*W*D	mm	1046×460×780
Weight	1	KG	47.3
Gross weight	1	KG	52.3
Sound level	Sound peessure	dB	52
Sourid level	Sound power	dB	65

ELECTRICAL SPECIFICATIONS			
		Cooling	heating
Nominal running current	Α	9.6	9.7
Maximum running current	Α	13	13

TECHNICAL SPECIFICATIONS-PARTS				
		cooling	heating	
	Туре		Rotary Compressor	
	Model		GTD186UKQA8JT6	
Compressor	Motor output	W	992	
	Oil type Oil charge volume L		ACS-68Rorequivalent	
			0.5	
	Туре		Axial fan	
Fan	Motor output	W	50	
raii	Air flow rate(high)	m³/h	2900	
	Speed(high/low)	rpm	800/300	
Heat	Туре		ML fin-φ7HI-HX tube	e
exchanger	Row*stage*fitch		2*15*1.4	





TECHNICAL SPECIFICATIONS-OTHERS				
Refrigerant type				R32
	Refrigerant charge		KG	1.2
Refrigerant	Maximum allowable d	istance		0.5
circuit	between indoor an ou	tdoor	m	25
	Maximum allowable le	evel differençe	m	15
	Refrigerant control		EEV	
Dining compact	. liquid		mm	Ф6.35
Piping connect		gas	mm	Ф12.7
(external diame	eter)	drain	mm	Ф16
Heat insulation ty	уре		Both liquid and Gas pipes	
Max. piping Length		m	25	
Max. Level Difference		m	15	
Chargeless		m	7	
Amount of Additi	onal Charge of Refriger	ant	g/m	20

Note: the data are based on the conditions shown in the table below

cooling	heating	Piping length
Indoor: 27°CDB/19°CWB	Indoor:20°CDB	5m
Outdoor: 35℃DB/24℃WB	Outdoor: 7℃DB/6℃WB	3111

Conversation formulae	
Kcal/h= KW×860	
Btu/h= KW×3414	
cfm=m³/min×35.3	

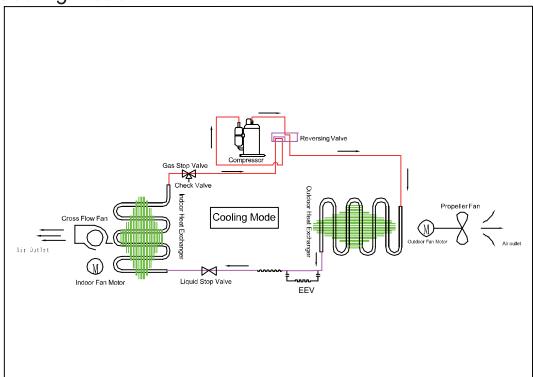
### 3.Sensors list

type	Description	Qty
Ambient sensor	Its used for detecting temperature of outdoor side	
Defrosting sensor	Its used for controlling outdoor defrosting at heating mode	1
Discharging sensor	Its used for compressor in case of over-heat	

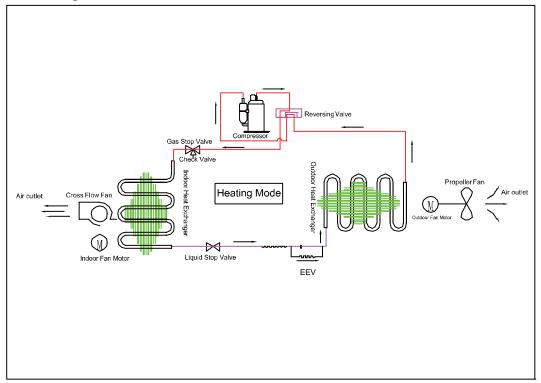


# 4. Piping diagrams

Cooling mode



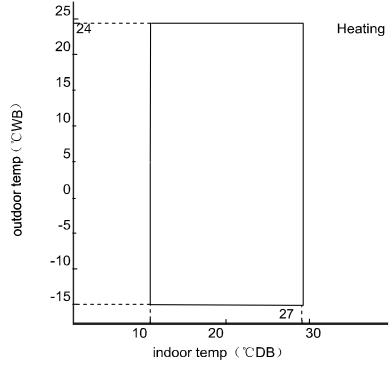
### Heating mode





### 5. Operation range

The name of parts Cooling 60 40 Outdoortemp. (°CDB) pull down 20 0 -10 -20 35 -40 10 20 30 indoor temp ( $^{\circ}CWB$ )



Notes:

The graphs are based on the following condition:

Equivalent piping length 5m
Level difference 0m
Air flow rate high



### 6. Printed circuit board connector wiring diagram

#### Connectors

PCB (1) (Control PCB) For 24k

- 1) CN1, CN2 Connector for power N and L
- 2) CN3 Connector for ground
- 3) CN22 Connector for DC POWER 15V and 5V to the module board
- 4) CN8, CN9 Connector for CN2, CN1 on the module board
- 5) CN21 Connector for fan motor
- 6) CN10 Connector for four way valve coil
- 7) CN20 Connector for outdoor sensor
- 8) CN23 Connector for communicate between the control board and the module board
- 9) CN24, CN26 Connector to N and P of the module board
- 10) CN4 Connector for communicate between indoor and outdoor unit
- 11) CN16 Connector for electric expansion valves
- 12) CN6, CN7 Connector for indoor power L and N

#### PCB (2) (Module PCB) For 24k

CN10 Connector for the DC power 5V and 15V form the control PCB

CN11 Connector for communicating between the control board and the module board

P (CN8), N (CN9) Connector for capacitance board

LI (CN3), LO (CN4) Connector for reactor

CN5, CN6, CN7 Connector for the U, V, W wire of the compressor

Notes: Other Designations

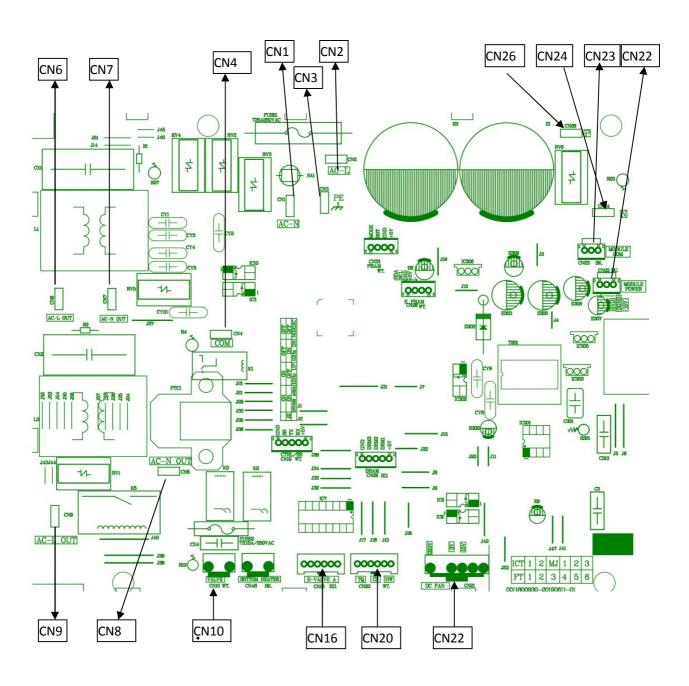
PCB (1) (Control PCB)

- 1) FUSE 1, (25A, 250VAC); FUSE 2(3.15A, 250VAC)
- 2) LED 1 Keep light representative normal, if keep flash interval representative trouble Alarm
- 3) RV1, RV2, RV3, RV4, RV5, RV6 Varistor





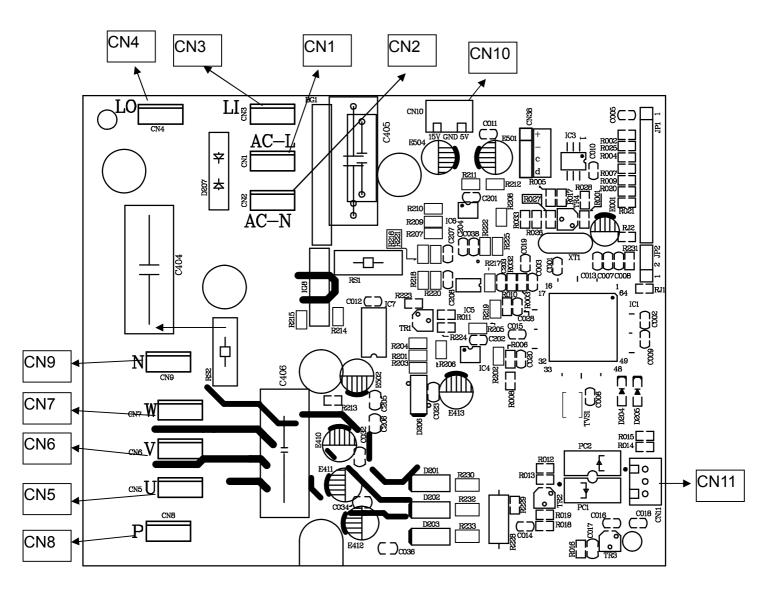
### **PCB** (1)







### **PCB(2)**







#### 7. Functions and control

### 7.1 Main functions and control specification

#### 7.1.1 The operation frequency of outdoor unit and its control

#### 7.1.1.1 The operation frequency control of compressor

The operation frequency scope of compressor:

Mode	Minimum operation frequency	Maximum operation frequency
Heating	15Hz	91Hz
Refrigeration	15Hz	90Hz

#### 7.1.1.2 The starting of compressor

When the compressor is started for the first time, it must be kept under the conditions of 38Hz,58Hz,88Hz for 6 seconds,one minute, one minute (the overheating protection of the outdoor unit air-blowing temperature, immediately decrease the frequency when the compressor is overflowing and releasing the pressure), then it can be operated towards the target frequency. When the machine runs normally, there's no such process. After starting the compressor for operation, the compressor should run according to the calculated frequency, and every determined frequency for protection should be prior to the calculated frequency.

#### 7.1.1.3 The speeds of increasing or decreasing the frequency of the compressor

The speed of increasing or decreasing the frequency rapidly 1 ------1HZ/second
The speed of increasing or decreasing the frequency slowly 2 -----1HZ/10seconds

#### 7.1.1.4 The calculation of the compressor's frequency

Refrigeration/dehumidification mode:

Pn=(Nh\_c- S\_c)\*10 $\geq$ 50 outdoor environment control Pn=(Nh\_c- S\_c)\*10 $\leq$ 50 PID control

Heating mode:

Pn=( $S_c - Nh_c$ ) \*10 $\geq$ 60 outdoor environment control Pn=( $S_c - Nh_c$ ) \*10 $\leq$ 60 PID control

(Nh c=indoor environment temperature S c=setting temperature)

- 1) The minimum/maximum frequency limitation
- A. While refrigerating: F-MAX-r is the maximum operation frequency of the compressor; F-MIN-r is the minimum operation frequency of the compressor.
- **B.** While heating: F-MAX-d is the maximum operation frequency of the compressor; F-MIN-d is the minimum operation frequency of the compressor.
- $\begin{tabular}{ll} \bf 2) & The frequency limitation which is affected by the environment temperature. \end{tabular}$

(Wh\_c= environment temperature)

Heating mode:

Serial No.	Temperature scope	Frequency limitation
1	Wh_c<-12	Max_hz1 91 HZ
2	Wh c<-8	Max hz2 91 HZ





3	Wh_c<-2	Max_hz3	91 HZ
4	Wh_c<5	Max_hz4	91 HZ
5	Wh_c<10	Max_hz5	83 HZ
6	Wh_c<17	Max_hz6	83 HZ
7	Wh_c<20	Max_hz7	61 HZ
8	Wh_c>=20	Max_hz8	51 HZ

Remarks: The above are the maximum frequency limitations of the complete appliance which are affected by the environment, and they have nothing to do with the ability of the indoor unit.

Refrigeration/dehumidification mode:

Serial No.	Temperature scope	Frequency limitation
1	Wh_c<16	Max_hz1 45HZ
2	Wh_c<22	Max_hz2 51HZ
3	Wh_c<29	Max_hz3 70HZ
4	Wh_c<32	Max_hz4 90HZ
5	Wh_c<40	Max_hz5 90HZ
6	Wh_c<48	Max_hz6 76HZ
7	Wh_c>=48	Max_hz7 45HZ

Remarks: the above are not only the maximum frequency limitations of the complete appliance which are affected by the environment, but also the maximum ability limitation of the system. When the starting ability is not the maximum, its maximum frequency limitation is calculated by the following equations:

The frequency limitation which is affected by the temperature and under the condition of actual ability=the actual running system ability\*the maximum frequency which is limited by the temperature and under the condition of maximum ability/the maximum designing ability of the system

Refrigeration/dehumidification mode:

The indoor setting airflow speed	Low	Medium	Quiet
The percentage of the rated frequency K	70%	85%	42%

#### Heating mode:

The indoor setting airflow speed	Low	Medium	Quiet
The percentage of the rated frequency K	80%	90%	60%

The calculation of the actual output frequency:

F= F-ED-\*(rated frequency) × K

F-ED-\*(rated frequency)= The frequency which is limited by the outdoor environment temperature





When refrigerating, it is needed to satisfy

F-MIN-d(compressor's Min\_hz)< F<F-MAX-d(compressor's Max\_hz)

When heating, it is needed to satisfy

F-MIN-r (compressor's Min\_hz)< F<F-MAX-r (compressor's Max\_hz)

#### PID control:

The innital frequency Sn is determined by Pn . We can calculate Hzoutf according to the value of Kp ,Ki ,Kd, Out\_gain,Pn.Then , Fn = Sn + Hzoutf. The value of Fn is calculated in each sample time (60 seconds),and Fn is adujusted according to previous frequency of Sn and filtered output of Hzoutf.

#### 7.1.2 The outdoor fan control (Exchange fan)

When the fan is changed among every airflow speed (including stop blowing), in order to avoid the airflow speed from skipping frequently, it must be kept under each mode for over 30 seconds, and then it can be changed to another mode (when refrigerating, the time is changed to 15 seconds).

#### 7.1.2.1 The outdoor fan control

Within three minutes of compressor starting, the compressor is controlled according to the ambient temperature.

Tao (℃)	Tao <22℃	<b>22</b> ℃< Tao <28℃	Tao≷29℃
Refrigeration/dehumidification	2nd level /2nd level	3rd level /4th level	5th level /6th level
Tao (℃)	Tao <<10℃	10℃< Tao <17℃	Tao≥17°C
Heating	5th level /6th level	3th level /5th level	3rd level /2nd level

After 3 minutes, the compressor is controlled according to the ambient temperature and the frequency of the compressor.

		<40 Hz	40 Hz-60 Hz	≥60 Hz
Refrigeration/dehumidification				
frequency (Hz)				
	≤22	2nd level	3rd level	5 th level(6 th)
Tao (℃)	22-28	3rd level	5 th level	7 th level(6 th)
	≥28	7 th level		

Heating (18K/24K)	g frequency (Hz)	<51 Hz	51-70 Hz	≥70 Hz
	≤10	5nd level(3rd)	6rd level	7 th level
Tao (℃)	10-17	3rd level(2nd)	4 th level	5 th level(6 th)
	≥17	2nd level		

#### 7.1.3 The control of the outdoor Electronic expansion valve (EEV)

In cooling mode, the EEV opening range is 90~480 steps. The EEV opening is 90 steps when unit is off.

In heating mode, the EEV opening range is 60~480 steps. The EEV opening is 60 steps when unit is off.

After outdoor unit is off, the EEV opening keep the current on for 5 s, then open the EEV completely for 2 minutes, then become 90 steps (cooling) or 60 steps (heating).

The EEV opening will increase if SH (superheat degree) >0 while decrease if SH<0.

Adjust frequency:

If |SH|=0, 60s/ 1 step





If  $|SH| \ge 3$ , and  $\triangle SH = 0$ , 10s/ 1 step.

If  $3 \ge |SH| \ge 0$ , 30s/ 1 step.

△SH= current SH- last SH

SH= Ts (suction temp)-Tc1 (indoor coil temp)-Tsh (fixed data, depend on different models, -1~2)

#### 7.1.4 Four way control

For the details of defrosting four-way valve control, see the defrosting process.

Four way working in other ways:

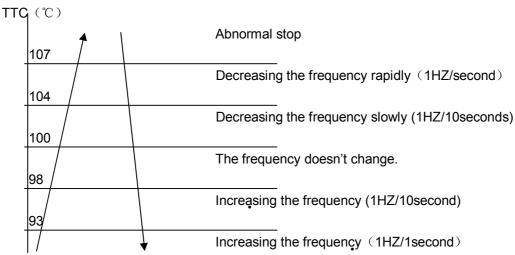
Under the mode of heating, open the four-way valve, when the compressor is not started or changed to non-heating mode, make sure the compressor is stoped for 2 minutes, and then close the four-way valve.

#### 7.1.5 Protection function

#### 7.1.5.1 TTC high temperature-preventing protection

Once the machine is started, it can run TTC(air-blowing temp) overheating protection of air-blowing, but air-blowing sensor malfunction must alarm after 4 minutes during which the compressor is started (during the course of self-detection, there's no such limitation)

Sensor detection methods: 100 times (one cycle of procedure run is one time, and about 5ms, detection method for each time: continuously sampling for 8 times, then order them and take the mean value of the middle 2 values), take the mean value.



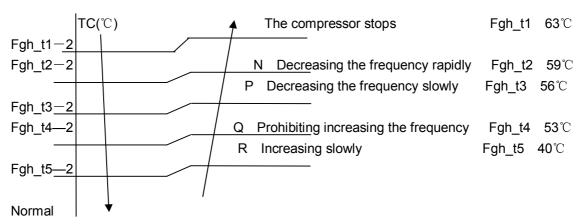
 $\bar{T}TC$ >=107°C lasts for 20 seconds. Overheating protection of air-blowing, alarm malfunction to the indoor, others don't last.

#### 7.1.5.2 TC high temperature-preventing control of the indoor heating unit:

Tpg\_indoor is the highest value of the effective indoor unit (start it and it is in accord with the running state). TC=indoor coil temp.

The indoor heat exchanger sensor tests the temperature of the indoor heat exchanger. If the temperature is higher than  $63^{\circ}$ C, decrease the rotate speed of the compressor and do the high temperature-preventing protection of the indoor heat exchanger; if the temperature of the indoor heat exchanger is lower than  $45^{\circ}$ C, recover to the normal control.





- N: Decreasing at the speed of 1HZ/1 second
- P: Decreasing at the speed of 1Hz/10 seconds
- Q: Continue to keep the last-time instruction cycle
- R: Increasing at the speed of 1Hz/10seconds

Remarks: the outdoor unit

#### 7.1.5.3 The control of preventing the over current of the compressor:

- During the starting process of the compressor, if the current of the compressor is greater than 17A for 3 seconds, stop the compressor and alarm, after 3 minutes, start it again, if such state appears 3 times in 20 minutes, stop the compressor and alarm, and confirm the malfunction. Then continue to run it only after the power is off.
- During the starting process of the compressor, if the AC current is greater than 15A, the frequency of the compressor decreases at the speed of 1HZ/second.
- During the starting process of the compressor, if the AC current is greater than 14A, the frequency of the compressor decreases at the speed of 0.1HZ/second.
- During the starting process of the compressor, if the AC current is greater than 13A, the frequency of the compressor increases at the prohibited speed.
- During the starting process of the compressor, if the AC current is greater than 12A the frequency of the compressor increases at the speed of no faster than 0.1HZ/second.

#### 7.1.5.4 The protection function of AC current:

During the starting process of the compressor, if the AC current is greater than 17.5Afor 3 seconds, stop the compressor and alarm, after 3 minutes, start it again, if such state appears 3 times in 20 minutes, stop the compressor and alarm, and confirm the malfunction. Then continue to run it only after the power is off.

During the starting process of the compressor, if the AC current is greater than 15A, the frequency of the compressor decreases at the speed of 1HZ/second.

During the starting process of the compressor, if the AC current is greater than 14A, the frequency of the compressor decreases at the speed of 0.1HZ/second.

During the starting process of the compressor, if the AC current is greater than 13A, the frequency of the compressor increases at the prohibited speed.

During the starting process of the compressor, if the AC current is greater than 12A, the frequency of the compressor increases at the speed of no faster than 0.1HZ/second.

Remarks: when the outdoor temperature is high, there's compensation for AC current protection.



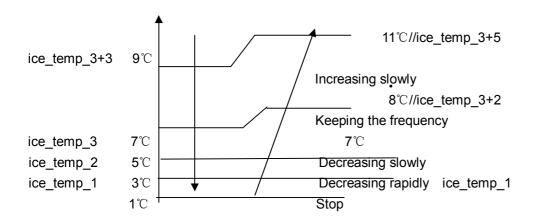


- (1) When the outdoor environment temperature is higher than  $40^{\circ}$ C, AC current protection value decreases by 1A.
- (2) When the outdoor environment temperature is higher than 50°C, AC current protection value decreases by 2A.

#### 7.1.5.5 Anti-freezing protection of the indoor heat exchanger

When refrigerating/heating, prevent freezing.

Tpg\_indoor is the minimum value of the effective indoor unit (start it and it is in accord with the running state).



When Tpg\_indoor 〈 ice\_temp\_1, the frequency of the compressor decreases at the speed of 1HZ/1second.

When Tpg\_indoor 〈 ice\_temp\_2, the frequency of the compressor decreases at the speed of 1HZ/10seconds.

When Tpg\_indoor begins to rise again, and ice\_temp\_2≤Tpg\_indoor≤ ice\_temp\_3, the frequency of the compressor doesn't change.

When ice\_temp\_3  $\langle Tpg\_indoor \langle ice\_temp\_3+3^{\circ}C \rangle$ , the frequency of the compressor increases at the speed of 1HZ/10seconds.

For example, Tpg\_indoor≤0°C, last for 2 minutes, and then the outdoor unit will stop, and report underload malfunction, but don't send malfunction report to the indoor.

The compressor stops for more than 3 minutes, Tpg\_indoor> ice\_temp\_3+2 $^{\circ}$ C, the compressor recovers.

#### 7.1.5.6 The frequency limitation of modification rate

In the field which is controlled by high frequency, if the modification rate is not high enough, the control-driven chip will enter into weak magnetic control, this will help to relieve the problem of modification rate. If during the course of weak magnetic control, the modification rate is still not high enough, enter into the control of decreasing frequency until the alarm of modification rate is relieved.

#### 7.1.5.7 Temperature protection of the outdoor refrigerating coil

When the frequency are higher than 40Hz,and the defrosting sensor's temperature are higher than  $68\,^\circ\text{C}$ , the frequency of the compressor decreases 1hz/10seconds. Keep the frequency until it





decreases to the lowest frequency. When the temperatures are lower than  $68^{\circ}$ C and higher than  $62^{\circ}$ C, keep the frequency of the compressor. When the temperatures are lower than  $62^{\circ}$ C, relieve the defrosting temperature protection.

#### 7.2 Value of Thermistor

#### Ambient Sensor, Defrosting Sensor, Pipe sensor

R25°C=10K $\Omega \pm 3\%$  B25°C/50°C=3700K $\pm 3\%$ 

Temp.(°C)	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(°C	2)
-30	165.2170	147.9497	132.3678	-1.94	1.75
-29	155.5754	139.5600	125.0806	-1.93	1.74
-28	146.5609	131.7022	118.2434	-1.91	1.73
-27	138.1285	124.3392	111.8256	-1.89	1.71
-26	130.2371	117.4366	105.7989	-1.87	1.70
-25	122.8484	110.9627	100.1367	-1.85	1.69
-24	115.9272	104.8882	94.8149	-1.83	1.67
-23	109.4410	99.1858	89.8106	-1.81	1.66
-22	103.3598	93.8305	85.1031	-1.80	1.64
-21	97.6556	88.7989	80.6728	-1.78	1.63
-20	92.3028	84.0695	76.5017	-1.76	1.62
-19	87.2775	79.6222	72.5729	-1.74	1.60
-18	82.5577	75.4384	68.8710	-1.72	1.59
-17	78.1230	71.5010	65.3815	-1.70	1.57
-16	73.9543	67.7939	62.0907	-1.68	1.55
-15	70.0342	64.3023	58.9863	-1.66	1.54
-14	66.3463	61.0123	56.0565	-1.64	1.52
-13	62.8755	57.9110	53.2905	-1.62	1.51
-12	59.6076	54.9866	50.6781	-1.60	1.49
-11	56.5296	52.2278	48.2099	-1.58	1.47
-10	53.6294	49.6244	45.8771	-1.56	1.46
-9	50.8956	47.1666	43.6714	-1.54	1.44
-8	48.3178	44.8454	41.5851	-1.51	1.42
-7	45.8860	42.6525	39.6112	-1.49	1.40
-6	43.5912	40.5800	37.7429	-1.47	1.39
-5	41.4249	38.6207	35.9739	-1.45	1.37
-4	39.3792	36.7676	34.2983	-1.43	1.35
-3	37.4465	35.0144	32.7108	-1.41	1.33
-2	35.6202	33.3552	31.2062	-1.38	1.31
-1	33.8936	31.7844	29.7796	-1.36	1.29
0	32.2608	30.2968	28.4267	-1.34	1.28
1	30.7162	28.8875	27.1431	-1.32	1.26
2	29.2545	27.5519	25.9250	-1.29	1.24
3	27.8708	26.2858	24.7686	-1.27	1.22
4	26.5605	25.0851	23.6704	-1.25	1.20



# Haier

5         25,3192         23,9462         22,6273         -1,23         1,16           6         24,1432         22,8686         21,6361         -1,20         1,16           7         20,2284         21,8388         20,6839         -1,18         1,14           8         21,9714         20,8689         19,7082         -1,15         1,12           9         20,9688         19,9409         18,3483         -1,11         1,00           10         20,076         19,6221         18,3588         -1,11         1,07           11         10,1149         18,2270         17,3646         -1,08         1,05           12         11,2280         17,4331         16,6305         -1,03         1,01           14         16,7711         16,5762         1,5315         -1,03         0,96           15         1,9386         15,2770         14,611         -9,98         0,96           16         1,3431         12,8522         12,3778         -0,98         0,97           16         1,3431         12,8522         12,3778         -0,88         0,87           19         1,3431         12,8522         12,3778         -0,88         0,87						dia control
7         23.0284         21.8398         20.6939         1.18         1.14           8         21.9714         20.8699         19.7982         1.15         1.12           9         20.868         19.9409         18.9483         -1.13         1.12           10         20.0176         19.0621         18.1358         -1.11         1.07           11         19.1149         18.2270         17.3846         -1.08         1.05           12         18.2890         17.4331         16.6005         -1.06         1.03           13         17.442         16.6711         15.9616         15.2857         -1.01         0.99           14         16.6711         15.9601         15.2857         -1.01         0.99           15         15.3396         15.2770         14.6315         0.98         0.96           16         15.2385         14.6688         14.0271         0.96         0.94           17         14.5748         14.0079         13.4610         0.93         0.92           18         13.9496         13.4185         12.9017         0.91         0.90           19         13.3431         12.8572         12.3778         0.88 </td <td>5</td> <td>25.3193</td> <td>23.9462</td> <td>22.6273</td> <td>-1.23</td> <td>1.18</td>	5	25.3193	23.9462	22.6273	-1.23	1.18
8         21,9714         20,8859         19,7982         -1,15         1,12           9         20,9688         19,9409         18,848         4,13         109           10         20,076         19,0621         18,1358         -1,11         107           11         19,1149         18,2270         17,3646         4,08         105           12         18,2860         17,4331         16,6305         -1,06         1,03           13         17,4442         16,6762         15,9315         4,03         101           14         16,6711         15,9601         15,2857         -1,01         0.98         0.96           15         15,3936         15,2770         14,6315         0.98         0.96           16         15,2385         14,6288         14,0271         -0.96         0.94           17         14,6748         14,0079         13,4510         -0.93         0.92           18         13,9436         13,4185         12,9017         -0.91         0.98         0.97           19         13,3431         12,8572         12,3778         0.98         0.87           20         12,7718         12,3223         11,8780	6	24.1432	22.8656	21.6361	-1.20	1.16
9         20.9688         19.9409         18.9463         4.13         1.09           10         20.0176         19.0621         18.1358         4.11         1.07           11         19.149         18.2270         17.3846         4.08         1.05           12         18.2580         17.331         16.6305         1.06         1.05           13         17.4442         16.6782         15.9315         4.03         1.01           14         16.6711         15.9601         15.2657         4.01         0.99           15         15.9365         14.6288         14.0271         0.96         0.94           17         14.5748         14.0079         13.4610         0.93         0.92           18         13.9436         13.4185         12.9017         0.91         0.90           19         13.3431         12.8572         12.3778         0.88         0.87           20         12.7718         12.3223         11.8780         0.80         0.83           21         12.2280         11.3126         11.4011         0.93         0.83           22         13.7002         11.3267         10.9459         -0.81         0.80	7	23.0284	21.8398	20.6939	-1.18	1.14
10         200176         19.0621         18.1358         -1.11         1.07           11         19.1449         18.2270         17.3646         -1.08         1.05           12         18.2580         17.4331         16.6305         -1.06         1.03           13         17.4442         16.6782         15.9315         -1.03         1.01           14         16.6711         15.9601         15.2657         -1.01         0.99           15         15.9368         15.2770         14.6315         -0.98         0.96           16         15.2385         14.6268         14.0271         -0.96         0.94           17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.9436         13.4185         12.9017         -0.91         0.90           19         13.3431         12.8572         12.3778         -0.88         0.87           20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2280         11.8128         11.4011         -0.83         0.83           22         11.702         11.3267         10.9459         -0.81 <td< td=""><td>8</td><td>21.9714</td><td>20.8659</td><td>19.7982</td><td>-1.15</td><td>1.12</td></td<>	8	21.9714	20.8659	19.7982	-1.15	1.12
11         19.1149         18.2270         17.3646         -1.06         1.05           12         18.2580         17.4331         16.6305         -1.06         1.03           13         17.4442         16.6782         15.9315         -1.03         1.01           14         16.6711         15.9601         15.2857         -1.01         0.99           15         16.9366         15.2770         14.6315         -0.98         0.96           16         15.2385         14.8268         14.0271         -0.96         0.94           17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.3436         13.4185         12.9017         -0.91         0.90           19         13.331         12.8572         12.2778         -0.88         0.87           20         12.7716         12.3223         11.8780         -0.86         0.85           21         1.22280         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.884         10.5144         -0.76 <td< td=""><td>9</td><td>20.9688</td><td>19.9409</td><td>18.9463</td><td>-1.13</td><td>1.09</td></td<>	9	20.9688	19.9409	18.9463	-1.13	1.09
12         18.2880         17.4331         16.8305         -1.06         1.03           13         17.4442         16.6782         15.9315         -1.03         1.01           14         16.6711         15.9601         15.2657         -1.01         0.99           15         15.9366         15.2770         14.8315         -0.98         0.96           16         15.2385         14.6268         14.0271         -0.96         0.94           17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.9438         13.4185         12.9017         -0.91         0.90           19         13.3431         12.8572         12.3778         -0.88         0.87           20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2280         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.76         0.75           24         10.7475         10.4216         10.0964         -0.76         <	10	20.0176	19.0621	18.1358	-1.11	1.07
13         17.4442         16.6782         15.9315         -1.03         1.01           14         16.6711         15.9001         15.2857         -1.01         0.99           15         15.9366         15.2770         14.6315         -0.98         0.96           16         15.2385         14.6288         14.0271         -0.96         0.94           17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.9436         13.4185         12.9017         -0.91         0.90           19         13.3431         12.8272         12.3778         -0.88         0.87           20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2280         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.78         0.78           24         10.7475         10.4216         10.0994         -0.75         0.75           25         10.3000         10.0000         9.7000         -0.76 <t< td=""><td>11</td><td>19.1149</td><td>18.2270</td><td>17.3646</td><td>-1.08</td><td>1.05</td></t<>	11	19.1149	18.2270	17.3646	-1.08	1.05
14         16.6711         15.9801         15.2657         -1.01         0.99           15         15.9366         15.2770         14.6315         -0.98         0.96           16         15.2385         14.6268         14.0271         -0.96         0.94           17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.9436         13.4185         12.2017         -0.91         0.90           19         13.3431         12.8572         12.3778         -0.86         0.85           20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2220         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.76         0.75           24         10.7475         10.4216         10.0964         -0.75         0.75           25         10.3000         10.0000         9.7000         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0	12	18.2580	17.4331	16.6305	-1.06	1.03
15         15,9366         15,2770         14,6315         -0,98         0,96           16         15,2385         14,6268         14,0271         -0,96         0,94           17         14,5748         14,0079         13,4510         -0,93         0,92           18         13,9436         13,4185         12,9077         -0,91         0,90           19         13,3431         12,8572         12,3778         -0,88         0,87           20         12,7718         12,3223         11,8780         -0,86         0,85           21         12,2280         11,8126         11,4011         -0,83         0,83           22         11,7102         11,3267         10,9459         -0,81         0,80           23         11,2172         10,8834         10,5114         -0,78         0,78           24         10,7475         10,4216         10,9499         -0,81         0,80           25         10,3000         10,0000         9,7000         -0,75         0,75           26         9,8975         9,5974         9,2980         -0,76         0,76           27         9,5129         9,2132         8,9148         -0,80         0,80	13	17.4442	16.6782	15.9315	-1.03	1.01
16         15 2385         14 6268         14.0271         -0.96         0.94           17         14 5748         14.0079         13 4510         -0.93         0.92           18         13 9436         13 4185         12 9017         -0.91         0.90           19         13 3431         12 8572         12.3778         -0.88         0.87           20         12 7718         12 3223         11.4011         -0.83         0.83           21         12 2280         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.78         0.78           24         10.7475         10.4216         10.0964         -0.76         0.75           25         10.3000         10.0000         9.7000         -0.76         0.75           25         10.3000         10.0000         9.7000         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83<	14	16.6711	15.9601	15.2657	-1.01	0.99
17         14.5748         14.0079         13.4510         -0.93         0.92           18         13.9436         13.4185         12.9017         -0.91         0.90           19         13.3431         12.8572         12.3778         -0.88         0.87           20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2280         11.8126         11.4011         -0.33         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.78         0.78           24         10.7475         10.4216         10.0964         -0.76         0.75           25         10.3000         10.0000         9.7000         -0.75         0.75           26         9.8975         9.5974         9.2980         -0.76         0.76           27         9.5129         9.2132         8.9484         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86	15	15.9366	15.2770	14.6315	-0.98	0.96
18         13,9436         13,4185         12,9017         -0.91         0.90           19         13,3431         12,8572         12,3778         -0.86         0.87           20         12,7718         12,3223         11,8780         -0.86         0.85           21         12,2280         11,8126         11,4011         -0.83         0.83           22         11,7102         11,3267         10,9459         -0.81         0.80           23         11,2172         10,8634         10,5114         -0.78         0.75           24         10,7475         10,4216         10,0964         -0.76         0.75           25         10,3000         10,0000         9,7000         -0.76         0.75           26         9,8875         9,5874         9,2980         -0.76         0.76           27         9,5129         9,2132         8,9148         -0.80         0.80           28         9,1464         8,8465         8,5496         -0.84         0.83           29         8,7942         8,4964         8,2013         -0.87         0.86           31         8,1331         7,6428         7,5522         -0.95         0.93	16	15.2385	14.6268	14.0271	-0.96	0.94
19         13,3431         12,8572         12,3778         -0.88         0.87           20         12,7718         12,323         11,8780         -0.86         0.85           21         12,2280         11,8126         11,4011         -0.83         0.83           22         11,7102         11,3267         10,9459         -0.81         0.80           23         11,2172         10,8634         10,5114         -0.78         0.78           24         10,7475         10,4216         10.0964         -0.75         0.75           25         10,3000         10,0000         9,7000         -0.75         0.76           26         9,8875         9,5974         9,2890         -0.76         0.76           27         9,5129         9,2132         8,9148         -0.80         0.80           28         9,1454         8,8465         8,5496         -0.84         0.83           29         8,7942         8,4964         8,2013         -0.87         0.86           30         8,4583         8,1621         7,8691         -0.91         0.90           31         8,1371         7,8428         7,5522         -0.95         0.93 <td>17</td> <td>14.5748</td> <td>14.0079</td> <td>13.4510</td> <td>-0.93</td> <td>0.92</td>	17	14.5748	14.0079	13.4510	-0.93	0.92
20         12.7718         12.3223         11.8780         -0.86         0.85           21         12.2280         11.8126         11.4011         -0.83         0.83           22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.78         0.78           24         10.7475         10.4216         10.0964         -0.75         0.75           25         10.3000         10.0000         9.7000         -0.76         0.76           26         9.8975         9.5974         9.2980         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86           30         8.4583         8.1621         7.8691         -0.91         0.90           31         8.1371         7.8428         7.5522         -0.95         0.93           32         7.8299         7.5377         7.2498         -0.98         0.97	18	13.9436	13.4185	12.9017	-0.91	0.90
21       12.2280       11.8126       11.4011       -0.83       0.83         22       11.7102       11.3267       10.9459       -0.81       0.80         23       11.2172       10.8634       10.5114       -0.78       0.78         24       10.7475       10.4216       10.0964       -0.75       0.75         25       10.3000       10.0000       9.7000       -0.76       0.76         26       9.8975       9.5974       9.2980       -0.76       0.76         27       9.5129       9.2132       8.9148       -0.80       0.80         28       9.1454       8.8465       8.5496       -0.84       0.83         29       8.7942       8.4964       8.2013       -0.87       0.86         30       8.4583       8.1621       7.8691       -0.91       0.90         31       8.1371       7.8428       7.5522       -0.95       0.93         32       7.8299       7.5377       7.2498       -0.98       0.97         33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04	19	13.3431	12.8572	12.3778	-0.88	0.87
22         11.7102         11.3267         10.9459         -0.81         0.80           23         11.2172         10.8634         10.5114         -0.78         0.78           24         10.7475         10.4216         10.0964         -0.75         0.75           25         10.3000         10.0000         9.7000         -0.75         0.75           26         9.8975         9.5974         9.2980         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86           30         8.4583         8.1621         7.8691         -0.91         0.90           31         8.1371         7.8428         7.5522         -0.95         0.93           32         7.8299         7.5377         7.2498         -0.98         0.97           33         7.5359         7.2461         6.9611         -1.02         1.00           34         7.2546         6.9673         6.6854         -1.06         1.04      <	20	12.7718	12.3223	11.8780	-0.86	0.85
23         11,2172         10,8634         10,5114         -0,78         0.78           24         10,7475         10,4216         10,0964         -0,75         0,75           25         10,3000         10,0000         9,7000         -0,75         0,76           26         9,8975         9,5974         9,2980         -0,76         0,76           27         9,5129         9,2132         8,9148         -0,80         0,80           28         9,1454         8,8465         8,5496         -0,84         0,83           29         8,7942         8,4964         8,2013         -0,87         0,86           30         8,4683         8,1621         7,8691         -0,91         0,90           31         8,1371         7,8428         7,5522         -0,95         0,93           32         7,8299         7,5377         7,2498         -0,98         0,97           33         7,5359         7,2461         6,9611         -1,02         1,00           34         7,2546         6,9673         6,6854         -1,06         1,04           35         6,9852         6,7008         6,4222         -1,10         1,07	21	12.2280	11.8126	11.4011	-0.83	0.83
24         10.7475         10.4216         10.0964         -0.75         0.75           25         10.3000         10.0000         9.7000         -0.76         0.75           26         9.8975         9.5974         9.2980         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86           30         8.4583         8.1621         7.8691         -0.91         0.90           31         8.1371         7.8428         7.5522         -0.95         0.93           32         7.8299         7.5377         7.2498         -0.98         0.97           33         7.5359         7.2461         6.9611         -1.02         1.00           34         7.2546         6.9673         6.6854         -1.06         1.04           35         6.9852         6.7008         6.4222         -1.10         1.07           36         6.7273         6.4459         6.1707         -1.13         1.11	22	11.7102	11.3267	10.9459	-0.81	0.80
25         10,3000         10,0000         9,7000         -0,75         0,75           26         9,8975         9,5974         9,2980         -0,76         0,76           27         9,5129         9,2132         8,9148         -0,80         0,80           28         9,1454         8,8465         8,5496         -0,84         0,83           29         8,7942         8,4964         8,2013         -0,87         0,86           30         8,4583         8,1621         7,8691         -0,91         0,90           31         8,1371         7,8428         7,5522         -0,95         0,93           32         7,8299         7,5377         7,2498         -0,98         0,97           33         7,5359         7,2461         6,9611         -1,02         1,00           34         7,2546         6,9673         6,6854         -1,06         1,04           35         6,9852         6,7008         6,4222         -1,10         1,07           36         6,7273         6,4459         6,1707         -1,13         1,11           37         6,4803         6,2021         5,9304         -1,17         1,14	23	11.2172	10.8634	10.5114	-0.78	0.78
26         9.8975         9.5974         9.2980         -0.76         0.76           27         9.5129         9.2132         8.9148         -0.80         0.80           28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86           30         8.4583         8.1621         7.8691         -0.91         0.90           31         8.1371         7.8428         7.5522         -0.95         0.93           32         7.8299         7.5377         7.2498         -0.98         0.97           33         7.5359         7.2461         6.9611         -1.02         1.00           34         7.2546         6.9673         6.6854         -1.06         1.04           35         6.9852         6.7008         6.4222         -1.10         1.07           36         6.7273         6.4459         6.1707         -1.13         1.11           37         6.4803         6.2021         5.9304         -1.17         1.14           38         6.2437         5.9687         5.7007         -1.21         1.18	24	10.7475	10.4216	10.0964	-0.75	0.75
27       9.5129       9.2132       8.9148       -0.80       0.80         28       9.1454       8.8465       8.5496       -0.84       0.83         29       8.7942       8.4964       8.2013       -0.87       0.86         30       8.4583       8.1621       7.8691       -0.91       0.90         31       8.1371       7.8428       7.5522       -0.95       0.93         32       7.8299       7.5377       7.2498       -0.98       0.97         33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25 <td< td=""><td>25</td><td>10.3000</td><td>10.0000</td><td>9.7000</td><td>-0.75</td><td>0.75</td></td<>	25	10.3000	10.0000	9.7000	-0.75	0.75
28         9.1454         8.8465         8.5496         -0.84         0.83           29         8.7942         8.4964         8.2013         -0.87         0.86           30         8.4583         8.1621         7.8691         -0.91         0.90           31         8.1371         7.8428         7.5522         -0.95         0.93           32         7.8299         7.5377         7.2498         -0.98         0.97           33         7.5359         7.2461         6.9611         -1.02         1.00           34         7.2546         6.9673         6.6854         -1.06         1.04           35         6.9852         6.7008         6.4222         -1.10         1.07           36         6.7273         6.4459         6.1707         -1.13         1.11           37         6.4803         6.2021         5.9304         -1.17         1.14           38         6.2437         5.9687         5.7007         -1.21         1.18           39         6.0170         5.7454         5.4812         -1.25         1.22           40         5.7997         5.5316         5.2712         -1.29         1.25	26	9.8975	9.5974	9.2980	-0.76	0.76
29       8.7942       8.4964       8.2013       -0.87       0.86         30       8.4583       8.1621       7.8691       -0.91       0.90         31       8.1371       7.8428       7.5522       -0.95       0.93         32       7.8299       7.5377       7.2498       -0.98       0.97         33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33 <td< td=""><td>27</td><td>9.5129</td><td>9.2132</td><td>8.9148</td><td>-0.80</td><td>0.80</td></td<>	27	9.5129	9.2132	8.9148	-0.80	0.80
30       8.4583       8.1621       7.8691       -0.91       0.90         31       8.1371       7.8428       7.5522       -0.95       0.93         32       7.8299       7.5377       7.2498       -0.98       0.97         33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36 <td< td=""><td>28</td><td>9.1454</td><td>8.8465</td><td>8.5496</td><td>-0.84</td><td>0.83</td></td<>	28	9.1454	8.8465	8.5496	-0.84	0.83
31       8.1371       7.8428       7.5522       -0.95       0.93         32       7.8299       7.5377       7.2498       -0.98       0.97         33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40 <td< td=""><td>29</td><td>8.7942</td><td>8.4964</td><td>8.2013</td><td>-0.87</td><td>0.86</td></td<>	29	8.7942	8.4964	8.2013	-0.87	0.86
32         7.8299         7.5377         7.2498         -0.98         0.97           33         7.5359         7.2461         6.9611         -1.02         1.00           34         7.2546         6.9673         6.6854         -1.06         1.04           35         6.9852         6.7008         6.4222         -1.10         1.07           36         6.7273         6.4459         6.1707         -1.13         1.11           37         6.4803         6.2021         5.9304         -1.17         1.14           38         6.2437         5.9687         5.7007         -1.21         1.18           39         6.0170         5.7454         5.4812         -1.25         1.22           40         5.7997         5.5316         5.2712         -1.29         1.25           41         5.5914         5.3269         5.0704         -1.33         1.29           42         5.3916         5.1308         4.8783         -1.37         1.33           43         5.2001         4.9430         4.6944         -1.41         1.36           44         5.0163         4.7630         4.5185         -1.45         1.40	30	8.4583	8.1621	7.8691	-0.91	0.90
33       7.5359       7.2461       6.9611       -1.02       1.00         34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.57       1.51 <td>31</td> <td>8.1371</td> <td>7.8428</td> <td>7.5522</td> <td>-0.95</td> <td>0.93</td>	31	8.1371	7.8428	7.5522	-0.95	0.93
34       7.2546       6.9673       6.6854       -1.06       1.04         35       6.9852       6.7008       6.4222       -1.10       1.07         36       §.7273       6.4459       6.1707       -1.13       1.11         37       §.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51 <td>32</td> <td>7.8299</td> <td>7.5377</td> <td>7.2498</td> <td>-0.98</td> <td>0.97</td>	32	7.8299	7.5377	7.2498	-0.98	0.97
35       6.9852       6.7008       6.4222       -1.10       1.07         36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	33	7.5359	7.2461	6.9611	-1.02	1.00
36       6.7273       6.4459       6.1707       -1.13       1.11         37       6.4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	34	7.2546	6.9673	6.6854	-1.06	1.04
37       6,4803       6.2021       5.9304       -1.17       1.14         38       6.2437       5.9687       5.7007       -1.21       1.18         39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	35	6.9852	6.7008	6.4222	-1.10	1.07
38     6.2437     5.9687     5.7007     -1.21     1.18       39     6.0170     5.7454     5.4812     -1.25     1.22       40     5.7997     5.5316     5.2712     -1.29     1.25       41     5.5914     5.3269     5.0704     -1.33     1.29       42     5.3916     5.1308     4.8783     -1.37     1.33       43     5.2001     4.9430     4.6944     -1.41     1.36       44     5.0163     4.7630     4.5185     -1.45     1.40       45     4.8400     4.5905     4.3500     -1.49     1.44       46     4.6708     4.4252     4.1887     -1.53     1.47       47     4.5083     4.2666     4.0342     -1.57     1.51	36	6.7273	6.4459	6.1707	-1.13	1.11
39       6.0170       5.7454       5.4812       -1.25       1.22         40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	37	6.4803	6.2021	5.9304	-1.17	1.14
40       5.7997       5.5316       5.2712       -1.29       1.25         41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	38	6.2437	5.9687	5.7007	-1.21	1.18
41       5.5914       5.3269       5.0704       -1.33       1.29         42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	39	6.0170	5.7454	5.4812	-1.25	1.22
42       5.3916       5.1308       4.8783       -1.37       1.33         43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	40	5.7997	5.5316	5.2712	-1.29	1.25
43       5.2001       4.9430       4.6944       -1.41       1.36         44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	41	5.5914	5.3269	5.0704	-1.33	1.29
44       5.0163       4.7630       4.5185       -1.45       1.40         45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	42	5.3916	5.1308	4.8783	-1.37	1.33
45       4.8400       4.5905       4.3500       -1.49       1.44         46       4.6708       4.4252       4.1887       -1.53       1.47         47       4.5083       4.2666       4.0342       -1.57       1.51	43	5.2001	4.9430	4.6944	-1.41	1.36
46     4.6708     4.4252     4.1887     -1.53     1.47       47     4.5083     4.2666     4.0342     -1.57     1.51	44	5.0163	4.7630	4.5185	-1.45	1.40
47     4.5083     4.2666     4.0342     -1.57     1.51	45	4.8400	4.5905	4.3500	-1.49	1.44
	46	4.6708	4.4252	4.1887		1.47
48     4.3524     4.1145     3.8862     -1.61     1.55	47		4.2666		-1.57	
	48	4.3524	4.1145	3.8862	-1.61	1.55



# Haier

				1 dilottorio	
49	4.2026	3.9686	3.7443	-1.65	1.59
50	4.0588	3.8287	3.6084	-1.70	1.62
51	3.9206	3.6943	3.4780	-1.74	1.66
52	3.7878	3.5654	3.3531	-1.78	1.70
53	3.6601	3.4416	3.2332	-1.82	1.74
54	3.5374	3.3227	3.1183	-1.87	1.78
55	3.4195	3.2085	3.0079	-1.91	1.82
56	3.3060	3.0989	2.9021	-1.95	1.85
57	3.1969	2.9935	2.8005	-2.00	1.89
58	3.0919	2.8922	2.7029	-2.04	1.93
59	2.9909	2.7948	2.6092	-2.08	1.97
60	2.8936	2.7012	2.5193	-2.13	2.01
61	2.8000	2.6112	2.4328	-2.17	2.05
62	2.7099	2.5246	2.3498	-2.22	2.09
63	2.6232	2.4413	2.2700	-2.26	2.13
64	2.5396	2.3611	2.1932	-2.31	2.17
65	2.4591	2.2840	2.1195	-2.36	2.21
66	2.3815	2.2098	2.0486	-2.40	2.25
67	2.3068	2.1383	1.9803	-2.45	2.29
68	2.2347	2.0695	1.9147	-2.49	2.34
69	2.1652	2.0032	1.8516	-2.54	2.38
70	2.0983	1.9393	1.7908	-2.59	2.42
71	2.0337	1.8778	1.7324	-2.63	2.46
72	1.9714	1.8186	1.6761	-2.68	2.50
73	1.9113	1.7614	1.6219	-2.73	2.54
74	1.8533	1.7064	1.5697	-2.78	2.58
75	1.7974	1.6533	1.5194	-2.83	2.63
76	1.7434	1.6021	1.4710	-2.88	2.67
77	1.6913	1.5528	1.4243	-2.92	2.71
78	1.6409	1.5051	1.3794	-2.97	2.75
79	1.5923	1.4592	1.3360	-3.02	2.80
80	1.5454	1.4149	1.2942	-3.07	2.84
81	1.5000	1.3721	1.2540	-3.12	2.88
82	1.4562	1.3308	1.2151	-3.17	2.93
83	1.4139	1.2910	1.1776	-3.22	2.97
84	1.3730	1.2525	1.1415	-3.27	3.01
85	1.3335	1.2153	1.1066	-3.32	3.06
86	1.2953	1.1794	1.0730	-3.38	3.10
87	1.2583	1.1448	1.0405	-3.43	3.15
88	1.2226	1.1113	1.0092	-3.48	3.19
89	1.1880	1.0789	0.9789	-3.53	3.24
90	1.1546	1.0476	0.9497	-3.58	3.28
91	1.1223	1.0174	0.9215	-3.64	3.33
92	1.0910	0.9882	0.8942	-3.69	3.37



Functions and control

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93	1.0607	0.9599	0.8679	-3.74	3.42
94	1.0314	0.9326	0.8424	-3.80	3.46
95	1.0030	0.9061	0.8179	-3.85	3.51
96	0.9756	0.8806	0.7941	-3.90	3.55
97	0.9490	0.8558	0.7711	-3.96	3.60
98	0.9232	0.8319	0.7489	-4.01	3.64
99	0.8983	0.8088	0.7275	-4.07	3.69
100	0.8741	0.7863	0.7067	-4.12	3.74
101	0.8507	0.7646	0.6867	-4.18	3.78
102	0.8281	0.7436	0.6672	-4.23	3.83
103	0.8061	0.7233	0.6484	-4.29	3.88
104	0.7848	0.7036	0.6303	-4.34	3.92
105	0.7641	0.6845	0.6127	-4.40	3.97
106	0.7441	0.6661	0.5957	-4.46	4.02
107	0.7247	0.6482	0.5792	-4.51	4.07
108	0.7059	0.6308	0.5632	-4.57	4.12
109	0.6877	0.6140	0.5478	-4.63	4.16
110	0.6700	0.5977	0.5328	-4.69	4.21
111	0.6528	0.5820	0.5183	-4.74	4.26
112	0.6361	0.5667	0.5043	-4.80	4.31
113	0.6200	0.5518	0.4907	-4.86	4.36
114	0.6043	0.5374	0.4775	-4.92	4.41
115	0.5891	0.5235	0.4648	-4.98	4.45
116	0.5743	0.5100	0.4524	-5.04	4.50
117	0.5600	0.4968	0.4404	-5.10	4.55
118	0.5460	0.4841	0.4288	-5.16	4.60
119	0.5325	0.4717	0.4175	-5.22	4.65
120	0.5194	0.4597	0.4066	-5.28	4.70

### Discharging Sensor

R80°C=50K $\Omega$   $\pm$ 3% B25/80°C=4450K $\pm$ 3%

Temp.((°C))	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	14646.0505	12061.7438	9924.4999	-2.96	2.45
-29	13654.1707	11267.8730	9290.2526	-2.95	2.44
-28	12735.8378	10531.3695	8700.6388	-2.93	2.44
-27	11885.1336	9847.7240	8152.2338	-2.92	2.43
-26	11096.6531	9212.8101	7641.8972	-2.91	2.42
-25	10365.4565	8622.8491	7166.7474	-2.90	2.42
-24	9687.0270	8074.3787	6724.1389	-2.88	2.41
-23	9057.2314	7564.2244	6311.6413	-2.87	2.41
-22	8472.2852	7089.4741	5927.0206	-2.86	2.40
-21	7928.7217	6647.4547	5568.2222	-2.84	2.39





20         7423,3828         6235,7109         6233,3554         2.83         239           .19         6853,2830         5851,5864         4920,6791         2.82         2.38           .18         6518,8375         5484,2064         4628,5894         -280         2.37           .17         6108,5393         5100,4821         4355,6078         -2.79         2.37           .16         5728,1413         4848,9863         4100,3708         -2.75         2.36           .14         5040,0114         4286,5535         3638,1938         -2.75         2.34           .13         4738,4141         4022,7088         3429,0191         -2.73         2.34           .12         4451,4586         3765,3810         3233,1039         -2.72         2.32           .10         3933,3289         3365,7336         2877,4527         -2.69         2.31           .9         3909,6139         3171,3488         2716,0828         -2.67         2.30           .8         3480,9407         299,2480         2584,6945         -2.66         2.29           .7         3276,5302         2818,6731         -242,6139         -2.64         2.28           .8         340,947						
18	-20	7423.3626	6235.7109	5233.3554	-2.83	2.39
-17         8108.5393         5160.4621         4355.6078         -2.79         2.37           16         5729.1413         4848.9963         4100.3708         2.27         2.36           -15         5375.5683         4558.1906         3861.6201         -2.76         2.34           -14         504.59114         4286.5355         3638.1938         2.275         2.34           -13         4738.4141         4632.7098         3428.0191         -2.73         2.34           -12         4451.4866         3795.3910         3233.1039         2.72         2.33           -11         4183.5548         3673.4260         3040.5312         -2.70         2.32           -10         3933.3289         3365.7336         2877.4527         2.69         2.31           -9         3699.5139         3171.3148         2716.0828         -2.67         2.30           -8         3400.9407         2989.2460         2564.8946         -2.66         2.29           -7         3276.5302         2818.6731         2426.139         -2.64         2.26           -6         3005.2864         2568.8058         2289.2164         2.63         2.28           -6         206.2861	-19	6953.2930	5851.9864	4920.6791	-2.82	2.38
-16         5729.1413         4848.9963         4100.3706         -2.77         236           -15         5375.5863         4558.1906         3861.6201         -2.76         2.35           -14         5045.9114         4286.5535         3636.1938         -2.75         2.34           -13         4738.4141         4032.7098         3420.0191         2.27         2.33           -12         4451.4566         3795.3910         3233.1009         -2.72         2.33           -11         4183.5548         3573.4260         3049.5312         2.20         2.32           -10         393.3289         3167.336         2877.4527         2.69         2.31           -9         3699.9139         3171.3148         2716.0228         2.26         2.30           -8         3480.9407         2989.2460         2564.6945         2.66         2.29           -7         3276.5302         2818.6731         2422.6139         2.264         2.28           -6         3085.2864         2568.8058         2282.164         2.63         2.22           -4         2738.0777         2389.3158         2046.1961         2.60         2.26           -3         2581.6752	-18	6515.8375	5494.2064	4628.5894	-2.80	2.37
15	-17	6108.5393	5160.4621	4355.6078	-2.79	2.37
-14         50459114         4286.5535         3638.1938         -2.75         2.34           -13         4738.4141         4032.7098         3420.0191         -2.73         2.34           -12         4451.4568         3756.3910         333.1039         -2.70         2.32           -10         3933.3289         3565.7336         2877.4527         -2.69         2.31           -9         3699.5138         3171.3148         2716.0828         -2.67         2.30           -8         3480.9407         2880.2460         2564.6945         -2.66         2.29           -7         3276.5302         2818.6731         2422.6139         -2.64         2.28           -6         3095.2854         2568.9058         2282.164         -2.63         2.28           -5         2906.2851         2508.9126         2163.9230         -2.61         2.27           -4         2738.6777         2383.3158         2046.1981         -2.60         2.26           -3         2581.6752         226.383.936         1935.5371         -2.56         2.24           -1         2296.6230         11962.2609         1733.6024         -2.56         2.24           -1         2296.6230	-16	5729.1413	4848.9963	4100.3708	-2.77	2.36
-13         4738.4141         4032.7098         3429.0191         -2.73         2.34           -12         4451.4588         3796.3910         323.1039         -2.72         2.33           -11         4183.5548         3573.4260         3049.5312         -2.70         2.32           -10         3933.3288         3365.7336         2877.4527         -2.69         2.31           -9         3699.5139         3171.3148         2716.0828         -2.67         2.30           -8         3480.9407         2989.2460         2564.0945         -2.66         229           -7         3276.5302         2818.6731         2422.0139         -2.64         2.28           -6         3095.2854         2558.8058         2289.2164         -2.63         2.28           -6         2906.2851         2508.9126         2163.8230         -2.61         2.27           -4         2736.6777         2368.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -1         2296.6230         1986.2569         173.8024         -2.55         2.23           -1         2296.6230	-15	5375.5683	4558.1906	3861.6201	-2.76	2.35
-12         4451,4586         3795,3910         3233,1039         -2.72         2.33           -11         4183,5548         3573,4260         3049,6312         -2.70         2.32           -10         3933,3289         3365,7336         2877,4527         -2.69         2.31           -9         3695,5139         3171,3148         2716,0828         -2.67         2.30           -8         3480,9407         2988,2460         2664,6945         -2.66         2.29           -7         3276,5302         2816,6731         2422,6139         -2.64         2.28           -6         3085,2854         2858,8058         2289,2164         -2.63         2.28           -5         2906,2851         2568,9126         2163,9230         -2.61         2.27           -4         2738,6772         2368,3158         294,61961         -2.60         2.26           -3         2816,6752         2236,3376         1935,5371         -2.58         2.25           -2         2434,5487         2112,5459         1831,4826         -2.56         2.24           -1         2296,6230         1996,2509         1733,6024         -2.55         2.23           0         2167,7730	-14	5045.9114	4286.5535	3638.1938	-2.75	2.34
-11         4183.5548         3573.4260         3049.5312         -2.70         2.32           -10         3933.3289         3365.7336         2877.4527         -2.69         2.31           -9         3699.5139         3171.3148         2716.0828         -2.67         2.30           -8         3480.9407         2989.2460         2564.6945         -2.66         2.29           -7         3276.5302         2818.6731         2422.6139         -2.64         2.28           -6         3085.2854         2658.8058         2289.2164         -2.63         2.28           -6         2906.2851         2508.9128         2163.9230         -2.61         2.27           -4         2738.6777         2383.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -2         2434.5487         2112.5459         1831.8826         -2.53         2.22           -1         2296.6230         1996.2509         1733.9024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         1932.0242	-13	4738.4141	4032.7098	3429.0191	-2.73	2.34
1-10   3933-3289   3365-7336   2877-4527   -2.69   2.31     9   3699.5139   3171.3148   2716.0828   -2.67   2.30     -8   3460.9407   2989.2460   2664.6945   -2.66   2.29     -7   3276.5302   2818.6731   2422.6139   -2.64   2.28     -6   3085.2854   2258.8058   2289.2164   -2.63   2.28     -5   2906.2851   2508.9126   2163.9230   -2.61   2.27     -4   2738.6777   2368.3158   2046.1961   -2.60   2.26     -3   2881.6752   2236.3676   1935.5371   -2.58   2.25     -2   2434.5487   2112.5459   1831.4826   -2.56   2.24     -1   2096.6230   1969.2609   1733.6024   -2.55   2.23     0   2167.2730   1887.0018   1641.4966   -2.53   2.22     1   2045.9191   1784.3336   1554.7931   -2.52   2.21     2   1932.0242   1687.8144   1473.1460   -2.50   2.20     3   1825.0899   1567.0431   1396.2333   -2.48   2.19     4   1724.6540   1511.6468   1323.7551   -2.47   2.17     5   1630.2870   1431.2787   1256.4324   -2.45   2.16     6   1541.5904   1355.6163   1191.0048   -2.43   2.15     7   1458.1938   1284.3993   1130.2288   2.41   2.14     8   1379.7528   1217.2282   1072.8813   -2.40   2.13     9   1305.4792   1153.9626   1018.7481   -2.38   2.11     10   1236.4792   1094.3200   967.6334   -2.36   2.11     11   171.0715   1036.0743   919.3533   -2.35   2.09     12   1109.4661   985.0146   873.7359   2.23   2.08     13   1051.4226   934.840   830.6210   -2.31   2.07     14   996.7169   887.6792   788.833   -2.29   2.06     15   945.1404   843.0466   751.3077   -2.27   2.04     16   896.4981   800.8922   714.8380   -2.26   2.03     17   850.6086   761.6033   680.3265   -2.24   2.02     19   727.8172   664.1596   587.4271   -2.18   1.98     20   727.8172   664.1596   587.4271   -2.18   1.98     21   691.3524   622.3161   569.6664   -2.16   1.96     22   658.8978   592.1831   533.834   -2.16   -1.96	-12	4451.4586	3795.3910	3233.1039	-2.72	2.33
-9         3699.5139         3171.3148         2716.0828         -2.67         230           -8         3480.9407         2989.2460         2564.6945         -2.66         229           -7         3276.5302         2818.6731         2422.6139         -2.64         228           -6         3085.2854         2658.8058         2289.2164         -2.63         228           -5         2906.2851         2508.9126         2163.9230         -2.61         2.27           -4         2738.6777         2368.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         225           -2         2434.5487         2112.5459         1831.4826         -2.56         2.24           -1         2296.6230         1996.2609         1733.0024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1667.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.	-11	4183.5548	3573.4260	3049.5312	-2.70	2.32
-8         3480.9407         2989.2460         2564.6945         -2.66         229           -7         3276.5302         2818.6731         2422.6139         -2.64         228           -6         3085.2854         2658.8058         2289.2164         -2.63         228           -5         2906.2851         2508.9126         2183.9230         -2.61         227           -4         2738.6777         2368.3158         2046.1961         -2.00         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -2         2434.5487         2112.5459         1831.4826         -2.56         2.24           -1         2296.6230         1996.2509         1733.6024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.	-10	3933.3289	3365.7336	2877.4527	-2.69	2.31
-7         3276.5302         2818.6731         2422.6139         -2.64         228           -6         3085.2854         2658.8058         2289.2164         -2.63         228           -5         2906.2851         2508.9126         2163.9230         -2.61         227           -4         2738.6777         2368.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -2         2434.5487         2112.5459         1831.4826         -2.56         2.24           -1         2296.6230         1996.2509         1733.6024         -2.56         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.	-9	3699.5139	3171.3148	2716.0828	-2.67	2.30
-6         3085.2854         2658.8058         2289.2164         -2.63         2.28           -5         2906.2851         2508.9126         2163.9230         -2.61         2.27           -4         2738.6777         2368.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -2         2434.5487         2112.5459         1831.4826         -2.56         2.24           -1         2296.6230         1996.2509         1733.6024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.2787         1255.4324         -2.45         2.16           6         1541.5904         135	-8	3480.9407	2989.2460	2564.6945	-2.66	2.29
-5         2906.2851         2508.9126         2163.9230         -2.61         227           -4         2738.6777         2368.3158         2046.1961         -2.60         226           -3         2581.6752         2236.3876         1935.5371         -2.58         225           -2         2434.5487         2112.5459         1831.4826         -2.66         2.24           -1         2296.6230         1996.2509         1733.6024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.8468         1323.7551         -2.47         2.17           5         1630.2870         1431.2767         1255.4324         -2.45         2.16           6         1541.5904         1355.6163         1191.0048         -2.43         2.15           7         1458.1938         1267.25	-7	3276.5302	2818.6731	2422.6139	-2.64	2.28
-4         2738.6777         2368.3158         2046.1961         -2.60         2.26           -3         2581.6752         2236.3876         1935.5371         -2.58         2.25           -2         2434.5487         2112.5459         1831.4826         -2.56         2.24           -1         2296.6230         1996.2509         1733.6024         -2.55         2.23           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6840         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.2787         1255.4324         -2.45         2.16           6         1541.5904         1355.6163         1191.0048         -2.43         2.15           7         1458.1938         1284.3593         1130.2298         -2.41         2.14           8         1379.7528         1217.	-6	3085.2854	2658.8058	2289.2164	-2.63	2.28
-3         2581.6752         2236.3876         1935.5371         -2.58         225           -2         2434.5487         2112.5459         1831.4826         -2.56         224           -1         2296.6230         1996.2509         1733.6024         -2.55         223           0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         221           2         1932.0242         1687.8144         1473.1460         -2.50         220           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.2787         1255.4324         -2.45         2.16           6         1541.5904         1355.6163         1191.0048         -2.43         2.15           7         1458.1938         1284.3593         1130.2298         -2.41         2.14           8         1379.7528         1217.2282         1072.8813         -2.40         2.13           9         1305.9472         1153.9626 </td <td>-5</td> <td>2906.2851</td> <td>2508.9126</td> <td>2163.9230</td> <td>-2.61</td> <td>2.27</td>	-5	2906.2851	2508.9126	2163.9230	-2.61	2.27
-2         2434,5487         2112,5459         1831,4826         -2.56         224           -1         2296,6230         1996,2509         1733,6024         -2.55         223           0         2167,2730         1887,0018         1641,4966         -2.53         2.22           1         2045,9191         1784,3336         1554,7931         -2.52         2.21           2         1932,0242         1687,8144         1473,1460         -2.50         2.20           3         1825,0899         1597,0431         1396,2333         -248         2.19           4         1724,6540         1511,6468         1323,7551         -247         2.17           5         1630,2870         1431,2787         1255,4324         -245         2.16           6         1541,5904         1355,6163         1191,0048         -243         2.15           7         1458,1938         1284,3593         1130,2298         -241         2.14           8         1379,7528         1217,2282         1072,8813         -240         2.13           9         1305,9472         1153,9626         1018,7481         -2.38         2.12           10         1236,4792         1094,3200	-4	2738.6777	2368.3158	2046.1961	-2.60	2.26
-1         2296,6230         1996,2509         1733,6024         -2.65         223           0         2167,2730         1887,0018         1641,4966         -2.53         2.22           1         2045,9191         1784,3336         1554,7931         -2.52         2.21           2         1932,0242         1687,8144         1473,1460         -2.50         2.20           3         1825,0899         1597,0431         1396,2333         -248         2.19           4         1724,6540         1511,6468         1323,7551         -247         2.17           5         1630,2870         1431,2787         1255,4324         -245         2.16           6         1541,5904         1355,6163         1191,0048         -243         2.15           7         1458,1938         1284,3593         1130,0298         -241         2.14           8         1379,7528         1217,2282         1072,8813         -240         2.13           9         1305,9472         1153,9626         1018,7481         -2.38         2.12           10         1236,4792         1094,3200         967,6334         -2.36         2.11           11         1171,0715         1038,0743	-3	2581.6752	2236.3876	1935.5371	-2.58	2.25
0         2167.2730         1887.0018         1641.4966         -2.53         2.22           1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.2787         1255.4324         -2.45         2.16           6         1541.5904         1355.6163         1191.0048         -2.43         2.15           7         1458.1938         1284.3593         1130.2298         -2.41         2.14           8         1379.7528         1217.2282         1072.8813         -2.40         2.13           9         1305.9472         1153.9626         1018.7481         -2.38         2.12           10         1236.4792         1094.3200         967.6334         -2.36         2.11           11         171.0715         1038.0743         919.3533         -2.35         2.09           12         1109.4661         985.0146<	-2	2434.5487	2112.5459	1831.4826	-2.56	2.24
1         2045.9191         1784.3336         1554.7931         -2.52         2.21           2         1932.0242         1687.8144         1473.1460         -2.50         2.20           3         1825.0899         1597.0431         1396.2333         -2.48         2.19           4         1724.6540         1511.6468         1323.7551         -2.47         2.17           5         1630.2870         1431.2787         1255.4324         -2.45         2.16           6         1541.5904         1355.6163         1191.0048         -2.43         2.15           7         1458.1938         1284.3593         1130.2298         -2.41         2.14           8         1379.7528         1217.2282         1072.8813         -2.40         2.13           9         1305.9472         1153.9626         1018.7481         -2.38         2.12           10         1236.4792         1094.3200         967.6334         -2.36         2.11           11         1171.0715         1038.0743         919.3533         -2.35         2.09           12         1109.4661         985.0146         873.7359         -2.33         2.08           13         1051.4226         934.9440<	-1	2296.6230	1996.2509	1733.6024	-2.55	2.23
2       1932.0242       1687.8144       1473.1460       -2.50       2.20         3       1825.0899       1597.0431       1396.2333       -2.48       2.19         4       1724.6540       1511.6468       1323.7551       -2.47       2.17         5       1630.2870       1431.2787       1255.4324       -2.45       2.16         6       1541.5904       1355.6163       1191.0048       -2.43       2.15         7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       8	0	2167.2730	1887.0018	1641.4966	-2.53	2.22
3       1825.0899       1597.0431       1396.2333       -2.48       2.19         4       1724.6540       1511.6468       1323.7551       -2.47       2.17         5       1630.2870       1431.2787       1255.4324       -2.45       2.16         6       1541.5904       1355.6163       1191.0048       -2.43       2.15         7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800	1	2045.9191	1784.3336	1554.7931	-2.52	2.21
4       1724.6540       1511.6468       1323.7551       -2.47       2.17         5       1630.2870       1431.2787       1255.4324       -2.45       2.16         6       1541.5904       1355.6163       1191.0048       -2.43       2.15         7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0	2	1932.0242	1687.8144	1473.1460	-2.50	2.20
5       1630.2870       1431.2787       1255.4324       -2.45       2.16         6       1541.5904       1355.6163       1191.0048       -2.43       2.15         7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1,171.0715       1038.0743       919.3533       -2.35       2.09         12       1,109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4	3	1825.0899	1597.0431	1396.2333	-2.48	2.19
6       1541.5904       1355.6163       1191.0048       -2.43       2.15         7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205<	4	1724.6540	1511.6468	1323.7551	-2.47	2.17
7       1458.1938       1284.3593       1130.2298       -2.41       2.14         8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596 <td>5</td> <td>1630.2870</td> <td>1431.2787</td> <td>1255.4324</td> <td>-2.45</td> <td>2.16</td>	5	1630.2870	1431.2787	1255.4324	-2.45	2.16
8       1379.7528       1217.2282       1072.8813       -2.40       2.13         9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.96         21       691.3524       622.3161	6	1541.5904	1355.6163	1191.0048	-2.43	2.15
9       1305.9472       1153.9626       1018.7481       -2.38       2.12         10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831	7	1458.1938	1284.3593	1130.2298	-2.41	2.14
10       1236.4792       1094.3200       967.6334       -2.36       2.11         11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	8	1379.7528	1217.2282	1072.8813	-2.40	2.13
11       1171.0715       1038.0743       919.3533       -2.35       2.09         12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	9	1305.9472	1153.9626	1018.7481	-2.38	2.12
12       1109.4661       985.0146       873.7359       -2.33       2.08         13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	10	1236.4792	1094.3200	967.6334	-2.36	2.11
13       1051.4226       934.9440       830.6210       -2.31       2.07         14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	11	1171.0715	1038.0743	919.3533	-2.35	2.09
14       996.7169       887.6792       789.8583       -2.29       2.06         15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	12	1109.4661	985.0146	873.7359	-2.33	2.08
15       945.1404       843.0486       751.3077       -2.27       2.04         16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	13	1051.4226	934.9440	830.6210	-2.31	2.07
16       896.4981       800.8922       714.8380       -2.26       2.03         17       850.6086       761.0603       680.3265       -2.24       2.02         18       807.3024       723.4134       647.6580       -2.22       2.00         19       766.4212       687.8205       616.7252       -2.20       1.99         20       727.8172       654.1596       587.4271       -2.18       1.98         21       691.3524       622.3161       559.6694       -2.16       1.96         22       656.8979       592.1831       533.3634       -2.14       1.95	14	996.7169	887.6792	789.8583	-2.29	2.06
17     850.6086     761.0603     680.3265     -2.24     2.02       18     807.3024     723.4134     647.6580     -2.22     2.00       19     766.4212     687.8205     616.7252     -2.20     1.99       20     727.8172     654.1596     587.4271     -2.18     1.98       21     691.3524     622.3161     559.6694     -2.16     1.96       22     656.8979     592.1831     533.3634     -2.14     1.95	15	945.1404	843.0486	751.3077	-2.27	2.04
18     807.3024     723.4134     647.6580     -2.22     2.00       19     766.4212     687.8205     616.7252     -2.20     1.99       20     727.8172     654.1596     587.4271     -2.18     1.98       21     691.3524     622.3161     559.6694     -2.16     1.96       22     656.8979     592.1831     533.3634     -2.14     1.95	16	896.4981	800.8922	714.8380	-2.26	2.03
19     766.4212     687.8205     616.7252     -2.20     1.99       20     727.8172     654.1596     587.4271     -2.18     1.98       21     691.3524     622.3161     559.6694     -2.16     1.96       22     656.8979     592.1831     533.3634     -2.14     1.95	17	850.6086	761.0603	680.3265	-2.24	2.02
20     727.8172     654.1596     587.4271     -2.18     1.98       21     691.3524     622.3161     559.6694     -2.16     1.96       22     656.8979     592.1831     533.3634     -2.14     1.95	18	807.3024	723.4134	647.6580	-2.22	2.00
21     691.3524     622.3161     559.6694     -2.16     1.96       22     656.8979     592.1831     533.3634     -2.14     1.95	19	766.4212	687.8205	616.7252	-2.20	1.99
22 656.8979 592.1831 533.3634 -2.14 1.95	20	727.8172	654.1596	587.4271	-2.18	1.98
	21	691.3524	622.3161	559.6694	-2.16	1.96
23     624.3328     563.6604     508.4261     -2.12     1.93	22	656.8979	592.1831	533.3634	-2.14	1.95
	23	624.3328	563.6604	508.4261	-2.12	1.93



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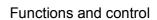
24         693,5446         \$36,640         484,7766         -2.10         1.92           25         564,4275         511,070         462,3510         -2.09         1.90           26         586,8868         486,9352         441,1516         -2.07         1.89           27         611,0105         440,600         421,0288         -2.05         1.87           28         480,4151         442,3499         401,9146         -2.03         1.88           30         441,0535         402,2430         366,5175         -1.99         1.83           31         420,1431         383,7161         350,301         -1.97         1.81           32         403,3242         384,341         319,7460         -1.93         1.76           33         361,3530         348,4541         319,7460         -1.99         1.76           34         33,3776         335,5801         2279,9266         -1.88         1.73           34         30,1124         275,6976         256,2820         -1.82         1.70           37         315,5682         290,6199         267,4031         -1.84         1.71           38         301,1224         275,6976         255,2826						
28         536,8865         486,9352         441,1516         2.07         1,89           27         611,0105         484,0600         421,0288         2.265         1,87           28         486,4151         442,3498         40,19146         2.263         1,87           29         485,1208         421,7683         383,7626         2,211         1,84           30         441,0535         402,2430         386,5175         -1,99         1,83           31         420,1431         383,7151         350,1301         -1,197         1,81           32         400,3242         366,1958         334,5582         -1,95         1,86           33         381,5350         349,4941         319,7460         -1,93         1,76           34         382,7176         333,8901         305,6845         -1,90         1,76           35         36,8176         318,5216         292,2709         -1,88         1,75           36         330,7339         304,2151         279,5288         -1,18         1,71           38         301,1254         277,6976         25,5820         -1,82         1,70           39         227,4128         285,4119         244,8745<	24	593.5446	536.6540	484.7796	-2.10	1.92
27         511,0105         464,0500         421,0258         2.05         1.87           28         488,4151         442,3499         401,0146         2.03         1.86           29         463,1208         421,7683         383,7626         2.01         1.84           30         441,0355         402,2430         386,5175         1.199         1.83           31         420,1431         383,7151         350,1301         1.197         1.81           32         400,3242         386,1295         334,5542         1.195         1.80           34         383,1750         349,4341         319,7460         -1.93         1.76           34         363,776         333,5891         306,58645         -1.90         1.76           35         346,8176         318,5216         292,2709         -1.88         1.75           36         330,7839         304,2151         279,5266         -1.86         1.73           37         315,5862         290,6193         267,4031         -1.84         1.71           38         301,1254         277,5976         255,8820         -1.82         1.70           39         287,4128         265,4119         244,8745 </td <td>25</td> <td>564.4275</td> <td>511.0760</td> <td>462.3510</td> <td>-2.09</td> <td>1.90</td>	25	564.4275	511.0760	462.3510	-2.09	1.90
28         486.151         442.3499         401.9146         -2.03         1.86           29         463.1208         421.7683         383.7626         2.201         1.84           30         441.0636         402.2430         366.5175         -1.99         1.83           31         420.1431         383.7151         360.1301         -1.97         1.81           32         400.3242         366.1295         334.5842         -1.95         1.80           33         381.5350         349.4341         319.7460         -1.93         1.78           34         363.7676         333.5601         305.6645         -1.90         1.76           35         348.8176         318.5216         292.2709         -1.88         1.73           36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         225.8620         -1.82         1.70           39         287.4128         285.4119         244.8745         -1.80         1.88           40         274.3905         253.7288         234.4118	26	536.9865	486.9352	441.1516	-2.07	1.89
29         463 1208         421 7683         383 7626         -2.01         1.84           30         441 0535         402 2430         365.5175         -1.99         1.83           31         420 1431         383 7151         350 1301         -1.197         1.81           32         400 2242         366 1295         334.5542         -1.96         1.80           33         391 5350         349.4341         319.7460         -1.93         1.76           34         33,37176         333.5801         305.6645         -1.90         1.76           35         346.8176         318.5216         292.2709         -1.88         1.76           36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.6745         -1.80         1.86           41         262.0206         242.6161         224.4067         -1.76         1.66           41         262.0266         232.0436         214.95	27	511.0105	464.0500	421.0258	-2.05	1.87
30         441.0535         402.2430         366.5175         -1.99         1.83           31         420.1431         383.7151         350.1301         -1.97         1.81           32         400.3242         366.1295         334.5642         -1.95         1.80           33         381.5350         349.4341         319.7460         -1.93         1.76           34         363.7176         333.5801         305.6645         -1.90         1.76           35         346.8176         318.5216         292.2709         -1.88         1.75           36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1264         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.68           41         262.0266         232.2038         234.4118         -1.78         1.66           41         262.0266         232.0438         214.952         -1.74         1.63           42         292.676         232.20438         214.952<	28	486.4151	442.3499	401.9146	-2.03	1.86
31         420.1431         383.7151         350.1301         -1.97         1.81           32         400.3242         366.1295         334.5542         -1.95         1.80           33         381.5360         349.4341         319.7460         -1.93         1.76           34         363.7176         333.5801         305.6645         -1.90         1.76           35         346.8176         318.5216         292.2709         -1.88         1.75           36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.88           40         274.3905         253.7288         234.418         -1.76         1.64           41         262.0206         242.6161         224.4865         -1.74         1.63           43         239.083         221.925         205.9065         -1.71         1.61           44         228.2676         232.0438         219.929 <td>29</td> <td>463.1208</td> <td>421.7683</td> <td>383.7626</td> <td>-2.01</td> <td>1.84</td>	29	463.1208	421.7683	383.7626	-2.01	1.84
32         400.3242         366.1295         334.5542         4.195         1.80           33         381.5350         349.4341         3197.760         4.193         1.78           34         363.7176         333.5801         305.6645         4.190         1.76           35         346.8176         318.5216         292.2709         4.186         1.73           36         330.7839         304.2151         279.5286         4.186         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1264         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.68           40         274.3905         253.7288         234.4118         -1.76         1.64           41         262.0206         242.6161         224.465         -1.76         1.64           42         250.2676         232.0436         214.9529         -1.74         1.63           43         238.0983         221.9825         205.9065         -1.71         1.61           44         228.4009         212.4060         197.284<	30	441.0535	402.2430	366.5175	-1.99	1.83
33         381,5350         349,4341         319,7460         41,93         1,78           34         363,7176         333,5801         305,6645         41,90         1,76           35         346,8176         318,5216         292,2709         41,88         1,75           36         330,7839         304,2151         279,5286         41,86         1,73           37         315,5682         290,6199         267,4031         41,84         1,71           38         301,1254         277,6976         255,8620         41,82         1,70           39         287,4128         265,4119         244,8745         -1,80         1,68           40         274,3905         283,7288         234,4118         4,76         1,64           41         262,0206         242,6161         224,465         4,76         1,64           42         250,2676         232,0436         214,9529         -1,74         1,61           44         28,809         212,4060         197,2844         -1,69         1,59           45         218,3860         203,2887         189,0548         -1,67         1,57           46         208,7855         194,6066         181,2273 <td>31</td> <td>420.1431</td> <td>383.7151</td> <td>350.1301</td> <td>-1.97</td> <td>1.81</td>	31	420.1431	383.7151	350.1301	-1.97	1.81
34         363.7176         333.5801         305.6845         4.190         1.76           35         346.8176         318.5216         292.2709         41.88         1.75           36         330.7839         304.2161         279.5286         41.86         1.73           37         315.6862         290.6199         287.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         41.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.68           40         274.3905         253.7288         234.4118         -1.76         1.66           41         262.0206         242.6161         224.4655         -1.76         1.64           42         250.2676         232.0436         214.9529         -1.74         1.63           43         239.0833         221.9825         205.9086         -1.71         1.61           44         228.4609         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0848         -1.67         1.57           47         199.6531         186.3369         173.752	32	400.3242	366.1295	334.5542	-1.95	1.80
35         346.8176         318.5216         292.2709         -1.88         1.75           36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         285.4119         244.8745         -1.80         1.68           40         274.3905         253.7288         234.4118         -1.76         1.66           41         262.0206         242.6161         224.4465         -1.76         1.64           42         250.2676         232.0436         214.9529         -1.74         1.63           43         239.9983         221.9825         205.9065         -1.71         1.61           44         228.4809         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.621	33	381.5350	349.4341	319.7460	-1.93	1.78
36         330.7839         304.2151         279.5286         -1.86         1.73           37         315.5682         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.68           40         274.3906         253.7288         234.4118         -1.76         1.66           41         262.0206         242.6161         224.465         -1.76         1.68           42         250.676         232.0436         214.9629         -1.74         1.63           43         239.0983         221.9825         205.9065         -1.71         1.61           44         228.4809         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.66         1.55           47         199.631         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.6217 </td <td>34</td> <td>363.7176</td> <td>333.5801</td> <td>305.6645</td> <td>-1.90</td> <td>1.76</td>	34	363.7176	333.5801	305.6645	-1.90	1.76
37         315.5882         290.6199         267.4031         -1.84         1.71           38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.88           40         274.3905         253.7288         234.4118         -1.76         1.66           41         262.0206         242.6161         224.4465         -1.74         1.66           41         262.0206         242.6161         224.4665         -1.74         1.63           42         250.2676         232.0436         214.9529         -1.74         1.61           43         239.0983         221.9825         205.9065         -1.71         1.61           44         228.4009         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.65         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.217	35	346.8176	318.5216	292.2709	-1.88	1.75
38         301.1254         277.6976         255.8620         -1.82         1.70           39         287.4128         265.4119         244.8745         -1.80         1.68           40         274.3905         253.7288         234.4118         -1.78         1.66           41         262.0206         242.6161         224.465         -1.76         1.64           42         250.2676         232.0436         214.9529         -1.74         1.63           43         239.0983         221.9825         205.9065         -1.71         1.61           44         228.4809         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.65         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         186.6217         -1.60         1.52           49         182.6945         170.9508         159.8181         -1.58         1.50           50         174.8228         163.7951         153.3249	36	330.7839	304.2151	279.5286	-1.86	1.73
39         287.4128         265.4119         244.8745         -1.80         1.68           40         274.3905         253.7288         234.4118         -1.78         1.66           41         262.0206         242.6161         224.465         -1.76         1.64           42         250.2676         232.0436         214.9529         -1.74         1.63           43         239.0983         221.9825         205.9065         -1.71         1.61           44         228.4809         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.63         1.54           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.217         -1.60         1.52           49         182.6945         170.9508         159.8181         -1.58         1.50           50         174.8228         163.7951         153.3249         -1.56         1.48           51         167.3280         156.9733         147.1268<	37	315.5682	290.6199	267.4031	-1.84	1.71
40         274,3905         253,7288         234,4118         -1,78         1,66           41         262,0206         242,6161         224,4465         -1,76         1,64           42         250,2676         232,0436         214,9529         -1,74         1,63           43         239,0983         221,9825         205,9065         -1,71         1,61           44         228,4809         212,4060         197,2844         -1,69         1,59           45         218,3860         203,2887         189,0648         -1,67         1,57           46         208,7855         194,6066         181,2273         -1,65         1,55           47         199,6391         186,3369         173,7524         -1,63         1,54           48         190,9639         178,4584         166,6217         -1,60         1,52           49         182,6945         170,9508         159,8181         -1,58         1,50           50         174,8228         163,7951         153,3249         -1,56         1,48           51         167,3280         156,9733         147,1268         -1,53         1,46           52         160,1904         150,4683         141,209	38	301.1254	277.6976	255.8620	-1.82	1.70
41       262.0206       242.6161       224.4465       -1.76       1.64         42       250.2676       232.0436       214.9529       -1.74       1.63         43       239.0983       221.9825       205.9065       -1.71       1.61         44       228.4809       212.4060       197.2844       -1.69       1.59         45       218.3860       203.2887       189.0648       -1.67       1.57         46       208.7855       194.6066       181.2273       -1.65       1.55         47       199.6531       186.3369       173.7524       -1.63       1.54         48       190.9639       178.4584       166.6217       -1.60       1.52         49       182.6945       170.9608       159.8181       -1.58       1.50         50       174.8228       163.7951       153.3249       -1.56       1.48         51       167.3280       156.9733       147.1268       -1.53       1.46         52       160.1904       150.4683       141.2090       -1.51       1.44         53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454 <td< td=""><td>39</td><td>287.4128</td><td>265.4119</td><td>244.8745</td><td>-1.80</td><td>1.68</td></td<>	39	287.4128	265.4119	244.8745	-1.80	1.68
42         250.2676         232.0436         214.9529         -1.74         1.63           43         239.0983         221.9825         205.9065         -1.71         1.61           44         228.4809         212.4060         197.2844         -1.69         1.59           45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.65         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.6217         -1.60         1.52           49         182.6945         170.9508         159.8181         -1.58         1.50           50         174,8228         163.7951         153.3249         -1.56         1.48           51         167.3280         156.9733         147.1268         -1.53         1.46           52         160.1904         150.4683         141.2090         -1.51         1.44           53         153.3914         144.2641         135.5577         -1.49         1.42           54         146.9136         138.3454         130.159	40	274.3905	253.7288	234.4118	-1.78	1.66
43         239,0983         221,9825         205,9065         -1.71         1.61           44         228,4809         212,4060         197,2844         -1.69         1.59           45         218,3860         203,2887         189,0648         -1.67         1.57           46         208,7855         194,6066         181,2273         -1.65         1.55           47         199,6531         186,3369         173,7524         -1.63         1.54           48         190,9639         178,4584         166,6217         -1.60         1.52           49         182,6945         170,9508         159,8181         -1.58         1.50           50         174,8228         163,7951         153,3249         -1.56         1.48           51         167,3280         156,9733         147,1268         -1.53         1.46           52         160,1904         150,4683         141,2090         -1.51         1.44           53         153,3914         144,2641         135,5577         -1.49         1.42           54         146,9136         138,3454         130,1598         -1.47         1.40           55         140,7403         132,6980         125,002	41	262.0206	242.6161	224.4465	-1.76	1.64
44         228,4809         212,4060         197,2844         -1,69         1,59           45         218,3860         203,2887         189,0648         -1,67         1,57           46         208,7855         194,6066         181,2273         -1,65         1,55           47         199,6531         186,3369         173,7524         -1,63         1,54           48         190,9639         178,4584         166,6217         -1,60         1,52           49         182,6945         170,9508         159,8181         -1,58         1,50           50         174,8228         163,7951         153,3249         -1,56         1,48           51         167,3280         156,9733         147,1268         -1,53         1,46           52         160,1904         150,4683         141,2090         -1,51         1,44           53         153,3914         144,2641         135,5577         -1,49         1,42           54         146,9136         138,3454         130,1598         -1,47         1,40           55         140,7403         132,6980         125,0027         -1,44         1,38           56         134,8559         127,3081         120,074	42	250.2676	232.0436	214.9529	-1.74	1.63
45         218.3860         203.2887         189.0648         -1.67         1.57           46         208.7855         194.6066         181.2273         -1.65         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.6217         -1.60         1.52           49         182.6945         170.9508         159.8181         -1.58         1.50           50         174.8228         163.7951         153.3249         -1.56         1.48           51         167.3280         156.9733         147.1268         -1.53         1.46           52         160.1904         150.4683         141.2090         -1.51         1.44           53         153.3914         144.2641         135.5577         -1.49         1.42           54         146.9136         138.3454         130.1598         -1.47         1.40           55         140.7403         132.6980         125.0027         -1.44         1.38           56         134.8559         127.3081         120.0746         -1.42         1.36           57         129.2457         122.1630         115.364	43	239.0983	221.9825	205.9065	-1.71	1.61
46         208.7855         194.6066         181.2273         -1.65         1.55           47         199.6531         186.3369         173.7524         -1.63         1.54           48         190.9639         178.4584         166.6217         -1.60         1.52           49         182.6945         170.9508         159.8181         -1.58         1.50           50         174.8228         163.7951         153.3249         -1.56         1.48           51         167.3280         156.9733         147.1268         -1.53         1.46           52         160.1904         150.4683         141.2090         -1.51         1.44           53         153.3914         144.2641         135.5577         -1.49         1.42           54         146.9136         138.3454         130.1598         -1.47         1.40           55         140.7403         132.6980         125.0027         -1.44         1.38           56         134.8559         127.3081         120.0746         -1.42         1.36           57         129.2457         122.1630         115.3645         -1.40         1.34           58         123.8956         117.2504         110.861	44	228.4809	212.4060	197.2844	-1.69	1.59
47       199.6531       186.3369       173.7524       -1.63       1.54         48       190.9639       178.4584       166.6217       -1.60       1.52         49       182.6945       170.9508       159.8181       -1.58       1.50         50       174,8228       163.7951       153.3249       -1.56       1.48         51       167.3280       156.9733       147.1268       -1.53       1.46         52       160.1904       150.4683       141.2090       -1.51       1.44         53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776 <td< td=""><td>45</td><td>218.3860</td><td>203.2887</td><td>189.0648</td><td>-1.67</td><td>1.57</td></td<>	45	218.3860	203.2887	189.0648	-1.67	1.57
48       190.9639       178.4584       166.6217       -1.60       1.52         49       182.6945       170.9508       159.8181       -1.58       1.50         50       174.8228       163.7951       153.3249       -1.56       1.48         51       167.3280       156.9733       147.1268       -1.53       1.46         52       160.1904       150.4683       141.2090       -1.51       1.44         53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961 <td< td=""><td>46</td><td>208.7855</td><td>194.6066</td><td>181.2273</td><td>-1.65</td><td>1.55</td></td<>	46	208.7855	194.6066	181.2273	-1.65	1.55
49       182.6945       170.9508       159.8181       -1.58       1.50         50       174.8228       163.7951       153.3249       -1.56       1.48         51       167.3280       156.9733       147.1268       -1.53       1.46         52       160.1904       150.4683       141.2090       -1.51       1.44         53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       9	47	199.6531	186.3369	173.7524	-1.63	1.54
50       174,8228       163,7951       153,3249       -1.56       1.48         51       167,3280       156,9733       147,1268       -1.53       1.46         52       160,1904       150,4683       141,2090       -1.51       1.44         53       153,3914       144,2641       135,5577       -1.49       1.42         54       146,9136       138,3454       130,1598       -1.47       1.40         55       140,7403       132,6980       125,0027       -1.44       1.38         56       134,8559       127,3081       120,0746       -1.42       1.36         57       129,2457       122,1630       115,3645       -1.40       1.34         58       123,8956       117,2504       110,8618       -1.37       1.32         59       118,7926       112,5589       106,5564       -1.35       1.30         60       113,9241       108,0776       102,4388       -1.32       1.28         61       109,2784       103,7961       98,5000       -1.30       1.26         62       104,8443       99,7046       94,7315       -1.28       1.23         63       100,6112       95,7939       91,	48	190.9639	178.4584	166.6217	-1.60	1.52
51       167.3280       156.9733       147.1268       -1.53       1.46         52       160.1904       150.4683       141.2090       -1.51       1.44         53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.673	49	182.6945	170.9508	159.8181	-1.58	1.50
52         160.1904         150.4683         141.2090         -1.51         1.44           53         153.3914         144.2641         135.5577         -1.49         1.42           54         146.9136         138.3454         130.1598         -1.47         1.40           55         140.7403         132.6980         125.0027         -1.44         1.38           56         134.8559         127.3081         120.0746         -1.42         1.36           57         129.2457         122.1630         115.3645         -1.40         1.34           58         123.8956         117.2504         110.8618         -1.37         1.32           59         118.7926         112.5589         106.5564         -1.35         1.30           60         113.9241         108.0776         102.4388         -1.32         1.28           61         109.2784         103.7961         98.5000         -1.30         1.26           62         104.8443         99.7046         94.7315         -1.28         1.23           63         100.6112         95.7939         91.1253         -1.25         1.21           64         96.5692         92.0553         87.6735	50	174.8228	163.7951	153.3249	-1.56	1.48
53       153.3914       144.2641       135.5577       -1.49       1.42         54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048	51	167.3280	156.9733	147.1268	-1.53	1.46
54       146.9136       138.3454       130.1598       -1.47       1.40         55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	52	160.1904	150.4683	141.2090	-1.51	1.44
55       140.7403       132.6980       125.0027       -1.44       1.38         56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	53	153.3914	144.2641	135.5577	-1.49	1.42
56       134.8559       127.3081       120.0746       -1.42       1.36         57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	54	146.9136	138.3454	130.1598	-1.47	1.40
57       129.2457       122.1630       115.3645       -1.40       1.34         58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	55	140.7403	132.6980	125.0027	-1.44	1.38
58       123.8956       117.2504       110.8618       -1.37       1.32         59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	56	134.8559	127.3081	120.0746	-1.42	1.36
59       118.7926       112.5589       106.5564       -1.35       1.30         60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	57	129.2457	122.1630	115.3645	-1.40	1.34
60       113.9241       108.0776       102.4388       -1.32       1.28         61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	58	123.8956	117.2504	110.8618	-1.37	1.32
61       109.2784       103.7961       98.5000       -1.30       1.26         62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	59	118.7926	112.5589	106.5564	-1.35	1.30
62       104.8443       99.7046       94.7315       -1.28       1.23         63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	60	113.9241	108.0776	102.4388	-1.32	1.28
63       100.6112       95.7939       91.1253       -1.25       1.21         64       96.5692       92.0553       87.6735       -1.23       1.19         65       92.7088       88.4805       84.3690       -1.20       1.17         66       89.0211       85.0614       81.2048       -1.18       1.15	61	109.2784	103.7961	98.5000	-1.30	1.26
64     96.5692     92.0553     87.6735     -1.23     1.19       65     92.7088     88.4805     84.3690     -1.20     1.17       66     89.0211     85.0614     81.2048     -1.18     1.15	62	104.8443	99.7046	94.7315	-1.28	1.23
65     92.7088     88.4805     84.3690     -1.20     1.17       66     89.0211     85.0614     81.2048     -1.18     1.15	63	100.6112	95.7939	91.1253	-1.25	1.21
66 89.0211 85.0614 81.2048 -1.18 1.15	64	96.5692	92.0553	87.6735	-1.23	1.19
	65	92.7088	88.4805	84.3690	-1.20	1.17
67 85.4976 81.7908 78.1744 -1.15 1.12	66	89.0211	85.0614	81.2048	-1.18	1.15
	67	85.4976	81.7908	78.1744	-1.15	1.12



# Haier

68         82.1303         78.6615         75.2715         -1.13         1.10           69         78.9116         75.6688         72.4902         -1.10         1.06           70         78.8343         72.8004         69.8249         -1.08         1.03           71         72.8816         70.0561         67.2703         -1.05         1.03           72         70.0707         67.4283         64.8213         -1.03         1.01           73         67.8444         64.9016         62.2731         -1.09         0.96           74         64.8030         62.5006         60.2211         -0.98         0.98           75         62.3422         60.1906         85.0000         -0.95         0.94           76         67.7223         55.852         53.9998         -0.90         0.89           76         67.7223         55.852         53.9998         -0.90         0.87           77         57.7223         55.8522         53.9998         -0.90         0.87           78         54.956         51.9700         50.0000         48.5000         -0.85         0.84           80         51.5000         50.0000         48.5000 <t< th=""><th></th><th></th><th></th><th></th><th></th><th>dia control</th></t<>						dia control
70         75.8343         72.8004         69.8249         -1.08         1.06           71         72.8916         70.0561         67.2703         -1.05         1.03           72         70.0770         67.4283         64.8213         -1.03         1.09           73         67.3844         64.8115         62.4731         -1.00         0.99           74         64.8080         62.5006         60.2211         -0.98         0.96           75         62.3423         60.1906         58.0609         -0.95         0.94           76         59.8821         57.9770         55.9885         -0.92         0.92           77         57.2223         55.8552         53.9988         -0.90         0.88           78         55.5583         53.8210         52.0912         -0.87         0.87           79         53.4866         51.8706         50.2591         -0.85         0.84           81         49.7663         48.2057         48.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         0.09         0.89           83         46.3286         44.8323         43.3452         -0.93 <t< td=""><td>68</td><td>82.1303</td><td>78.6615</td><td>75.2715</td><td>-1.13</td><td>1.10</td></t<>	68	82.1303	78.6615	75.2715	-1.13	1.10
71         72 8916         70.0661         67 2703         -1.05         1.03           72         70 0770         67 4283         64.8213         -1.03         1.01           73         67 3844         64.9115         62.4731         -1.00         0.98         0.96           74         64.8060         62.2506         60.2211         0.98         0.96           75         62.3423         60.1906         58.8000         -0.95         0.94           76         59.9821         57.9770         55.9885         0.92         0.92           77         57.7223         55.8552         53.9998         -0.90         0.87           78         55.5563         53.8210         52.0912         -0.87         0.87           79         53.4856         51.8706         80.2591         -0.85         0.84           80         51.5000         50.0000         48.5000         -0.85         0.84           81         49.7633         48.2427         44.9911         -0.99         0.89           82         47.9835         46.4842         44.9911         -0.99         0.89           83         48.226         43.2468         41.7672         -	69	78.9116	75.6668	72.4902	-1.10	1.08
72         70.0770         67.4283         64.8213         -1.03         1.01           73         67.3844         64.9115         62.4731         -1.00         0.99           74         64.8060         62.5066         60.2211         -0.98         0.96           75         62.3423         80.1906         58.8669         -0.95         0.94           76         59.9821         57.9770         55.9885         -0.92         0.92           77         67.7223         56.5652         59.9998         -0.90         0.89           78         55.583         53.8210         52.0912         -0.87         0.87           79         53.4866         51.5000         50.0000         48.5000         -0.85         0.84           80         51.5000         50.0000         48.5000         -0.85         0.85           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.8835         43.2468         41.7672         -0.96         0.95           84         41.336         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         <	70	75.8343	72.8004	69.8249	-1.08	1.06
73         67.3844         64.9115         62.4731         -1.00         0.99           74         64.8080         62.5006         60.2211         -0.98         0.98           75         62.3423         60.1906         58.0609         -0.95         0.94           76         59.9821         57.9770         55.9885         -0.92         0.92           77         57.7223         55.8552         53.9998         -0.90         0.89           78         55.5583         53.8210         52.0912         -0.87         0.87           79         53.4856         61.8706         60.2591         -0.86         0.84           80         61.5000         48.6000         -0.86         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.8323         43.3452         -0.93         0.92           84         44.7385         43.2488         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99	71	72.8916	70.0561	67.2703	-1.05	1.03
74         64.8080         62.5006         60.2211         0.96         0.96           75         62.3423         60.1906         58.0609         -0.95         0.94           76         59.9821         57.9770         55.8885         -0.92         0.92           77         57.7223         55.8552         53.9998         -0.90         0.89           78         55.5683         58.8210         62.0912         -0.87         0.87           79         53.4856         81.8706         80.2591         -0.85         0.84           80         61.5000         50.0000         48.5000         -0.85         0.84           81         49.7633         48.207         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.8323         43.3452         -0.93         0.92           84         41.7386         49.2648         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         49.2604         38.7966         -1.03 <td< td=""><td>72</td><td>70.0770</td><td>67.4283</td><td>64.8213</td><td>-1.03</td><td>1.01</td></td<>	72	70.0770	67.4283	64.8213	-1.03	1.01
75         62,3423         60,1906         58,0609         -0.95         0.94           76         59,9921         57,9770         55,8855         -0.92         0.92           77         57,7223         55,8552         53,9998         -0.90         0.89           78         55,5583         53,8210         52,0912         -0.87         0.87           79         53,4856         51,8706         50,2591         -0.85         0.84           80         51,5000         50,0000         48,5000         -0.85         0.84           81         49,7063         48,2067         46,7083         -0.85         0.85           82         47,9835         46,4842         44,9911         -0.89         0.89           83         46,3286         44,8323         43,452         -0.93         0.92           84         4,7385         43,2468         41,7672         -0.96         0.95           85         43,2105         41,7248         40,2540         -1.00         0.99           86         41,7386         40,2604         38,7996         -1.03         1.02           87         40,3241         38,8545         37,4048         -1.07 <th< td=""><td>73</td><td>67.3844</td><td>64.9115</td><td>62.4731</td><td>-1.00</td><td>0.99</td></th<>	73	67.3844	64.9115	62.4731	-1.00	0.99
76         \$9.9821         \$7.9770         \$5.9885         4.9.92         0.92           77         \$7.7223         \$5.8552         \$3.9988         4.990         0.89           78         \$5.5583         \$5.8210         \$5.29912         4.87         0.87           79         \$3.4856         \$1.8706         \$0.2591         -0.85         0.84           80         \$1.5090         \$50.0000         48.5000         -0.85         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.98         0.92           83         46.3286         44.8323         43.3452         -0.93         0.92           84         47.885         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2804         38.7996         -1.03         1.02           87         40.3241         38.8546         37.4048         -1.07         1.06           88         38.9643         37.5045         36.5688         -1.11	74	64.8080	62.5006	60.2211	-0.98	0.96
77         57.7223         55.8552         53.9998         -0.90         0.89           78         55.5833         53.8210         52.0912         -0.87         0.87           79         53.4856         51.8706         50.2591         -0.85         0.84           80         51.5000         50.0000         48.5000         -0.85         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.8323         43.3452         -0.93         0.92           84         47.7385         42.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2604         38.7996         -1.03         1.02           87         40.3241         38.8545         37.4048         -1.07         1.06           88         38.9643         37.5045         36.0668         -1.11         1.09           89         37.6569         36.2078         34.7831         -1.14         <	75	62.3423	60.1906	58.0609	-0.95	0.94
78         55.583         53.8210         52.0912         -0.87         0.87           79         53.4856         51.8706         50.2591         -0.85         0.84           80         61.5000         50.0000         48.5000         -0.85         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         48.4921         40.9911         -0.99         0.89           83         46.3286         44.8323         43.3452         -0.93         0.92           84         44.7385         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2604         38.7986         -1.03         1.02           87         40.3241         38.8545         37.4048         -1.07         1.06           88         33.9643         37.5045         36.0668         -1.11         1.09           89         37.6569         36.2078         34.7831         -1.14         1.13           91         36.1903         33.7653         32.3689         -1.22 <t< td=""><td>76</td><td>59.9821</td><td>57.9770</td><td>55.9885</td><td>-0.92</td><td>0.92</td></t<>	76	59.9821	57.9770	55.9885	-0.92	0.92
79         53.4856         51.8706         50.2591         -0.85         0.84           80         51.5000         50.0000         48.5000         -0.85         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.3233         43.3452         -0.93         0.92           84         44.7385         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2604         38.7996         -1.03         1.02           87         40.3241         38.8645         37.4048         -1.07         1.06           88         38.9643         37.5045         36.0688         -1.11         1.09           89         37.6569         36.2078         34.7831         -1.14         1.13           90         36.3996         34.9622         33.5513         -1.18         1.16           91         35.1903         37.653         32.3689         -1.22 <t< td=""><td>77</td><td>57.7223</td><td>55.8552</td><td>53.9998</td><td>-0.90</td><td>0.89</td></t<>	77	57.7223	55.8552	53.9998	-0.90	0.89
80         \$1.5000         \$0.0000         48.5000         -0.85         0.84           81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.8323         43.3462         -0.93         0.92           84         44.7385         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2604         38.7996         -1.03         1.02           87         40.3241         38.8545         37.4048         -1.07         1.06           88         38.9643         37.5045         36.0668         -1.11         1.09           89         37.6669         36.2078         34.7831         -1.14         1.13           90         36.3996         34.9622         33.5513         -1.18         1.16           91         35.1903         33.7653         32.3689         -1.22         1.19           92         34.0269         32.6151         31.2338         -1.26         <	78	55.5583	53.8210	52.0912	-0.87	0.87
81         49.7063         48.2057         46.7083         -0.85         0.85           82         47.9835         46.4842         44.9911         -0.89         0.89           83         46.3286         44.8323         43.3452         -0.93         0.92           84         44.7385         43.2468         41.7672         -0.96         0.95           85         43.2105         41.7248         40.2540         -1.00         0.99           86         41.7386         40.2604         38.7996         -1.03         1.02           87         40.3241         38.8545         37.4048         -1.07         1.06           88         38.9643         37.5045         36.0668         -1.11         1.09           89         37.6569         36.2078         34.7831         -1.14         1.13           90         36.3996         34.9622         33.5513         -1.18         1.16           91         35.1903         33.7653         32.3689         -1.22         1.19           92         34.0269         32.6151         31.2338         -1.26         1.23           93         3.9975         31.5096         30.4467         29.0970	79	53.4856	51.8706	50.2591	-0.85	0.84
82       47,9635       46.4842       44.9911       -0.89       0.89         83       46.3286       44.8323       43.3452       -0.93       0.92         84       44.7385       43.2468       41.7672       -0.96       0.95         85       43.2105       41.7248       40.2540       -1.00       0.99         86       41.7386       40.2604       38.7996       -1.03       1.02         87       40.3241       38.8545       37.4048       -1.07       1.06         88       38.8643       37.5045       36.0668       -1.11       1.09         89       37.6569       36.2078       34.7831       -1.14       1.13         90       36.3996       34.9622       33.5513       -1.18       1.16         91       35.1903       33.7653       32.3689       -1.22       1.19         92       34.0269       32.6151       31.2338       -1.26       1.23         93       3.29075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37	80	51.5000	50.0000	48.5000	-0.85	0.84
83         46,3286         44,8323         43,3452         -0,93         0.92           84         44,7385         43,2468         41,7672         -0,96         0.95           85         43,2105         41,7248         40,2540         -1,00         0.99           86         41,7386         40,2604         38,7996         -1,03         1,02           87         40,3241         38,8545         37,4048         -1,07         1,06           88         38,9643         37,5045         36,0668         -1,11         1,09           89         37,6569         36,2078         34,7831         -1,14         1,13           90         36,3996         34,9622         33,5513         -1,18         1,16           91         35,1903         33,7653         32,3689         -1,22         1,19           92         34,0269         32,8151         31,2338         -1,26         1,23           93         32,9075         31,5096         30,1438         -1,30         1,27           94         31,8302         30,4467         29,0970         -1,33         1,30           95         30,7933         29,4246         28,0915         -1,37         <	81	49.7063	48.2057	46.7083	-0.85	0.85
84       44.7385       43.2468       41.7672       -0.96       0.95         85       43.2105       41.7248       40.2540       -1.00       0.99         86       41.7386       40.2604       38.7996       -1.03       1.02         87       40.3241       38.8545       37.4048       -1.07       1.06         88       38.9643       37.5045       36.0668       -1.11       1.09         89       37.6569       36.2078       34.7831       -1.14       1.13         90       36.3996       34.9622       33.5513       -1.18       1.16         91       35.1903       33.7653       32.3689       -1.22       1.19         92       34.0269       32.6151       31.2338       -1.26       1.23         93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7960       28.417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       <	82	47.9835	46.4842	44.9911	-0.89	0.89
85         43,2105         41,7248         40,2540         -1,00         0.99           86         41,7386         40,2604         38,7996         -1,03         1,02           87         40,3241         38,8545         37,4048         -1,07         1,06           88         38,9643         37,5045         36,0668         -1,11         1,09           89         37,6569         36,2078         34,7831         -1,14         1,13           90         36,3996         34,9622         33,5513         -1,18         1,16           91         35,1903         33,7653         32,3689         -1,22         1,19           92         34,0269         32,6151         31,2338         -1,26         1,23           93         32,9075         31,5096         30,1438         -1,30         1,27           94         31,8302         30,4467         29,0970         -1,33         1,30           95         30,7933         29,4246         28,0915         -1,37         1,34           96         29,7950         28,4417         27,1254         -1,41         1,37           97         28,8337         27,4961         26,1970         -1,45         <	83	46.3286	44.8323	43.3452	-0.93	0.92
86       41.7386       40.2604       38.7996       -1.03       1.02         87       40.3241       38.8545       37.4048       -1.07       1.06         88       38.9643       37.5045       36.0668       -1.11       1.09         89       37.6569       36.2078       34.7831       -1.14       1.13         90       36.3996       34.9622       33.5513       -1.18       1.16         91       35.1903       33.7653       32.3689       -1.22       1.19         92       34.0269       32.6151       31.2338       -1.26       1.23         93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         100       26.1569       24.8685       23.0222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.81	84	44.7385	43.2468	41.7672	-0.96	0.95
87       40,3241       38,8545       37,4048       -1.07       1.06         88       38,9643       37,5045       36,0668       -1.11       1.09         89       37,6569       36,2078       34,7831       -1.14       1.13         90       36,3996       34,9622       33,5513       -1.18       1.16         91       35,1903       33,7653       32,3689       -1.22       1.19         92       34,0269       32,6151       31,2338       -1.26       1,23         93       32,9075       31,5096       30,1438       -1.30       1,27         94       31,8302       30,4467       29,0970       -1,33       1,30         95       30,7933       29,4246       28,0915       -1,37       1,34         96       29,7950       28,4417       27,1254       -1,41       1,37         97       28,8337       27,4961       26,1970       -1,45       1,41         99       27,0160       25,7110       24,4470       -1,53       1,48         100       26,1569       24,8685       23,6222       -1,57       1,52         101       25,3290       24,0574       22,8291       -1,61	85	43.2105	41.7248	40.2540	-1.00	0.99
88       38.9643       37.5045       36.0668       -1.11       1.09         89       37.6569       36.2078       34.7831       -1.14       1.13         90       36.3996       34.9622       33.5513       -1.18       1.16         91       35.1903       33.7653       32.3689       -1.22       1.19         92       34.0269       32.6151       31.2338       -1.26       1.23         93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61	86	41.7386	40.2604	38.7996	-1.03	1.02
89         37.6569         36.2078         34.7831         -1.14         1.13           90         36.3996         34.9622         33.5513         -1.18         1.16           91         35.1903         33.7653         32.3689         -1.22         1.19           92         34.0269         32.6151         31.2338         -1.26         1.23           93         32.9075         31.5096         30.1438         -1.30         1.27           94         31.8302         30.4467         29.0970         -1.33         1.30           95         30.7933         29.4246         28.0915         -1.37         1.34           96         29.7950         28.4417         27.1254         -1.41         1.37           97         28.8337         27.4961         26.1970         -1.45         1.41           98         27.9078         26.5864         25.3048         -1.49         1.44           100         26.1569         24.8685         23.6222         -1.57         1.52           101         25.3290         24.0574         22.8291         -1.61         1.55           102         24.5311         23.2765         22.0662         -1.65	87	40.3241	38.8545	37.4048	-1.07	1.06
90         36.3996         34.9622         33.5513         -1.18         1.16           91         35.1903         33.7653         32.3689         -1.22         1.19           92         34.0269         32.6151         31.2338         -1.26         1.23           93         32.9075         31.5096         30.1438         -1.30         1.27           94         31.8302         30.4467         29.0970         -1.33         1.30           95         30.7933         29.4246         28.0915         -1.37         1.34           96         29.7950         28.4417         27.1254         -1.41         1.37           97         28.8337         27.4961         26.1970         -1.45         1.41           98         27.9078         26.5864         25.3048         -1.49         1.44           99         27.0160         25.7110         24.4470         -1.53         1.48           100         26.1569         24.8685         23.6222         -1.57         1.52           101         25.3290         24.0574         22.8291         -1.61         1.55           102         24.5311         23.265         21.025         19.9465	88	38.9643	37.5045	36.0668	-1.11	1.09
91       35.1903       33.7653       32.3689       -1.22       1.19         92       34.0269       32.6151       31.2338       -1.26       1.23         93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.77	89	37.6569	36.2078	34.7831	-1.14	1.13
92       34.0269       32.6151       31.2338       -1.26       1.23         93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77	90	36.3996	34.9622	33.5513	-1.18	1.16
93       32.9075       31.5096       30.1438       -1.30       1.27         94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81	91	35.1903	33.7653	32.3689	-1.22	1.19
94       31.8302       30.4467       29.0970       -1.33       1.30         95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85 <td>92</td> <td>34.0269</td> <td>32.6151</td> <td>31.2338</td> <td>-1.26</td> <td>1.23</td>	92	34.0269	32.6151	31.2338	-1.26	1.23
95       30.7933       29.4246       28.0915       -1.37       1.34         96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89 <td>93</td> <td>32.9075</td> <td>31.5096</td> <td>30.1438</td> <td>-1.30</td> <td>1.27</td>	93	32.9075	31.5096	30.1438	-1.30	1.27
96       29.7950       28.4417       27.1254       -1.41       1.37         97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.99       1.81         109       19.6899       18.5564       17.4723       -1.93 </td <td>94</td> <td>31.8302</td> <td>30.4467</td> <td>29.0970</td> <td>-1.33</td> <td>1.30</td>	94	31.8302	30.4467	29.0970	-1.33	1.30
97       28.8337       27.4961       26.1970       -1.45       1.41         98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98<	95	30.7933	29.4246	28.0915	-1.37	1.34
98       27.9078       26.5864       25.3048       -1.49       1.44         99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	96	29.7950	28.4417	27.1254	-1.41	1.37
99       27.0160       25.7110       24.4470       -1.53       1.48         100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	97	28.8337	27.4961	26.1970	-1.45	1.41
100       26.1569       24.8685       23.6222       -1.57       1.52         101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	98	27.9078	26.5864	25.3048	-1.49	1.44
101       25.3290       24.0574       22.8291       -1.61       1.55         102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	99	27.0160	25.7110	24.4470	-1.53	1.48
102       24.5311       23.2765       22.0662       -1.65       1.59         103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	100	26.1569	24.8685	23.6222	-1.57	1.52
103       23.7620       22.5245       21.3323       -1.69       1.63         104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	101	25.3290	24.0574	22.8291	-1.61	1.55
104       23.0205       21.8002       20.6261       -1.73       1.66         105       22.3055       21.1025       19.9465       -1.77       1.70         106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	102	24.5311	23.2765	22.0662	-1.65	1.59
105     22.3055     21.1025     19.9465     -1.77     1.70       106     21.6159     20.4303     19.2924     -1.81     1.74       107     20.9508     19.7825     18.6626     -1.85     1.77       108     20.3091     19.1582     18.0563     -1.89     1.81       109     19.6899     18.5564     17.4723     -1.93     1.85       110     19.0924     17.9761     16.9098     -1.98     1.89	103	23.7620	22.5245	21.3323	-1.69	1.63
106       21.6159       20.4303       19.2924       -1.81       1.74         107       20.9508       19.7825       18.6626       -1.85       1.77         108       20.3091       19.1582       18.0563       -1.89       1.81         109       19.6899       18.5564       17.4723       -1.93       1.85         110       19.0924       17.9761       16.9098       -1.98       1.89	104	23.0205	21.8002	20.6261	-1.73	1.66
107     20.9508     19.7825     18.6626     -1.85     1.77       108     20.3091     19.1582     18.0563     -1.89     1.81       109     19.6899     18.5564     17.4723     -1.93     1.85       110     19.0924     17.9761     16.9098     -1.98     1.89	105	22.3055	21.1025	19.9465	-1.77	1.70
108     20.3091     19.1582     18.0563     -1.89     1.81       109     19.6899     18.5564     17.4723     -1.93     1.85       110     19.0924     17.9761     16.9098     -1.98     1.89	106	21.6159	20.4303	19.2924	-1.81	1.74
109     19.6899     18.5564     17.4723     -1.93     1.85       110     19.0924     17.9761     16.9098     -1.98     1.89	107	20.9508	19.7825	18.6626	-1.85	1.77
110 19.0924 17.9761 16.9098 -1.98 1.89	108	20.3091	19.1582	18.0563	-1.89	1.81
	109	19.6899	18.5564	17.4723	-1.93	1.85
111     18.5157     17.4166     16.3680     -2.02     1.93	110	19.0924	17.9761	16.9098	-1.98	1.89
	111	18.5157	17.4166	16.3680	-2.02	1.93



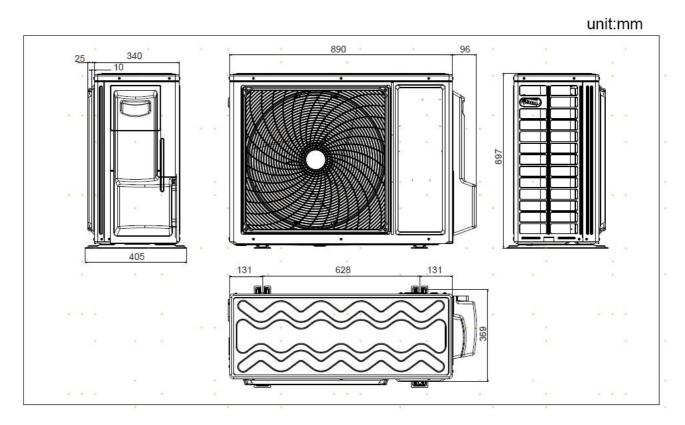


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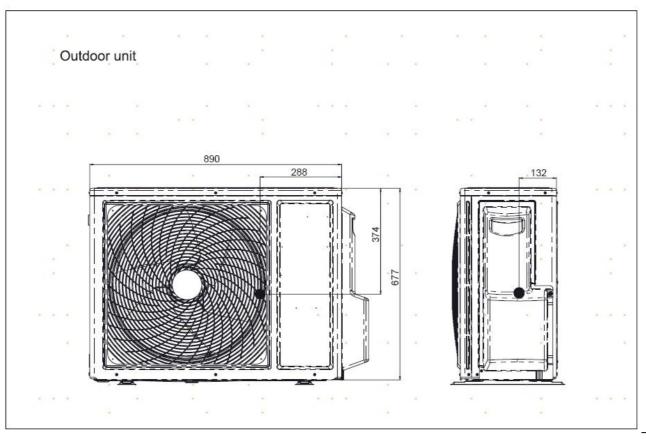
				, arrodori	o arra oorra or
112	17.9590	16.8769	15.8458	-2.06	1.96
113	17.4214	16.3564	15.3427	-2.10	2.00
114	16.9023	15.8542	14.8577	-2.15	2.04
115	16.4010	15.3696	14.3902	-2.19	2.08
116	15.9167	14.9020	13.9394	-2.23	2.12
117	15.4489	14.4506	13.5047	-2.27	2.16
118	14.9968	14.0149	13.0855	-2.32	2.19
119	14.5599	13.5942	12.6811	-2.36	2.23
120	14.1376	13.1879	12.2909	-2.41	2.27
121	13.7294	12.7955	11.9144	-2.45	2.31
122	13.3347	12.4165	11.5510	-2.50	2.35
123	12.9531	12.0503	11.2003	-2.54	2.39
124	12.5840	11.6965	10.8617	-2.58	2.43
125	12.2270	11.3545	10.5348	-2.63	2.47
126	11.8817	11.0240	10.2191	-2.68	2.51
127	11.5475	10.7046	9.9142	-2.72	2.55
128	11.2242	10.3957	9.6197	-2.77	2.59
129	10.9112	10.0970	9.3352	-2.81	2.63
130	10.6084	9.8082	9.0602	-2.86	2.67
131	10.3151	9.5288	8.7945	-2.91	2.71
132	10.0312	9.2586	8.5378	-2.95	2.75
133	9.7563	8.9971	8.2895	-3.00	2.80
134	9.4901	8.7441	8.0495	-3.05	2.84
135	9.2322	8.4993	7.8175	-3.09	2.88
136	8.9824	8.2623	7.5931	-3.14	2.92
137	8.7404	8.0329	7.3760	-3.19	2.96
138	8.5059	7.8108	7.1660	-3.24	3.00
139	8.2787	7.5958	6.9629	-3.29	3.04
140	8.0584	7.3875	6.7664	-3.33	3.09



# 8. Dimensional drawings



# 9. Center of gravity







### 10. Service Diagnosis

### 10.1 Caution for Diagnosis

The operation lamp flashes when any of the following errors is detected.

- 1. When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.
- 2. When a signal transmission error occurs between the indoor and outdoor units. In either case, conduct the diagnostic procedure described in the following pages.

### 10.2 Problem Symptoms and Measures

Symptom	Cḥeck Item	Details of Measure
None of the units	Check the power supply.	Check to make sure that the rated voltage is supplied.
operates	Check the indoor PCB	Check to make sure that the indoor PCB is broken
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles can stop air conditioner operation.
Equipment operates but does not cool, or does not heat (only for heat pump)	Check for faulty operation of the electronic expansion valve.	Set the units to cooling operation, and compare the temperatures of the liquid side connection pipes of the connection section among rooms to check the opening and closing operation of the electronic expansion valves of the individual units.
	Diagnosis by service port pressure and operating current.	Check for insufficient gas.
Large operating noise and vibrations	Check the installation condition.	Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided.





# 10.3 Error Codes and Description indoor display

	Code indication						<u> </u>	
	Code indication							
	In	Indoor displaying panel code indication		Outdoor		Referenc		
			Only For 498 and 498A display			(LED1	fault description	e Page
	(	Other display				flash		erage
			(Red/Green Time Run □On★Flash■Off)		times)			
muooi				lasii	■OII)		Communication fault between	
and			_		*	15	indoor and outdoor units	Page.42
Outdoo	E7	Directly display	_	_				
	E1	Directly display	*			/	Indoor temperature sensor failure	Page.32
Indoor		Directly display	*			/	Indoor coil sensor failure	Page.32
Malfunc		Directly display	*		*	/	Indoor eeprom failure	Page.33
tion		Directly display			*	/	Indoor fan failure	Page.34
		Trouble record			*	22	Internal unit antifreeze protection	Page.
		Trouble record			*	21	Internal unit overload	Page.45
		Directly display		<u></u> ★		1	Eeprom failure	Page.33
		Directly display			<del>_</del>	2	IPM failure	Page.37
		Directly display	*	*		3	AC current overcurrent protection	Page.38
	122	Directly display	-		_		Communication error between	i ageise
				*		4	module board and main PCB	Page.39
	F3	Directly display	_		_		board.	
		Trouble record		*		5	High pressure protection	Page.45
			<u> </u>				Power over/under voltage	
	F19	Trouble record		*		6	protection	Page.40
						7	Compressor stall / press	Daga 40
	F27	Directly display		*		/	instantaneous stop	Page.40
				•		8	Compressor discarging	Page.41
		Directly display	_				temperature protection	
	F8	Trouble record		*		9	Abnormal of DC motor	Page.36
	F21	Directly display			*	10	Abnormal of piping sensor	Page.32
Outdoo	F7	Directly display		*		11	Suction temperature sensor failure	Page.32
r				*		12	Abnormal of outdoor ambient	Page.32
Malfunc	F6	Directly display				12	sensor	r age.52
tion			<b>*</b>			13	Abnormal of compressor	Page.32
		Directly display	^				discharge sensor	
		Trouble record				16	Lack of refrigerant	Page.
		Trouble record		<u></u>		17	4-way valve reverse failure	Page.
		Directly display	,	<u></u>		18	Compressor jam (only for spdu)	Page.44
	F28	Directly display		*		19	Module PWM select circuit error	Page.44
			_	<b>+</b>		20	Outdoor terminal block	Page.
	F15	Trouble record	_			20	temperature protection	r age.
		L		*		24	Instantaneous over-current	Page.38
	F2	Trouble record	_ <del>-</del>				protection of the compressor	. ageise
			_		_		Compressor U-phase overcurrent	
	<b>-</b> 22			*		25	Compressor V-phase overcurrent	Page.38
		Trouble record				26	Compressor W-phase overcurrent	D 46
		Trouble record	ļ .			26	Module reset	Page.46
		Trouble record	*		*	27	CT disconnection	Page.
		Trouble record		/		37	Outdoor coil protection	Page.
		Trouble record		*		38	Compressor driver board failure	Page.
	F43	/		*		46	Model matching abnormality	Page.





#### 10.3.1 Thermistor or Related Abnormality

Indoor Display E1: Room temperature sensor failure

E2: Heat-exchange sensor failure

Outdoor display LED1 flash 10 times: Defrost temperature sensor failure

LED1 flash 11 times: Suction temperature sensor failure LED1 flash 12 times: Ambient temperature sensor failure

LED1 flash 13 times: Discharge temperature sensor failure

Method of Malfunction Detection

The temperatures detected by the thermistors are used to determine thermistor errors

Malfunction Decision Conditions When the thermistor input is more than 4.92V or less than 0.08V during compressor operation.

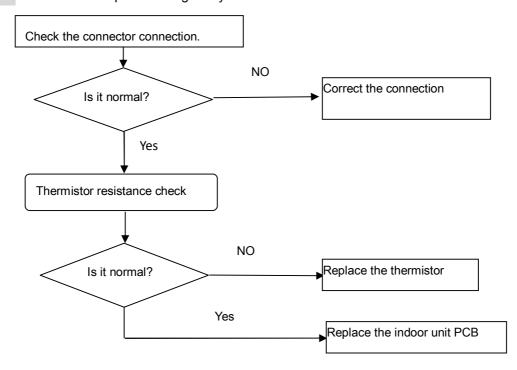
Note: The values vary slightly in some models

Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

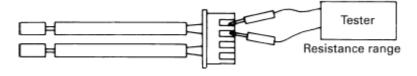
Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Thermistor resistance check method:

Remove the connector of the thermistor on the PCB, and measure the resistance of thermistor using tester. The relationship between normal temperature and resistance is shown in the value of indoor thermistor.







#### 10.3.2 EEPROM abnormal

Indoor Display

E4: Indoor EEPROM error

Indoor display

F12: Outdoor EEPROM error; Outdoor LED1 flash 1 times

Method of Malfunction Detection The Data detected by the EEPROM are used to determine MCU

Malfunction
Decision
Conditions

When the data of EEPROM is error or the EEPROM is damaged

Supposed Causes

■ Faulty EEPROM data

■ Faulty EEPROM

■ Faulty PCB

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Replace the indoor or outdoor mainboard.





#### 10.3.3 Indoor AC fan motor malfunction

Indoor Display E14

Method of Malfunction Detection The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation

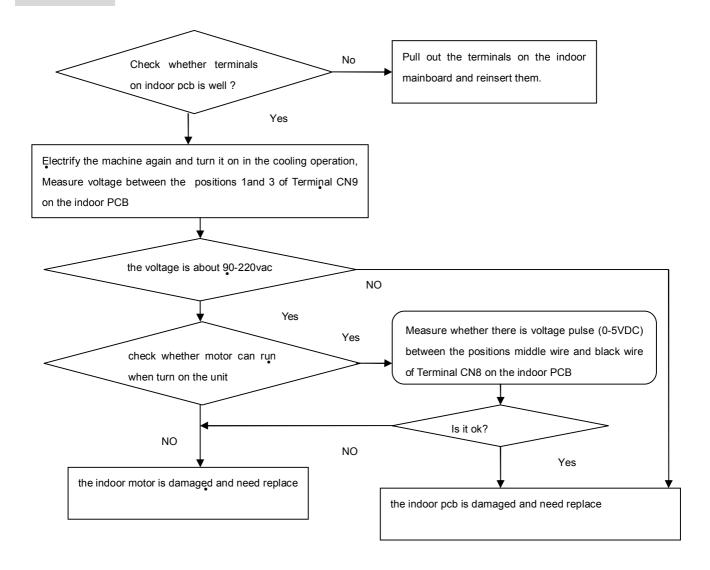
Malfunction Decision Conditions when the detected rotation feedback signal don't received in 2 minutes

Supposed Causes

- Operation halt due to breaking of wire inside the fan motor.
- Fan motor overheat protection
- Operation halt due to breaking of the fan motor lead wires
- Detection error due to faulty indoor unit PCB

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.







#### 10.3.4 Outdoor DC fan motor fault

Outdoor display

LED1 flash 9 times

Method of Detection

DC fan motor is detected by checking the fan running condition and so on

Malfunction Malfunction

when the data of EEPROM is error or the EEPROM is damaged

Decision Conditions

Supposed Causes

■ DC fan motor protection dues to the DC fan motor faulty

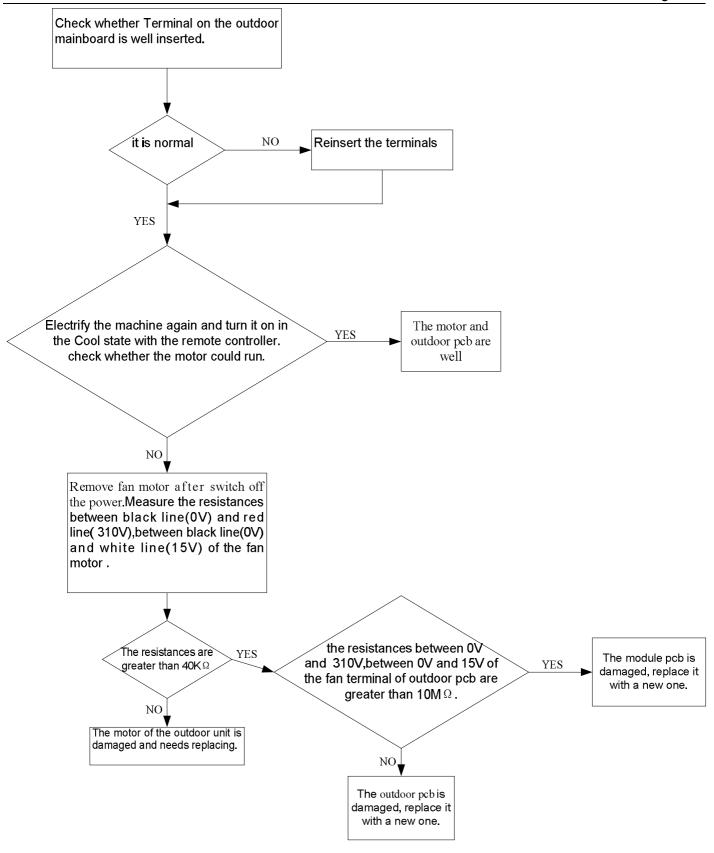
DC fan motor protection dues to faulty PCB

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.









#### 10.3.5 IPM protection

Outdoor display:

LED1 flash 2 times

Method of Malfunction Detection IPM protection is detected by checking the compressor running condition and so on

Malfunction Decision Conditions

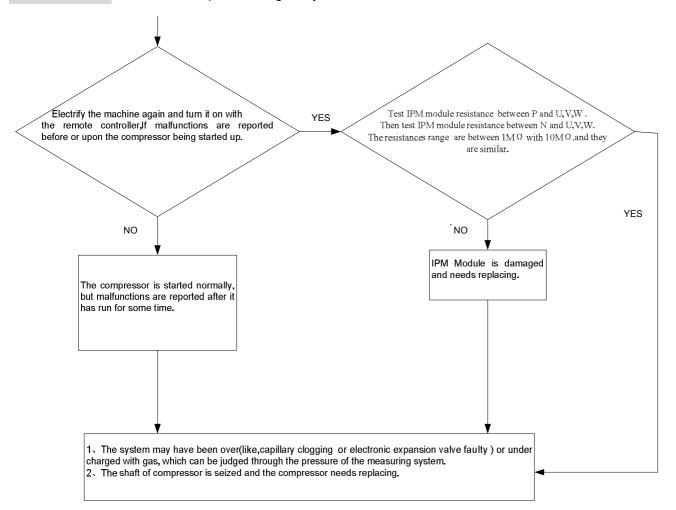
- The system leads to IPM protection due to over current
- The compressor faulty leads to IPM protection
- circuit component of IPM is broken and led to IPM protection

Supposed Causes

- IPM protection dues to the compressor faulty
- IPM protection dues to faulty PCB of IPM module
- Compressor wiring disconnected

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.







#### 10.3.6 Over-current of the compressor

Outdoor Display: LED1 flash 3 or 24 or 25 times

Method of Malfunction Detection The current of the compressor is too high

Malfunction Decision Conditions

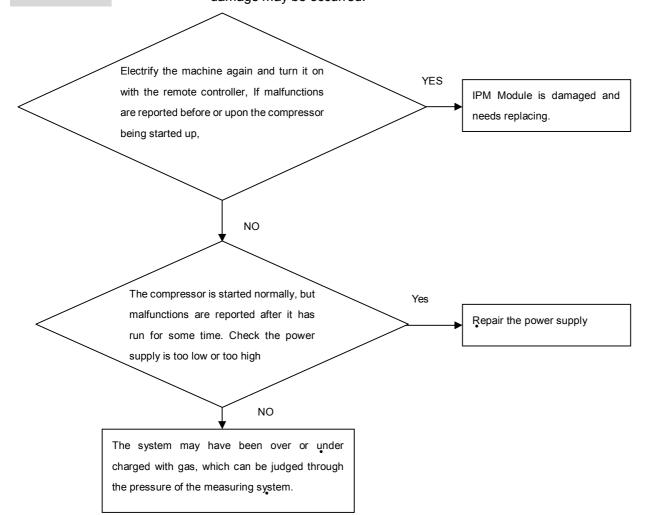
when the IPM Module is damaged or the compressor is damaged. power supply voltage is too low or too high

Supposed Causes

- Faulty IPM Module
- Faulty compressor
- Faulty power supply

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.







#### 10.3.7 The communication fault between IPM and outdoor PCB

Outdoor display: LED1 flash 4 times

Method of Malfunction Detection Communication is detected by checking the IPM module and the outdoor PCB

Malfunction Decision Conditions

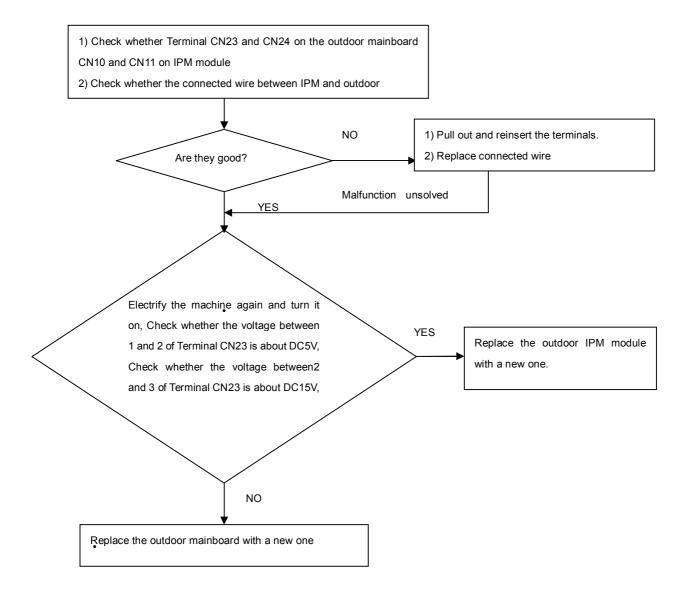
- The outdoor PCB broken leads to communication fault
- The IPM module broken leads to communication fault

Supposed Causes

- The outdoor PCB is broken
- The IPM module is broken
- Communication wiring disconnected

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.







#### 10.3.8 Power Supply Over or under voltage fault

Outdoor display: LED1 flash 6 times The power supply is over voltage

Method of Malfunction Detection

An abnormal voltage rise or fall is detected by checking the specified voltage detection circuit.

Malfunction Decision Conditions

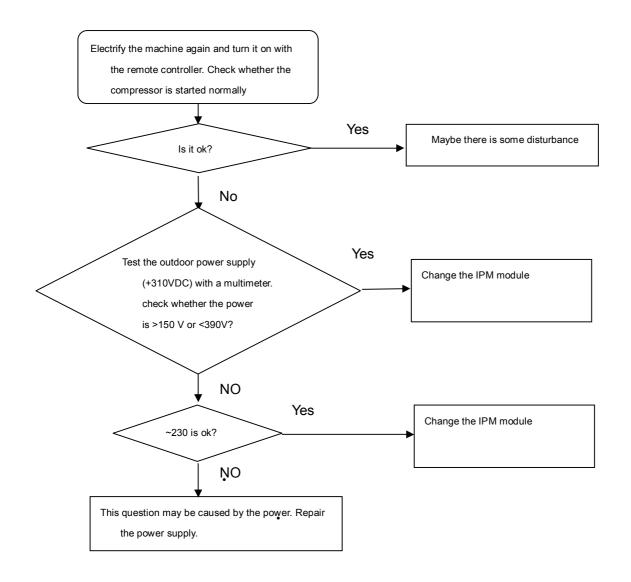
An voltage signal is fed from the voltage detection circuit to the microcomputer

Supposed Causes

- Supply voltage not as specified
- the IPM module is broken
- the outdoor PCB is broken

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.







#### 10.3.9 Overheat Protection For Discharge Temperature

Outdoor display: LED1 flash 8 times

Method of Malfunction Detection Malfunction Decision

The Discharge temperature control is checked with the temperature being detected by the Discharge pipe thermistor

when the compressor discharge temperature is above 110°C

Supposed Causes

Conditions

- Electronic expansion valve defective
- Faulty thermistor
- Faulty PCB

Troubleshooting

Be sure to turn off power switch before connect or disconnect connector, \* Caution or else parts damage may be occurred.

Electrify the machine again and turn it on with the remote controller, then measure the temperature at the exhaust temperature sensor of the compressor on the outdoor unit 1) The cryogen may have been leaked during YES installation, or there may be leakage in the piping The temperature exceeds system. shortly after the 2) There may be other causes to make the exhaust machine starts up? temperature too high. NO Malfunctions occur after running for some time even though the measured temperature is below 110°C. Pull out the exhaust sensor and measure its resistance at standard temperatures according the resistance-temperature table YES The sensor is damaged. Replace the sensor The results deviate with a new one. much? NO The outdoor mainboard is damaged and needs be replaced



#### 10.3.10 The communication fault between indoor and outdoor

Indoor display outdoor display

E7

LED1 flash 15 times

Method of Malfunction Detection Communication is detected by checking the indoor PCB and the outdoor PCB.

Malfunction Decision Conditions

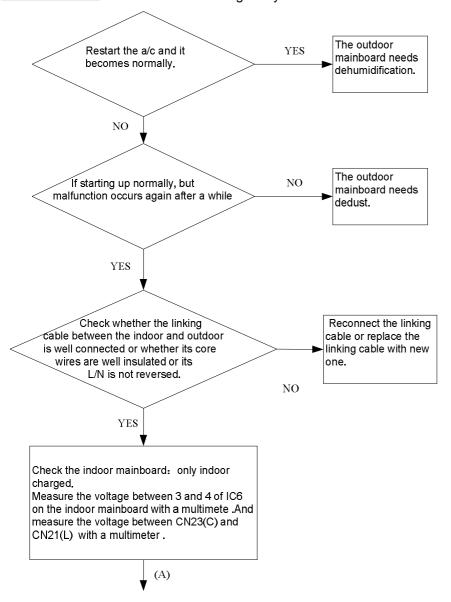
- The outdoor PCB broken leads to communication fault.
- The indoor PCB broken leads to communication fault.

Supposed Causes

- Communication wiring disconnected.
- The indoor PCB is broken.
- The outdoor PCB is broken.
- The Module PCB is broken.

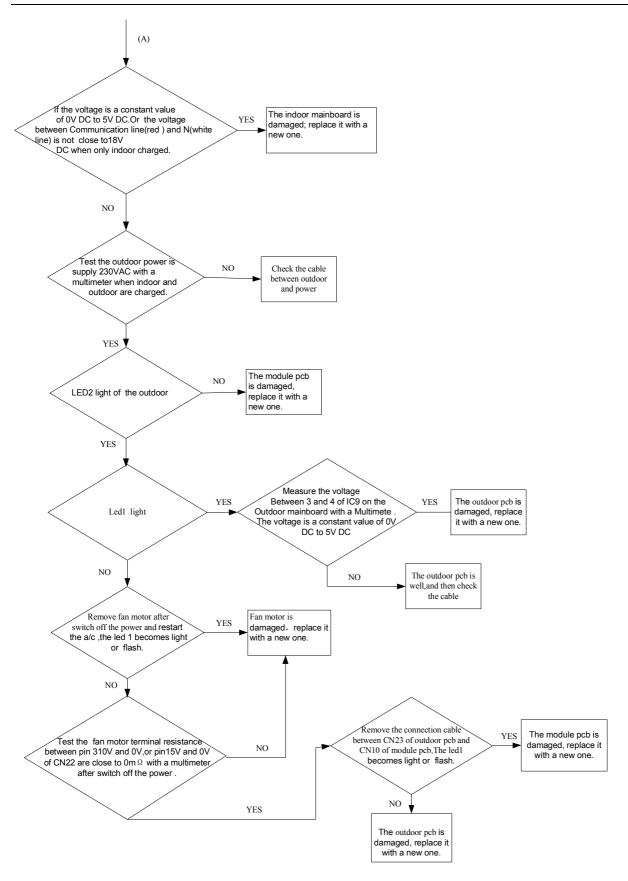
Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.













#### 10.3.11 Loss of synchronism detection

#### Inverter side current detection is abnormal

**Outdoor Display** 

LED1 flash 18 times

LED1 flash 19 times

Method of Malfunction Detection The position of the compressor rotor can not detected normally

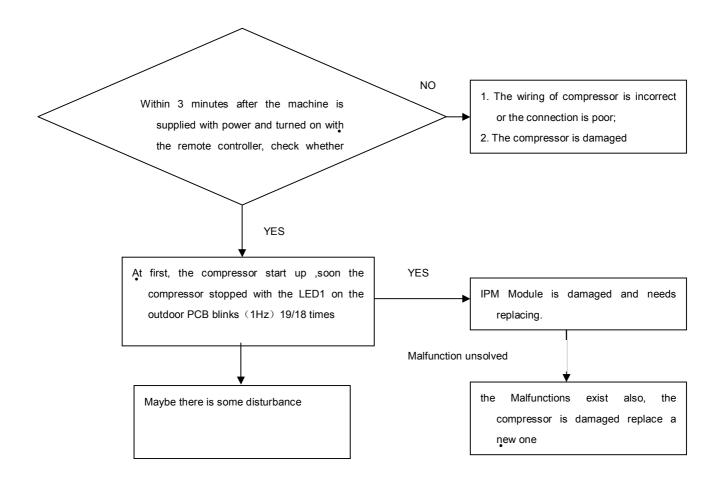
Malfunction Decision Conditions when the wiring of compressor is wrong or the connection is poor; or the compressor is damaged

Supposed Causes

- Faulty The wiring of compressor
- Faulty compressor
- Faulty PCB

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.





#### 10.3.12 High work-intense protection

Outdoor display

LED1 flash 21 times

Method of Malfunction Detection

High work-intense control is activated in the heating mode if the temperature being sensed by the heat exchanger thermistor exceeds the limit.

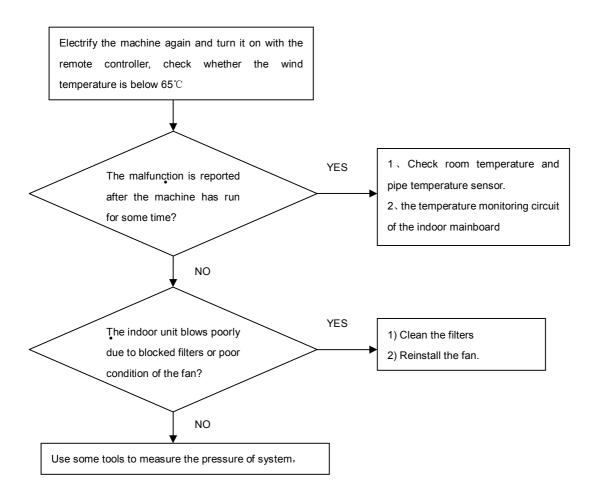
Malfunction Decision Conditions Activated when the temperature being sensed by the heat exchanger rises above 65°C twices in 30 minutes.

Supposed Causes

- Faulty electronic expansion valve
- Dirty heat exchanger
- Faulty heat-exchange sensor
- Insufficient gas

Troubleshooting

\* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.

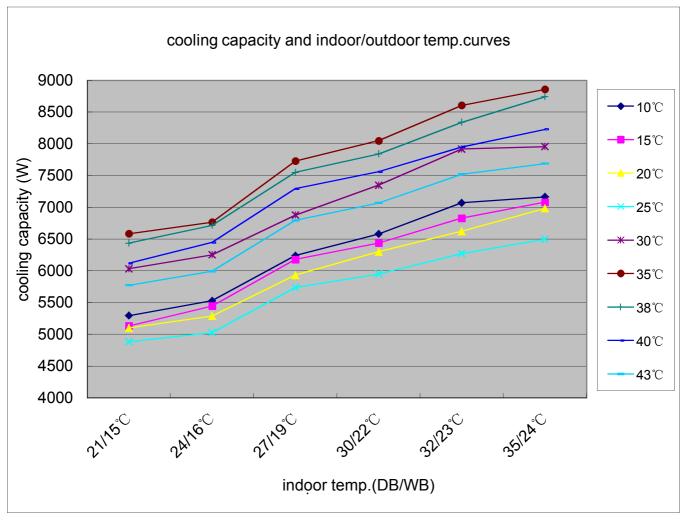




# 11.Performence and cerves diagrams

#### 11.1 Cooling capacity-temperature curves

performance curves									
cooling va lue-ţemera	ture table								
indoor temp.	outdoor	temp.							
DB/WB	10℃	15℃	20℃	25℃	30℃	35℃	38℃	40℃	43℃
21/15℃	5297	5135	5101	4885	6035	6585	6437	6121	5774
24/16℃	5530	5446	5290	5028	6254	6768	6718	6448	5994
<b>27/19</b> ℃	6239	6181	5933	5739	6879	7729	7551	7294	6795
30/22℃	6580	6440	6300	5950	7350	8050	7840	7560	7070
<b>32/23</b> ℃	7072	6830	6624	6274	7919	8606	8339	7951	7523
35/24℃	7165	7081	6985	6500	7956	8858	8741	8228	7689

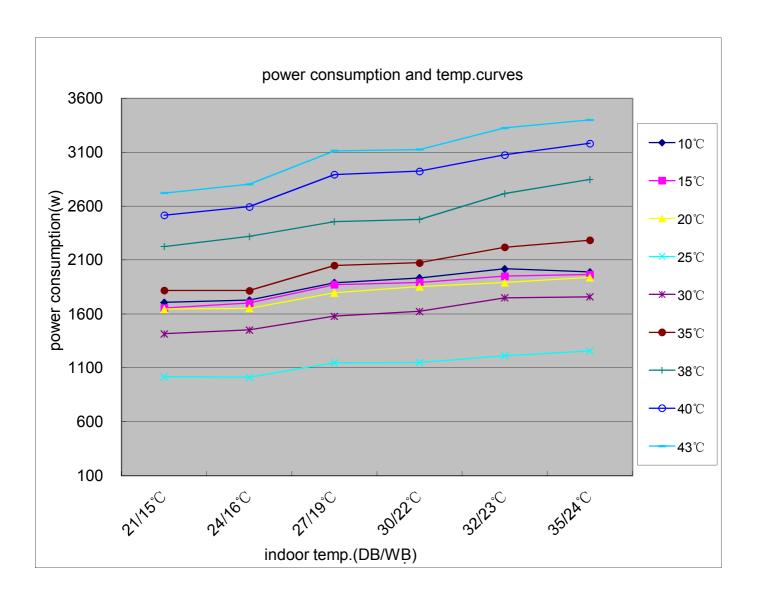






# 11.2 Cooling power consumption value- temperature curves

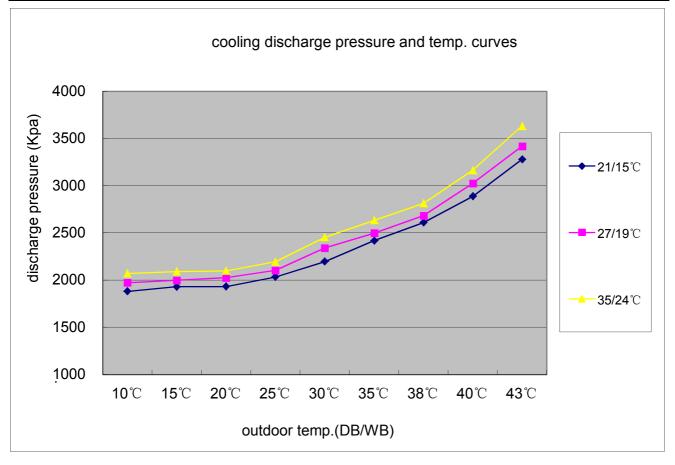
performance curves									
power consumption va	alue -tem	p.table							
indoor temp.	outdoor	temp.							
DB/WB	10℃	15℃	20℃	25℃	30℃	35℃	38℃	40℃	43℃
<b>21/15</b> ℃	1709	1657	1646	1019	1416	1819	2227	2517	2723
<b>24/16</b> ℃	1728	1702	1653	1013	1453	1818	2320	2596	2805
27/19℃	1891	1873	1798	1147	1581	2051	2458	2895	3115
30/22℃	1935	1894	1853	1151	1625	2077	2477	2926	3127
<b>32/23</b> ℃	2021	1951	1893	1214	1751	2220	2718	3077	3327
35/24℃	1990	1967	1940	1258	1759	2285	2849	3184	3401





### 11.3 Cooling discharge pressure curves

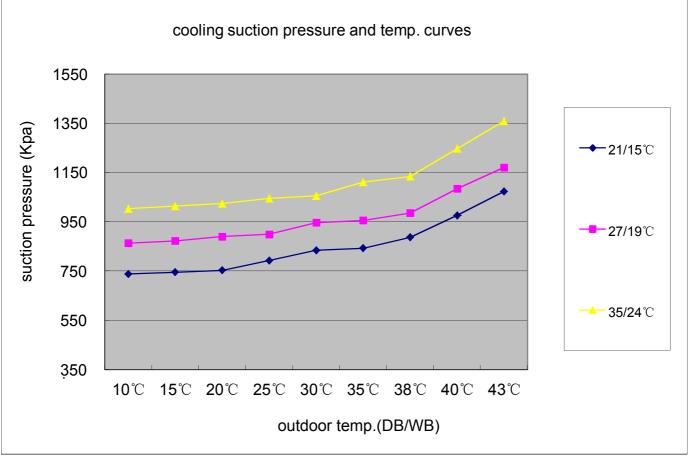
performance curves							
cooling discharge pressure.table	cooling discharge pressure.table						
outdoor temp. (humidity 46%)	indoor temp.						
DB/WB	21/15℃	27/19℃	35/24℃				
10℃	1882	1973	2071				
15℃	1931	1999	2092				
20℃	1931	2025	2099				
25℃	2033	2104	2195				
30℃	2197	2341	2454				
35℃	2418	2499	2634				
38℃	2610	2683	2814				
40℃	2888	3025	3165				
43℃	3279	3419	3631				





### 11.4 Cooling suction pressure curves

performance curves						
cooling suction pressure.table	cooling suction pressure.table					
outdoor temp.	indoor temp.					
(humidity 46%)	macor tomp.					
DB/WB	21/15℃	27/19℃	35/24℃			
10℃	738	864	1004			
15℃	746	873	1014			
20℃	753	891	1024			
25℃	793	900	1045			
30℃	835	947	1056			
35℃	8 <u>4</u> 3	956	1111			
38℃	887	986	1134			
40℃	976	1085	1247			
43℃	1074	1171	1360			

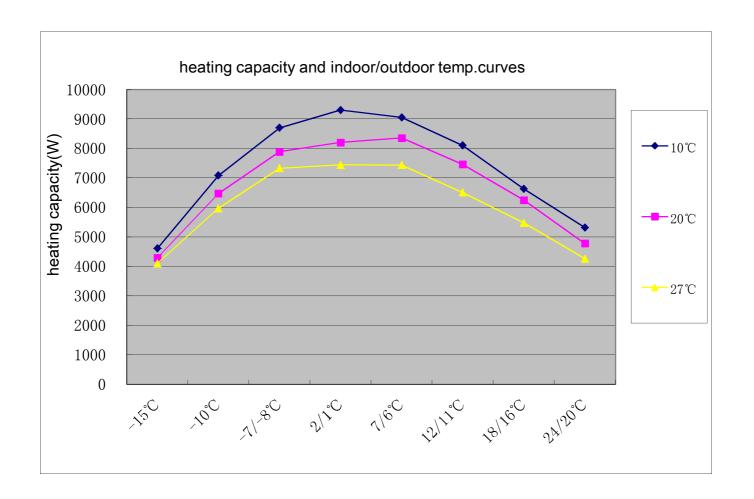






### 11.5 Heating capacity-temperature curves

performa	ance curves		
heating capacity and indoor/outdoor	temp.table		
outdoor temp.	indoor temp.	(humidity 46%)	
DB/WB	10℃	20℃	27℃
-15℃	4607	4293	4095
-10℃	7081	6474	5972
-7/-8℃	8702	7890	7332
2/1℃	9303	8210	7445
7/6℃	9054	8361	7439
12/11℃	8104	7466	6509
18/16℃	6631	6252	5482
<b>24/20</b> ℃	5320	4781	4264

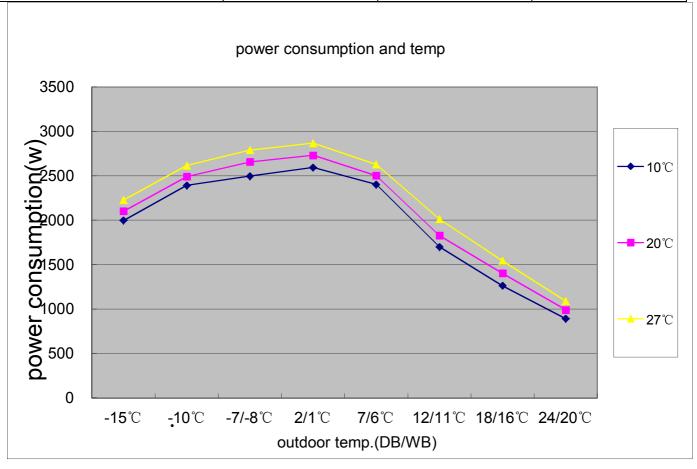






### 11.6 Heating power consumption value- temperature curves

performance curves							
power consumption val	power consumption value-temp.table						
outdoor temp.	indoor temp.(hu	indoor temp.(humidity 46%)					
DB/WB	10℃	<b>20</b> ℃	27℃				
-15℃	1999	2104	2230				
-10℃	2393	2493	2618				
-7/-8°C	2499	2658	2791				
2/1℃	2595	2732	2868				
7/6℃	2404	2504	2629				
12/ <b>1</b> 1℃	1701	1829	2012				
18/16℃	1264	1404	1545				
24/20℃	892	991	1090				

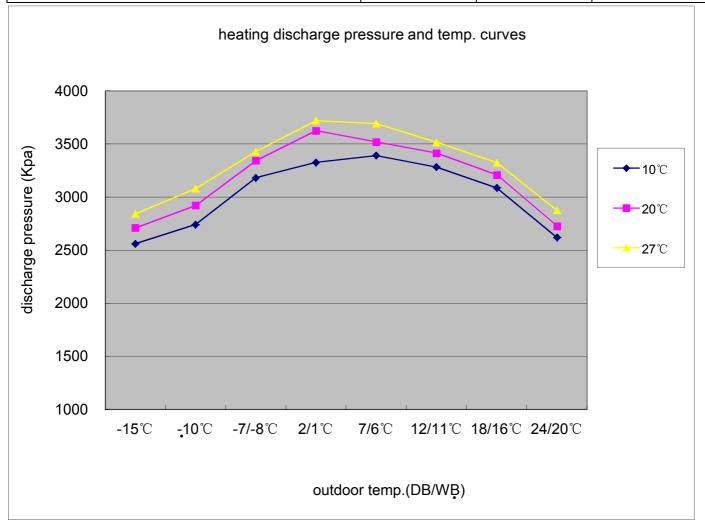






# 11.7 Heating discharge pressure curves

performance curves					
heating discharge pressure.table					
outdoor temp	indoor temp.				
DB/WB	10℃	20℃	27℃		
-15℃	2562	2710	2844		
-10℃	2743	2922	3082		
-7/-8℃	3183	3344	3430		
2/1℃	3327	3626	3721		
7/6℃	3392	3520	3695		
12/11℃	3283	3414	3518		
18/16℃	3089	3210	3326		
24/20℃	2620	2728	2877		

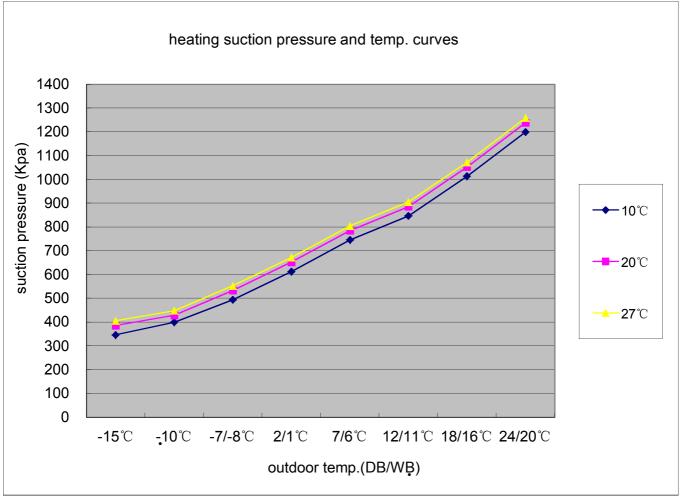






### 11.8 Heating suction pressure curves

perform	nance curves				
heating suction pressure.table					
outdoor temp	indoor temp.				
DB/WB	10℃	20℃	<b>27</b> ℃		
-15℃	347	386	406		
-10℃	400	429	449		
-7/-8℃	494	533	553		
2/1℃	613	652	672		
7/6℃	746	785	805		
12/11℃	847	886	906		
18/16℃	1014	1053	1073		
24/20℃	1200	1239	1259		

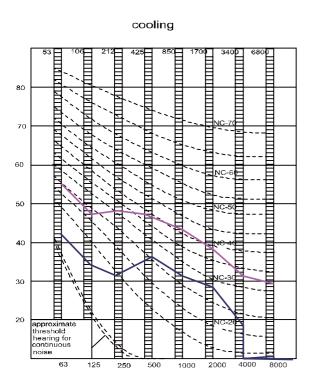


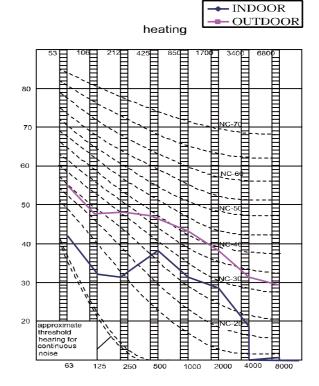




#### 12.Sound level

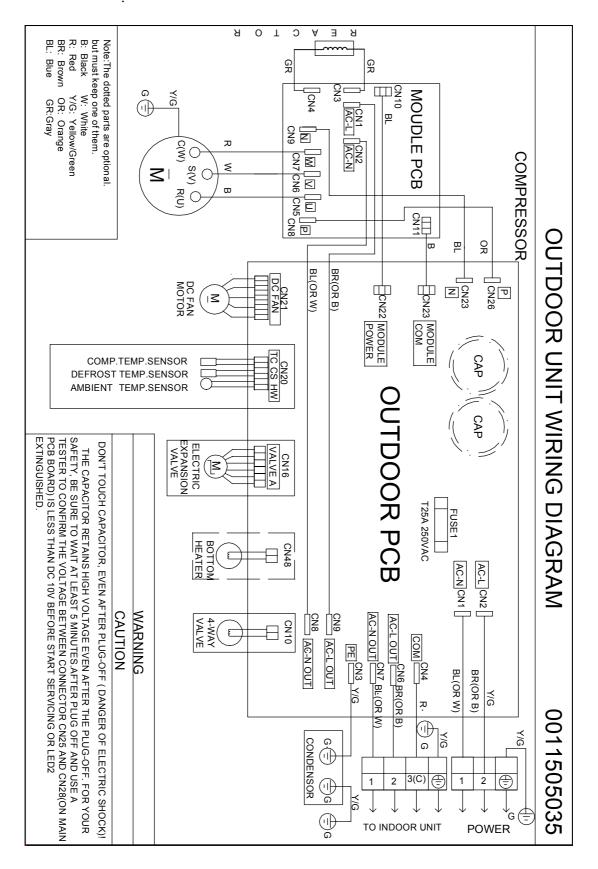
	Sound pres	sure level					
Mandal	230V,50HZ						Sound power level
Model	Cooling/heating			Measuring local microphone	location	ocation of	(cooling/heating)
	Н	L	SL	Тисторноне			
1U68RENFRA	52			1m	0.8m		<b>65</b>



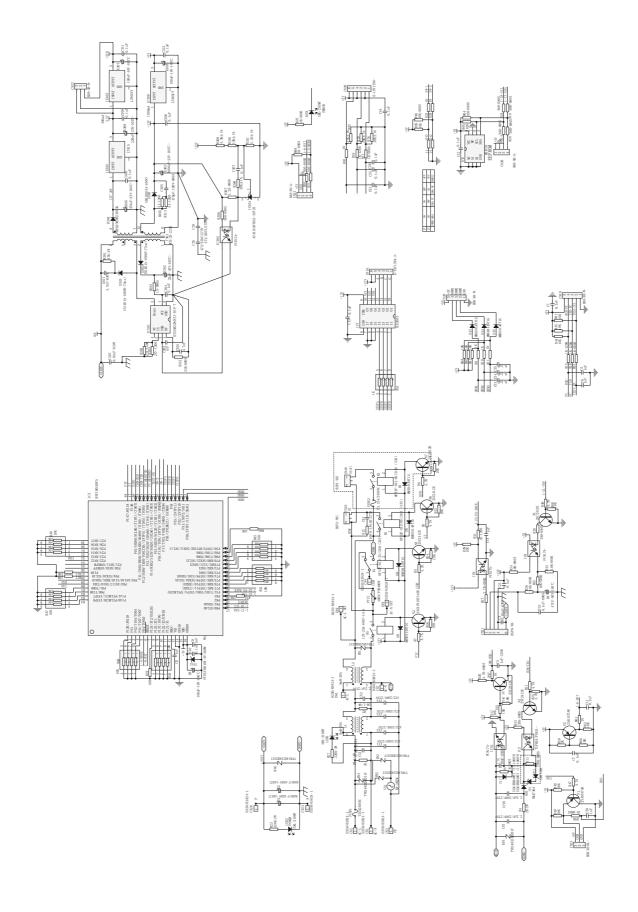


# 13 Wiring Diagrams

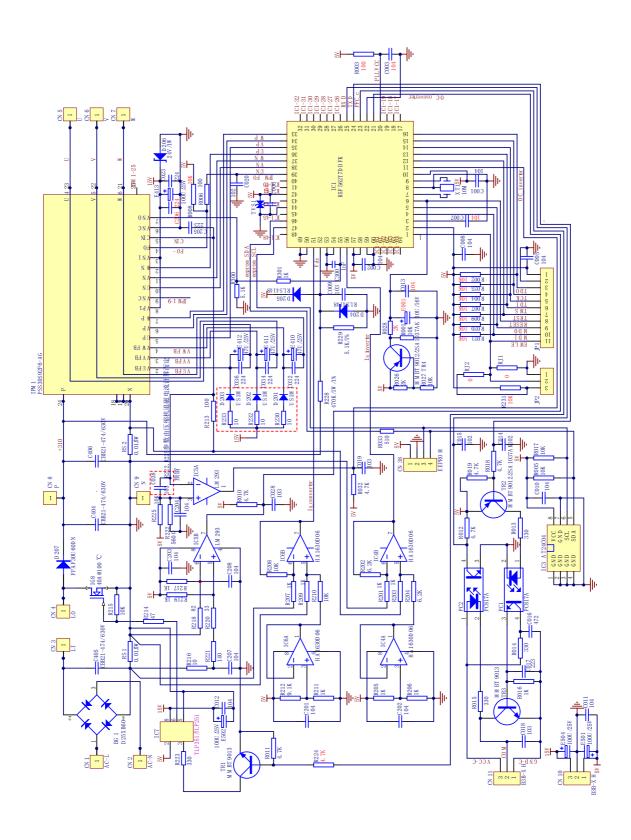
#### 13.1 Outdoor unit



# 13.2 Outdoor unit control board circuit diagrams



# 12.3 Module board circuit diagram



# REMOVAL PROCEDURE



This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or Repair the product or products dealt with in this service information by anyone else could result in serious injury or death

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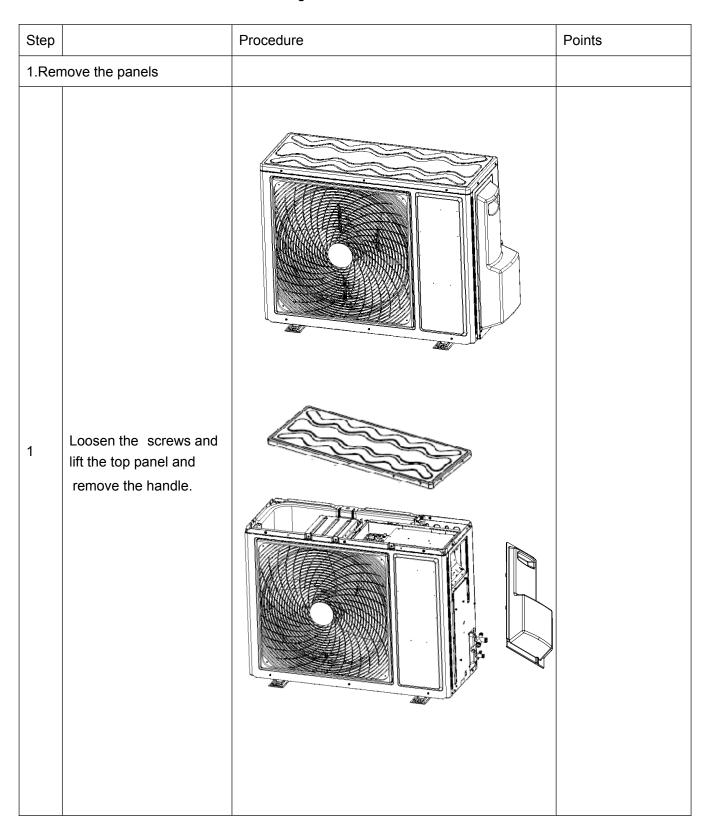
Version: V1 Date: 2019-3-12

# 1.Removal of Outdoor panel

Procedure

Æ

Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work



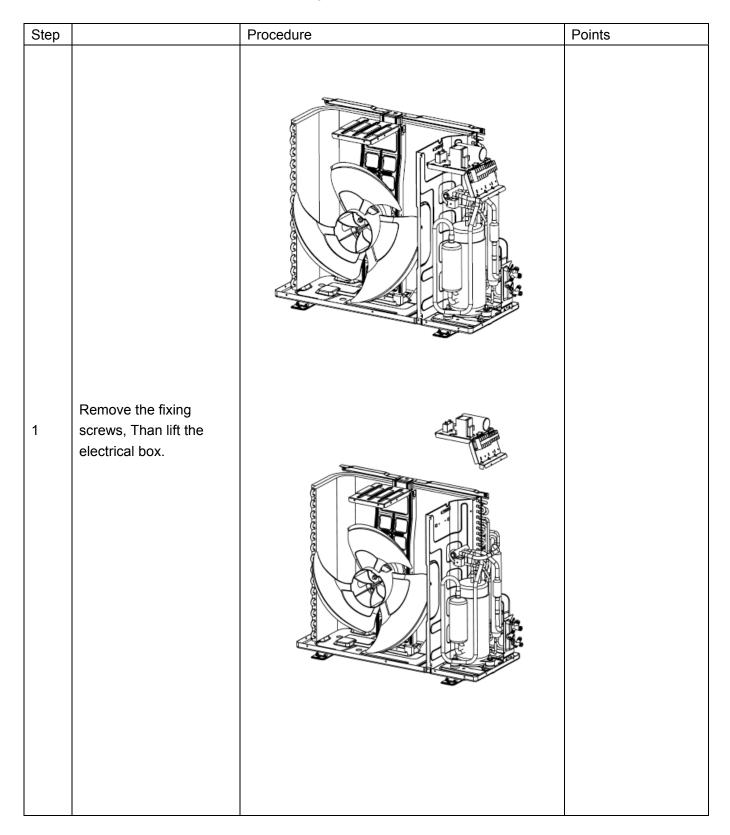
G:			Removal of procedur
Ste		Procedure	Points
2	Loosen the screws of the panel, pull and remove the front panel.		

#### 2.Removal of Electrical Box

Procedure



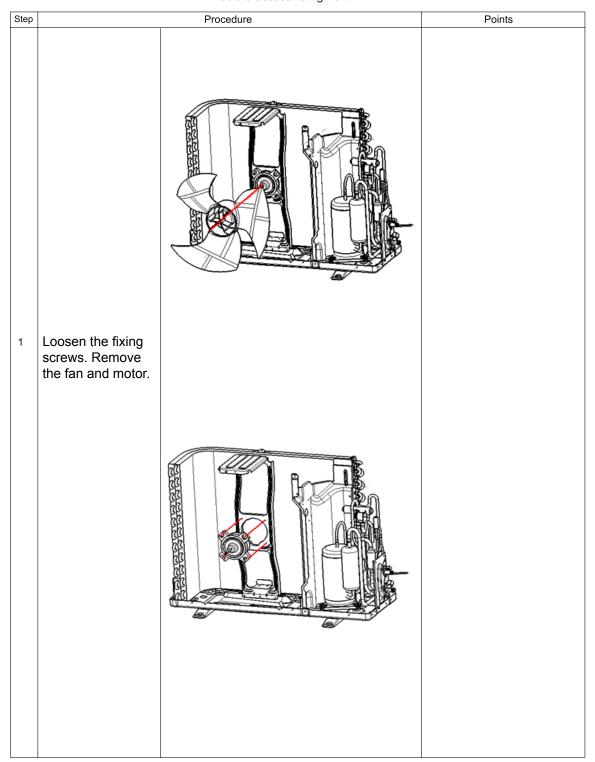
Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work



### 3. Removal of Fan and Fan Motor

Procedure

Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

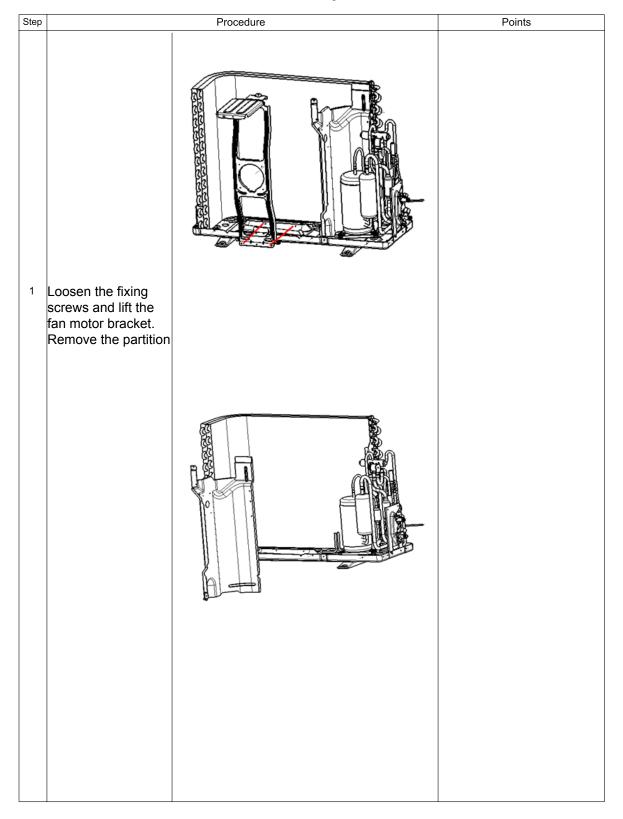


### 4. Removal of Fan Motor Bracket and Partition

Procedure

Warning

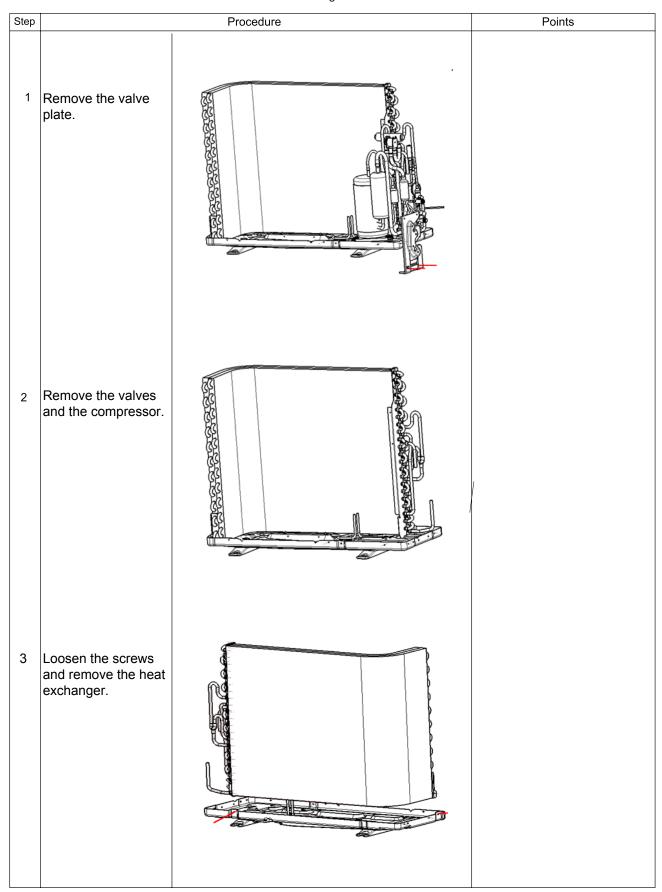
Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.



# 5.Removal of Compressor and Heat Exchanger

Procedure

Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.



# Generalny Dystrybutor Systemów Klimatyzacji i Pomp Ciepła w Polsce:

### REFSYSTEM Sp. z o. o.

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#### **Producent:**

#### Qingdao Haier Air Conditioner Electric Co., Ltd.

Haier Industrial Park, Qianwangang Road, Eco-Tech Development Zone, Qingdao 266555, Shandong, R.P.C. +86 532 88936943

www.haier.com

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