USER MANUAL

for

SBE, SBK, SBT, SRB, SBH, SBX, SBA

SBE-G, SBK-G, SBT-G, SRB-G, SBH-G, SBA-G

UNIT COOLERS WITH AIR BLOWER

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This document provides general information about; assembly, commissioning, maintenance, and repair works of air blast condensers manufactured by SARBUZ ISI TRANSFER CIHAZLARI SAN. ve TIC A.Ş..

These products include the series and glycol types, mentioned within the list below.

Model	Fin Spacing			Series
SBE, SBE, - G	4-6-8-10	mm	Fin Spacing	Applies to all series
SBK, SBK, - G	4-6-8	mm	Fin Spacing	Applies to all series
SBT, SBT, - G	4-6-8	mm	Fin Spacing	Applies to all series
SRB, SRB, - G	5-7-9	mm	Fin Spacing	Applies to all series
SBH, SBH, - G	4-6-8-10	mm	Fin Spacing	Applies to all series
SBX,	10	mm	Fin Spacing	Applies to all series
SBA, SBA, - G	8	mm	Fin Spacing	Applies to all series

1. GENERAL

The following instructions must be strictly observed for health and safety reasons during the assembly, use, and maintenance of the product and for the system to operate smoothly.

1.1 Product Introduction

The cooler is a machine that evaporates the heat of the environment by the use of liquid refrigerant in a cooling system. These devices; also known as evaporator, airforce and unit cooler, consist of refrigerant serpentine, fan motor, drain tray, and outer casing.

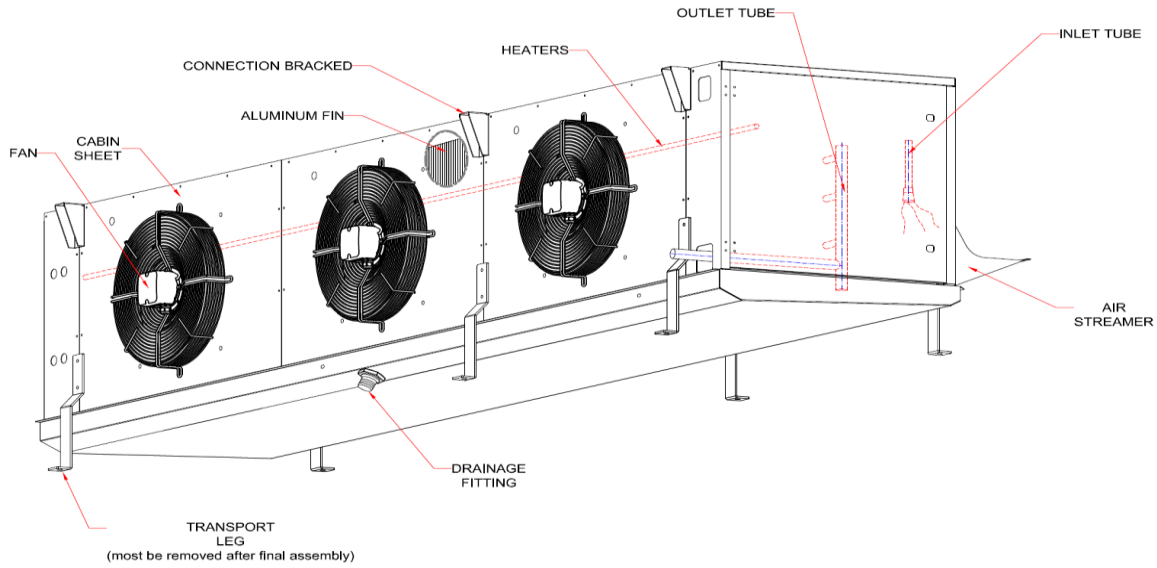


Figure-1a Evaporator Diagram

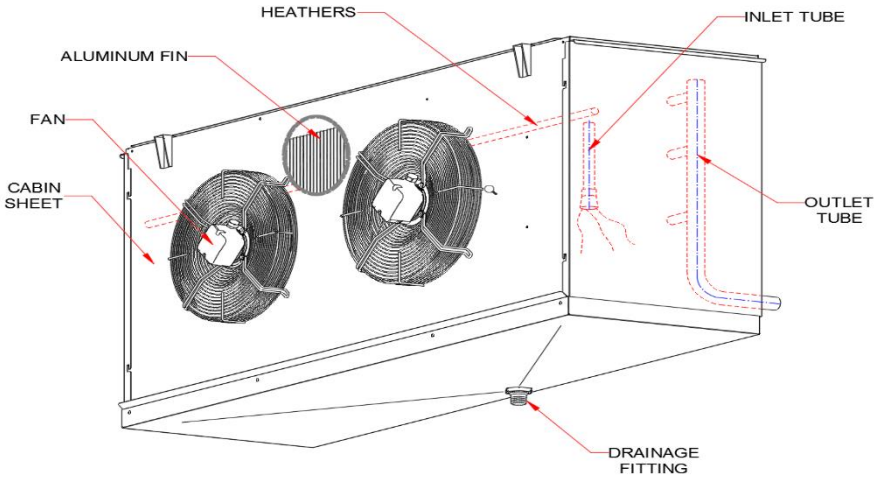
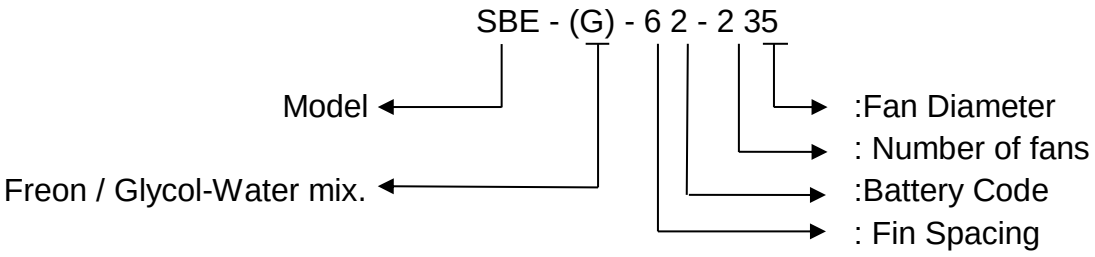


Figure-1b Evaporator Diagram

The room coolers manufactured by SARBUZ, consist of the aluminum Fins, copper pipe and epc (electrostatic powder coating) painted galvanized casing.

Model Identification



2. TRANSPORTATION and STORAGE

- Until it is installed; the product should be stored in a dry place, in its package so that it does not get dirt in the environment, or wrapped in plastic or similar packaging materials to protect the fan motor and aluminum Finss from dust, dirt and other external influences.
- Do not expose the product to extreme heat or cold.
- Store the product as it comes from the factory; with the nozzles of the pipes closed.
- If it is stored for a long period of time, check the bearings by turning the fan impellers by hand. It is recommended to operate the fans; if the storage environment is damp.
- For transport or storage, place the stacked coolers with materials like styrofoam so that they do not damage the drain pipe and outlet pipes.
- When transporting the refrigerant, make sure that it is not held from the inlet and outlet copper pipes.
- Protect the aluminum Fins from impacts during transport.

A forklift, bridge crane or other suitable equipment must be used during transport.

Fins can cut your hand, use work gloves.
Use work gloves when handling hand-held coolers.

Heavy coolers can be transported with the use of suitable equipment such as forklift, pallet truck and so on.

3. ASSEMBLY

3.1. POSITIONING

The distance between the products and the wall in the cold room should be as follows.

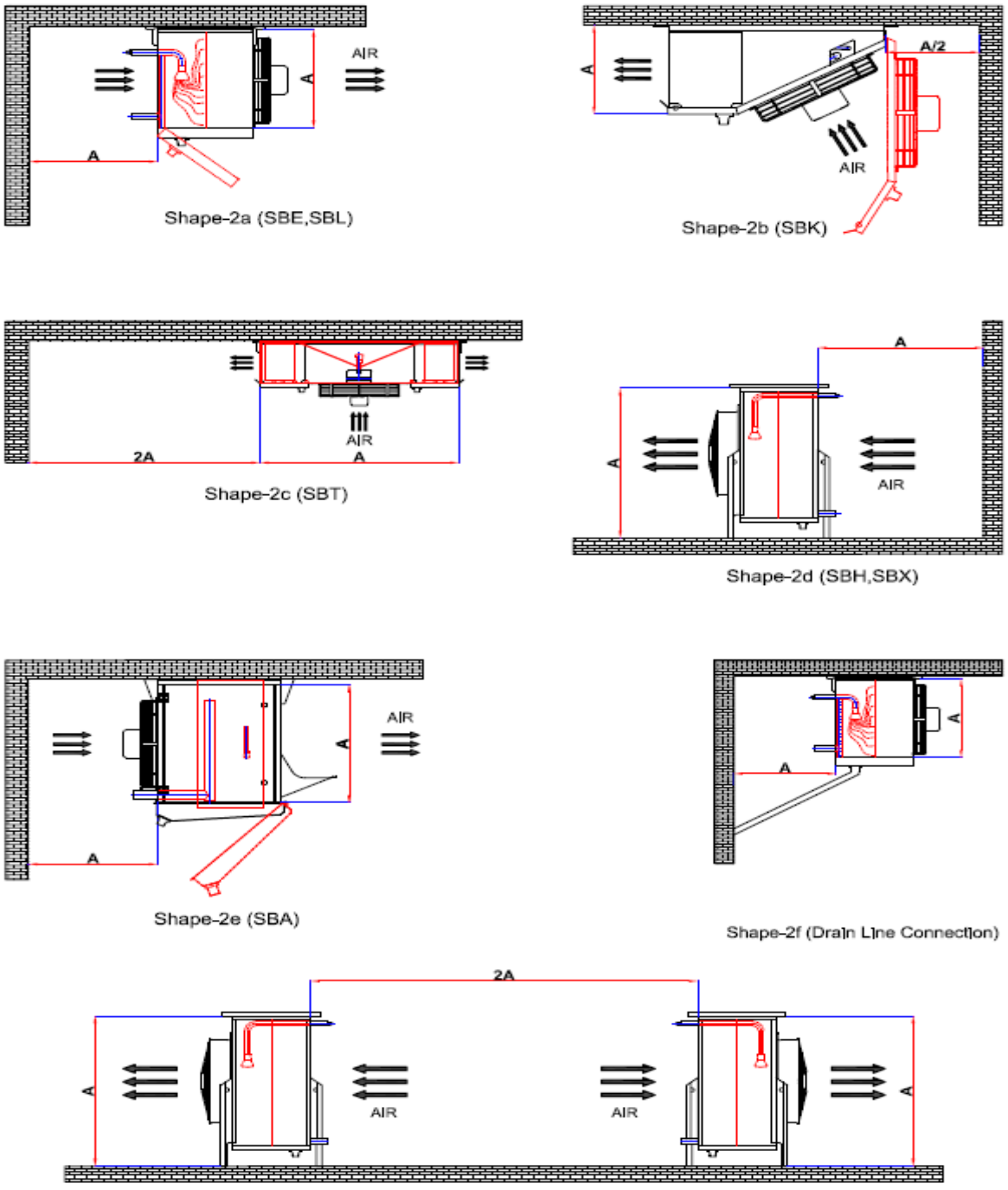


Figure - 2 Positioning Examples

3.2. STARTING-UP

The product must be used together with the products within the Machinery Safety Regulations and other relevant directives. The installer of the system is responsible for installing the system in accordance with the relevant regulations.

- assembly of the device must be made by authorized persons.
- During assembly, the rules of EN 60204-1 and EN 50110-1 must be complied with regards to electrical terms.
- Prior to assembly, the product must be inspected for possible damages to the product during transportation (crushing/perforating of the pipes, tearing of the Finss).
- The product should not be connected to power supply during **assembly.**
- Protective/working gloves should be used during assembly.
- If the product has been stored for a long period of time before assembly, it should be checked whether the fan blades rotate freely. Make sure that the balance of the fans is not disturbed.
- Airflow should not be obstructed on the positioning. Positioning examples are shown in Figure-3.
- Product weights are notified to the buyer during product shipment. The company should use vibration isolator bolts or shims and so on, proper for vibrations that may arise due to product weight and possible unexpected reasons and should tighten them with appropriate torque/strength.
- In order for the product to work smoothly, it must be positioned straight and stable. This condition must definitely be fulfilled.
- assembly should be done in such a way that external vibrations are not transmitted to the product. If necessary, vibration receptor should be inserted in the system.
- Attention should be paid, not to damage the drainage and outlet pipes during the assembly of the product.

- For the piping process, the condition in Figure 2 must be observed.
- Ensure that the fans rotate in the same direction as indicated by the arrows on the product.
- Ensure that the electrical cables are away and secured from the moving fan parts and heaters.
- The power must be divided equally into phases when wiring electrical connections; none of the lines should be overloaded, and earth connection should be made.

  Appendix-2 provides exemplary connection diagrams for advice.
- Evaporators are supplied with pressurized gas. Do not perform any welding works before clearing off the gas inside.

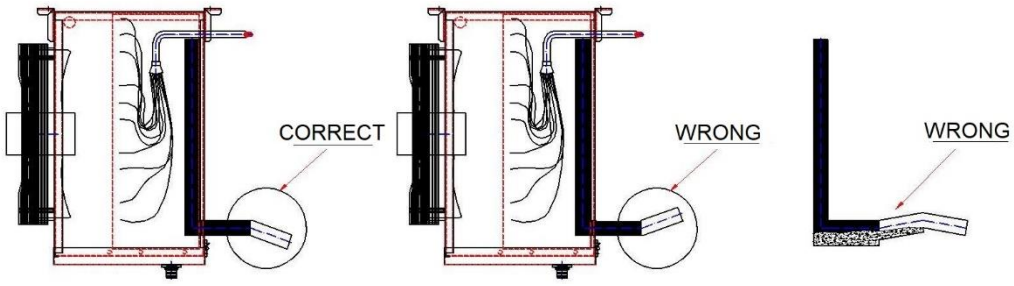


Figure-3 Piping Diagram

3.3. FANS

3.3.1. SAFETY

- If a fan is exposed to a humid atmosphere for a long period of time, run it for a minimum of two hours each month to eliminate the moisture that can condensate inside the engine.
- Disconnect the fan from power and secure it so that it cannot be started again. No maintenance work should be performed on a working fan.
- During maintenance, ensure that the fan blades are stopped and follow the fan manufacturer's instructions.
- Keep the air flow paths of the fan free, as it is potentially dangerous for falling of the objects.
- Replace the bearings when the fans are in the greasing period or if they fail.
- Replace bearings with original parts only.

3.3.2. INSTALLATION

Schematic examples of the electrical connection for the fans, used by SARBUZ, in standard products are given in Appendix-1.

3.3.3. OPERATING

- For fans, the recommended value for the hourly start is 6 and the maximum value is 10.
- When fans are running, things that can pass through the fan protection grill, such as a piece of cloth or long hair, must be kept away from the fan zone.
- Keep away from the air flow line when the fans are running.
- If extraordinary operating status such as abnormal operation noise are detected, the system must be stopped and the supplier should be contacted. Excessive vibration, caused by the unbalanced operation of the fans, can cause the product to become unusable.

3.3.4. SOUND LEVELS

Sound levels are given in Appendix-2. The test data given in the appendices are taken from the manufacturers' documents. The values given are for comparison purposes only; actual
values may vary depending on the environmental structure and the assembly characteristics.

3.4. HEATERS/HEATERS

- To secure the heaters, the rings have been fitted. Use the ring pliers to remove and fixate the heater fasteners/rings.
- Unless otherwise stated or the system installing company arranged the system of the semi-finished product in a different way; defrosting should be performed 15-30 minutes every 4-6 hours (In practice, this duration can be shortened or extended depending on the melting status of the ice. Taking energy efficiency

also into consideration; defrosting should not be performed longer than necessary.

- Heater should be connected to the drain line at the temperature under -10°C

4. OPERATING INSTRUCTIONS

4.1. GENERAL INFORMATION

- Due to the operating principle of the evaporator; air circulation inside the room should not be obstructed, and the products in the room should be stocked so as not to obstruct the air circulation.
- Keep in mind that the air will circulate in the room through the device, and for this reason; the front side of the fans and bottom side of the cooler should not be fully blocked so that the airflow will not be obstructed.
- The evaporator must not be approached or touched at the time of operation.

4.2. FILLING UP and OPERATING of THE EVAPORATOR

4.2.1. FILLING of FLUID GASES

The nitrogen in the battery must be discharged before the gas (freon, etc.) is placed in the battery. After the evaporator is connected to the assembly, the air must be drained by the system installer with a vacuum pump. Gas should not be supplied to the evaporator and/or system without vacuuming.

4.2.2. FILLING of FLUIDS

Ensure that all drain plugs are closed and all air vents are fully open before any liquid is put in the battery. When the system reaches operating temperature, stop the pump and relieve the air through the air vents. Depending on the system and/or fluid characteristics, this process may need to be repeated several times in the initial stages of system operation.

4.3. DRAINAGE of the EVAPORATORS

4.3.1. DISCHARGE of FLUID GASES

Shutdown/discharge of the product must be done by authorized persons using protective gloves. The product must be disconnected from all electrical and other systems and discharged completely with the help of the Fluid Recovery Unit within the system. During this process, the refrigerant must never be released into the air.

4.3.2. DRAINAGE OF FLUIDS

When the ambient temperature falls below the freezing point of the fluid being used, or if the batteries will be out of service for a long period of time; the fluids inside the batteries should be drained.

To ensure drainage, close all air vents connected to the battery, and open the drain plugs. To discharge the small amount of fluid left in the tank after the discharge is completed; close the collector holes and blow compressed air (5-6 bar) through the air vent at an amount of up to 3 times of the internal volume of the battery.

5. INSTRUCTIONS for PERIODIC MAINTENANCE AND REPAIR

- As the products are semi-finished, the companies that perform the assembly works hold the responsibility for the authorized service. On the contrary case, contact the manufacturer.
- Maintenance and repair of the product should only be carried out by authorized persons.
- Check the Fins and pipe parts once a year for abrasion.
- The system must be turned off during maintenance and repair.
- Wait until the fan motor impellers stop completely.
- Cleaning of the exterior surface of the product can be done by water (water pressure should not be more than 3 bar). However, water should be absolutely kept away from fan motors and electrical connections.

- Attention should be paid on cleaning the battery covers as they have a sensitive structure. Aluminum Finss (fins) can cut your hand, use work gloves during this process.
- If there is a risk of abrasion or leakage, warn the system installer; the system must not be restarted until leakage or abrasion is repaired.
- In the case of maintenance and/or repair of the fans, the instructions prepared by the fan manufacturer must be followed.
- Check the mounting screws of the fan motors for loosening, during the periodic inspections. Special pulley bolts are used in fans that are installed by SARBUZ.
- If you suspect a product malfunction, contact your system installer.

Solution suggestions for common problems are given in Table-1.

Problem	**Cause**	**Proposed Solution**
Unit does not Work	The power supply may be not connected.	Check the power supply connection. Check fuses
There is a leakage	Some tubes may be torn or cut by side sheet metals. There could be a leakage in the welding area.	Contact your system installer.
Rough running	There may be an error with the assembly of the system.	Contact the assembly company to check the system assembly (the positions of the fans, etc.)
One or more fans are not working.	The power supply may be not connected or the fan is obstructed from turning.	Check the power supply connection. Ensure that the motors can rotate freely and that the moving parts are not obstructed in any way.
Capacity decrease	Evaporator Finss are clogged with ice or dirt. There is a lack of gas or gas leakage in the system.	Clean the coverslips with pressurized water of 3 Bars. Contact your system installer
Unit does not defrost	The electrical connections of the Heaters may be non-contact.	Check electrical connections. If there is not any problem with the connections, contact your system installer

Table-1 Solution suggestions for common problems

6. INVALIDITY OF WARRANTY

In the event of failures, accidents and so on, which may occur under the following conditions, SARBUZ ISI TRANSFER CIHAZLARI SAN. ve TIC A.Ş.. will not be liable and the product will not be considered under warranty:

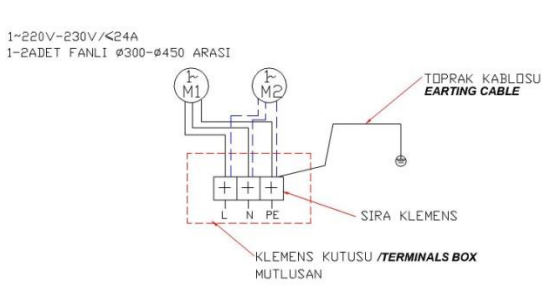
- If the product is used contrary to the conditions specified in the instructions for use,
- If the product is used outside of its purpose,
- If the product is used or installed improperly or incorrectly and so on.

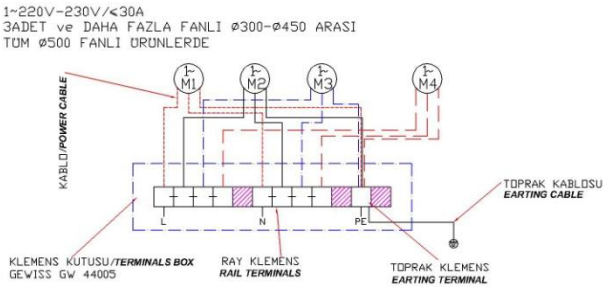
Users can submit their applications for complaints and objections, which cannot be resolved by the manufacturer, to Consumer Courts and Consumer Arbitration Committees.

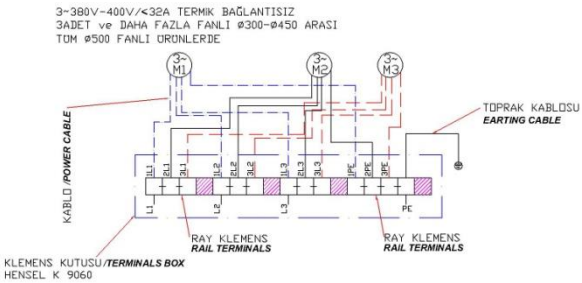
The economic life-cycle of the product is around 10 years.

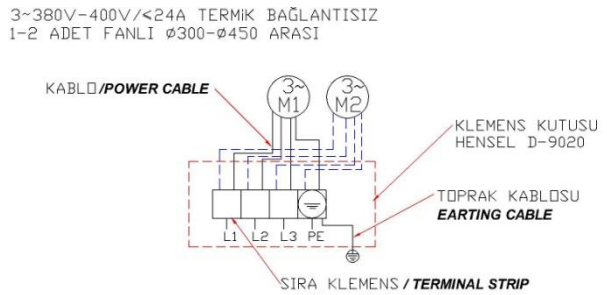
7. APPENDICES

APPENDIX-1) FAN WIRING DIAGRAMS









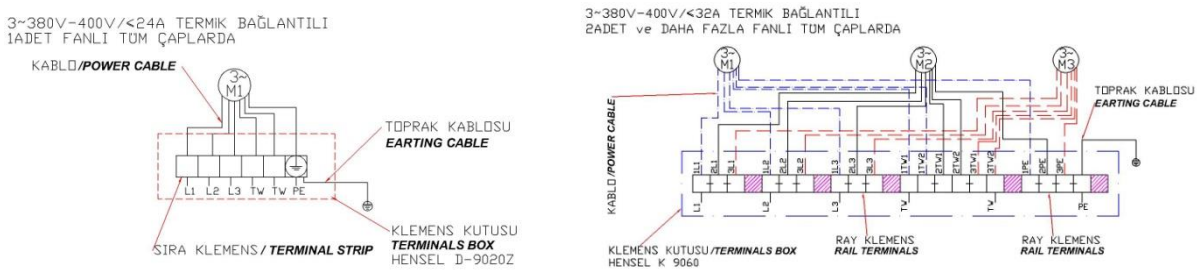


Figure-4 Wiring diagrams of fan motors

Fan Sound Levels

Fan Diameter (mm)	**Voltage** (v)	**Frequency** (Hz)	**Transfer** (d/min)	**Noise Level** (dBA-1m)	**Noise Level** (dBA-3m)	**Noise Level** (dBA-5m)	**Noise Level** (dBA-10m)
250	230	50	1390	54	44	40	34
350	230	50	1380	60	50	46	40
350	230	50	1365	64	54	50	44
400	230	50	1430	69	59	55	49
450	230	50	1400	73	63	59	53
500	230	50	1300	72	62	58	52

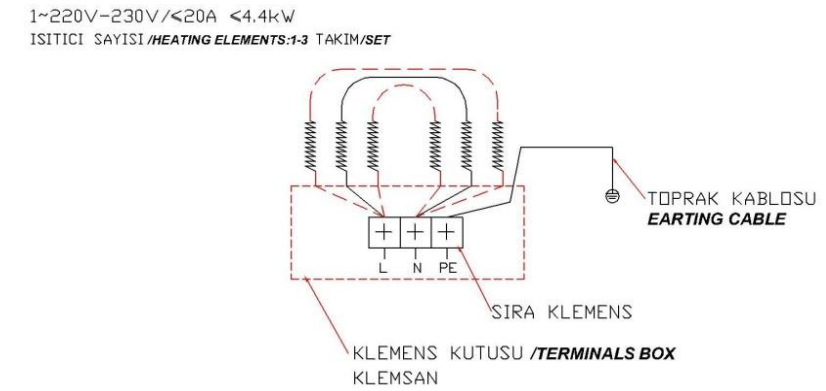
Table-2 Change in sound levels depending on the number of fans.

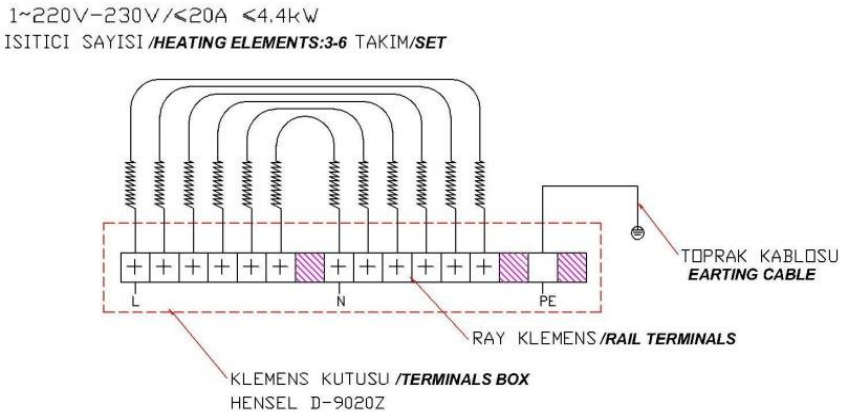
Fan Number	1	2	3	4	5	6
Sound Boost	0	3	5	6	7	8

Table-3 Change in sound levels depending on the number of fans.

For fan volume levels, averages from the catalog values of European fan manufacturers are taken and may vary depending on the application areas. Based on European Fan manufacturers' catalogs.

APPENDIX-2) RESISTANCE-CONNECTOR WIRING DIAGRAMS





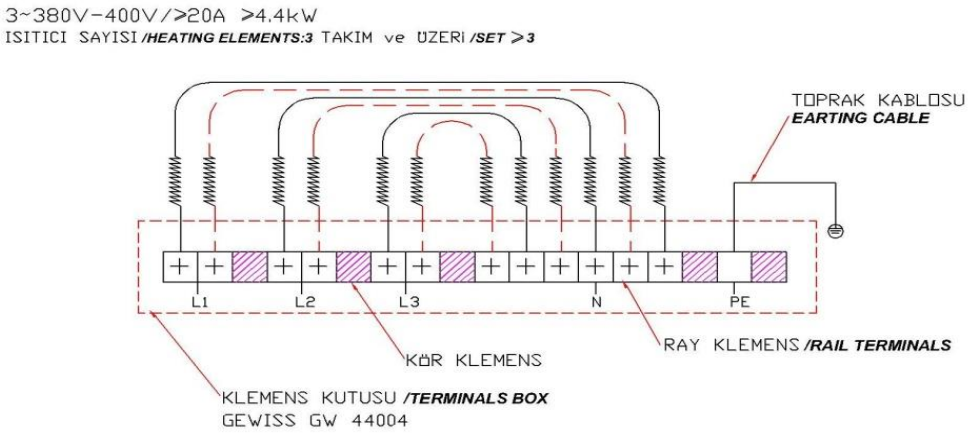


Figure-5 Resistance diagrams depending on the number and force

If there is not enough terminal box assembly place on the product and / or if necessary, connections can be made in one terminal box in accordance with the same fan and resistance electrical circuit diagrams. See Figure-6 for examples.

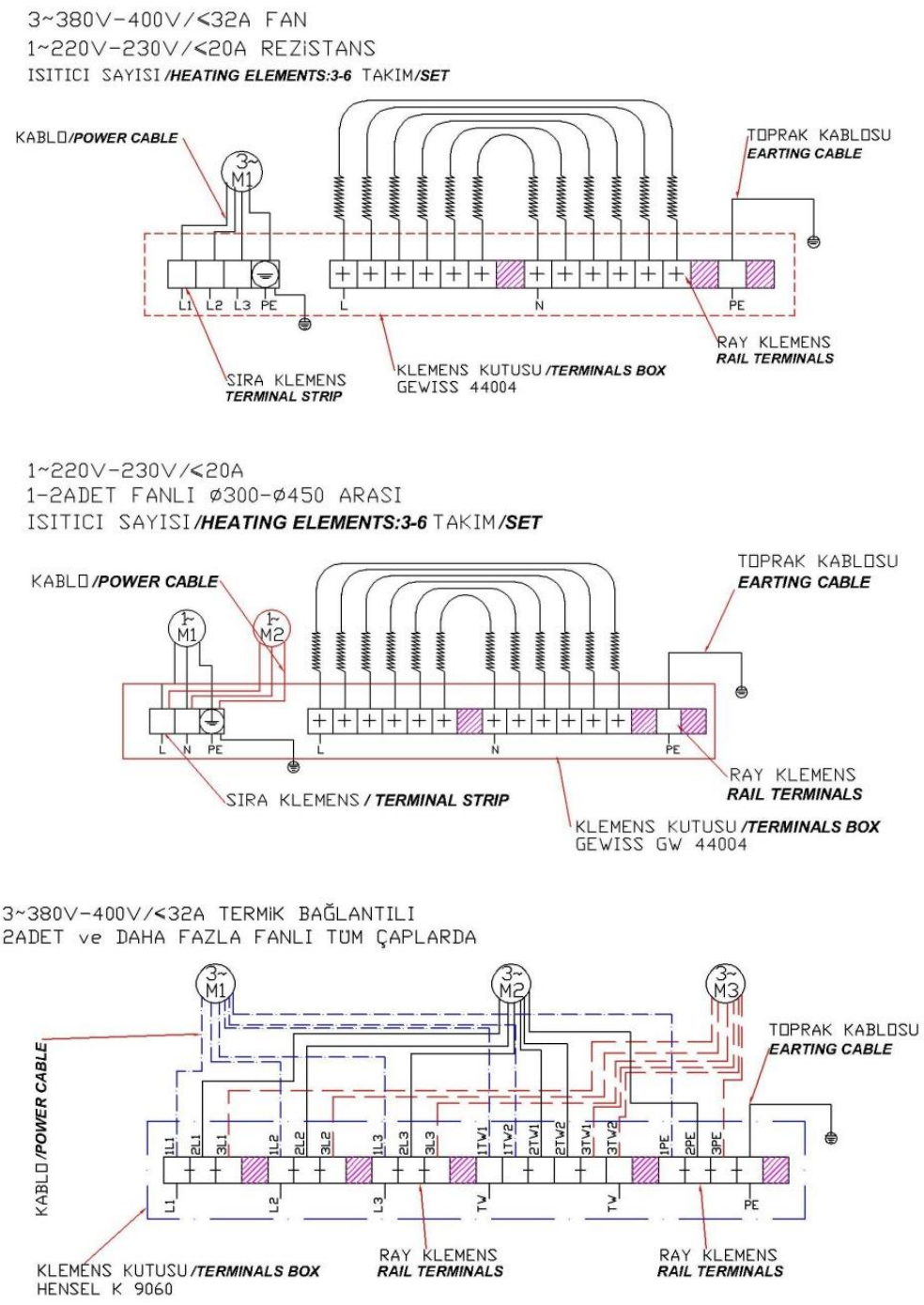


Figure-6 Combination of Fans and Heaters in a single terminal box

APPENDIX-3) PRODUCT LABEL

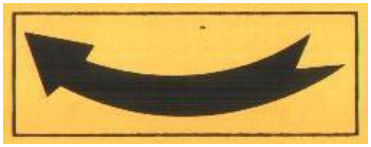
The label contains the product model, capacity, manufacturing number/serial number, pitch and resistance force information if available.

APPENDIX-4) CAUTION SIGNS

1) Pressure warning sign

It is placed on the product, and indicates the gas pressure in it.

2) Fan Rotation Sign



Note that the fans rotate in the direction indicated.

3) Electric Sign

Electrical connections of the device must be carried out by authorized personnel.

The device must not be connected to the power supply during assembly.

4) Fan Caution sign

When fans are running, things that can pass through the fan protection grill, such as a piece of cloth or long hair, must be kept away from the fan zone.