



USER MANUAL
for
SPK, STK, SFK, SEK, SVK TYPE
AIR COOLED CONDENSERS
and
WET/DRY CONDENSERS

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

These products include the series listed below.

Model	Fin Spacing	Series
SPK	3 mm Fin Spacing	Applies to all series
STK	3 mm Fin Spacing	Applies to all series
SFK	2,1-2,5 mm Fin Spacing	Applies to all series
SEK	2,1-2,5-3 mm Fin Spacing	Applies to all series
SVK	2,1-2,5-3 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

A condenser is a machine within a cooling system, which throws the heat of the inner environment to outer environment, by condensing it through the use of gas refrigerant. Condensers consist of serpentine, fan motor and outer casing.

The condensers manufactured by SARBUZ, consist of aluminum lamella, copper pipe and epc (electrostatic powder coating) painted galvanized casing.

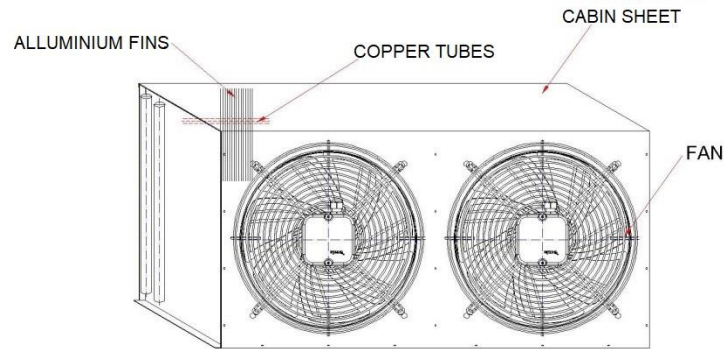
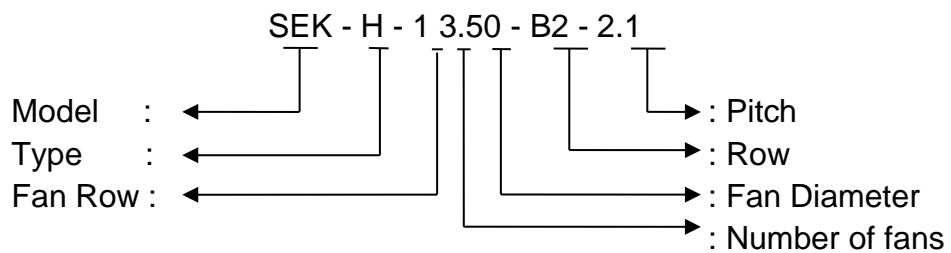
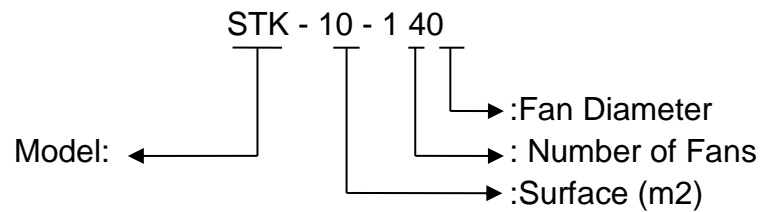


Figure-1 Schematic Illustration of the Condenser

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 lamellas 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 condensers with materials like styrofoam so that the inlet and outlet pipes will not be damaged.
- When you handle the condensers, pay attention not to hold inlet and outlet copper pipes.
- Protect the aluminum lamella from impacts during transport.

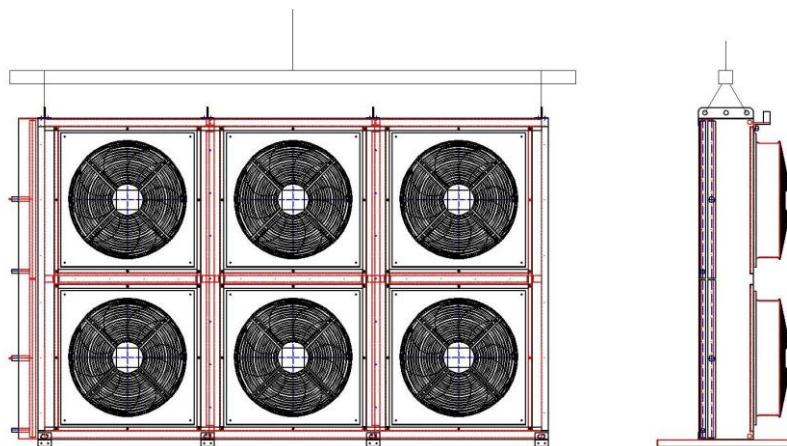


**Lamella can cut your hand, use work gloves.
Use work gloves when handling handheld condensers.**



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

Carry out the transportation works; with a mobile crane, forklift or other suitable equipment as shown below.



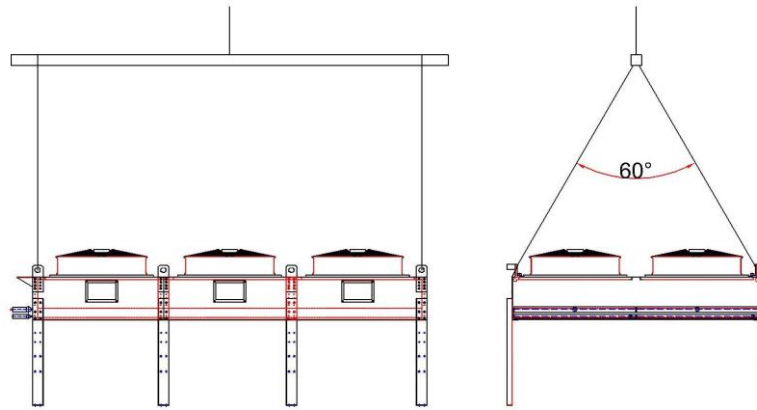


Figure 2) Transportation examples

3. ASSEMBLY

3.1. POSITIONING

- The ventilation of the operation area must be sufficient and there must not be any hazardous or explosive substances in the environment.
- When positioning, the air flow must not be obstructed, the fans should not blow against the wind flow, but they should take the wind behind or be perpendicular to the wind flow.

The distances between the condensers and the wall should be as follows.

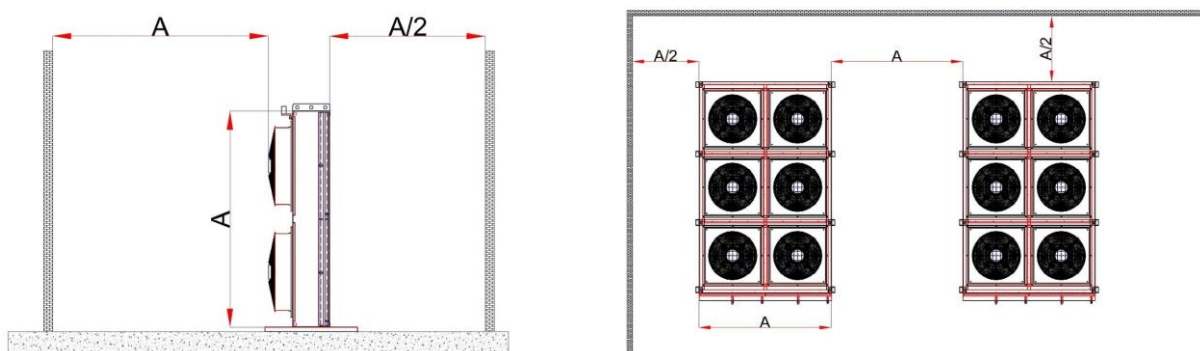


Figure 3) Positioning examples

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 lamellas).
- 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 2.
- 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.

Number of Document	:	UM-002.R00-0112
Number of Revision	:	00
Revision Date	:	--
First Release Date	:	24.May.2019

- 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 outlet pipes during assembly of the product.
- 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.
- Condensers are supplied with pressurized gas. Do not perform any welding works before clearing off the gas inside.

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.

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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

4. OPERATING INSTRUCTIONS

4.1. GENERAL INFORMATION

- The condenser's air flow should not be obstructed as required by the working principle.
- The condenser must not be approached or touched at the time of operation.
- Under any purposes (maintenance / repair / assembly etc.); do not climb / step on the condenser!

4.2. FILLING UP and OPERATION of CONDENSERS

The nitrogen in the battery must be discharged before the gas (freon, etc.) is placed in the battery. After the condenser is connected to the installation, the air must be drained by the system installer with a vacuum pump. Gas should not be supplied to the condenser and/or system without vacuuming. This operation should be performed by an authorized person, using protective gloves.

4.3. DISCHARGE/DRAINAGE OF CONDENSERS

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.

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 lamella 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 lamellas (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	Condenser lamellas are clogged with dirt-dust. There is a lack of gas or gas leakage in the system.	Clean the lamellas with pressurized water of 3 Bars. 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 10 years.

APPENDICES

APPENDIX-1) FAN WIRING DIAGRAMS

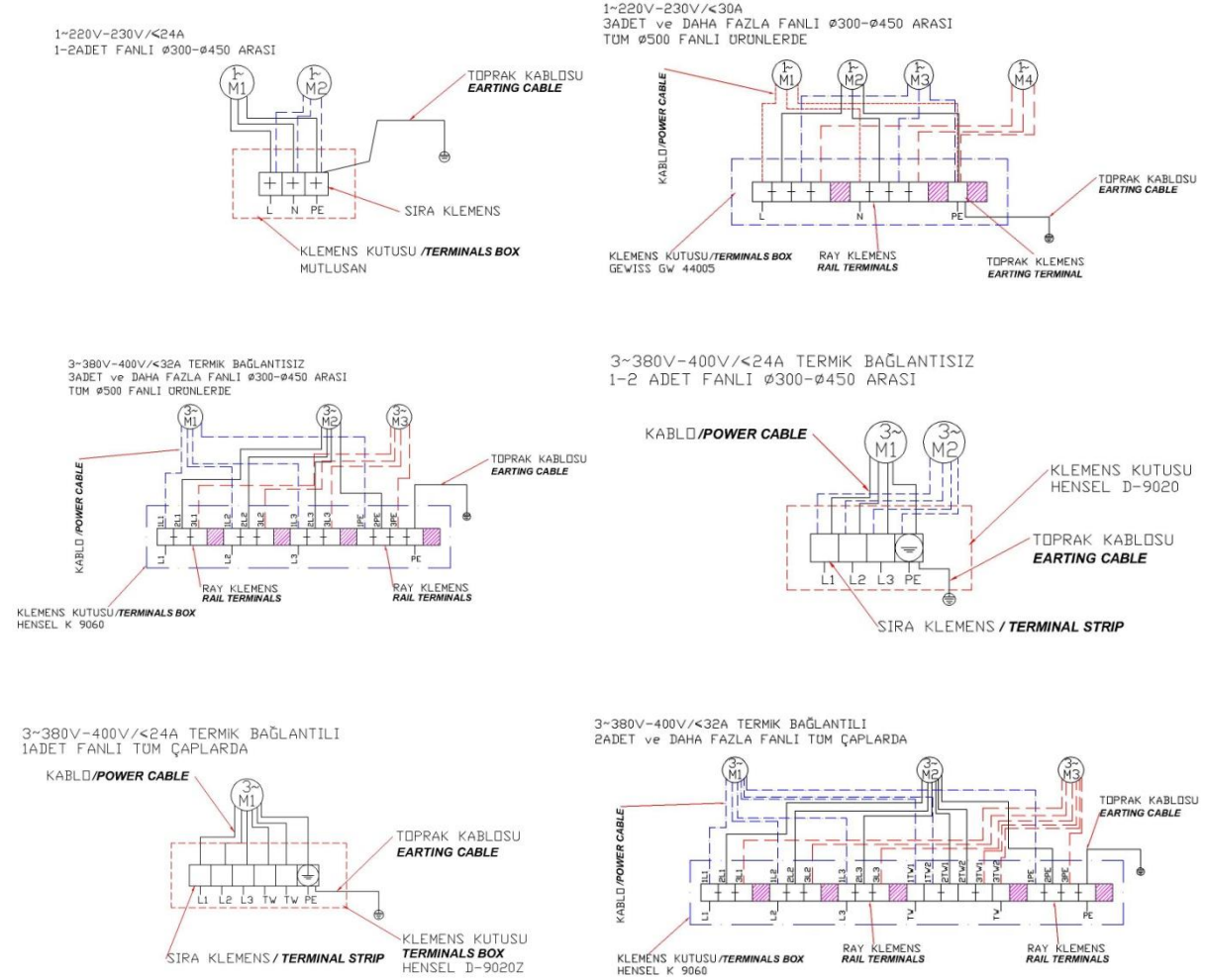


Figure-4 Wiring diagrams of fan motors

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) PRODUCT LABEL

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



Reim 1) Label example

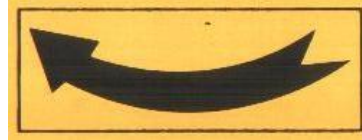
APPENDIX-4) CAUTION SIGNS

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.