ThermoWay
Heat Exchanger Solutions

user manuel

condensers

COMMERCIAL TYPE AIR COOLED CONDENSERS

TCC SERIES

TCC H
TCC S
TCC E

INDUSTRIAL TYPE AIR COOLED CONDENSERS

TCS SERIES

TCS H
TCS V

TLG SERIES

TLG H
TLG V

TCI SERIES

TCI V

Table of Contents

1. About the Manual

This user manual provides technical information, instructions on transportation, storage, station, operation and maintenance of Freon Condenser series products manufactured by THERMOWAY A.Ş.

This guide in digital platform

Retrieved from http://www.thermoway.com.tr/pdf/kondanser-kullanim-kilavuzu.pdf

or you can download it by scanning the QR code on the product.

1.1. Compliance with Instructions for Use

- The user manual should be accessible at all times
- All persons responsible for the product should be informed the user manual.
- Make sure that all persons involved have read and understood the instructions in the user manual.

1.2. EN378 Standard

EN378 standard is related to safety and environmental conditions related to refrigerants in refrigeration systems and heat pumps where refrigerants are used; design, production, manufacturing, manufacturing, station, operation, repair. The purpose of this standard is to minimize hazars situations that may arise from refrigeration systems and refrigerants to people and the environment. These hazardous conditions are mainly related to the physical and chemical characteristics of refrigerants as well as the pressures and temperatures generated in the refrigeration cycle.

Inadequate measures may result in the following situations:

- Risk of shattering or explosion of components, risk of parts scattering
- Risk of environmental damage and toxicity if refrigerant escapes due to a crack, a leak due to poor design, improper operation, inadequate maintenance, repair, charging or discharging
- Risk of combustion of escaping fluid and consequent risk of fire and toxic products

1.3. Responsibilities

1.3.1. Responsibilities of manufacturer

- To ensure that production stages are carried out in accordance with ISO and EN378 requirements.
- To ensure product production by designing and material selection in accordance with the working conditions and conditions specified during the order.
- To ensure the provision of the user manual.
- To ensure the presence of warning symbols and labels on the product.

1.3.2. Subcontractor, Assembler Company Responsibilities

- In case of any damage or defect observed upon delivery of the product, immediate notification should be made to THERMOWAY A.Ş.
- After unloading the product, nitrogen pressure testing should be performed.
- Compliance with the instructions specified in the user manual is required.
- Adherence to occupational safety and environmental protection regulations is mandatory
- Any issues arising during ass and commissioning should be reported to THERMOWAY A.Ş.
- Ensure the complete assembling of the product.
- The information label related to the refrigerant gas that will be used in the system should be indicated on the product.
- Cables and electrical materials that meet the amperage values specified on the product label should be selected.
- Operator training should be provided for any disruptions that may occur during operation.
- Operator training should be provided for any disruptions that may occur during operation.

1.3.3. Owner or Operator Responsibilities

- Follow the instructions in the user manual.
- Compliance with occupational safety and environmental protection rules.
- Ensuring that the product is assembled by authorized persons.
- Eliminating the elements that will prevent the product from working efficiently or creating a more suitable place for it to work.
- Providing operators and receiving training from authorized persons for any problems that may occur during operation.

1.4. Warranty Coverage and Legal Notes

1.4.1. Warranty Period

- The warranty period is 24 months from the invoice date.

1.4.2. Conditions that Violate the Warranty

- Failure to notify THERMOWAY A.Ş. in writing and with visuals about any damages that may occur during transportation.
- Performing transportation and assembly not in accordance with the instructions in the manual.
- Damages caused by equipment and accessories assemblied outside the original order.
- Any revision or modification made to the equipment and accessories without the manufacturer's approval.
- Damages caused by deviations greater than +-%10 from the network voltage value specified on the product label.
- Damages caused by improper electrical connections.
- Failures caused by corrosive factors in the operating environment, as the products are designed based on standard nominal working environments.

  Removal of the information label from the product.

  In the above cases, the product will be excluded from the warranty coverage.

2. Safety

2.1. Symbols and Warning Signs

Below are the warning signs and their meanings specified in the user manual and on the product.

To prevent fatalities and injuries, the warnings and cautions in the user manual should be strictly followed.

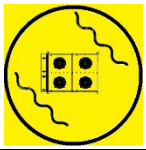
The measures to be taken under the heading of Emergency Situations are notified in writing in case of any problems that may be encountered.

2.1.1. General Safety Signs in the User Manual

DANGER	Dangerous situation which, if not avoided, will certainly cause serious injury or death.
WARNING	Dangerous situation which, if not avoided, could result in serious injury or death.
CAUTION	Dangerous situation which, if not avoided, could result in minor to moderate injury.
NOTES	Information

2.1.2. Symbols in the User Manual

	**Warns against hand injuries** Otherwise, it can lead to cuts, crushing or amputation of hands and fingers.
	**Warns against hot surfaces** Contacting may cause burns.
	**Warns against electrical voltage** Contacting may result in electric shock.
	**Warns about substances hazard to health.** May cause injury and health hazards if contacing or inhaling.

	**Warns about contact with rotating equipment.** May damage hands in case of automatic operation during contacting.
	**Warns about Fan Rotation Direction** Provides information about the fan rotation direction in fan products.
	**Warns of Burning Danger** There may be a risk of ignition during intervention.
	**Warns of Freezing Danger** May cause frostbite on contacting.
	**Warns about dispatch pressure warning** Indicates the amount of pressure during product shipment.
	**Warns about the Transport Place** Indicates the transportation place to prevent damage to the product and the environment during transportation.
	**Warns about Product Connection Point** Notifies the points where connections should be made during product assembly.
	**Warns on Product Quality control** It represents that the product was produced in accordance with the quality control rules during the production process
	**Warns about vibration**

2.1.3. Basic Safety Signs

	**Warns of flame contact** Indicates that there should be no flame contact
	
	**Warns about fire**
	**Electrical Disconnection is required**
	**Warns about pressure**

2.1.4. Protection Equipment During Intervention

	Use of Protective Eyewear
	Glove Usage
	Mask Usage
	Usage of Protection Suit
	Helmet Usage
	Insulated Shoes

2.2. Intervention Situations

- The product shpold be only intervened by authorized and trained person.
- In cases of electrical intervention, especially the intervention of persons with relevant certificates is required.

2.2.1. Emergency Situations

DANGER

Dangerous situation which, if not avoided, will certainly cause serious injury or death.

During the danger;

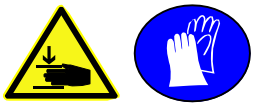
- The product power should be switched off,
- In case of gas leakage, the product should not be allowed to be approached except by an authorized person as it will reduce the oxygen concentration in the environment.
- A qualified and authorized technician should be notified.

2.2.2. Fins and Sharp Surface Intervention

ATTENTION

A dangerous situation which, if not avoided, could result in minor to moderate injury.

The sharp corners of the product on the fin surface may cause hand and finger cuts. Warnings should be followed in order to prevent injuries that may occur especially during transportation and assembly.



2.2.3. Fan Intervention

DANGER

Dangerous situation which, if not avoided, will certainly cause serious injury or death.

To prevent hand and finger injuries during fan intervention,

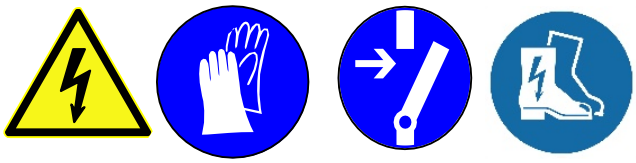
- Warning signs should be placed to close the power line before intervention and to prevent possible unintentional opening,
- Gloves should be used to prevent possible hand and finger cuts on the sharp surfaces of the fan,
- Gloves should be used to prevent injuries that may occur as a result of hot surface contact,
- Bolt, washer and washer connections should be made completely and precisely during assembly after the fan intervention,
- During the assembly of the fan, the fan wireframe and electrical box should be assembly completely,
- After assembly, make sure that the fan is working properly and in the correct air direction.

2.2.4. Electrical Intervention

DANGER

Dangerous situation which, if not avoided, will certainly cause serious injury or death.

- Warning signs should be placed to close the power line before intervention and to prevent possible unintentional opening,
- Even if the electrical system is switched off, intervention should be carried out with appropriate electrical equipment as the mains cables may carry voltage,
- Work on the electrical system should only be carried out by a trained person.



2.2.5. Leakage Intervention

WARNING

A hazardous situation which, if not avoided, could result in serious injury or death.

- Warning signs should be placed to close the power line before intervention and to prevent possible unintentional opening,
- Untrained persons should be prevented from accessing the product,
- Since oil and hot fluid coming out of the system with the pressure may cause injuries to personnel it should be intervened with appropriate safety equipment,
- Since the oxygen concentration in the air will decrease, ambient ventilation should be provided before the intervention in terms of personnel health,
- Before intervention, the product should be checked to ensure that it is unpressurized,
- In order to prevent ignition according to the flammability class of the refrigerant gas, substances that will create fire and sparks should be kept away,
- During renovation, intervention should be carried out by trained personnel in order to prevent ignition according to the flammability class of the refrigerant gas,
- Even if the flammability class of the refrigerant is low, the risk of ignition of the oil in the system should be taken into system,
- In order to prevent possible ignition, fire extinguishing equipment that will not react with the refrigerant used should be available.

2.2.6. Hot Surface Intervention

ATTENTION

Precautions to be taken to prevent mild to moderate injury during contact with a hot surface,

- High temperature should be considered when contacting the fin surfaces,
- High temperature should be considerade during contact with collectors and tubes, and if intervention is required, refer to the Leakage Intervention section,
- The high temperature during fan contact should be considered, and if intervention is required, refer to the Fan Intervention section.

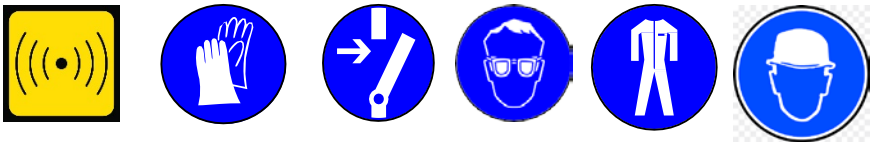
2.2.7. Vibration-related Problems

WARNING

A Hazardous situation which, if not avoided, could result in serious injury or death.

Measures to be taken to prevent serious injury or death in the event of vibration-related problems,

- Warning signs should be placed to close the power line before possible vibration-induced intervention and to prevent unintentional opening,
- personnel safety precautions should be taken against part breakage as a result of fan damage,
- Before intervening in case of cable breaks due to vibration, it is necessary to refer to the Electrical Intervention section.
- For leakage problems due to vibration, refer to the Leakage Intervention section.
- After all interventions have been completed, the product should be commissioned after the final check before operation.



2.2.8. Problems caused by faulty installation

WARNING

A Hazardous situation which, if not avoided, could result in serious injury or death.

- Failure to center the product tube connections may cause tension in the tube line and may cause breakage and leakage at the tube connection points during operation.
- Improper placement of the product may adversely affect the air flow and cause capacity reduction.
- Failure to assembly the product in a straight line may affect the oil flow in the system and cause capacity reduction.
- In cases where air inlet and outlet is blocked, product capacity efficiency may decrease.
- It may cause service and intervention problems when proper distance and space is not left for assembly.
- In cases where the Product Leg connection point bolts are missing and left loose, vibration may cause damage to the product.

3. Product Name Extansion And Label Definition

3.1. Product Name Extansion

INFO

1	2	3	4	5	6	7	8
TCS	H	080	B	13	A3	21	M3D

1. **Product Type**
   TCS : Flat Tube, Corrugated Fins Industrial Condenser
   TLG : Grooved Tube, Louvered Fins Industrial Condenser
   TCI : Flat Tube, Corrugated Fins V Design Industrial Condenser

   Coil Position
   H : Horizontal
   V : Vertical

2. **Fan Diameter**
   050 : Ø500
   063 : Ø630
   080 : Ø800
   090 : Ø900

3. **Length Module**

4. **Number of Fans**
   13 : the first number is the number of fan line, the second number is the number of fans in the line
   13 = 1*3 = 3 fans

5. **Mold Geometry**

6. **Fin**
   21 : 2.1mm pitch
   25 : 2.5mm pitch

7. **Fan Electric / Circuit Type**
   S1N: Single phase 1400dd
   M1N: Single phase 900dd
   S3D: Three-phase 1400dd
   M3D : Three-phase 900dd
   M3Y: Three-phase 600dd
   Q3D : Three-phase 440dd
   Q3Y: Three-phase 340dd

3.2. Product Label Presentation

INFO

ThermoWay
Heat Exchanger Solutions

TCS H 080.B13-A3-25-M3D

İmalat No *Production Number*	2010-0056-001	Fan Markası *Fan Brand*	Rosenberg
Kapasite *Capacity*	140.180 Watt (EN327)	Fan Sayısı & Çapı *Fan Pcs. & Dia.*	3 x Ø800
Ağırlık *Weight*	320 kg	Fan Elektrik *Fan Electric*	400V/3~/50Hz.
Ürün Yüzeyi (m2) *Surface*	256,00 m2	Fan Toplam Gücü *Fan Total Power*	5.820 Watt
Boru Hacmi *Inlet Volume*	41,76 lt.	Rezistans Toplam Gücü *Rezistans Total Power*	-
Mak. Çalışma Basıncı *Max. Working Pressure*	34 bar	Rezistans Sayısı *Rezistans Pcs.*	-
Test basıncı *Test Pressure*	36 bar	Toplam Akım *Total Current*	
Test Tipi *Test Type*	Azot	Akışkan Grubu *Group Of Fluid*	HCFC/HFC (2)
FREE*STROKESCRIBE*		İmalat Tarihi *Production Date*	10.10.2020

Sertifikalar
Certificate

Kullanım Kılavuzu
Manuel

Teknik Doküman
Technical Data

THERMOWAY TESİSLERİNDE ÜRETİLMİŞTİR.

4. Technical Information

4.1. Coil Information

INFO

- Product standard designs are designed as aluminum fin on copper tube. (*1)
- Fin spacing is designed as standard 2.1-2.5mm.(*2)
- To Increase the efficiency makes a staggered tube arrangement.
- Each fan section is separated from each other to prevent the fans from interacting with each other.
- High performance is achieved with improved heat transfer.
- Optimum curcuiting is performed.
- The coil was made of galvanized sheet with aluminum snap-on cover to prevent sheet cuts and increase strength.
- TLG series products are designed with grooved tubes and burst fins to increase efficiency.
- Maximum working pressure is 28 bar.
- Test pressure is 36 bar.
- Thick walled copper tube option, gold epoxy and hydrophilic foil are available as options. (*1)
- Suitable working positions of the product series are indicated below,

SERIES	HORIZONTAL	VERTICAL	V Type
TCC H/E/S		✓	
TCS HV / TLG HV	✓	✓	
TCI V			✓

(*1) Different fin material selection is optional for corrosive working environments.

(*2) Optionally, production between 1.8mm and 3.2mm can be made.

4.2. Casing Information

INFO

- RAL 9016 electrostatic epoxy oven powder coating is used on galvanized sheet as standard.(*1)
- The minimum paint thickness uses as 70 microns.
- Industrial condensers have carrier legs and lifting lugs.

(*1) Can be painted in different RAL codes according to customer request.

(*1)Stainless case option is available as an option for corrosive working environments.

4.3. Product Intended Use

INFO

- Condensers transfer the heat load on the refrigerant to the external environment by means of the fans on it and ensure that the fluid is condensed.
- Condensers are suitable for operation with R404A, R507, R134A, R407A, R407C, R448A, R449A, R452A (etc. pressure range) fluids and capacities are given according to R404A.
- Group L1/A1 refrigerants complying with flammability (L) and toxicity (A) classification in accordance with EU Directive 97/23/.
- Max. working pressure is specified as 28 bar.
- Test pressure is36 bar

4.4. Determination of Working Conditions

INFO

For the selection of air-cooled condensers, the following criteria should first be answered.

- Determination of the required condenser capacity,
- Determination of the type of refrigerant to be used,(*1)
- Determination of the ambient temperature and condensation value,(*2)
- Determination of the corrosive status of the working environment,(*3)
- Determination of product dimensions,
- Determination of the maximum permissible sound level in the working environment,
- Determination of the desired energy class,
- Determination of fan operating temperature,
- Determination of additional pressure loss,(*4)

(*1) The type and pressure characteristics of the refrigerant to be used should be checked. Standard operating conditions are specified in the Product Intended Use section. For the type of

refrigerant and fluids requiring different pressure resistance, the manufacturer should be informed at the order stage.

(*2) Standard product capacities are calculated according to Eurovent EN327 standard for R404A gas. Capacity calculation needs to be renewed for different condensation conditions.

(*3) Products are designed according to the nominal working environment as standard. THERMOWAY A.Ş. should be informed according to the corrosive conditions of the working environment.

(*4) Capacities are calculated without adding additional pressure loss. The manufacturer should be contacted for possible additional pressure losses.

4.5. Inappropriate Use

INFO

- Product design is designed according to the intended use of the product and the specified operating conditions.
- Using the product with refrigerant of a different class and pressure range may cause the following problems.
  - The tube material used and the welding points may not withstand thermal and chemical stresses.
  - The max. working pressure indicated on the label may be exceeded and may cause damage to the product.
  - Different safety class refrigerant leaks can cause serious injury and death.
- Changes to the location of the product may cause the following problems.
  - Changing the amount of air flow may cause a capacity reduction,
  - Indoor corrosive agents may cause damage to the material on the product.

4.6. Fan Information

INFO

- High efficiency Rosenberg, EBM or equivalent fans should be used.(*1)
- AC type axial fans operating in the suction direction are used for the condensers specified in this manual.
- Fan diameters between Ø350 and Ø910 are used.
- Voltage value for single-phase fans 220V / 50Hz.
- Voltage value for three-phase fans 400V / 50Hz.
- Three-phase fans can be operated at two different speeds with star-delta connection.
- All motors have internal protection thermistors. Motor protection class IP 44/IP 54, insulation class F.

- The permissible operating temperature range for standard fans is from -40° C to +50° C /+ 65° C.(*2)

(*1) Thermoway reserves the right to use equivalent models of different fan brands.

(*2) Please contact the manufacturer for different fan and motor options at high operating temperatures.

(*3) For long periods of storage and system downtime, fans should be run for 2 to 4 hours per month.

4.6.2. EC Fans

EC fan technology is, in short, an electronically variable direct current motor. Being electronically variable means that the direction of the electric current changes electronically backwards or forwards. In traditional AC type fans, this process is done mechanically. EC motors are constant magnet and electronically adjust the direction of rotation according to the current. Therefore, it does not cause power loss in current changes as in AC motors.

General advantages of EC engines;

- More efficient
- Low operation and maintenance costs
- Low sound level
- Low heat losses, less risk of overheating
- Small dimensions
- Easy control
- Perfect conformity to the desired operating point
- Control unit is on the motor
- Remote control possibility
- No loss of efficiency and no increase in noise level at variable speeds
- Controllable with 0-10V DC.

4.7. Product Size Information

INFO

All dimension information for the product range mentioned in this manual,

Retrieved from http://www.thermoway.com.tr/download

or scanning the QR code.

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4.8. Sound Level

INFO

Sound Pressure Level

Sound Pressure Level is calculated using the formula below according to EN 13487 standards.

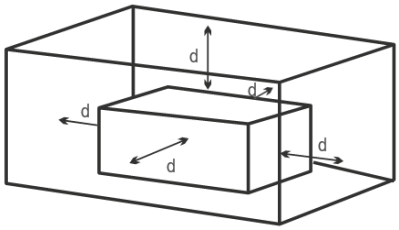
LpA = LwA - 10 log (Sp/Sr)

LpA = Sound Pressure Level

LwA = Sound Power Level

Sp = Rectangular Prism Surface at a distance of 10 meters

Sr = Reference Surface (1m2)



Sound Power Level

MONOFAZE 1-230 V				**TRIPHASE 3-400 V**			
Fan Diameter	RPM	dBA (50Hz) LwA		Fan Diameter	Electricity Connection	RPM	dBA (50Hz) LwA
Ø250	1390	54		Ø500	Ü	1390	72
Ø300	1380	59				930	64
Ø350	1400	64				680	58
	945	54			Y	1180	70
Ø400	1430	69				800	62
	940	59				680	55
Ø450	1400	73		Ø630	Ü	1320	80
	980	63				890	67
Ø500	1300	72				660	61
	915	64			Y	1050	74
	665	59				690	61
Ø630	915	68				520	56
	665	62		Ø800	Ü	880	77
						660	74
						435	59
					Y	670	70
						485	66
						340	52

*Manufacturer Company Test Results.

Effect of Fan Number Change on Sound Pressure Level									
Number of Fans	1	2	3	4	5	6	8	10	12
Increase	0	3	5	6	7	8	9	10	11

Effect of Distance on Sound Pressure Level					
Distance	1	5	10	50	100
Sound Pressure Level Variation	20	6	0	-14	-20

Sound pressure levels depending on the number of fans at a distance of 10 meters

Fan Diameter	Connection	RPM	Number of Fans														
			1	2	3	4	5	6	7	8	9	10	12	14	16	18	20
			LpA = Sound Pressure Level														
Ø500	1Ph - 230V	1300	45	48	50	51	52	53	53	54	54	55	56	57	57	58	58
		940	31	34	36	37	38	39	39	40	40	41	42	43	43	44	44
Ø630	3Ph-400V	1310 (Ü)	57	60	62	63	64	65	65	66	66	67	68	69	69	70	70
		1000 (Y)	50	53	55	56	57	58	58	59	59	60	61	62	62	63	63
		900 (Ü)	42	45	57	58	59	50	50	51	51	52	53	54	54	55	55
		720 (Y)	37	40	42	43	44	45	45	46	46	47	48	49	49	50	50
Ø800		890 (Ü)	47	50	52	53	54	55	55	56	56	57	58	59	59	60	60
		690 (Y)	42	45	47	48	49	50	50	51	51	52	53	54	54	55	55
		670 (Ü)	40	43	45	46	47	48	48	49	49	50	51	52	52	53	53
		510 (Y)	33	36	38	39	40	41	41	42	42	43	44	45	45	46	46
		440 (Ü)	29	32	34	35	36	37	37	38	38	39	40	41	41	42	42

*Sound level values are given for 50Hz.

For recommended sound criteria in various environments,

From www.thermoway.com.tr/download,

or by scanning the QR code.

4.9. Energy Efficiency

INFO

The energy efficiency of the products is specified in the table below according to the EUROVENT Rating Standard (ECP-02HE 01-2020).

ENERGY CLASS EFFICIENCY		
CLASS	**ENERGY CONSUMPTION**	**ENERGY RATE (R)**
A+	Lowest	R≥ 226
A	Lower	169≤ R < 226
B	Low	109≤ R < 169
C	Middle	69≤ R < 109
D	High	37≤ R < 69
E	Very High	R < 37

$$R = \frac{\text{Capacity (EN327)}}{\text{Fan Power}}$$

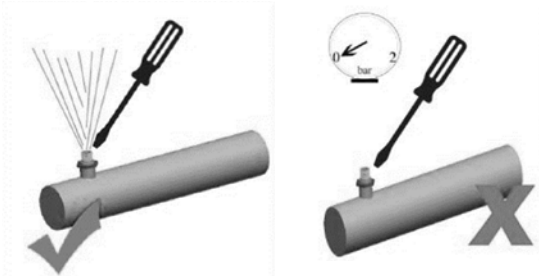
Product	TCS H 080.C13-A3-21-Q3D
Capacity (EN327)	91.980 Watts
Fan Type	Axial
Fan Diameter	Ø800
Fan RPM+	440dd
Fan Total Power	1,080 Watt
R	85,16
Energy Class	C

5. Transportation and Storage

5.1. Transportation

INFO

- Before receiving the product, the product or its packaging should be checked for any damage,
- Vibrations during transportation may cause damage to the product. After the product is unloaded, the delivery pressure should be checked first,
- If any damage is detected, THERMOWAY A.Ş. should be informed immediately.
- The following instructions and safety rules should be followed when transporting the product,
- Transportation should be carried out by a competent and certified personnel,
- Equipment with sufficient carrying capacity should be used,
- Connection should be made from the transportation points indicated on the product,
- Equal weight distribution should be ensured at the transportation points.
- Collectors and fans should not be carry by support during transportation,



You can find sample transportation methods before the product is transported by scanning the QR code.

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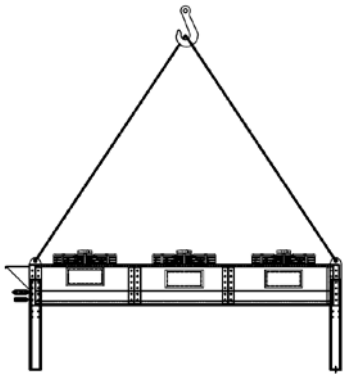
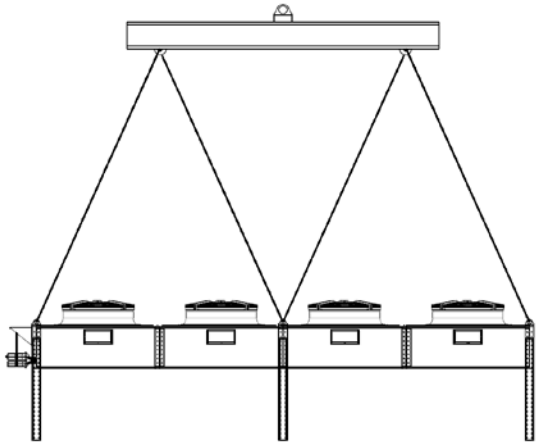
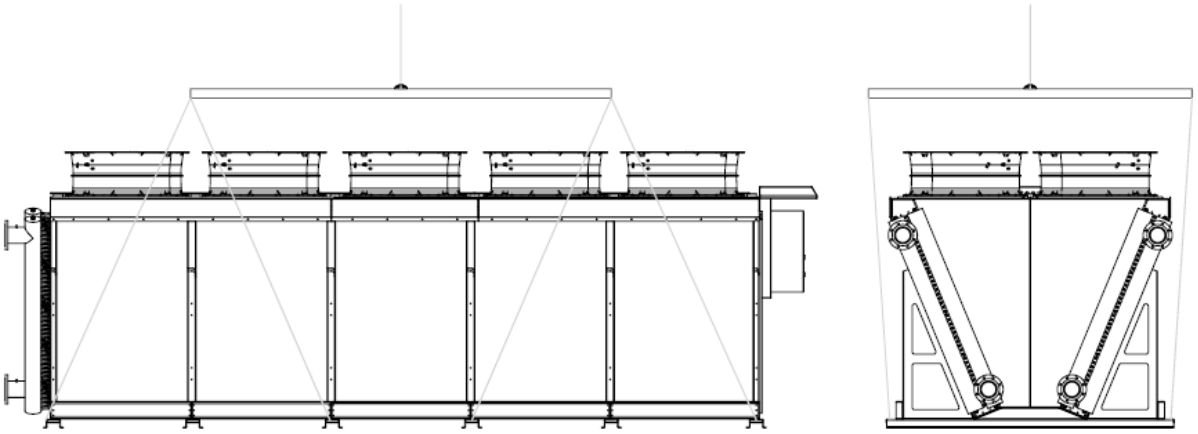
If the product is to be lifted with a rope device, it should be transported by adjusting the rope angle so that the product is not damaged.

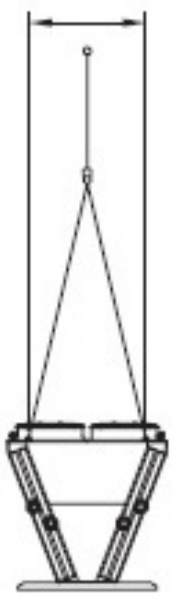


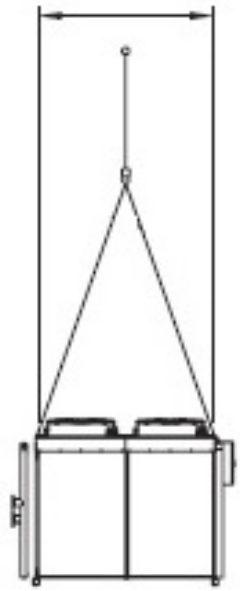
If the desired angle cannot be provided with a single rope mechanism in the product, transportation should be done with the equipment in the visual.

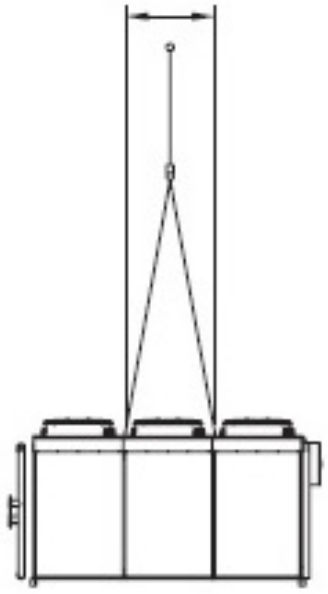


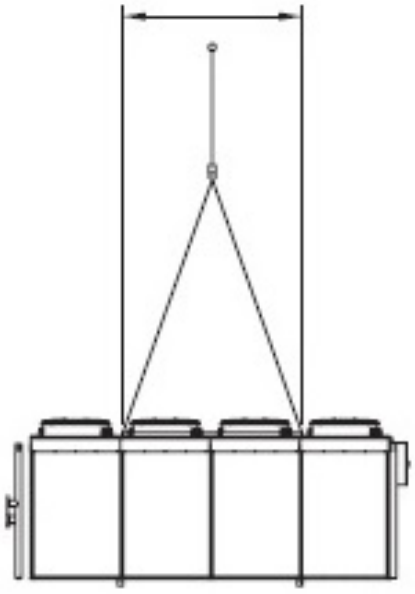
If transported by forklift, check that the forklift blades lift in the correct direction and with the necessary clearance so as not to damage the product.

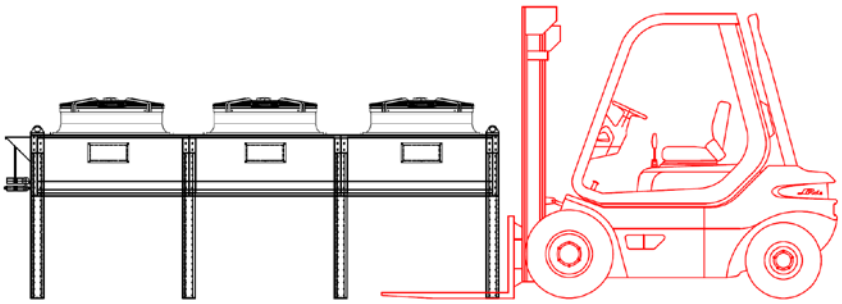


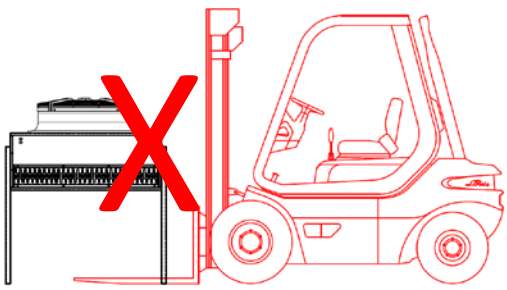


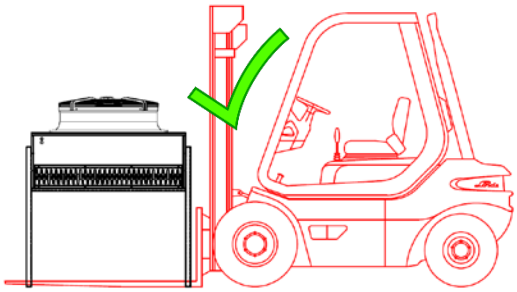












5.2. Storage

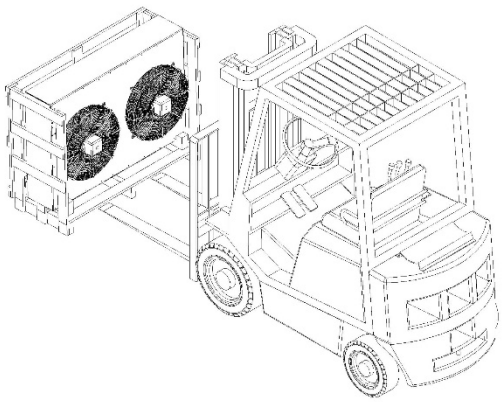
INFO

- The product should be stored in its packaging to protect it from inappropriate weather conditions and environmental influences,
- If the product is to be stored in a humid environment for a long time, the condensed water vapor formed should be removed from the environment and the fans should be operated for at least 2 hours every month as it may cause mold on copper and fin surfaces and white rust on galvanized sheet metal in unpainted products
- Avoid stacking products in different packages and sizes on top of each other during storage.

6. Packaging Opening

6.1. Wooden Packaging

INFO



7.Install, Loacation, and Assembly

7.1. Install

7.1.1. Assembly of Product Support Legs

INFO

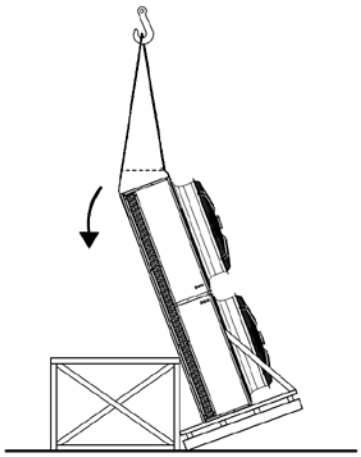
Attention should be paid to using the appropriate equipment during the product support leg asembly process.

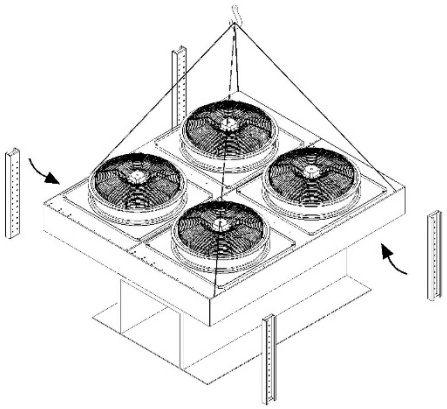
Bolt assembly should not be loose.

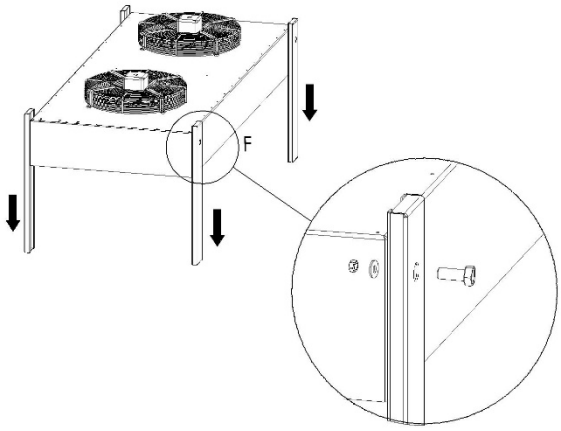
When assembling the product support leg of horizontal or vertical products, the fin surface and tube line of the product should be supported in such a way that they will not be damaged and the product support leg connection should be made.

Depending on the dimensions of the product, it should be supported by a crane when making the support leg connection.

The suitable quantities of bols, washers and nuts for assembly are provided with the product. No other parts should be used, and if any additional parts are needed, care should be taken to use parts with the same specifications.







7.2. Location

Appropriate conditions for product placements are given in the headings below.

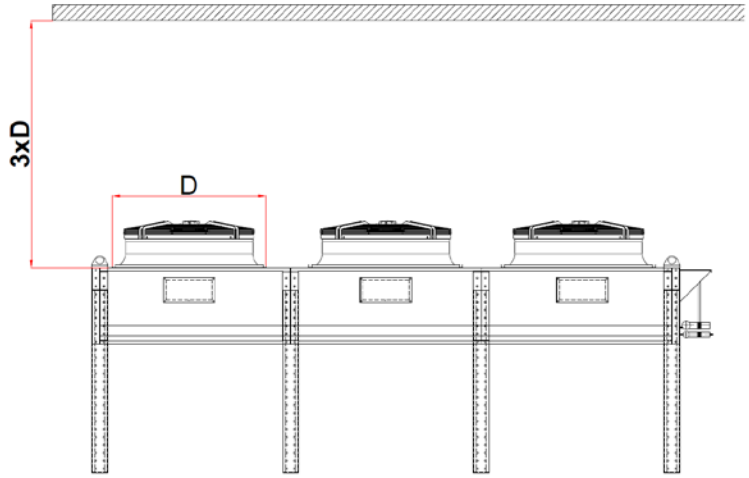
(*) Keep away from heat sources or devices that blow high temperature air near the product.

(*) In order for the product to work efficiently, there should be no obstacles affecting air suction and exhaust.

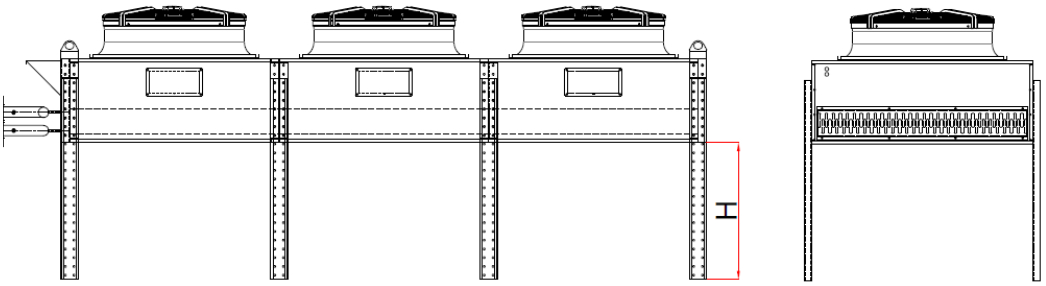
7.2.1. Horizontal Use of Products

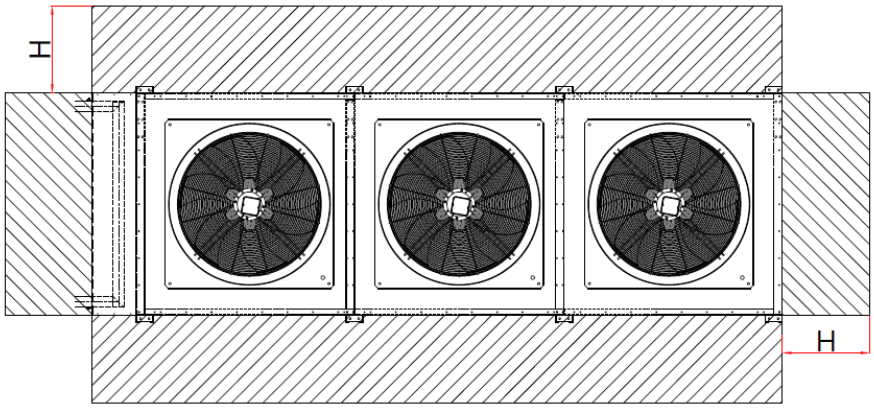
INFO

If the product is to be used horizontally, there should **be no obstacle in the air blowing direction that will prevent the flow. If there is an obstacle**, it should be **at least 3 times the fan diameter in order not to create back pressure in the system** and if possible, an air blowing channel should be made by giving a suitable angle.

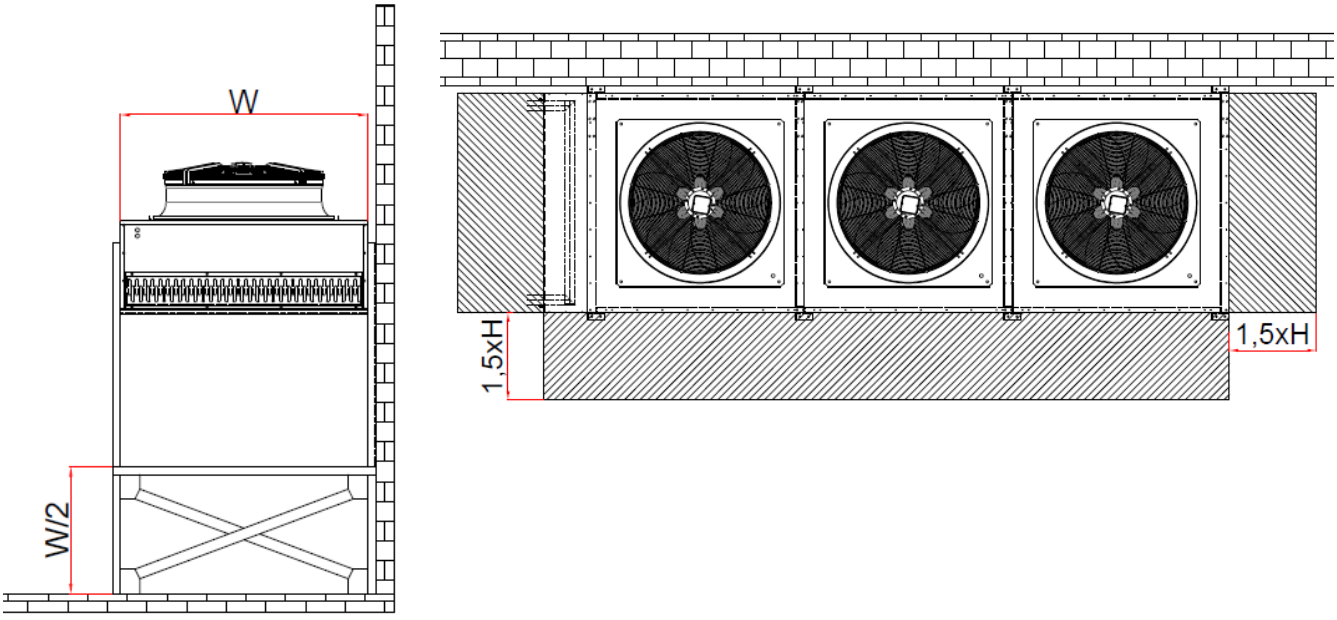


- When placing the product, a distance of at least the support legs clearance (H) should be left on all four sides to ensure unobstructed air flow and comfortable maintenance, cleaning and repair conditions.



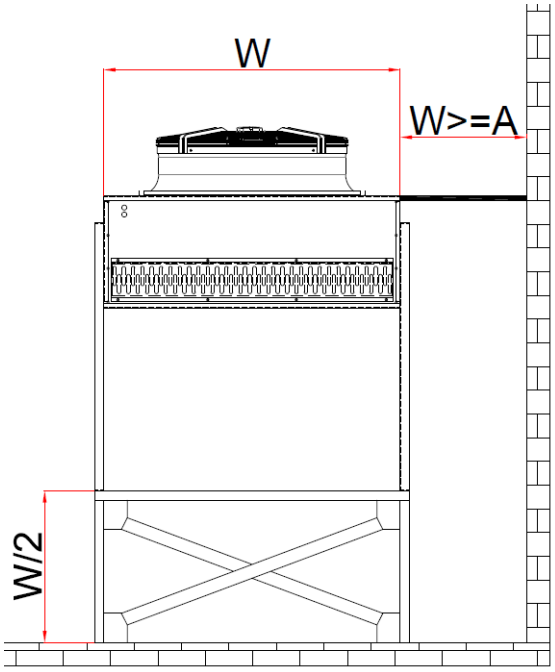


- In some cases, there may be situations where one side of the product is adjacent to the wall. In such cases, it is useful to make a chassis at least half the height of the product width under the product and leave a distance of at least 1.5 times the support legs space



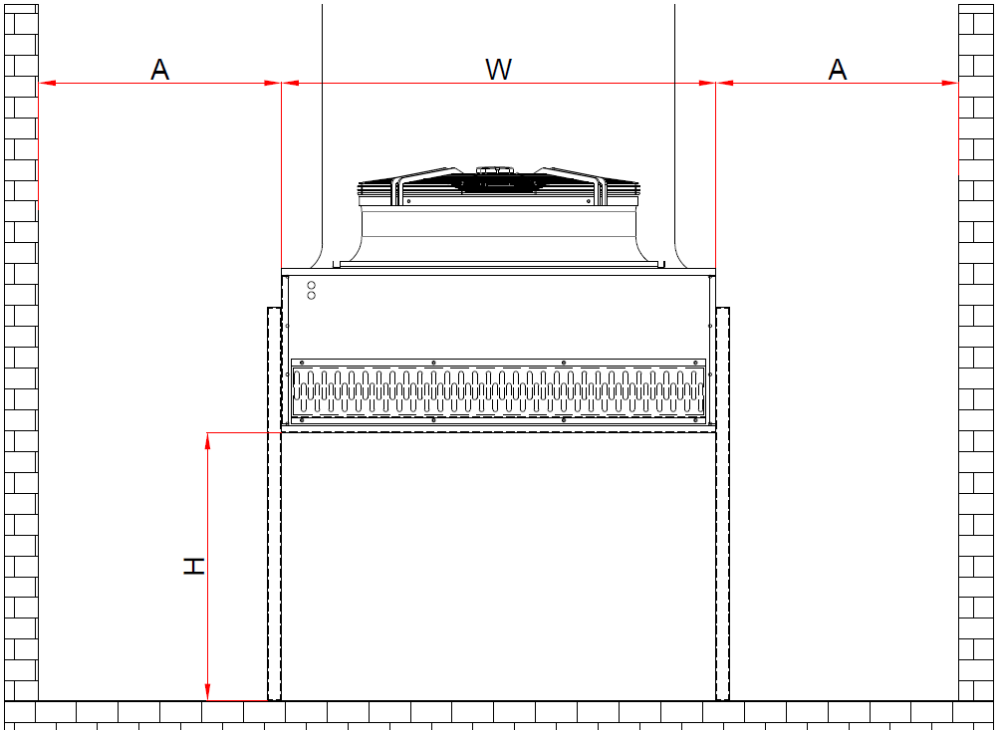
on 3 sides.

- If there is a certain opening between the wall and the product, it is useful to close it as shown in the figure below so that the air flow does not bypass.



- If the product is located in a hollow environment;

To prevent fan air bypass, the air diverter must be adjusted up to the pit level. Or the product should be raised with an additional chassis.

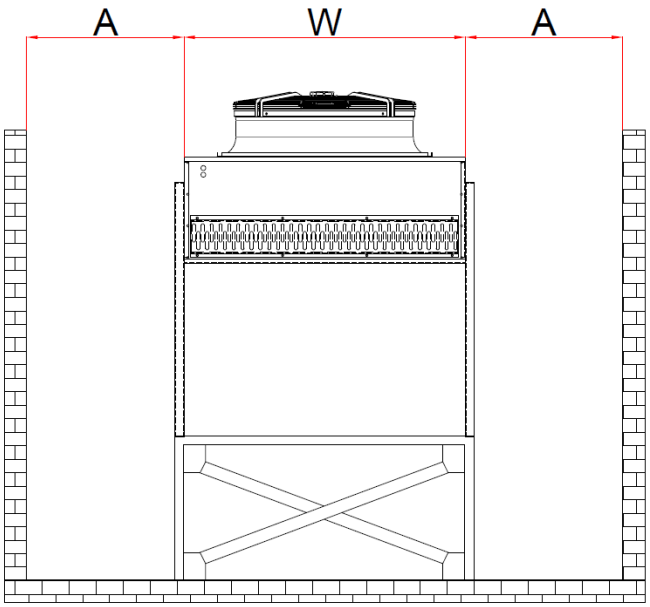


If an air diverter is used, its length should not exceed the fan diameter.

Distance A must be greater than W/2.

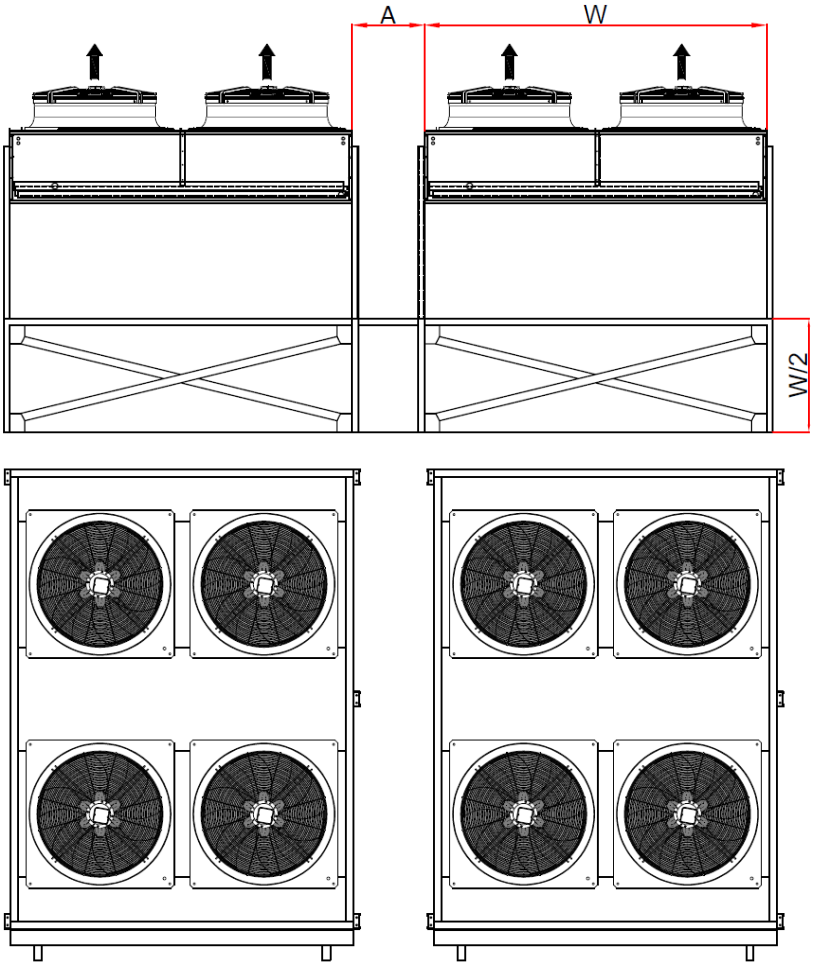
H distance must be greater than A*0.7

- If the chassis has been upgraded



A must be greater than W/2

- In case more than one product is used;

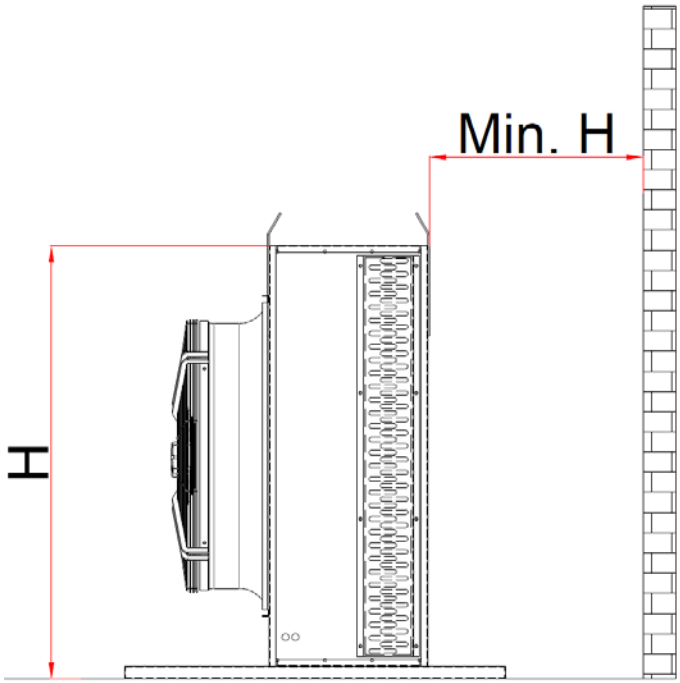


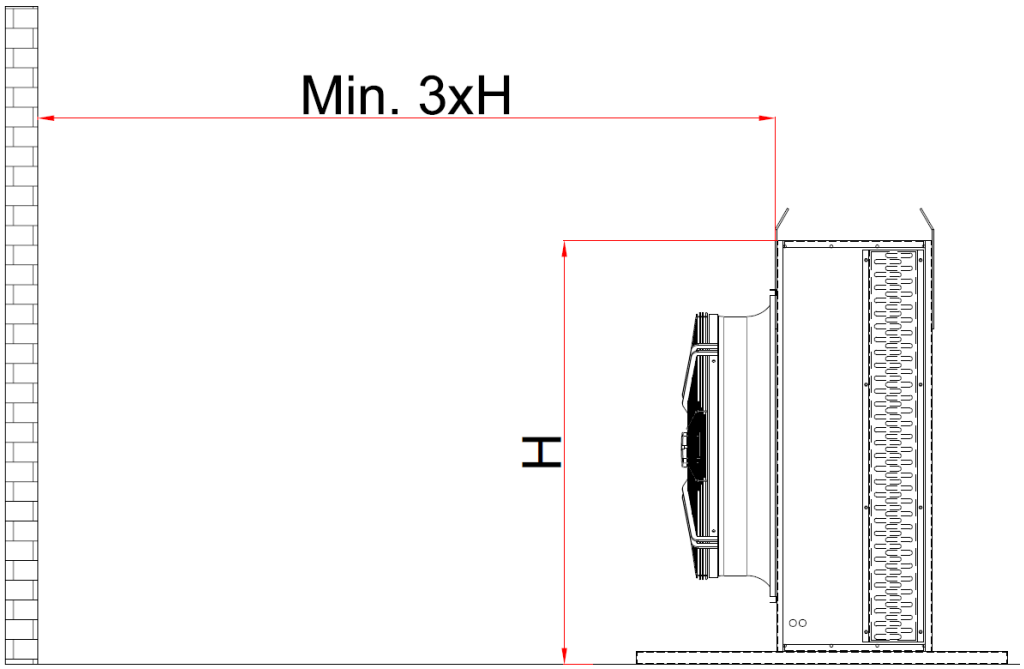
A must be greater than W/3

7.2.2. Vertical Use of Products

INFO

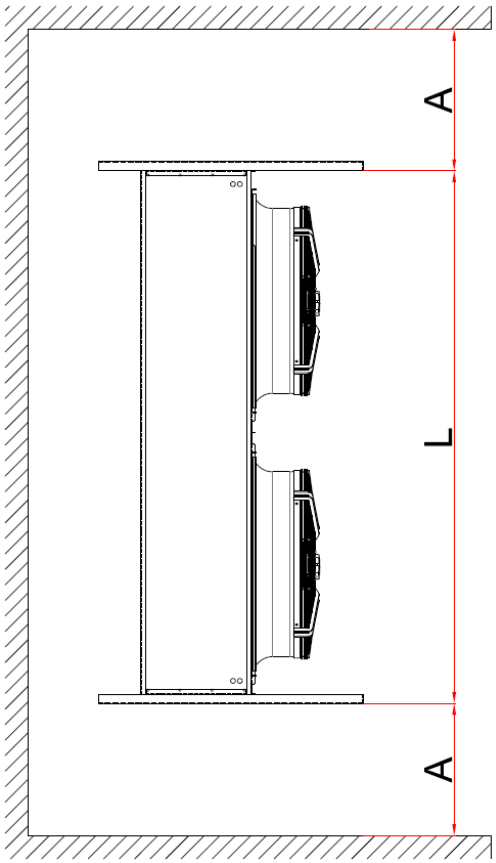
- If the products will be used vertically,





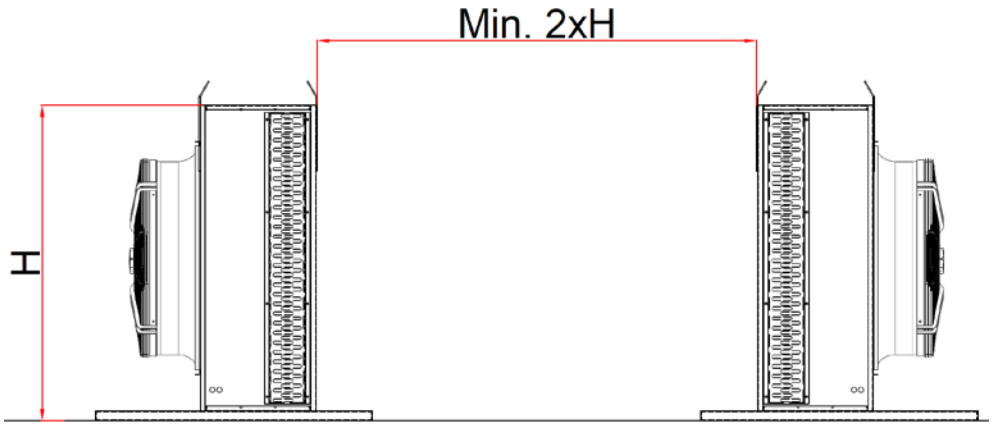
The distances between it and the surrounding wall are indicated in the pictures.

- Also if the product is to be placed in a walled area;



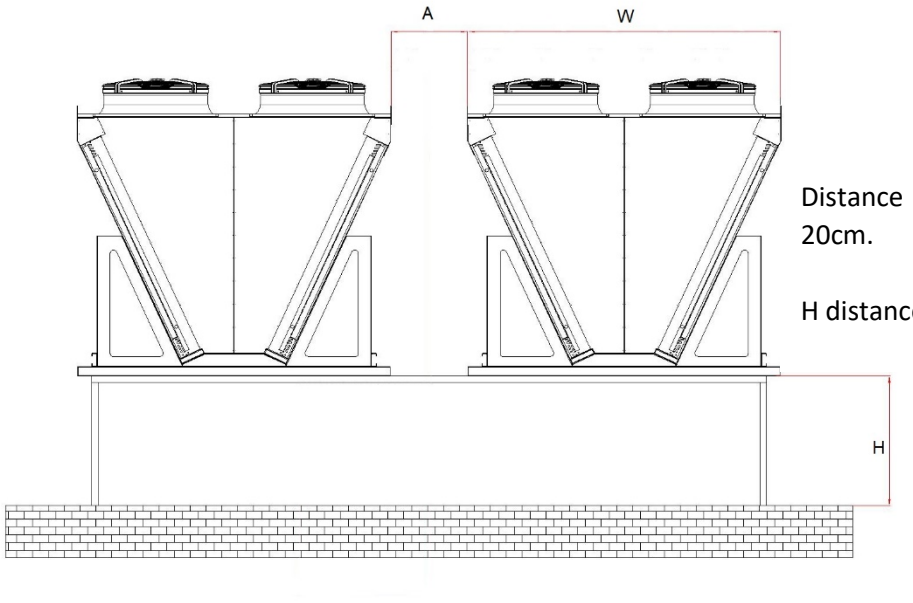
Size A must be at least as much as L/2

- In cases where the products received should face back to back;



7.2.3. V Design Product Usage

INFO



Distance A must be greater than min 20cm.

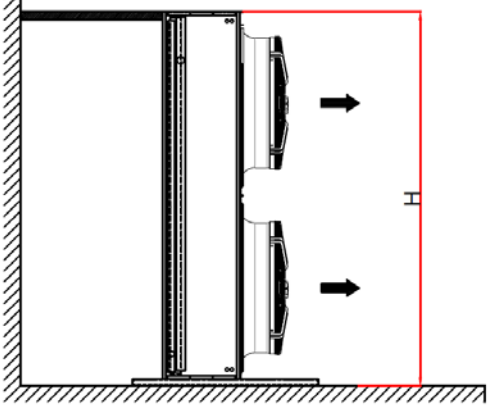
H distance must be at least W*0.5

7.3. Performing The Fixing Assembly

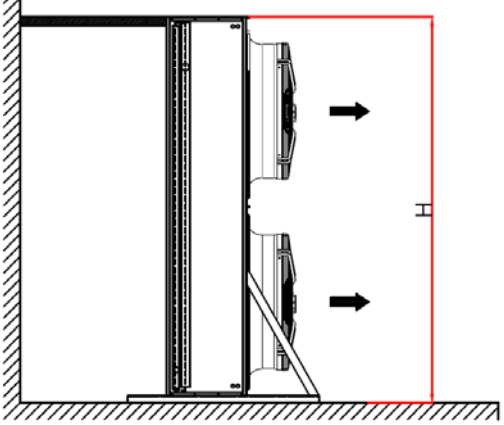
INFO

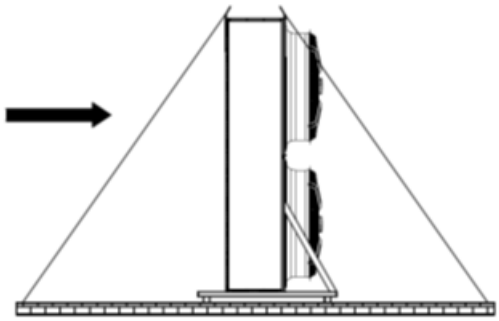
Especially during the vertical use of the products, it is useful to make fixing in the following ways in order to prevent overturning due to wind speed.

The product should be fixed to the nearby wall with a fixing bar if possible.



If the wind speed is too high, flags should be added on the product to support stabilization.



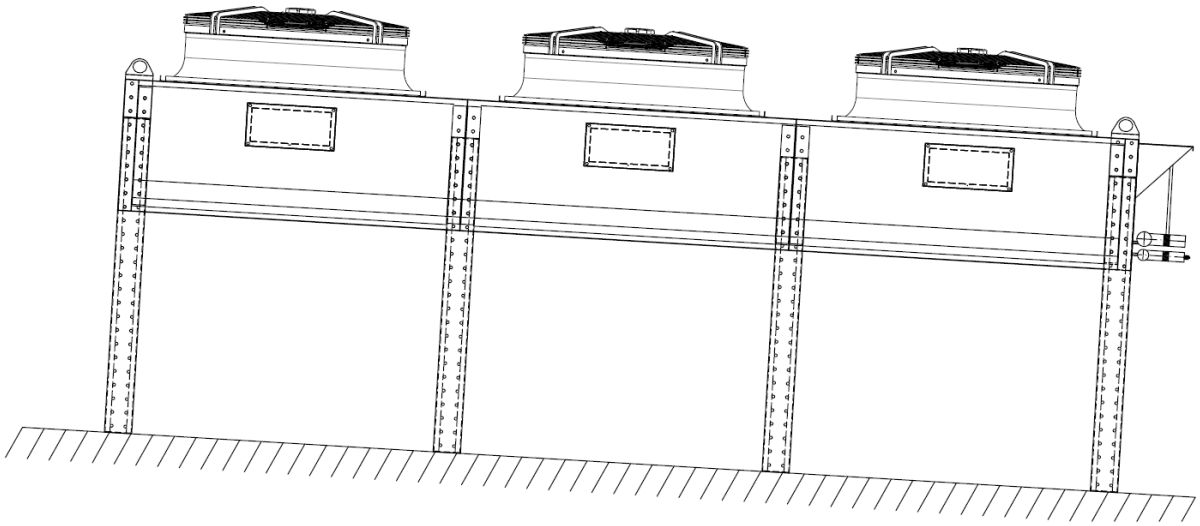


If there is no wall to support the product, the product should be secured using a rope device and flag.

7.4. Assembly

INFO

- Make sure that all support legs of the product are on the ground.
- Make sure the product is level.

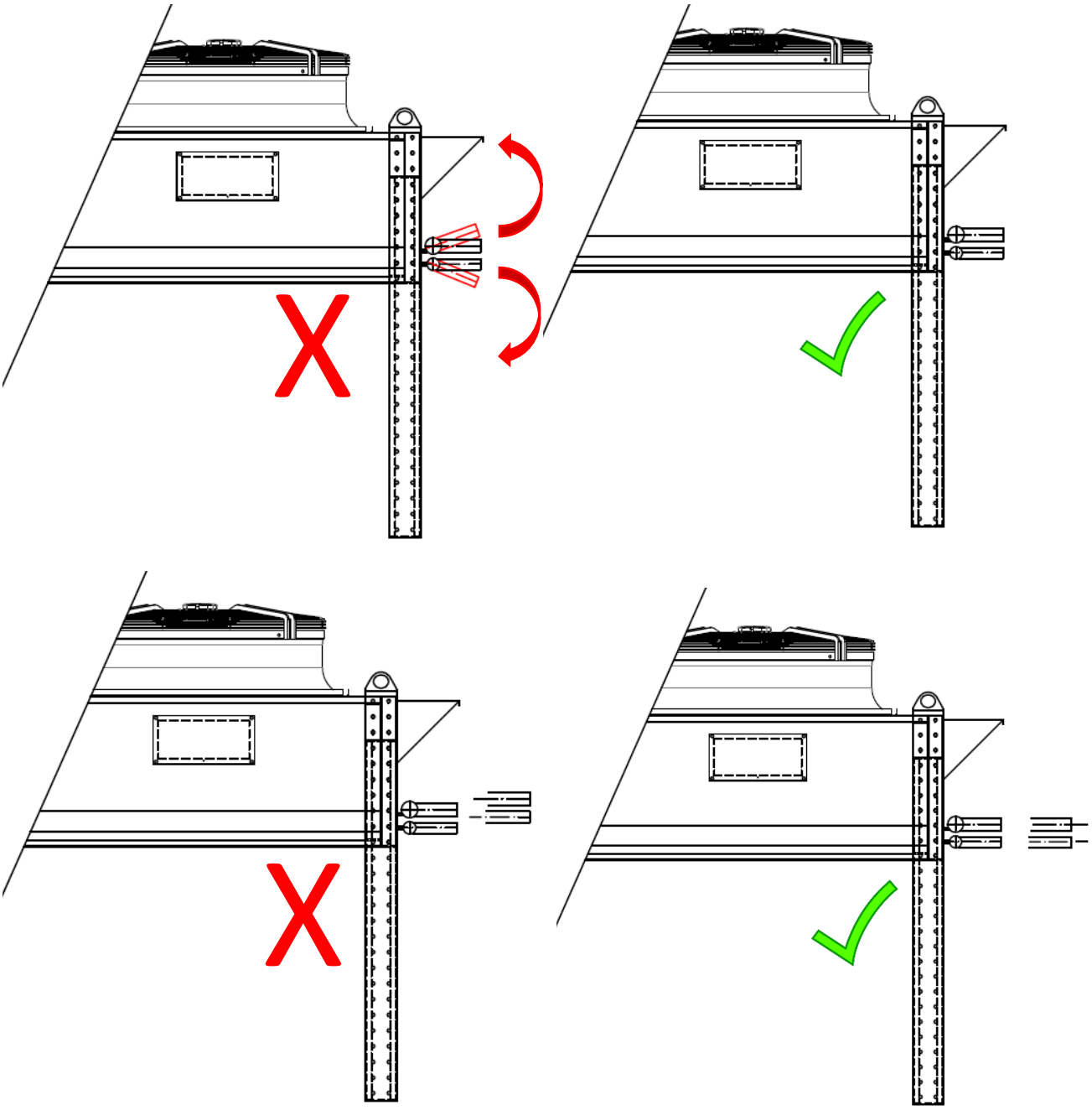


7.4.1. Connecting the Product to the System

INFO

- The collector connection tubes should be supported during setup.
- Equipment should be used to prevent the vibration generated in the compressor unit from reaching the product.

- Collector outlet tubes should be assebly without bending.
- At the inlet and outlet of the collector, care should be taken to ensure that the connection tubes are in the same alignment in order not to create tension on the tube.
- It is useful to place ball valves at the inlet and outlet for maintenance operations to be carried out properly,
- Before operating the system, care should be taken to ensure that sufficient vacuum is made to prevent moisture inside.



7.4.2. Electrical Connection

INFO

DANGER

Improper or unauthorized electrical connection can cause serious injury or death.

- After the product assembly and installation processes are completed, electrical connections must be made.
- All connections must be completed before the system is energized.
- Care should be taken to ensure that the cable entries of the fan electrical boxes are positioned in such a way that water does not get into them,
- It is recommended to use thermal relay for protection of fan motors.
- Cables and equipment must be selected in accordance with the voltage, power and current values indicated on the product label.
- Electrical connections must be enclosed in enclosures with at least IP54 protection class.

7.5. Test and Final Control

INFO

DANGER

Failure to perform a pre-start test and final inspection can result in serious injury or death.

What needs to be done is set out below.

- Check the suitability of the product location Make sure that the rules in the Location heading apply.
- Identify and eliminate factors that will prevent sufficient air flow.
- Check that the electrical connections are complete, secure and protected.
- Check that the power supply is of sufficient strength.
- Check the fan and product support legs connection bolts.
- Check that the tube line connected to the system is suitable, supported at the required points and aligned.
- Check the welding points of the tube2 connections for the last time.
- If the product is in the sun or in a place that is constantly exposed to rain, it is worth protecting it.
- Check that there are no residual packaging parts on the suction and discharge sides of the product that may obstruct the air flow.
- Before starting the system, make sure that there is sufficient vacuum to ensure that no moisture remains inside.
- Check that the test is carried out at 10% more than the max. working pressure.

8. First-time operation

INFO

- Make sure that the Test and Final check procedure has been completed.
- When refrigerant gas is supplied to the system, check for leaks with a suitable leak checker.
- Eliminate any vibration detected in system operation.
- Check the direction of operation of the fans.
- Check the vibration of the fans.
- Make sure all fans are activated.
- Monitor the system pressure.
- If possible, observe the system for the first 48 hours.

9. Maintenance and Cleaning

INFO

Before maintenance, the gas in the system should be collected elsewhere for safety purposes.

In order to prevent serious injuries and deaths, the condenser should be disconnected from the system by closing the inlet and outlet valves, if any.

The electrical connection must be switched off.

Since regular maintenance and cleaning will extend product life, a maintenance and cleaning period should be established and followed.

9.1. Maintenance of Fans

INFO

Regular maintenance of the fans will prevent potential failures, hazards and reduced product efficiency.

A sample periodic maintenance table is attached below.

Vibration, slack and noise control of fans	3 Months
Corrosion control of connection bolts of fans (*)	6 months
Deformation of the fan blades or guard wire (*)	6 months
Detection of possible deformations in fan electrical cables (*)	6 months

(*) Shutting off the power line to the fans during inspections will prevent possible serious injuries and deaths.

9.2. Maintenance of the Condenser Section

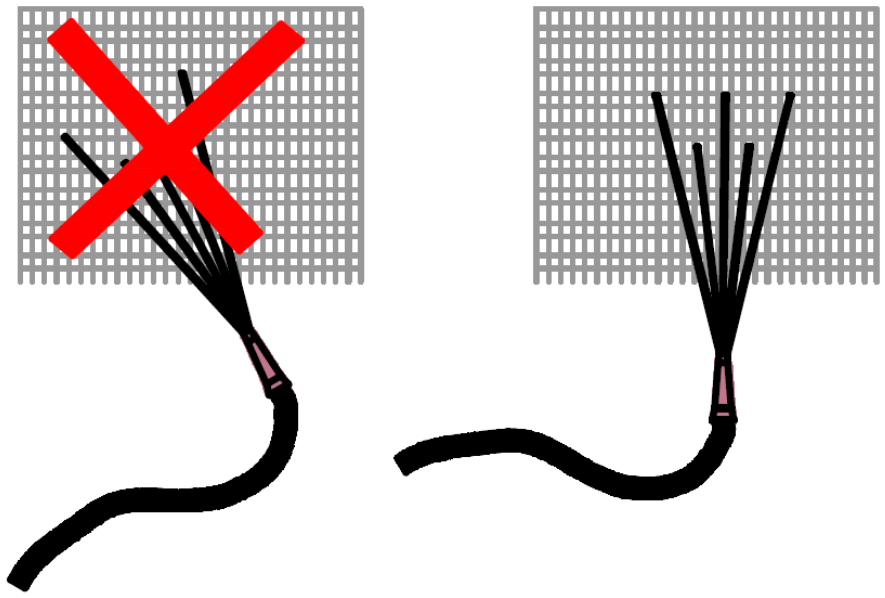
INFO

Intermittent maintenance and control of the coil section will prevent potential hazards and loss of product efficiency.

A sample periodic maintenance table is attached below.

Cleaning the fin surface and checking for dents	2 months
Cleaning the fin surface with fresh water (*)	6 months
Control of the system with a leak detector to prevent leaks that may occur after fan-induced vibration failures	6 months
Control of corrosion or deformation of connection tubes	6 months

(*) Cleaning of the fin surface must be done in the opposite direction of air intake. For this purpose, the fans must be disconnected from the electricity and removed from their places. An example of cleaning with water is shown below. During the cleaning of the fin, the water should be sprayed at a right angle to avoid crushing the fin surface.



(*) In order to prevent damage to the fin surface, water should be held at a right angle while washing with water.

Check the First-time operation procedure after all maintenance work has been completed

(*) All maintenance conditions are specified for nominal operating environments. In cases where environmental factors are harsh (excessive wind, dust, sand, chemical agents), it is useful to adjust the maintenance intervals.

10. Troubleshooting

INFO

Possible Problems	Causes	Solutions
Fans Not Working	There may be a problem with the electrical connection	Check Electrical Connection
	Fan blade may be stuck	Detect possible mechanical faults.
Loud Fan Noise	Fan Motor has failed	The fan needs to be replaced.
Vibration	Due to the Fan	Investigation of the cause of fan vibration, checking the connection bolts, balancing or replacing the fan with a new one.
	Due to the tube line	Recalculation of diameters used in the line, checking tube support points
Insufficient Product Capacity	Due to the Fan	Check that the fans are working properly
	Coil surface dirty	Cleaning the surface of the battery and removing substances that may obstruct the air flow
	Possible Pressure Equipment Failure	Any faulty equipment should be identified
	Possible Gas leak	Leak detection should be done

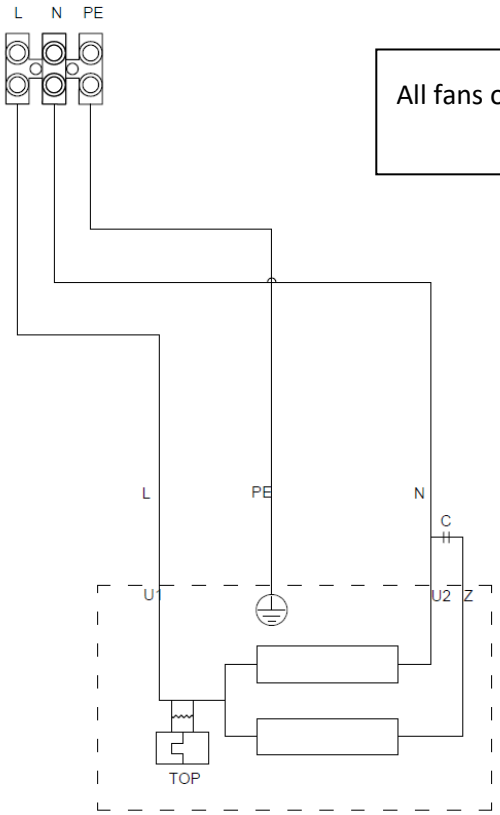
11. Electrical Connection Diagrams

INFO

11.1.AC Fan Connection

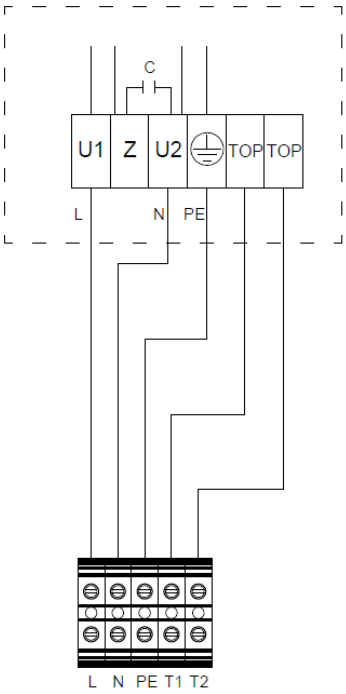
11.1.1. EBM Fan Connection Types

11.1.1.1. A1 Connection Type



All fans on the product are collected on a single junction box.

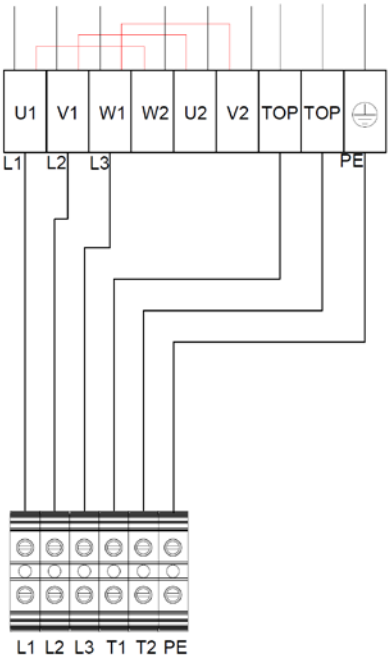
11.1.1.2. A2b Connection Type



For Ø500 and below fans, all fans on the product are collected on a single junction box.

For fans over Ø500, each fan on the product is collected in a separate junction box.

11.1.1.3. F1b/F2b Connection Type



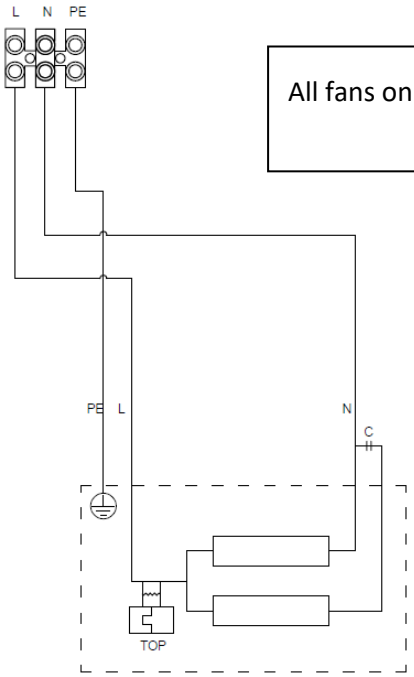
For Ø500 and below fans, all fans on the product are collected on a single junction box.

For fans over Ø500, each fan on the product is collected in a separate junction box.

*Fans are left with Triangle connection as standard during production. Connection diagram should be checked for low speed operation.

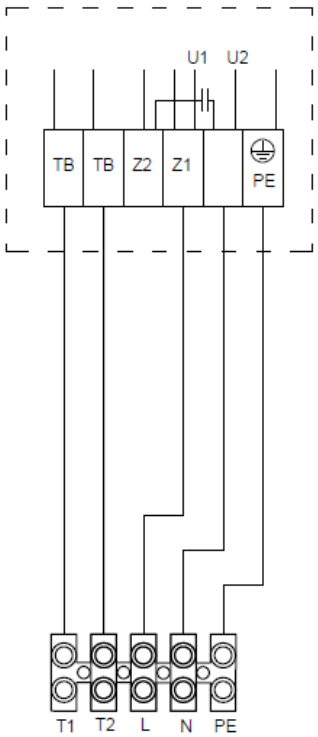
11.1.2. Rosenberg Fan Connection Types

11.1.2.1. Type1 Connection Type



All fans on the product are collected on a single junction box.

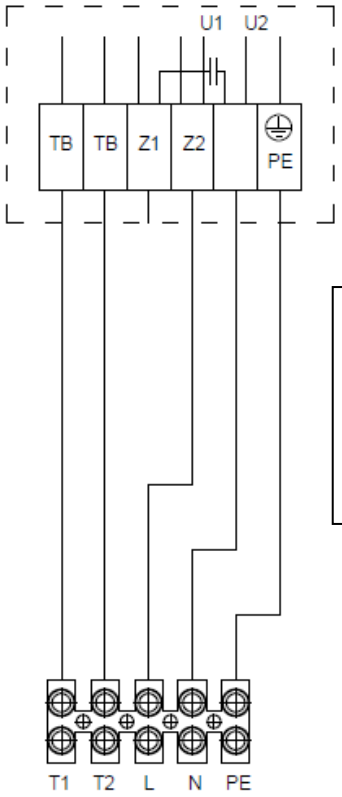
11.1.2.2. Nr01-024 Connection Type



For Ø500 and below fans, all fans on the product are collected on a single junction box.

For fans over Ø500, each fan on the product is collected in a separate junction box.

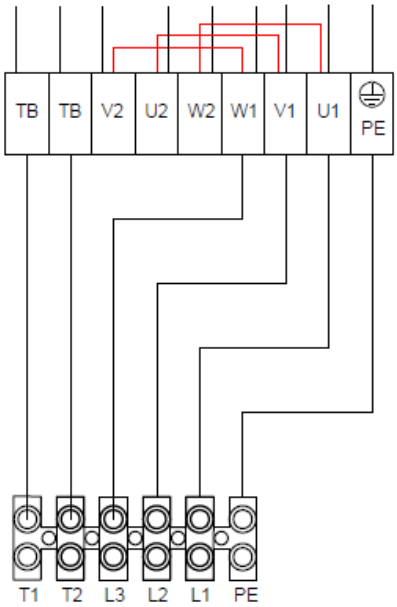
11.1.2.3. Nr01-025 Connection Type



In Ø500 and below fans, all fans on the product are collected on a single junction box.

For fans over Ø500, each fan on the product is collected in a separate junction box.

11.1.2.4. Nr01-045 Connection Type



For Ø500 and below fans, all fans on the product are collected on a single junction box.

For fans over Ø500, each fan on the product is collected in a separate junction box.

*As a production standard, fans are left with Triangle connection. Connection diagram should be checked for low speed operation.

11.2.EC Fan Connection

Contact THERMOWAY Inc. for EC fan connection diagram.

11.3.EC Fan On/Off Switch

11.4.Fan Stepper Control Unit

With the Thermoway Fan Stepper controller, you can adjust the operation of AC type fans gradually, extending service and system life.

You can access the panel drawing and parameter list with the order, using the QR code on the panel.

11.5.Fan Speed Control Unit

With the Thermoway Fan Speed controller, you can proportionally adjust the operation of AC type fans, providing energy efficiency compared to the normal operating system.

You can access the panel drawing and parameter list with the order, using the QR code on the panel.

11.6.Fan EC Control Unit

Thermoway EC Fan control unit is applied for high efficiency EC fans. It is the optimal solution in terms of energy efficiency and sound level.

You can access the panel drawing and parameter list with the order, using the QR code on the panel.

12. Certificates

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

SERTİFİKA

TÜV SÜD Management Service GmbH
Sertifikasyon Merkezi

işbu belge ile

ThermoWay Heat Exchanger Solutions

THERMOWAY TERMİK CİHAZLAR ve MAK. SAN.TİC. A.Ş.
ATATÜRK ORG. SAN. BÖLG. MEHMET BOZKURT CAD. NO:50 ARNAVUTKÖY HADIMKÖY 34285 İSTANBUL TÜRKİYE

şirketinin,

Hava, su / glikol, buhar, yağ, gaz ve soğutucu akışkanlar için kanatlı borulu ısı değiştiriciler, kuru ve ıslak/kuru soğutucular, radyatörler, hava soğutmalı kondenserler ve evaporatörlerin tasarımı, imalatı, satışı, pazarlaması ve satış sonrası hizmetleri

konusunda bir kalite yönetim sistemini yürürlüğe koyduğunu ve uygulamakta olduğunu teyit eder.

707040528 sayılı rapordaki inceleme ile

ISO 9001:2015

şartlarının sağlanmış olduğu kanıtlanmıştır.

Bu sertifika **2021-04-19** tarihinden **2024-03-25** tarihine kadar geçerlidir.

Önceki yayınlanmış sertifika 2021-03-25 yılına kadar geçerlidir.

Sertifika Kayıt Numarası: **12 100 49777 TMS**.

Head of Certification Body
Münih, 2021-04-20

IAF DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

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MS/01-01/2019

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ
ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель Общество с ограниченной ответственностью «ДС Компания».
Основной государственный регистрационный номер: 1107746937374.
Место нахождения: 105037, Российская Федерация, город Москва, улица 3-я Парковая, дом 9, квартира 18
Телефон: 79660273663, адрес электронной почты: dc.company2000@gmail.com
в лице Генерального директора Ежова Олега Олеговича
заявляет, что
Оборудование холодильное с маркировкой «THERMOWAY»: конденсаторы, модели: TCC B, TCC D, TCC E, TCC H, TCC S, TCI HV, TCI W, THERMOBOX, MAXIBOX, V-BOX; шоковые заморозки, модели: TEC C, TEC D, TEC S, TEI C, TEF C, TEF D, TEY, TEY D, TGC C, TGC D, TGC S, TGI C; сухие охладители, модели: TDI HV, TDI W
Продукция изготовлена в соответствии с Директивой 2006/42/ЕС «Машины и механизмы»
изготовитель «THERMOWAY TERMIK CIHAZLAR VE MAKINE SAN.TIC.A.S.».
Место нахождения: ТУРЦИЯ, Omerli Mah. Prof. M.Bozkurt Cad. No:50 Hadımkoy/Arnavutkoy ISTANBUL

код ТН ВЭД ЕАЭС 8418 99 100 9
Серийный выпуск
соответствует требованиям
ТР ТС 010/2011 "О безопасности машин и оборудования"

Декларация о соответствии принята на основании
протоколов испытаний №№ 364-01/12-КТ, 365-01/12-КТ, 366-01/12-КТ, 367-01/12-КТ от 30.01.2017 года, выданных испытательной лабораторией «Контрольтест» Общества с ограниченной ответственностью «НАУЧНО – ИССЛЕДОВАТЕЛЬСКИЙ ИСПЫТАТЕЛЬНЫЙ ЦЕНТР», регистрационный № РОСС RU.04ИДЮ0.001
Схема декларирования: 1д
Дополнительная информация
Условия хранения продукции в соответствии с требованиями ГОСТ 15150-69. Срок хранения (службы, годности) указан в прилагаемой к продукции эксплуатационной документации. Стандарты, обеспечивающие соблюдение требований Технического регламента Таможенного союза ТР ТС 010/2011 "О безопасности машин и оборудования": ГОСТ 12.2.233-2012 (ISO 5149:1993) "Система стандартов безопасности труда. Системы холодильные холодопроизводительностью свыше 3,0 кВт. Требования безопасности" (разделы 3 – 5)

Декларация о соответствии действительна с даты регистрации по 31.01.2022 **включительно.**

(подпись) О.О. Ежов
(инициалы и фамилия руководителя организации-заявителя или физического лица, зарегистрированного в качестве индивидуального предпринимателя)

М.П.

Сведения о регистрации декларации о соответствии:

Регистрационный номер декларации о соответствии: ЕАЭС № RU Д-TR.A301.B.04995
Дата регистрации декларации о соответствии 01.02.2017

SZUTEST CE

CERTIFICATE OF COMPLIANCE
UYGUNLUK SERTİFİKASI

The technical file and test reports of the following product have been checked and found in compliance with the Parliament and Council Directive 2014/35/EU of 26 February 2014 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits and Parliament and Council Directive 2006/42/EC of 17 May 2006 on the approximation of the laws of the Member States relating to machinery.

Teknik dosya ve test raporları incelenerek, belirtilen ürünün Avrupa Birliği Teknik Komisyonu tarafından 26 Şubat 2014 tarihinde yayınlanan 2014/35/EU Belirli Gerilim Sınırları Dahilinde Çalışmak Üzere Tasarlanmış Teçhizat ile İlgili yönetmeliği ve 17 Mayıs 2006 tarihinde yayınlanan 2006/42/AT Makina Emniyeti Yönetmeliğine uygunluğu saptanmıştır.

Certificate Number: *Sertifika Numarası*	**SZL-21MA14047-1**
Applicant: *Başvuru Sahibi:*	**THERMOWAY TERMİK CİHAZLAR VE MAKİNA SAN. TİC. A.Ş.** Ömerli Mah. Atatürk Sanayi Sitesi Bölgesi Prof. Dr. Mehmet Bozkurt Cad. No:50 - 34285 Hadımköy - Arnavutköy / İST
Manufacturer: *Üretici*	**THERMOWAY TERMİK CİHAZLAR VE MAKİNA SAN. TİC. A.Ş.** Ömerli Mah. Atatürk Sanayi Sitesi Bölgesi Prof. Dr. Mehmet Bozkurt Cad. No:50 - 34285 Hadımköy - Arnavutköy / İST
Trade Mark: *Ticari Marka*	**THERMOWAY**
Product: *Ürün:*	**CONDENSER** KONDANSER
Type: *Model:*	TCS HV / TLG HV / TCI V / TCC H / TCC E / TCC S / TBOX / HBOX / SBOX / MBOX / EBOX / QBOX / WBOX / WBOX-T / WBOX-C
Applied Standards: *Uygulanan Standartlar:*	EN ISO 12100:2010, EN 60204-1:2018
Base of attestation: *Onay Dayanağı:*	File of technical documentation, test report Ref. No. **21-1004/01** *Teknik Dokümantasyon,* **21-1004/01** *numaralı Test Raporu*
Validity: *Geçerlilik*	15.10.2021-14.10.2024

* This Certificate of compliance is issued on a voluntary basis according to Council Directive 2014/35/EU of 26 February 2014 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits and Parliament and Council Directive 2006/42/EC of 17 May 2006 on the approximation of the laws of the Member States relating to machinery.It comforms that listed equipment/machinery (Not AnnexIV equipment/machinery) complies essential health and safety requirements of the directive.The referred technical file(s) is reviewed and attested with presumption of compliance with the essential requirements listed EU Directive(s) above. This attestation does not abrogate the compulsory obligation of the manufacturer to issue the declaration of conformity

**Bu uygunluk sertifikası 26 Şubat 2014 tarihinde yayınlanan 2014/35/EU Belirli Gerilim Sınırları Dahilinde Çalışmak Üzere Tasarlanmış Teçhizat ile İlgili yönetmeliği ve 17 Mayıs 2006 tarihinde yayınlanan 2006/42/AT Makina Emniyeti Yönetmeliğine göre isteğe bağlı düzenlenmiştir. Yukarıda listelenmiş ekipman/makinaların ilgili yönetmeliğin temel gerekliliklerine uygun olduğunun onaylar.Diğer ilgili direktiflere uyulmalıdır. Bu onay üreticinin uygunluk beyanı düzenleme zorunluluğunu ortadan kaldırmaz. Referans teknik dosya ile ürünün yukarıda belirtilen AT Direktiflerinin temel gereklerine uygunluğu kabul edilir.*

Dept. Manager

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SZUTEST UYGUNLUK DEĞERLENDİRME A.Ş.
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