

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



FEDD, FEWR (Ceiling Type)

www.friterm.com



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1. ABOUT THIS MANUAL

This document specifies the instructions for installation, operating and maintenance of the air coolers (FEDD-FEWR series) manufactured by FRITERM A.Ş., Turkey.

The instructions below must be followed strictly for the health and safety reasons during installation and maintenance of products.

Upon receipt, the product should be visually inspected, and in case of any damage or fault, the supplier must be notified within 7 days.

The manufacturer will not accept any responsibility in these situations;

- Damages caused by persons,
- Damages product due to the disregarding of the recommendations indicated in this handbook.

1.1. Examining the operating manual

To follow the instructions defined in this document is a prerequisite for safety of the staff and for the products to be operated in a fault-free and safe manner.

- The operating manual must always be available. In case of absence of this manual another copy could be obtained from the manufacturers web page. It should be printed out and kept in an accessible place to everyone whoever should carry out any work regarding the product.
- All persons who are responsible for the transport, assembly, initial commissioning, operating, maintenance or repair of the component must be acquainted with the operating manual. The operator should accept in written form that they are acquainted with the operating manual.
- Whenever you have difficulty in understanding and/or comprehend and description or definition given/expressed in this manual, please immediately ask for help from an expert or from then manufacturer. It is of great importance to understand this manual completely and correctly for the sake of labor health and safety.

1.2. Responsibilities

1.2.1 Manufacturer's Responsibilities

- The manufacturer is strictly responsible for supplying a manual accompanying the product which comprises the necessary and enough detailed information regarding the installation/mounting and operation of the product. Besides, the product is expected to fulfill the requirements and satisfy with the anticipated functioning.

- The construction of the product should comply with the presumed operational conditions. The product is expected to be robust enough and resistive against all the mechanical, thermal and chemical challenges. The material used to produce should be compatible with the fluid and the mixture of fluids used as heat transfer media.
- All the materials and components used in constructing the product should be resistive against all the stress and pressure that the product will be subjected to.

1.2.2 Contractor's Responsibilities (Installation, Commissioning)

- Should follow all the instructions and provide all the conditions stated in this manual.
- All the documentation accompanying the product are complementary to this manual. The safety instructions and all other information stated in this manual should be considered.
- The national regulations regarding the protection of environment and labor safety should be strictly followed besides the instructions for safe and correct operation.
- In case of any problem encountered during the installation, FRITERM A.Ş. should be informed and asked for technical assistance if necessary.
- Emergency instructions and the required infrastructure should be prepared and ready for use in any case.
- The regular maintenance/servicing periods and instructions should be determined and defined.
- If storage of the product for a long period is needed, a clean, non-hazardous and low humidity environment is recommended.
- The fans of the products that are stored horizontally are recommended to be run for 4-5 hours a week. In case of difficulty of running the fans, then they should be covered and protected from rain and excess humidity.
- In case of storing vertically, it is not recommended to store more than 1 month.

1.2.3 Operator's or Owner's Responsibilities (Operation and Maintenance)

- The director is the responsible person who employs the adequate staff for servicing operating and monitoring the system.
- All requirements and instructions in this operating manual must be complied with.
- The documentation of purchased products is a constituent part of this operating manual. All safety information in this operating manual and all other information must be observed.
- All relevant regulations concerning accident prevention and environmental protection must be complied as well as the confirmed technical regulations for safe and proper working.

- Personal ineligibility. All the work should be conducted by authorized and trained personnel.
- Any defect/damage/malfunction caused by disregarding the instructions given in this manual is the responsibility of the operator.
- Any defect/damage/malfunction caused by the misuse of the product is the responsibility of the operator.
- The product should not be put in operation without the completion of the installation and commissioning.
- The personnel who is responsible for the operation/servicing/maintenance of the product should be provided with all the necessary documentation including this manual.

1.3. Warranty

- The manufacturer warrants that the equipment delivered to the client shows no defects caused by failure of design, material, manufacturing and/or workmanship within the warranty period.
- The client must notify in written form within 10 days from the receipt of the goods, any perceptible defect including transport damages. For hidden defects, he/she must notify the defect in written form and in details within 10 days from observation time.
- Unless otherwise agreed, the warranty period shall be 24 months starting from the date of delivery.
- The warranty does not cover defects in the product's operation stemming from a fault in materials or parts provided by the client, nor shall it cover an installation that has not been assembled according to the manufacturer's instructions and according to professional practice.
- The warranty shall not cover equipment and/or its accessories if they have been modified by the client without manufacturer's written consent.
- The warranty clause can only be invoked by the client if the equipment is used normally and in conformity with its purpose and manufacturer's instructions.
- The manufacturer's liability hereunder shall be limited to repair, modify or replace the parts or equipment that shows defect within the limitation of the items under this article.
- The warranty period of the repaired or modified or replaced parts or equipment shall in no way extend the warranty period of the original ones.

- The works resulting from the warranty conditions shall be carried out in the manufacturer's workshop after the client has sent the defective equipment or parts for repair or replacement.
- The manufacturer's responsibility is strictly limited to the obligations as stipulated herein and it is expressly agreed that he shall not be found to make any other indemnity. In particular, he shall in no case be liable to compensate loss caused directly or indirectly by a defect in the equipment delivered.
- The product should be installed and commissioned in accordance with the national/international regulations and rules.
- The power supply which the product is supplies should not deviate 10% from the values given on the label.
- This document and annexed given installation, operation and maintenance conditions as long as the warranty specified in the sales contract is valid.

2. SAFETY REGULATIONS

2.1. Symbols and Warning Signs

The following terms and/or symbols are used in the operating manual for particularly important information.

Safety messages and symbols are quoted at the relevant positions in the operating manual if there is danger such as death, personal injury and environmental damage. These safety warnings must be strictly adhered to.



Indicates a hazardous situation which, if not avoided, may result in death or serious injury.



Indicates a hazardous situation which, if not avoided, may result in serious injury.



Indicates a hazardous situation which, if not avoided, may result in moderate or minor injury.



Additional notes, information and tips.



IN CASE OF DANGER!

- Switch off the power
- Switch off the main
- Please ask assistance from an authorized technician or expert.
- Please do not try to resolve any problem by trial and error.

2.2. Personal Protection

While working on and standing by the product, protective clothing must be worn.



- Safety shoes
- Safety helmet
- Protective gloves for fitting and repair work
- Chemical-resistant clothing and protective gloves for cleaning work, especially when handling solvents
- Safety goggles for cleaning work, especially while handling solvents or using compressed air for cleaning
- Hearing protection

2.2.1 Personal Protection Sign



Head Protection



Eye Protection



Foot Protection



High Visibility Clothing



Protective Clothing



Hand Protection



Respiratory Protection

2.2.2 Warning Signs



No Smoking



Flammable



High Voltage



Hot Surfaces



Hand Injuries



Poisoning Danger



Fire Risk



Frostbite Hazard

2.3. Warnings

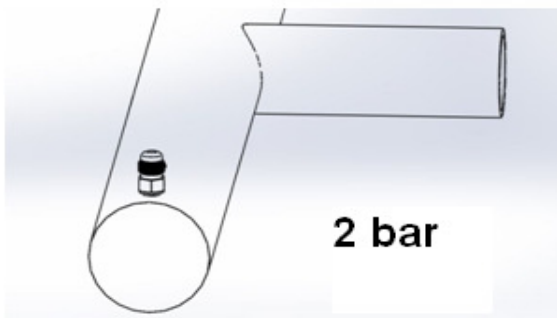
- In an unexpected situation use the emergency stop button which is set up on an easily accessible place.

- Do not exceed maximum operating pressure given on the unit's type plate.
- Unless the advised safety devices available or fully active the unit must not be operated.
- Set up the unit with extreme cleanliness.
- The unit must not be operated if it is damaged. FRİTERM A.Ş. must be informed about all damages.
- The unit must be installed, operated and maintained by authorized/qualified personnel only.
- In case of using any other coolant may cause damage, leakage, danger and environmental pollution.
- No modification is allowed on the product without written permission from the manufacturer.
- Operational conditions are limited within the specified range by the manufacturer. In case of need to operate the product out of the range, a confirmation should be asked from FRİTERM A.Ş.

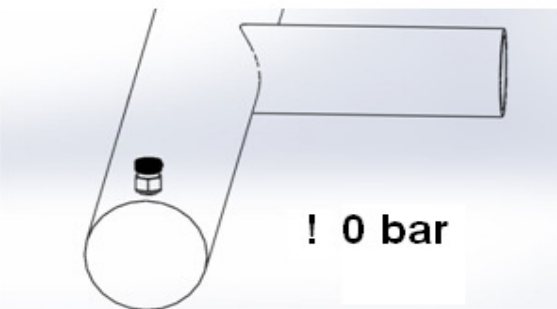


Products delivered to our customers with positive pressure inside. The pressure relief valve must be opened before starting the installation. If there is no pressurized air in the tube side please stop installation process and inform the manufacturer about the situation.

The product is delivered with 2 bar pressure. Upon receipt, it must be checked with schrader valve.



After checking, unless the product has 2 bar pressure Friterm must be notified immediately.



2.4. Improper Use

Danger of injuries in improper using;



2.4.1 Hazardous Rotating Machinery



Danger of cutting hands and fingers. Lids should be unscrewed by an authorized technician.



hand protection.



2.4.2 Hazardous Voltage



Electrical voltage can cause serious injuries or death. Do not contact with voltage direct or indirect. Do not forget to power off the unit before you begin maintenance work.



2.4.3 Hazardous Thermal



Some of the components of the unit such as fin and tube have high temperatures.



Danger of burns and frostbites.



The danger of frostbite can occur in case of inadequate protection and when the drainage process doesn't implement completely. Protective gloves should be used.

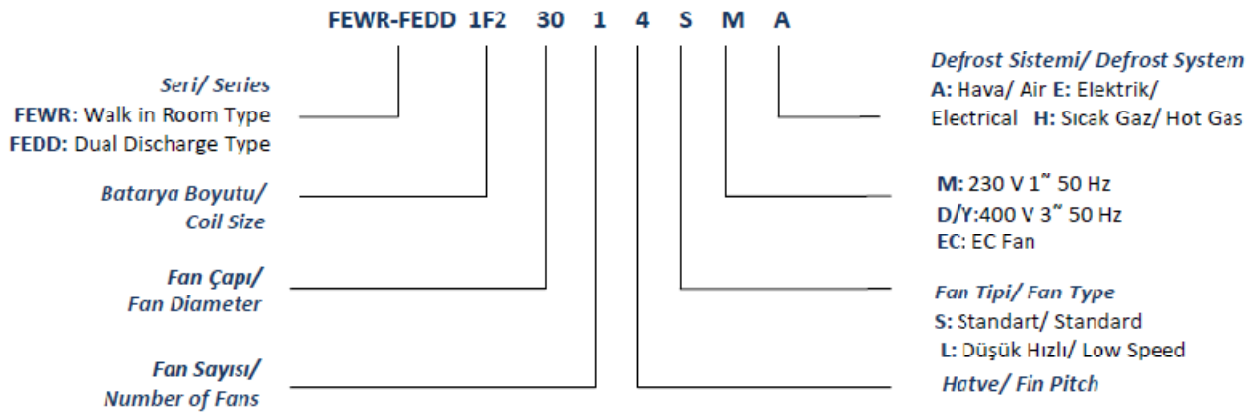
2.5. Environmental Protection

While handling the product, it has to be ensured that materials which can endanger the environment are disposed of properly. Service materials must not be allowed to enter the sewerage system and the underground water system.

All relevant national regulations concerning environmental protection and the technical issues for safe and proper working must be complied.

3. LABELLING

3.1. Product Code



3.2. Type Plate



Type	FEDD	Fan speed	rpm
Serial Nr.		Total Fan Power	kW
TS min/ max	°C	Electric Heater Power	kW
Weight	kg	Power Supply	
Internal Vol.	L.	Max. Opr. Pr.	Bar
Medium		Test Pr. / Medium	Bar / Dry Air
Prod. Year			



FRİTERM TERMİK CİHAZLAR SAN. ve TİC. A.Ş.
İDOSB Dilek Sokak No: 10 X-12 Özel Parsel Tuzla 34957 İstanbul / Türkiye
E-mail: info@friterm.com Web: http://www.friterm.com

3.3. Friterm Logo



4. TECHNICAL DATA

4.1. Standards

- 2014/68/EU PED (Pressure Equipment Directive)
- TS EN 378 "Refrigeration systems and heat pumps, technical safety and environmental requirements"
- Capacity standard for evaporators is defined according to the EN 327 standard (Heat Exchangers - Forced Convection Air Cooled Refrigerant Condensers - Test Procedure for Establishing Performance)

- The system installer is responsible for that the inherent installation and security information are harmonized with the valid standards and guidelines (DIN EN 292 / 294).

4.2. Product

The basic principle is to transfer the thermal load of warm air in the room to the refrigerant by the aid of a heat exchanger employing axial fans. Its working principle is that the air blown by fans cools down by the refrigerant evaporating within the tubes while passing through the fins.

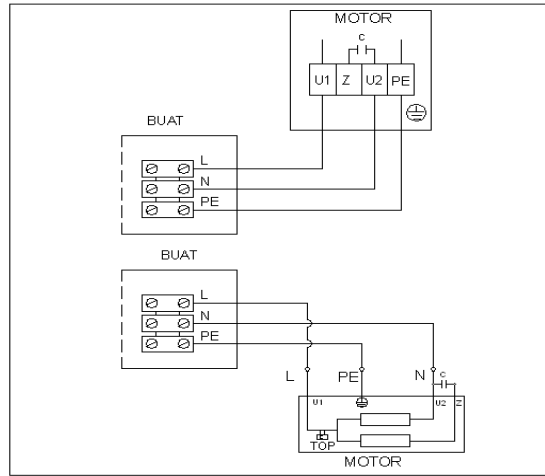
The unit is designed and delivered to the end user for operation at a specific operating point.

4.3. Fans

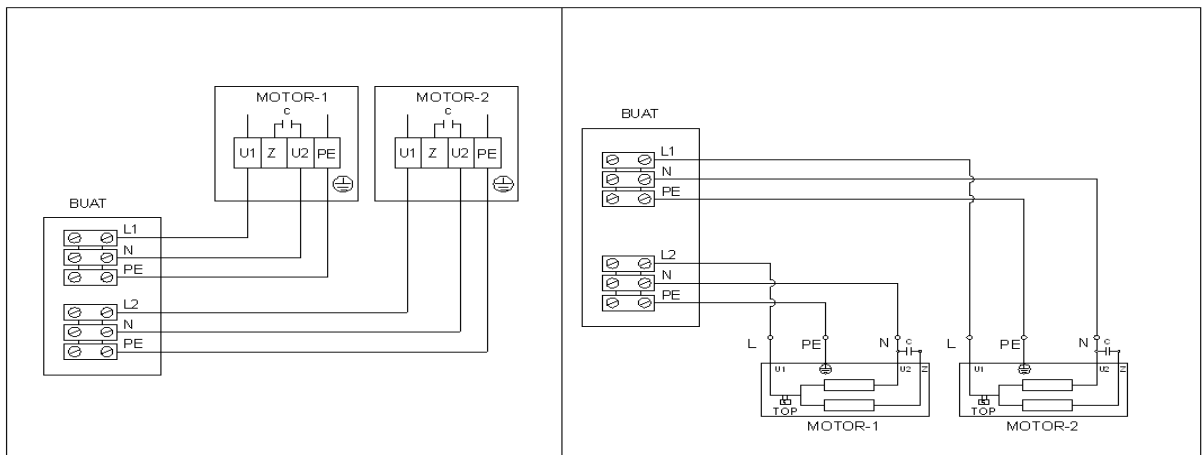
- High efficient axial Ziehl-Abegg, EBM or equivalent fans are used.
- Fan diameters: 300/ 350/ 400/ 450/ 500/ 630/ 800 mm.
- 400V 3~50Hz, 230V 1~50Hz
- Triphase fans can work at two different speeds. Furthermore, providing speed control is optional for EC fans.
- Variable fan speed regulation can be achieved using triphase fans with frequency inverter and sine filter.
- Variable voltage speed control system could be used as an alternative fan speed control system.
- All motors are suitable for speed control applications up to 100 %.
- All motors have feature internal thermal protection.
- Standard wiring of all motors are for one speed.
- Working temperature for exterior mounting is between -40 °C and +50 °C - +70 °C.
- Fans are designed with assuming fans working Fans run in a housing designed to maximize air flow.
- Recommended starting for motors is 6 starts per hour, maximum starting for motors is 10 starts per hour.
- In case of prolonged stoppage of system, run the fan motors at least 4 hours per week.
- Motor protection IP54; insulation class F.
- Friterm reserves the right to use fans of different manufacturers. Depending on the type, the fan data may slightly vary.

4.3.1 Fan Connection Diagrams

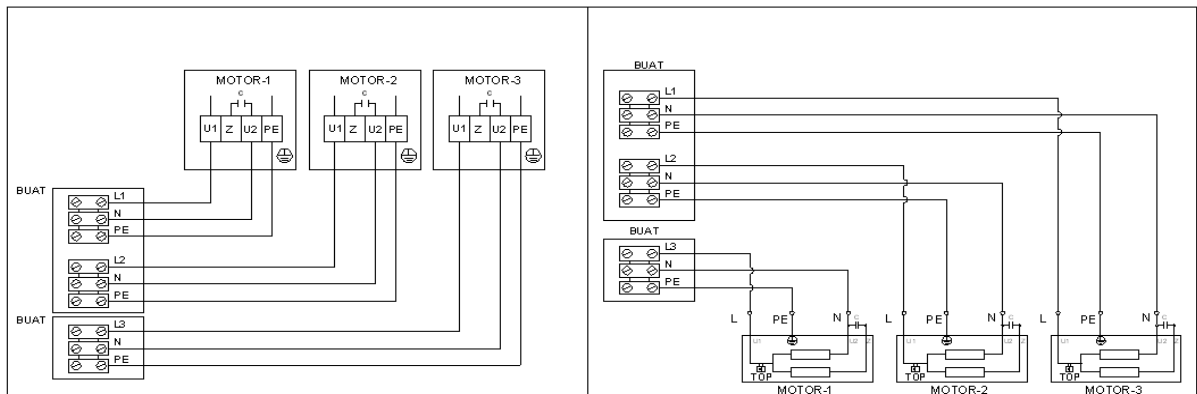
4.3.1.1. EBM Fan Connection Diagrams



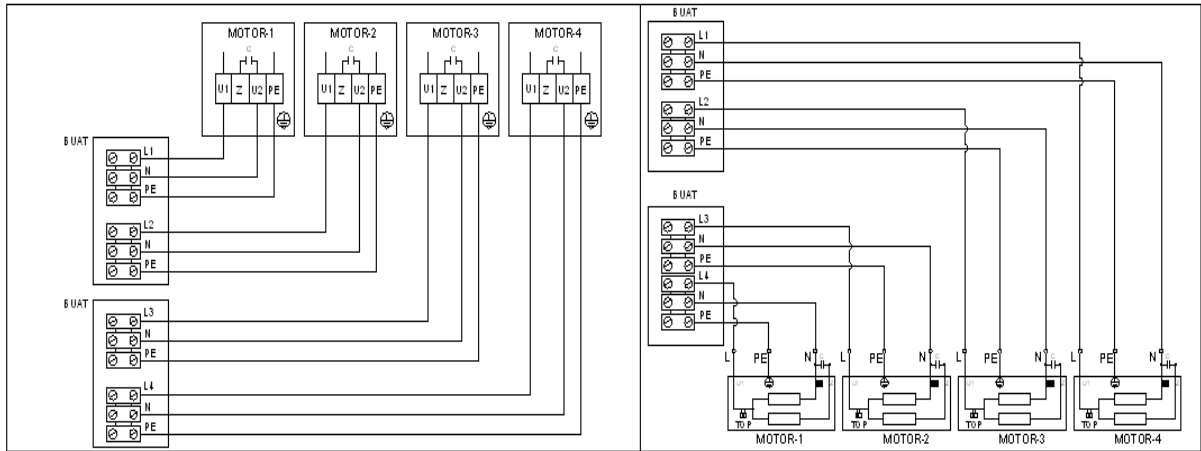
EBM 230V Internal Thermistor EBM Fan (1 Fan)



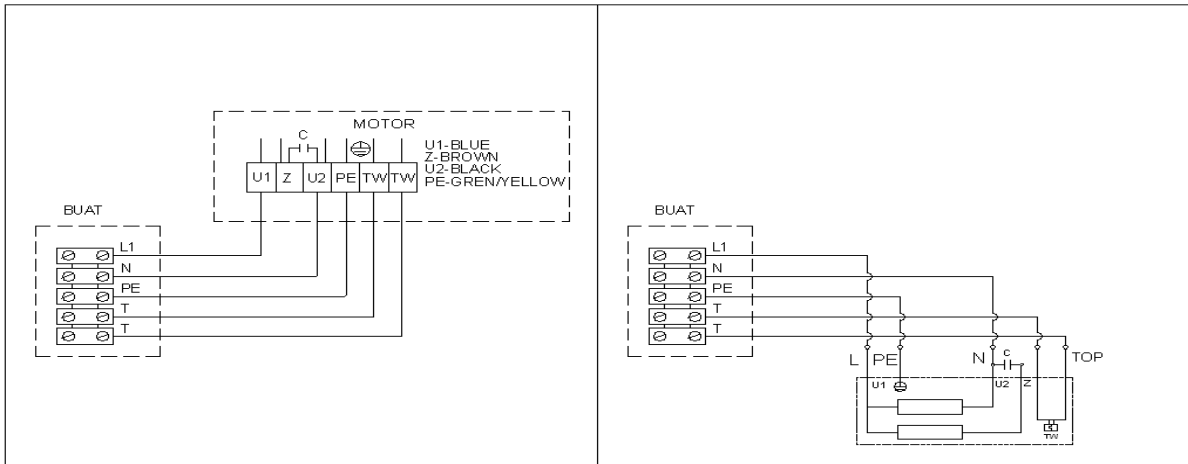
EBM 230V Internal Thermistor Fan Connection (2 Fan)



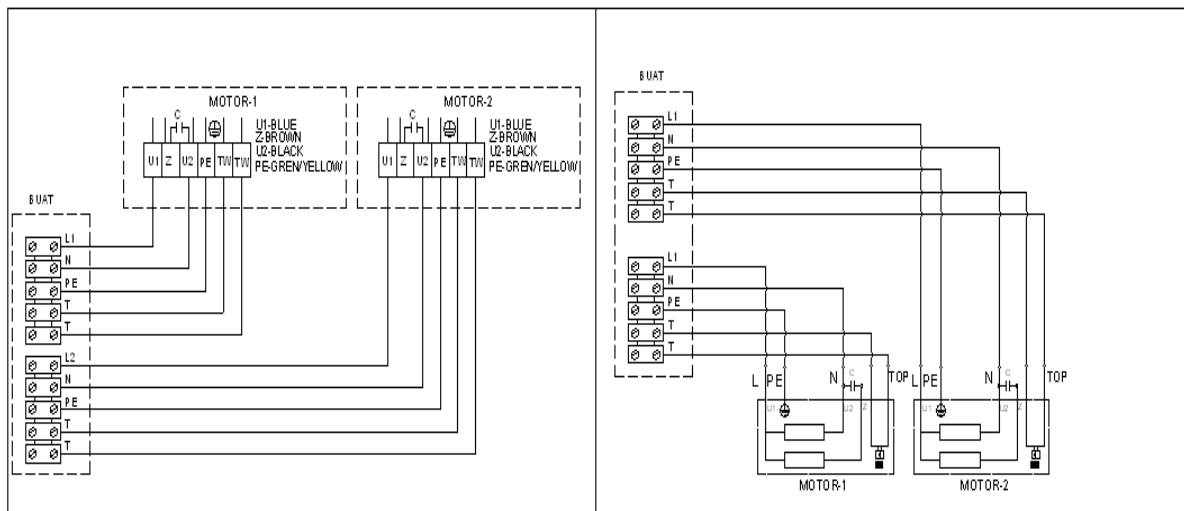
EBM 230V Internal Thermistor Fan Connection (3 Fan)



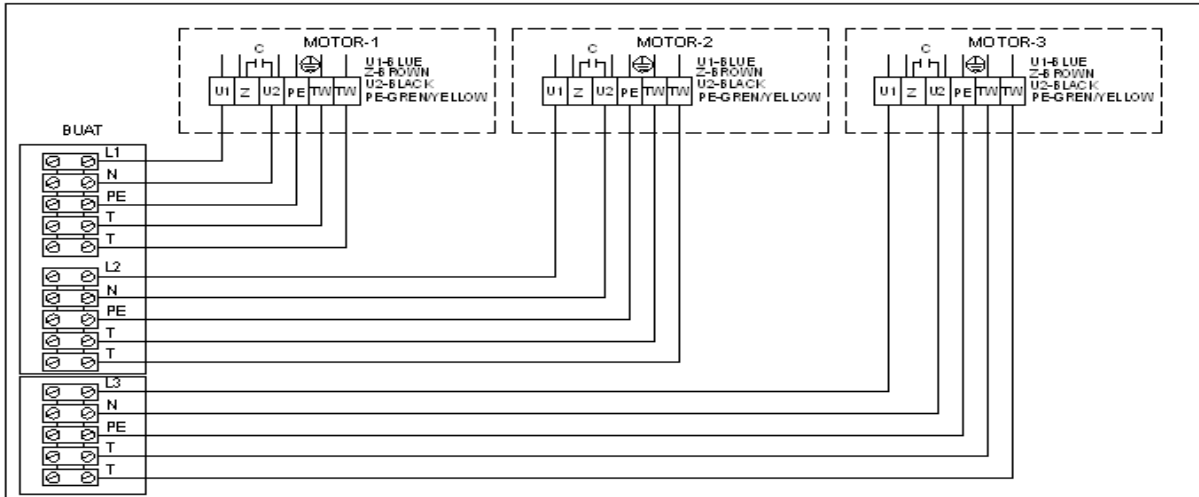
EBM 230V Internal Thermistor Fan Connection (4 Fan)



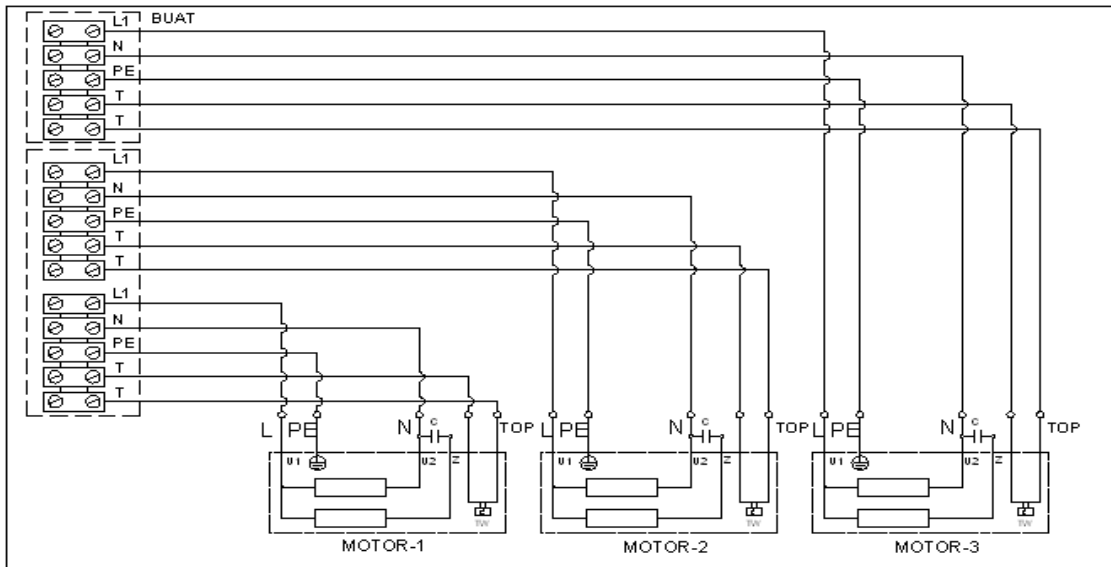
EBM 230V External Thermistor Fan Connection (1 Fan)



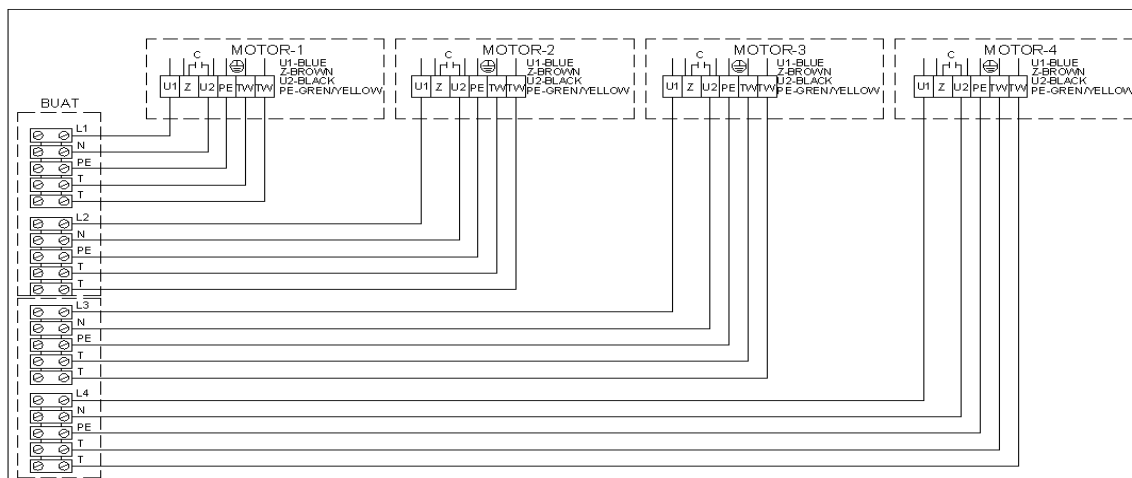
EBM 230V External Thermistor Fan Connection (2 Fan)



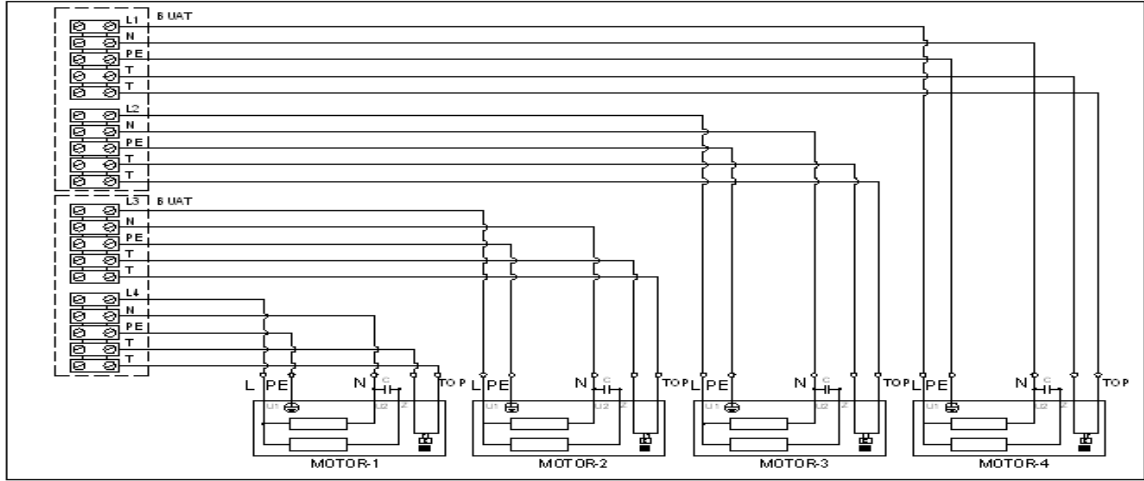
EBM 230V External Thermistor Fan Connection (3 Fan)



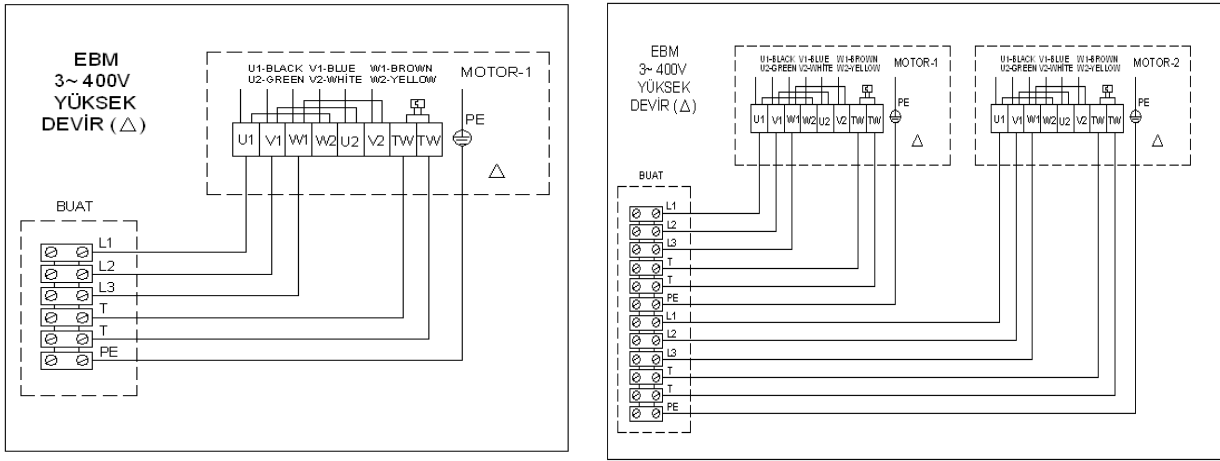
EBM 230V External Thermistor Fan Connection (3 Fan)



EBM 230V External Thermistor Fan Connection (4 Fan)



EBM 230V External Thermistor Fan Connection (4 Fan)

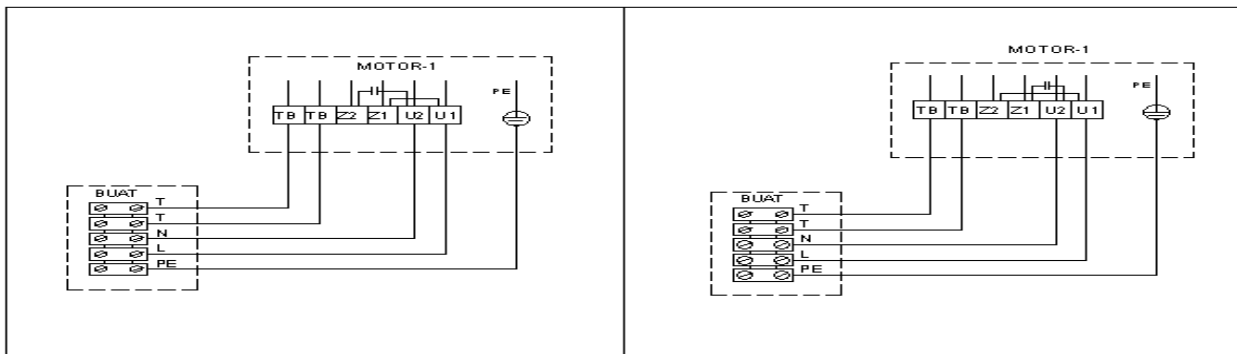


EBM 400V Thermistor Fan Connection (1 Fan) Thermistor Fan Connection (2 Fan)

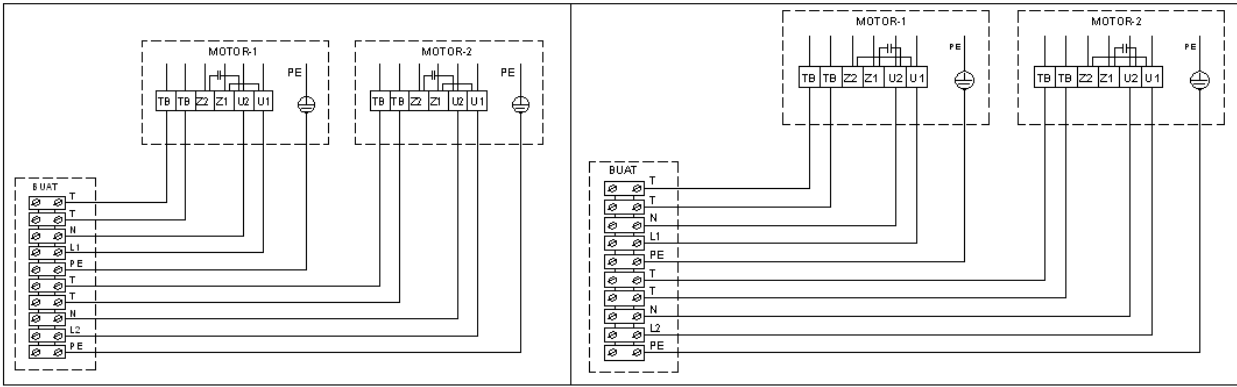
NOTICE

For the products with 3 fans, one 1 fan diagram and one 2 fan diagram should be used,
For the products with 4 fans, two 2 fan diagrams should be used.

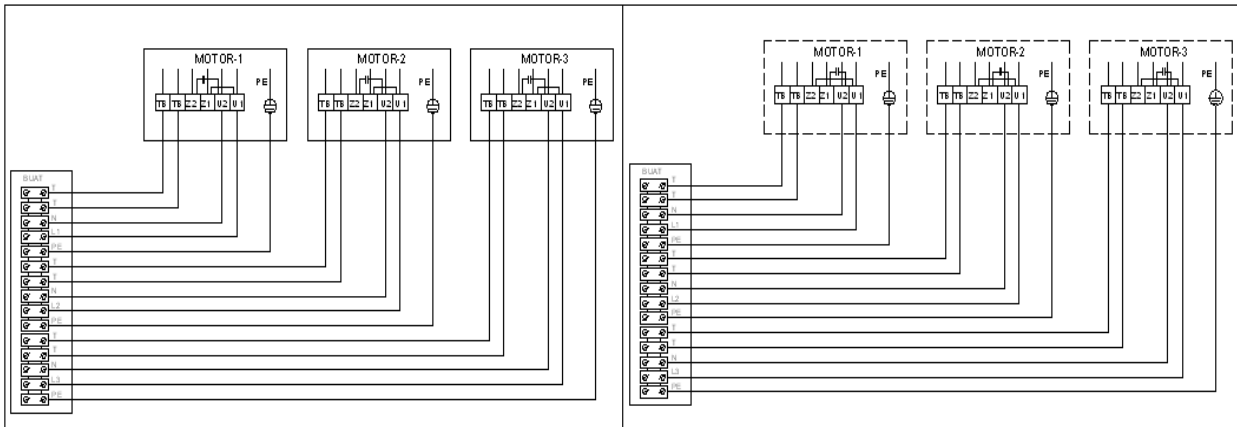
4.3.1.2. Z. ABEGG Fan Connection Diagrams



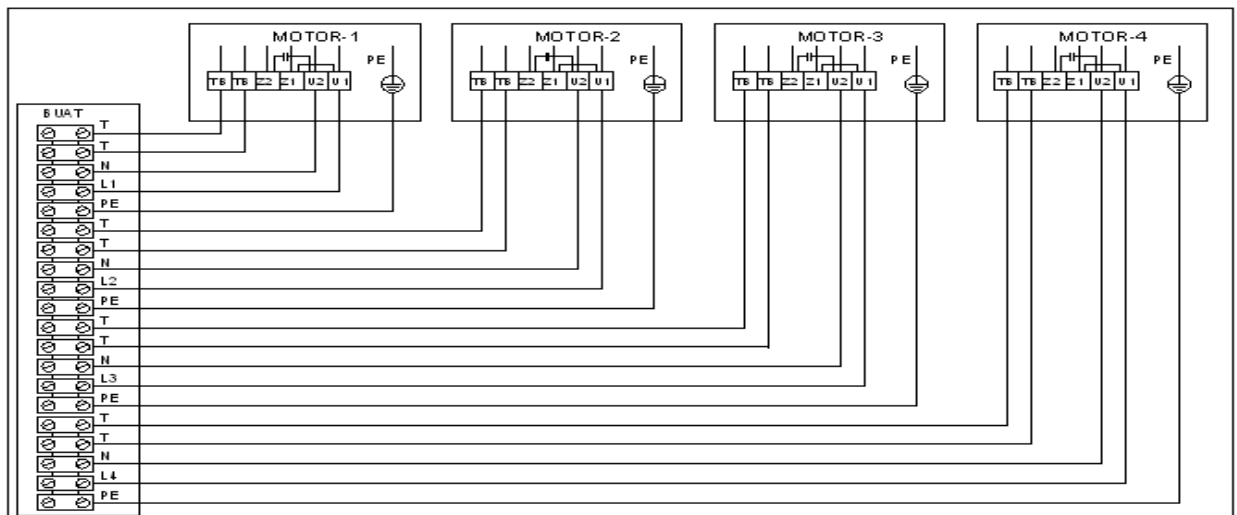
Z.ABEGG 230V Suction/Blowing Fan Connection (1 Fan)



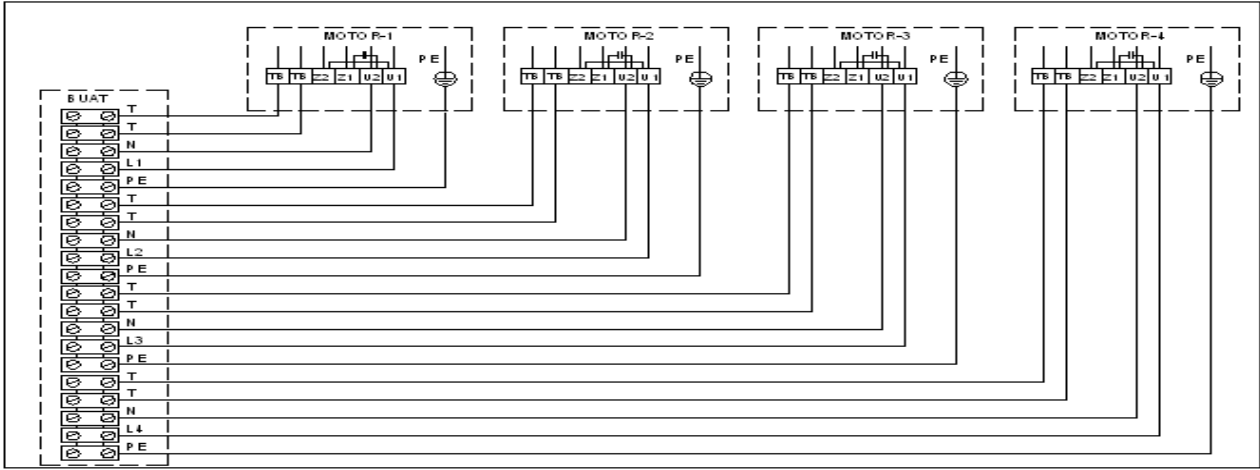
Z.ABEGG 230V Suction/Blowing Fan Connection (2 Fan)



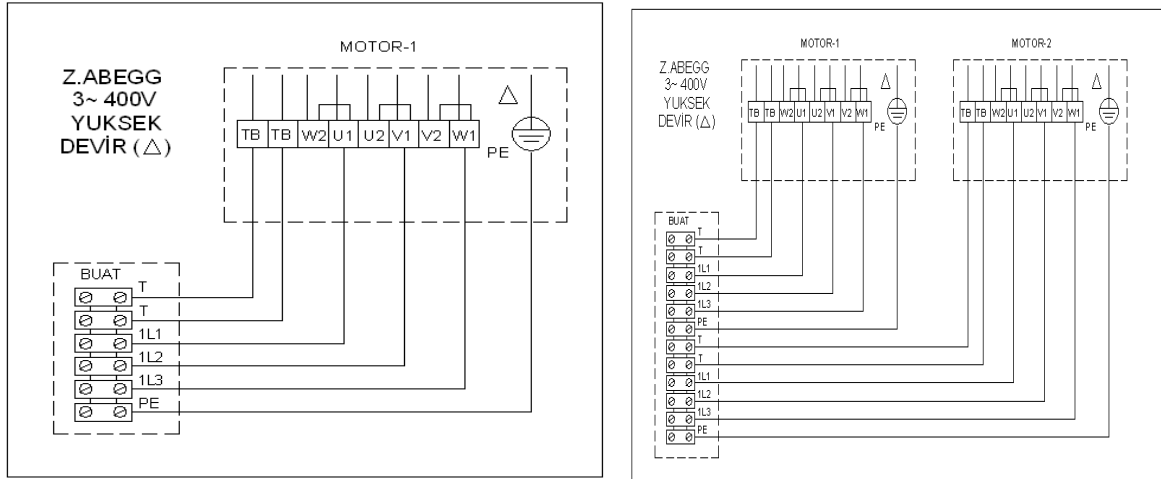
Z.ABEGG 230V Suction/Blowing Fan Connection (3 Fan)



Z.ABEGG 230V Suction Fan Connection (4 Fan)



Z.ABEGG 230V Blowing Fan Connection (4 Fan)



Z.ABEGG 400V Thermistor Fan Connection (1 Fan) -(2 Fan)

NOTICE

For the products with 3 fans, one 1 fan diagram and one 2 fan diagram should be used.
For the products with 4 fans, two 2 fan diagrams should be used.

NOTICE

Electrical fan connection diagrams shown in the table are for standard serial products. The other suitable fans could be installed based on the same diagrams. Product catalogue could be referred for fan number and diameter.

CAUTION

Installation of the product while the thermistor connection must be made. Otherwise, fan fairules and overheating can be encountered similar problems.

NOTICE

When the hoods on the fan heater used, the heating system must be work in operation during defrost and other operation time.

4.4. Sound Pressure Level

Noise pressure levels (LpA) are determined from the sound power levels (LwA) by using following formula according to EN 13487 Surrounding Surface Method.

$$LpA = LwA - 10 \log\left(\frac{Sp}{Sr}\right)$$

Sp = parallepiped surface(3 m)

Sr = Surface reference (1m²)

Sound pressure levels given shows the average values on a parallepiped surface at 3 m distance from the unit in open air over a reflecting plain.

NOTICE

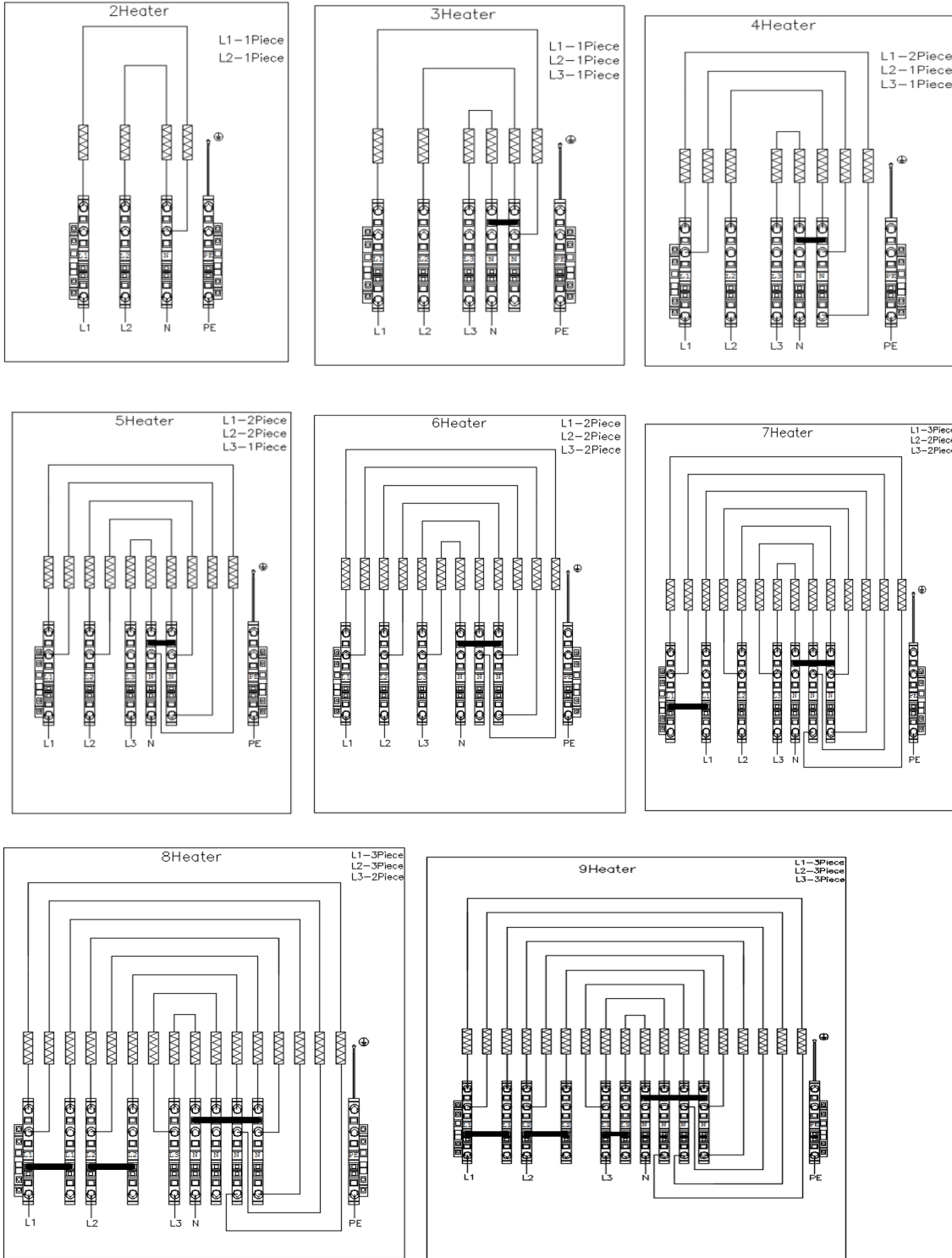
The values given in the table are only for giving an idea of magnitude; the actual values might vary depending on the environmental conditions and installation characteristics

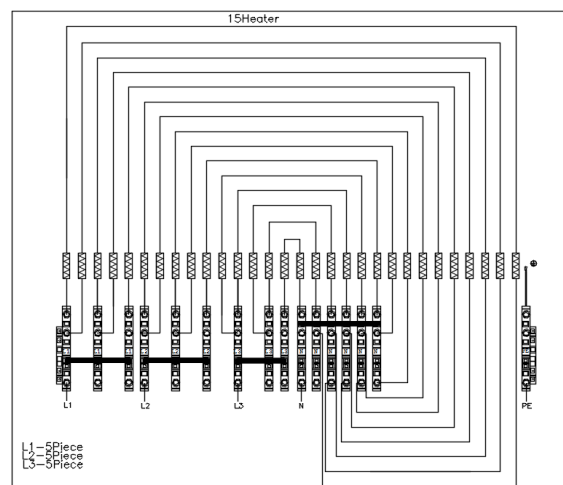
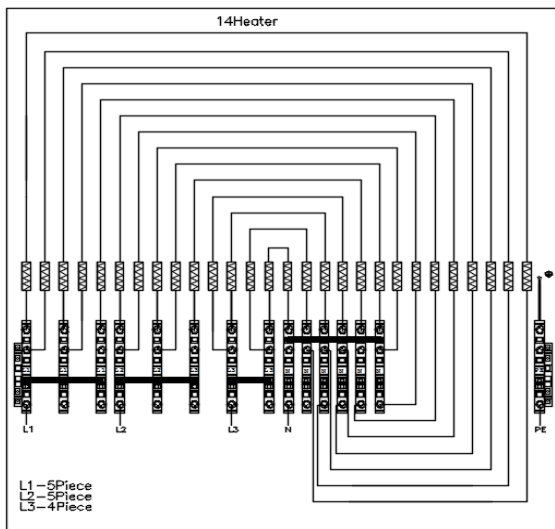
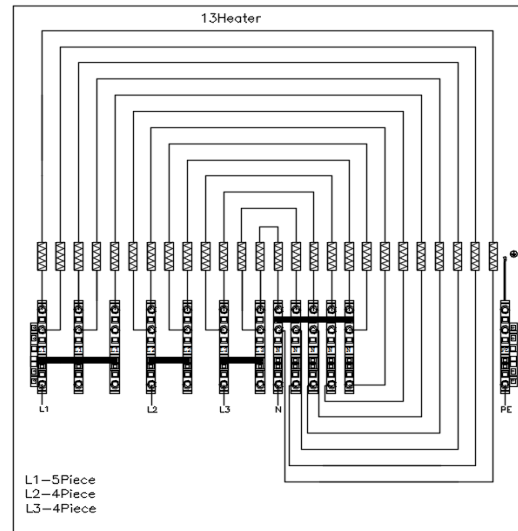
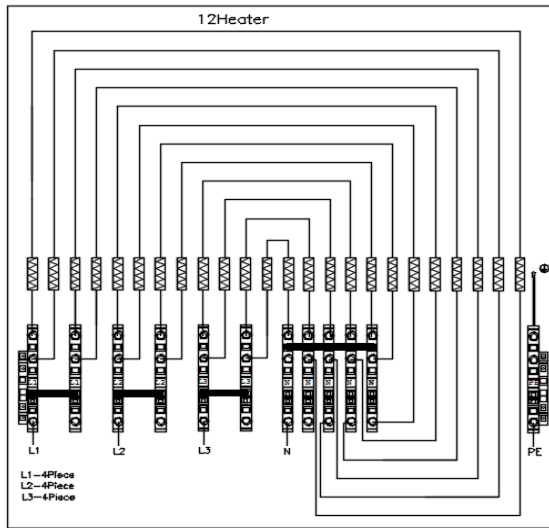
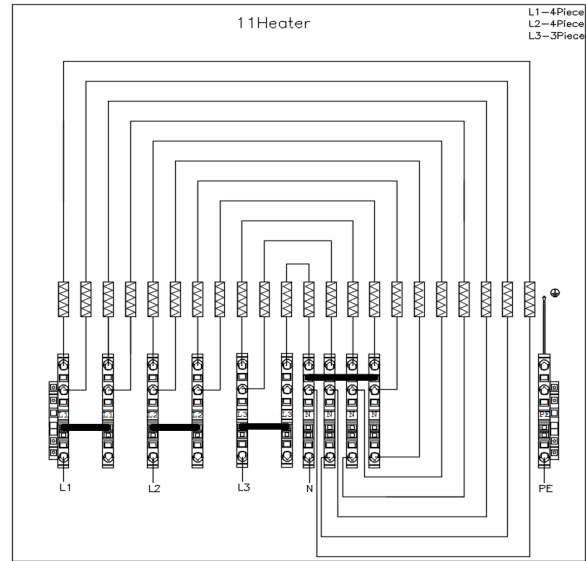
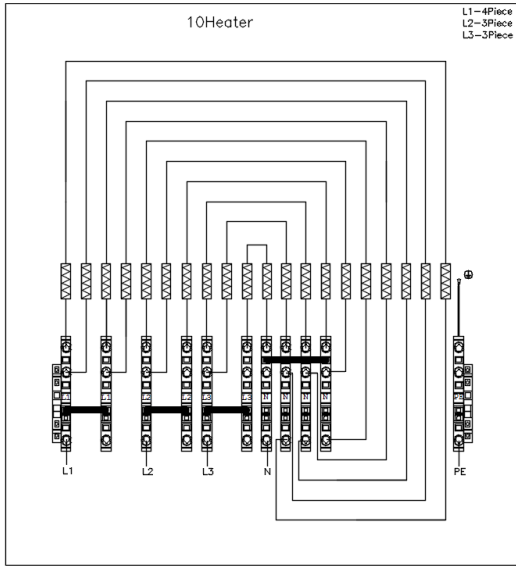
Fan Diameter(mm)	Fan Speed(rpm)	Sound Power Level LwA dB(A)	Number of Fan	1	2	3	4
630	900/ Δ	74	Sound Pressure Level dB(A) (Distance at 3 m)	52	55	57	58
	720/ Y	69		47	50	52	53
500	1330/ Δ	77		55	58	60	61
	940/ Y	71		49	52	54	55
450	1310	68		47	50	52	53
	900	61		39	42	44	45
400	1430	74		52	55	57	58
	870	59		37	40	42	43
350	1340	64		43	46	48	49
	910	53		32	35	37	38
300	1320	61		29	32	34	35
250	1400	54		22	25	27	28

4.5. Heater Connection Diagrams

4.5.1 Diagrams

Electric defrost heater connection diagrams show as follows.





NOTICE

Please refer to product catalogue for the heater power. A difference as much as current drawn by a heater could be measured between two phases.

 **CAUTION**

The heaters are fixed with segments. The segment plier should be used to disassemble segments before removing heaters. When the heater is replaced by a new one, the segments must be fixed again.

 **WARNING**

The electrical connections must comply with related specifications and the earthing connection must be made carefully and elaborately.

5. TRANSPORT AND STORAGE

5.1. Check for Completeness and transport damage

- Attention! May cause severe injuries or unrecoverable damages in case of uncontrolled fall down.
- Instructions on lift and transportation should be strictly followed.
- Check if there is any damage on product or package. Immediately after receipt, the delivery must be inspected for possible transport damage. Any damage must be reported immediately to the shipping company. If it is to be expected that the transport damage may affect proper operation, then the product must not be commissioned.
- Upon receipt, the product should be visually inspected, and in case of any damage or shortage, the supplier should be notified within 7 days.

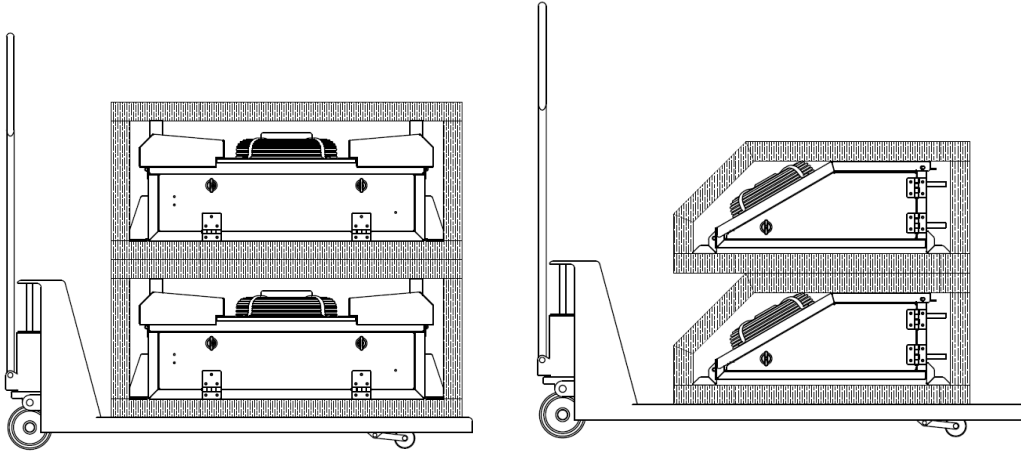
5.2. Transport

The product may only be lifted and moved by persons who:

1. are authorised to operate crane systems,
2. are authorised to drive motorised handling product
3. Also know the transport and lifting instructions according to the operating manual and the assembly drawing.



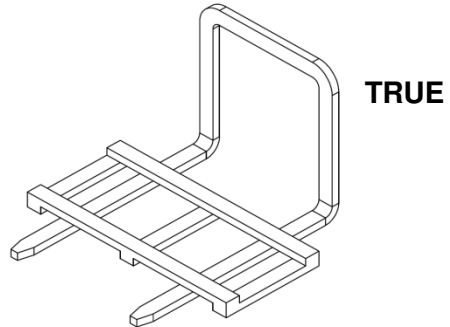
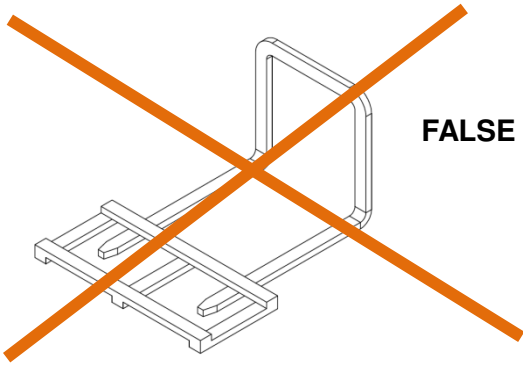
Suitable transport equipment must be used.



Transport Position for FEDD –FEWR Series



Only lift the packed unit with a forklift with full work length.



Risk of accident due to falling load

The size and weight of the product may cause accidents while transporting

- Be extremely careful during transport to avoid damage or deformation on the product.
- Only use suitable transport equipment and lifting gear with sufficient load-bearing capacity.
- All precautions should be taken against any possible mechanical risk.
- Never stand or work under suspended loads.
- Wear appropriate protective clothing (helmet, safety gloves, safety shoes).



- During lifting, a suitable lifting tool like a forklift or a crane is to be operated as in the drawings below. When lifting the product with hauling hooks, it is necessary to use a lifting beam connected to the hooks.
- Product is mounted with wooden beams at the bottom. It can be placed on the ground on these wooden beams. These wooden beams provide enough height for forklifts. During landing the product onto the ground, be careful for the notches on the ground and prevent defects of the aluminium fins below the product.
- If lightweight product is to be handled without a lifting vehicle, excessive care should be taken and suitable gloves should be used.

NOTICE

Be careful not to damage the product by the forks of the forklift. In order not to scratch the product, place a separator material. (cardboard, plywood, isolation material etc.)

5.3. Storage

- Store the product in the original packaging in order to protect from improper weather conditions, dirt, moisture and environmental effects and the equipment.
- Avoid excessive storage periods (one year of storage at maximum is recommended).

- If the product is stationary for long periods in a humid atmosphere, the fans should be switched ON for minimum four hours per a month to remove moisture that may have condensed within the motors
- Pay attention to the instructions on visual signs and labels for safety transport and handling of packaged product.
- Avoid exposure to extreme heat and cold.

CAUTION

Damage caused by improper storage

Incorrect or improper storage may cause damage to the radiator or radiator components.

6. INSTALLATION

The system installer is responsible for the proper installation according to standards and guidelines (DIN EN 292 / 294) which contains installation and security guidelines.

Before installing, it must be ensured that the technical specifications of the product are in accordance with the desired working conditions.

6.1. Location

- The product is designed only for permanent installation. It should be fixed to a stable base.
- All measures should be taken during the installation in order to avoid any vibration in operation.
- The working fluid, the maximum working pressure and the voltage declared by the producer should be proper for the working environment.

DANGER

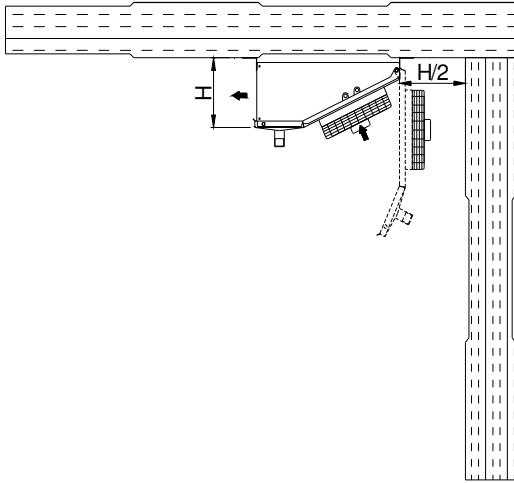
The working area should be well ventilated and should not be contained any hazardous substances or explosives.

- Air motion should not be adversely affected by obstructions and inlet air should not be undesirably heated or cooled by some other product.

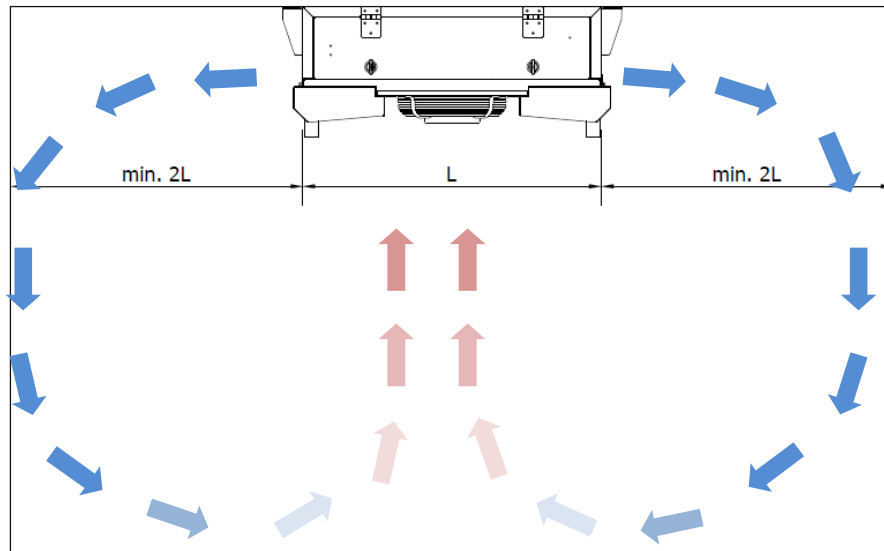
- The site where the installation process is being carried out should be provided as clean as possible and low humidity.

6.2. Requirements at the Setup Point

The standart air coolers must be installed as shown in following figures



FEWR Ceiling Type Air Coolers Layout Plan

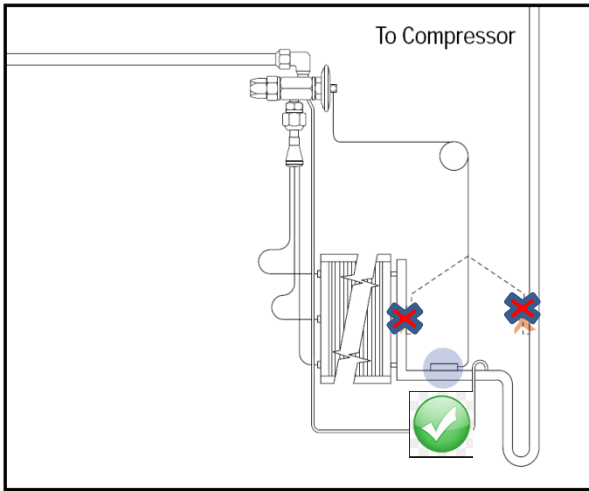


FEDD Ceiling Type Air Coolers Layout Plan

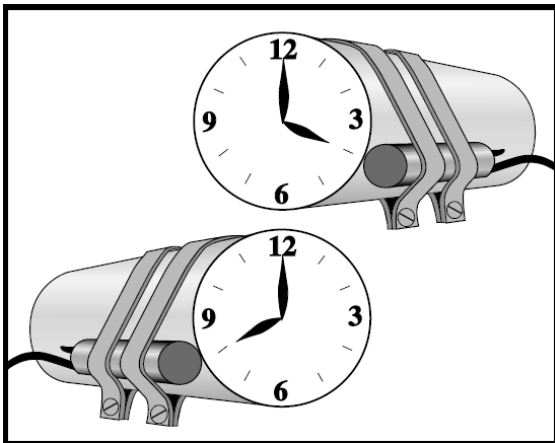
CAUTION

In case of using Thermostatic expansion valve please follow the instructions of the Expansion valve supplier. In case of absence of instructions please install the Expansion device according to the following instructions. Improper installation of the expansion device may result in poor cooling capacity.

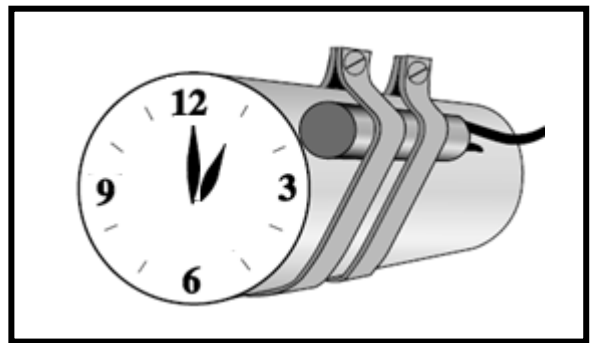
The sensing bulb of the expansion device should be placed on the horizontal part of the unit cooler outlet pipe in between the coil and the pressure balance capillary pipe connection. In addition the sensing bulb **MUST BE thermally insulated** against the ambient temperature.



The bulb should be placed tightly on the evaporator outlet pipe at 4 O'clock position if the pipe diameter is 7/8" and bigger. If the pipe diameter is smaller than 7/8" then the bulb should be positioned at 1 O'clock position.



Pipe diameter larger than 7/8"



Pipe diameter smaller than 7/8"

6.3. Mounting

The system installer is responsible for the installation and safety information with the compliance standard instructions(**TS EN 12100-1/2**).

Operator should consider**2004-108 EC** directive.

Before the installation, the technical specifications of the product must be ensured that they are compatible with the desired working conditions.

Stability of units must be provided by users during installation against to any possible vibration.

Air flow should not be blocked by any obstacle.

Additional air flow resistance should not be allowed by fans or motors which are located next to the product.

Installation and electrical connection must be performed by only qualified personnel.

Be careful while unpacking and installing products in order not to cause any damage to the tubes and piping connections.

NOTICE

It must be ensured that no electrical supply connection exists during installation.

The mounting position of the product should be in accordance with its design.

The connections used for mounting should be adequate to support the total operational forces.

The product must be mounted in such a way that no vibration would be carried to the product (vibration dampers can be used if required).

Carrier legs and lifting lugs are delivered as mounted on product

DANGER

Electrical connections must not be done before mounting the product to the ground with the legs.

CAUTION

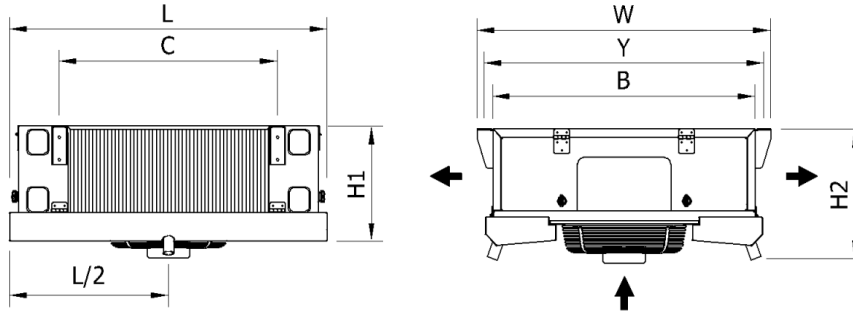
Product must not be operated and electrically connected before the mounting legs fixed.

FEDD Drawings

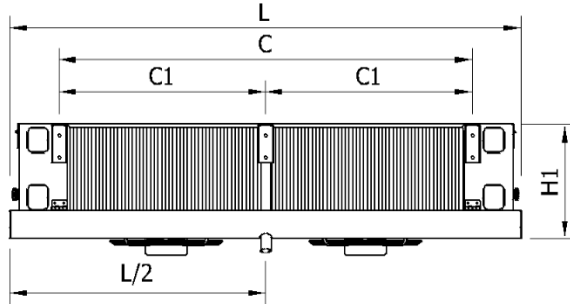
FEDD 4 • 7 • 10 • 12 mm

TEKNİK ÇİZİM • DRAWING

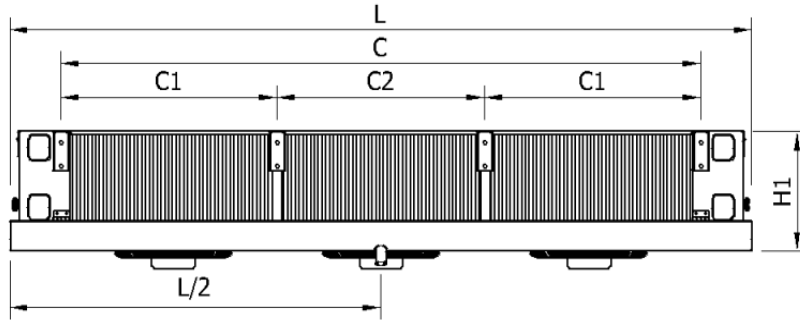
1 Fan/ 1 Fan



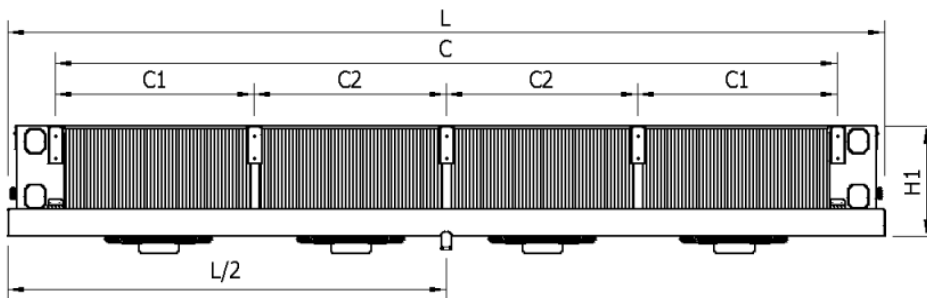
2 Fan/ 2 Fans







3 Fan/ 3 Fans








4 Fan/ 4 Fans



FEDD Dimension Table (250-300-350-400)

FEDD 4 • 7 • 10 • 12 mm											BOYUTLAR • DIMENSIONS				
MODEL MODEL	L	C	C1	C2	W	Y	B	H1	H2	Dişli Drenaj Bağlantısı Drain (G-Thread) Connection	Ağırlık* / Weight*				
											4 mm	7 mm	10 mm	12 mm	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch	kg	kg	kg	kg	
	FEDD 1F2 25.1._	770	450	0	0	836	796	736	285	322	1"	21	21	-	-
	FEDD 1F4 25.1._	770	450	0	0	976	936	876	290	328	1"	25	25	-	-
	FEDD 1F2 30.1._	870	550	0	0	906	866	806	285	322	1"	24	24	-	-
	FEDD 1F4 30.1._	870	550	0	0	1046	1006	946	290	328	1"	30	30	-	-
	FEDD 1F2 35.1._	1020	700	0	0	941	901	841	355	393	1"	35	35	-	-
	FEDD 1F4 35.1._	1020	700	0	0	1081	1041	981	360	398	1"	43	42	-	-
	FEDD 1F2 40.1._	1100	700	0	0	1136	1096	1036	358	395	1"	42	-	-	-
	FEDD 1F3 40.1._	1100	700	0	0	1136	1096	1036	358	395	1"	45	44	-	-
	FEDD 1F4 40.1._	1100	700	0	0	1171	1131	1071	360	398	1"	49	48	45	45
FEDD 1F6 40.1._	1100	700	0	0	1336	1296	1236	368	405	1"	-	57	54	53	
	FEDD 1F2 25.2._	1170	850	0	0	836	796	736	285	322	1"	33	33	-	-
	FEDD 1F4 25.2._	1170	850	0	0	976	936	876	290	328	1"	42	41	-	-
	FEDD 1F2 30.2._	1370	1050	0	0	906	866	806	285	322	1"	40	40	-	-
	FEDD 1F4 30.2._	1370	1050	0	0	1046	1006	946	290	328	1"	50	50	-	-
	FEDD 1F2 35.2._	1670	1350	0	0	941	901	841	355	393	1"	60	60	-	-
	FEDD 1F4 35.2._	1670	1350	0	0	1081	1041	981	360	398	1"	75	74	-	-
	FEDD 1F2 40.2._	1750	1350	675	0	1136	1096	1036	358	395	1"	71	-	-	-
	FEDD 1F3 40.2._	1750	1350	675	0	1136	1096	1036	358	395	1"	77	75	-	-
	FEDD 1F4 40.2._	1750	1350	675	0	1171	1131	1071	360	398	1"	85	83	78	76
FEDD 1F6 40.2._	1750	1350	675	0	1336	1296	1236	368	405	1"	-	98	92	90	
	FEDD 1F2 25.3._	1570	1250	0	0	836	796	736	285	322	1"	46	46	-	-
	FEDD 1F4 25.3._	1570	1250	0	0	976	936	876	290	328	1"	58	57	-	-
	FEDD 1F2 30.3._	1870	1550	0	0	906	866	806	285	322	1"	56	56	-	-
	FEDD 1F4 30.3._	1870	1550	0	0	1046	1006	946	290	328	1"	71	70	-	-
	FEDD 1F2 35.3._	2320	2000	0	0	941	901	841	355	393	1"	86	85	-	-
	FEDD 1F4 35.3._	2320	2000	0	0	1081	1041	981	360	398	1"	107	106	-	-
	FEDD 1F2 40.3._	2400	2000	675	650	1136	1096	1036	358	395	1"	99	-	-	-
	FEDD 1F3 40.3._	2400	2000	675	650	1136	1096	1036	358	395	1"	108	107	-	-
	FEDD 1F4 40.3._	2400	2000	675	650	1171	1131	1071	360	398	1"	120	117	110	107
FEDD 1F6 40.3._	2400	2000	675	650	1336	1296	1236	368	405	1"	-	140	130	127	
	FEDD 1F2 25.4._	1970	1650	825	0	836	796	736	285	322	1"	59	58	-	-
	FEDD 1F4 25.4._	1970	1650	825	0	976	936	876	290	328	1"	74	73	-	-
	FEDD 1F2 30.4._	2370	2050	1025	0	906	866	806	285	322	1"	72	71	-	-
	FEDD 1F4 30.4._	2370	2050	1025	0	1046	1006	946	290	328	1"	91	90	-	-
	FEDD 1F2 35.4._	2970	2650	1325	0	941	901	841	355	393	1"	111	110	-	-
	FEDD 1F4 35.4._	2970	2650	1325	0	1081	1041	981	360	398	1"	140	138	-	-
	FEDD 1F2 40.4._	3050	2650	675	650	1136	1096	1036	358	395	1"	127	-	-	-
	FEDD 1F3 40.4._	3050	2650	675	650	1136	1096	1036	358	395	1"	140	137	-	-
	FEDD 1F4 40.4._	3050	2650	675	650	1171	1131	1071	360	398	1"	157	151	142	138
FEDD 1F6 40.4._	3050	2650	675	650	1336	1296	1236	368	405	1"	-	180	168	163	

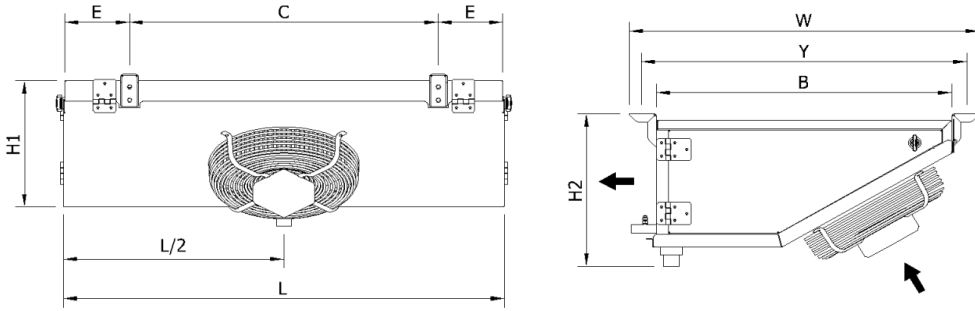
FEDD Dimension Table (450-500-630)

FEDD 4 • 7 • 10 • 12 mm											BOYUTLAR • DIMENSIONS				
MODEL MODEL	L	C	C1	C2	W	Y	B	H1	H2	Dişli Drenaj Bağlantısı Drain (G-Thread) Connection	Ağırlık* / Weight*				
											4 mm	7 mm	10 mm	12 mm	
											kg	kg	kg	kg	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch	kg	kg	kg	kg	
 X 1	FEDD 1F2 45.1._	1250	850	0	0	1186	1146	1086	428	465	1"	54	-	-	-
	FEDD 1F3 45.1._	1250	850	0	0	1186	1146	1086	428	465	1"	59	58	-	-
	FEDD 1F4 45.1._	1250	850	0	0	1221	1181	1121	430	467	1"	64	63	59	58
	FEDD 1F6 45.1._	1250	850	0	0	1406	1366	1306	438	475	1"	-	76	71	69
	FEDD 1F2 50.1._	1450	1050	0	0	1236	1196	1136	428	465	1"	109	-	-	-
	FEDD 1F3 50.1._	1450	1050	0	0	1236	1196	1136	428	465	1"	116	114	-	-
	FEDD 1F4 50.1._	1450	1050	0	0	1271	1231	1171	430	467	1"	123	121	117	115
	FEDD 1F6 50.1._	1450	1050	0	0	1436	1396	1336	438	475	1"	-	141	135	133
	FEDD 1F2 63.1._	1750	1250	0	0	1276	1226	1156	494	532	1"	154	-	-	-
	FEDD 1F3 63.1._	1750	1250	0	0	1346	1296	1226	497	535	1"	169	168	-	-
 X 2	FEDD 1F4 63.1._	1750	1250	0	0	1416	1366	1296	500	538	1"	183	183	173	170
	FEDD 1F6 63.1._	1750	1250	0	0	1556	1506	1436	506	543	1"	-	211	200	195
	FEDD 1F2 45.2._	2050	1650	825	0	1186	1146	1086	428	465	1"	91	-	-	-
	FEDD 1F3 45.2._	2050	1650	825	0	1186	1146	1086	428	465	1"	100	98	-	-
	FEDD 1F4 45.2._	2050	1650	825	0	1221	1181	1121	430	467	1"	110	108	102	99
	FEDD 1F6 45.2._	2050	1650	825	0	1406	1366	1306	438	475	1"	-	130	121	118
	FEDD 1F2 50.2._	2450	2050	1025	0	1236	1196	1136	428	465	1"	184	-	-	-
	FEDD 1F3 50.2._	2450	2050	1025	0	1236	1196	1136	428	465	1"	195	193	-	-
	FEDD 1F4 50.2._	2450	2050	1025	0	1271	1231	1171	430	467	1"	209	207	198	195
	FEDD 1F6 50.2._	2450	2050	1025	0	1436	1396	1336	438	475	1"	-	243	232	228
 X 3	FEDD 1F2 63.2._	2950	2450	1225	0	1276	1226	1156	494	532	1"	263	-	-	-
	FEDD 1F3 63.2._	2950	2450	1225	0	1346	1296	1226	497	535	1"	289	286	-	-
	FEDD 1F4 63.2._	2950	2450	1225	0	1416	1366	1296	500	538	1"	312	312	294	287
	FEDD 1F6 63.2._	2950	2450	1225	0	1556	1506	1436	506	543	1"	-	363	340	331
	FEDD 1F2 45.3._	2850	2450	825	800	1186	1146	1086	428	465	1"	128	-	-	-
	FEDD 1F3 45.3._	2850	2450	825	800	1186	1146	1086	428	465	1"	141	139	-	-
	FEDD 1F4 45.3._	2850	2450	825	800	1221	1181	1121	430	467	1"	155	153	142	138
	FEDD 1F6 45.3._	2850	2450	825	800	1406	1366	1306	438	475	1"	-	185	171	165
	FEDD 1F2 50.3._	3450	3050	1025	1000	1236	1196	1136	428	465	1"	264	-	-	-
	FEDD 1F3 50.3._	3450	3050	1025	1000	1236	1196	1136	428	465	1"	279	274	-	-
 X 4	FEDD 1F4 50.3._	3450	3050	1025	1000	1271	1231	1171	430	467	1"	297	294	279	274
	FEDD 1F6 50.3._	3450	3050	1025	1000	1436	1396	1336	438	475	1"	-	344	327	320
	FEDD 1F2 63.3._	4150	3650	1225	1200	1276	1226	1156	494	532	1"	372	-	-	-
	FEDD 1F3 63.3._	4150	3650	1225	1200	1346	1296	1226	497	535	1"	410	408	-	-
	FEDD 1F4 63.3._	4150	3650	1225	1200	1416	1366	1296	500	538	1"	447	444	414	404
	FEDD 1F6 63.3._	4150	3650	1225	1200	1556	1506	1436	506	543	1"	-	515	481	467
	FEDD 1F2 45.4._	3650	3250	825	800	1186	1146	1086	428	465	1"	168	-	-	-
	FEDD 1F3 45.4._	3650	3250	825	800	1186	1146	1086	428	465	1"	186	179	-	-
	FEDD 1F4 45.4._	3650	3250	825	800	1221	1181	1121	430	467	1"	203	198	184	178
	FEDD 1F6 45.4._	3650	3250	825	800	1406	1366	1306	438	475	1"	-	239	221	213
 X 4	FEDD 1F2 50.4._	4450	4050	1025	1000	1236	1196	1136	428	465	1"	340	-	-	-
	FEDD 1F3 50.4._	4450	4050	1025	1000	1236	1196	1136	428	465	1"	359	353	-	-
	FEDD 1F4 50.4._	4450	4050	1025	1000	1271	1231	1171	430	467	1"	383	380	363	356
	FEDD 1F6 50.4._	4450	4050	1025	1000	1436	1396	1336	438	475	1"	-	445	422	413
	FEDD 1F2 63.4._	5350	4850	1225	1200	1406	1356	1286	480	517	1"	517	-	-	-
	FEDD 1G3 63.4._	5350	4850	1225	1200	1506	1456	1386	484	521	1"	578	578	-	-
FEDD 1G4 63.4._	5350	4850	1225	1200	1606	1556	1486	488	525	1"	634	634	587	568	
FEDD 1G6 63.4._	5350	4850	1225	1200	1806	1756	1686	496	533	1"	-	749	685	661	

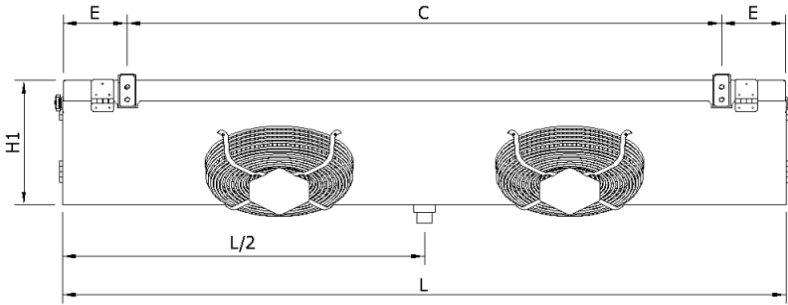
FEWR Drawings

FEWR 4 • 7 • 10 • 12 mm TEKNİK ÇİZİM • DRAWING

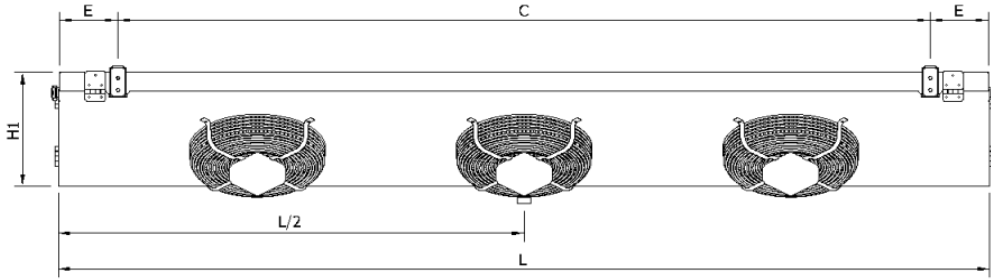
1 Fan/ 1 Fan



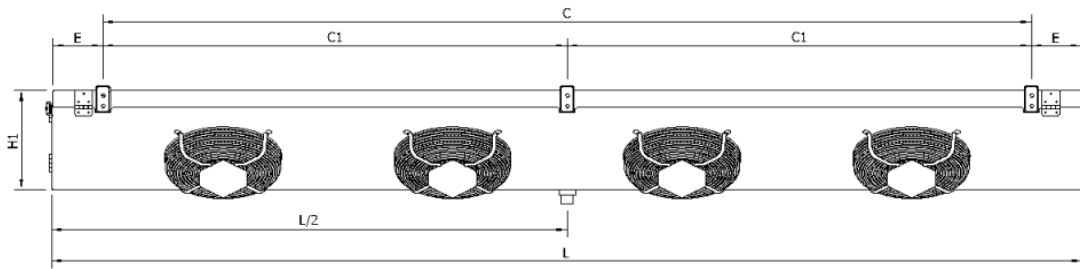
2 Fan/ 2 Fans



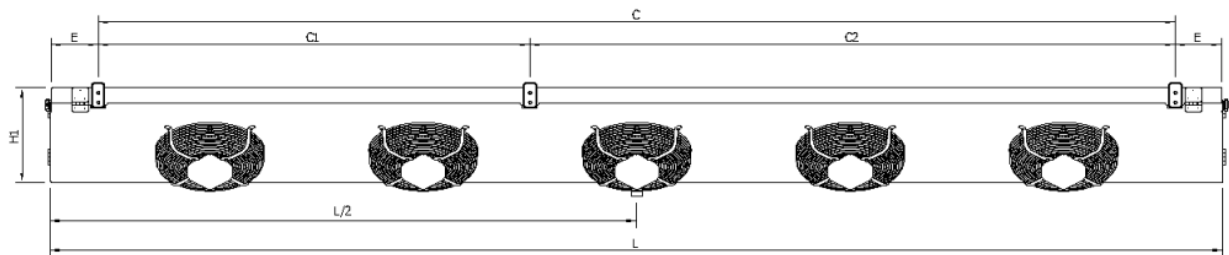
3 Fan/ 3 Fans








4 Fan/ 4 Fans



5 Fan/ 5 Fans



FEWR 4 • 7 mm BOYUTLAR • DIMENSIONS

MODEL MODEL	L	C	C1	C2	E	W	Y	B	H1	H2	Dışi Drenaj Bağlantısı Drain (G-Thread) Connection	Ağırlık* / Weight*		
												4 mm	7 mm	
												mm	kg	
 X 1	FEWR 1F2 201-	650	430	-	-	110	654	604	534	219	277	1"	9	9
	FEWR 1F4 201-	650	430	-	-	110	654	604	534	219	277	1"	10	10
	FEWR 1F2 251-	750	530	-	-	110	654	604	534	219	277	1"	10	10
	FEWR 1F4 251-	750	530	-	-	110	654	604	534	219	277	1"	11	11
	FEWR 1F2 301-	970	680	-	-	145	724	674	604	219	277	1"	12	12
	FEWR 1F4 301-	970	680	-	-	145	724	674	604	219	277	1"	14	14
	FEWR 1F2H 301-	970	680	-	-	145	764	714	644	289	347	1"	15	15
	FEWR 1F4H 301-	970	680	-	-	145	764	714	644	289	347	1"	18	18
	FEWR 1F2 351-	970	680	-	-	145	764	714	644	289	347	1"	15	15
FEWR 1F4 351-	970	680	-	-	145	764	714	644	289	347	1"	18	18	
 X 2	FEWR 1F2 202-	1050	830	-	-	110	654	604	534	219	277	1"	14	14
	FEWR 1F4 202-	1050	830	-	-	110	654	604	534	219	277	1"	16	16
	FEWR 1F2 252-	1250	1030	-	-	110	654	604	534	219	277	1"	16	16
	FEWR 1F4 252-	1250	1030	-	-	110	654	604	534	219	277	1"	18	18
	FEWR 1F2 302-	1620	1330	-	-	145	724	674	604	219	277	1"	20	20
	FEWR 1F4 302-	1620	1330	-	-	145	724	674	604	219	277	1"	23	23
	FEWR 1F2H 302-	1620	1330	-	-	145	764	714	644	289	347	1"	25	25
	FEWR 1F4H 302-	1620	1330	-	-	145	764	714	644	289	347	1"	30	29
	FEWR 1F2 352-	1620	1330	-	-	145	764	714	644	289	347	1"	25	25
FEWR 1F4 352-	1620	1330	-	-	145	764	714	644	289	347	1"	30	30	
 X 3	FEWR 1F2 203-	1450	1230	-	-	110	654	604	534	219	277	1"	19	19
	FEWR 1F4 203-	1450	1230	-	-	110	654	604	534	219	277	1"	22	22
	FEWR 1F2 253-	1750	1530	-	-	110	654	604	534	219	277	1"	21	21
	FEWR 1F4 253-	1750	1530	-	-	110	654	604	534	219	277	1"	26	25
	FEWR 1F2 303-	2270	1980	-	-	145	724	674	604	219	277	1"	28	27
	FEWR 1F4 303-	2270	1980	-	-	145	724	674	604	219	277	1"	33	33
	FEWR 1F2H 303-	2270	1980	-	-	145	764	714	644	289	347	1"	34	34
	FEWR 1F4H 303-	2270	1980	-	-	145	764	714	644	289	347	1"	42	41
	FEWR 1F2 353-	2270	1980	-	-	145	764	714	644	289	347	1"	35	35
FEWR 1F4 353-	2270	1980	-	-	145	764	714	644	289	347	1"	42	42	
 X 4	FEWR 1F2 204-	1850	1630	815	-	110	654	604	534	219	277	1"	24	24
	FEWR 1F4 204-	1850	1630	815	-	110	654	604	534	219	277	1"	29	28
	FEWR 1F2 254-	2250	2030	1015	-	110	654	604	534	219	277	1"	28	27
	FEWR 1F4 254-	2250	2030	1015	-	110	654	604	534	219	277	1"	33	33
	FEWR 1F2 304-	2920	2630	1315	-	145	724	674	604	219	277	1"	36	36
	FEWR 1F4 304-	2920	2630	1315	-	145	724	674	604	219	277	1"	43	43
	FEWR 1F2H 304-	2920	2630	1315	-	145	764	714	644	289	347	1"	44	44
	FEWR 1F4H 304-	2920	2630	1315	-	145	764	714	644	289	347	1"	54	53
	FEWR 1F2 354-	2920	2630	1315	-	145	764	714	644	289	347	1"	45	45
FEWR 1F4 354-	2920	2630	1315	-	145	764	714	644	289	347	1"	55	54	
 X 5	FEWR 1F2 305-	3570	3280	1315	1965	145	724	674	604	219	277	1"	44	43
	FEWR 1F4 305-	3570	3280	1315	1965	145	724	674	604	219	277	1"	53	52
	FEWR 1F2H 305-	3570	3280	1315	1965	145	764	714	644	289	347	1"	54	53
	FEWR 1F4H 305-	3570	3280	1315	1965	145	764	714	644	289	347	1"	66	65
	FEWR 1F2 355-	3570	3280	1315	1965	145	764	714	644	289	347	1"	55	55
	FEWR 1F4 355-	3570	3280	1315	1965	145	764	714	644	289	347	1"	67	66

6.4. Electrical Connection

The electrical connection must comply with the relevant instructions and ground wires must be installed correctly.

- The wiring of fans should be done in accordance with the related rules..
- The main power supply cable should be determined according to electrical power requirements of the product specified on the label.
- A protection thermal relay should be used where absent for the operational protection of fan.
- Electrical wiring connections/junction should be under protection with minimum IP54 class boxes.



Risk of injury by electric shock

When connecting the electronic control to the power supply, injuries by electric shock are possible because of the voltage supply.

- All electrical connections on the product must be made by a qualified electrician in accordance with the electrical engineering rules.
- The main power switch should be turned off unless needed before a repairing/maintenance action.

7. OPERATION

7.1. Initial Commissioning

Before running the unit for the first time, be sure that all guards, motor mountings and electrical covers are secure, installation and electrical connection are done properly, internal wiring is kept away from the fans and the fans can rotate freely.

Make sure that all the mechanical connections are done in accordance with the rules. Piping is consistent with the guidelines. Before the start-up you may run the fans individually to make sure that they are running properly. Turn on the fluid valves and let the fluid flow right before running the fans. In case you may encounter any problem or disfunction please refer to the manufacturer for the resolution of the problem.

7.2. Regular Commissioning

If the product is stationary for long periods in a humid atmosphere, the fans must be switched ON for **minimum of four hours in every month** to remove any moisture that may have condensed within the motors.

While the fans are running, anything that could pass through the finger guards, like a piece of cloth or long hair, must be kept away from the fans.

- Switch on the main power switch
- Make sure that the fluid is flowing inside the pipes.
- Switch on the fans.
- Defrost and heating systems should be checked and ensured that its work.
- Alternating operating states, e.g. usage changes at the set-up point, must also be considered. The defrosting frequency can be influenced by effects on the air side.
- Defrosting the unit with proper timing guarantees continuous operational reliability and the prevention of inaccessibilities that could result in a shutdown and disruptions. As the local conditions have a very big influence on the unit's performance and the need for defrosting, the operation must be checked regularly and specifically for frost and/or icing on the heat exchanger.
- If not taking the necessary measures could result in ice formation within the product's drainage system. Part of the drainage system in cold room must be insulated. The use of flexible heater within the drainage pipe to prevent icing is recommended.



Stay away from the air direction of the fans while the fans are running.

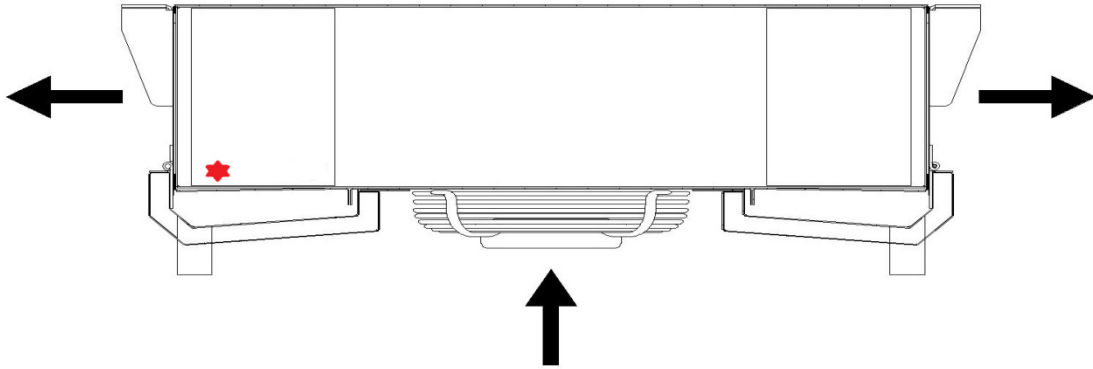
7.3. Defrost System

7.3.1. Defrost Control

- The defrosting process is started at pre-set intervals or as required.
- The process completion must be ensured twice (time/temperature and temperature/time),
- For defrost operation (circulation air, electric, hot gas (optional)) the correct on-site installation of the defrosting sensor must be ensured.
- The defrost probe temperature setpoint of 35 °C and defrosting time of 30 minutes is recommended.

7.3.2. Circulation Air Defrost

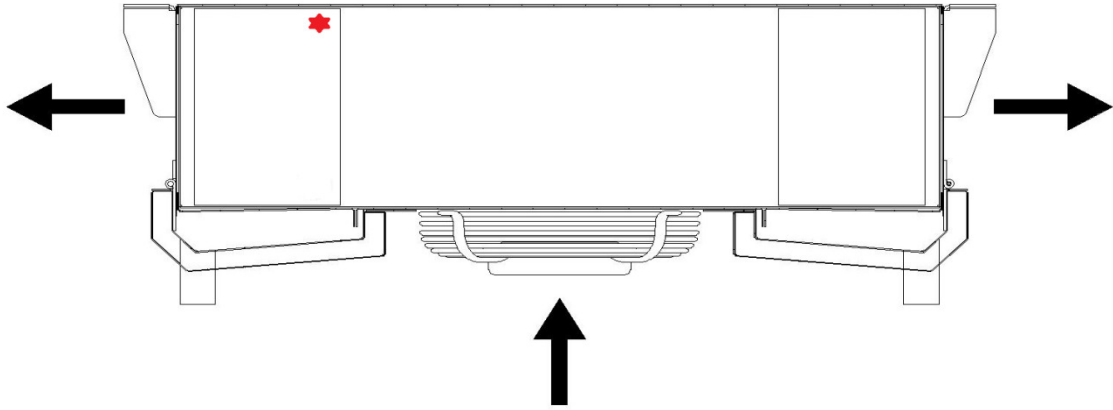
- With operation of the units at room temperatures in the plus range (plus-cold storage rooms) and evaporation temperatures $t_0 = 0$ to -5 °C.
- Circulation air defrosting is usually sufficient with shut-off working fluid-carrying lines the required defrosting heat is generated by the fan heat flow and the air temperature in the plus range. But it also applies here: the refrigerating operation may be restarted, as described, only after complete defrosting.



Proposed defrosting sensor positioning

7.3.3. Electric Defrost

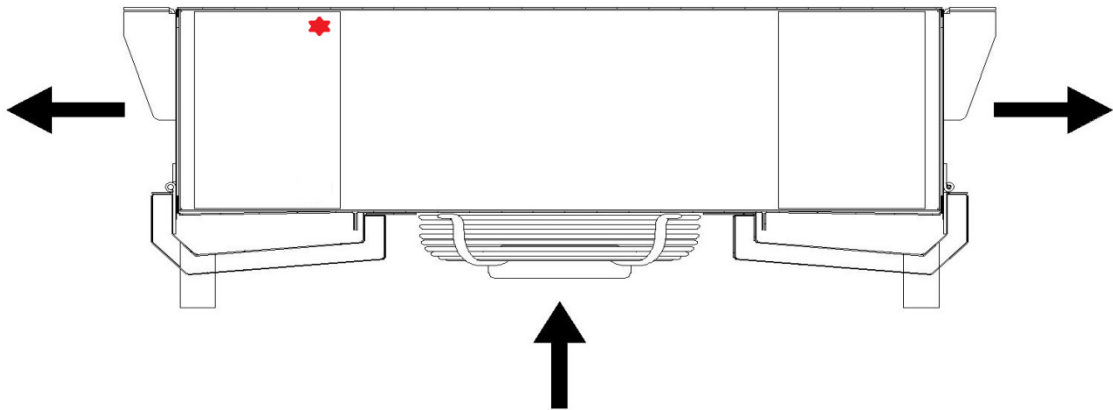
- With several units per room with electric defrosting alternating defrosting should be avoided, as otherwise reciprocal influences can have a negative effect here.
- The influences result on one hand from the extraction of the heat from the units to be defrosted and therefore in a defrost delay, and on the other hand in an additional stress with heat and moist air on the units in refrigerating operation.
- Group defrosting is recommended instead of alternating. Several units are grouped here into a defrosting group. If a group is now defrosted, the other groups must be switched off.
- A separate control of the coil and tray defrosting is possible (see note in electric connection plan).
- With average usage conditions a reduced defrosting capacity in the coil can be adjusted with a simple wiring change .



Proposed defrosting sensor positioning

7.3.4. Hot Gas Defrost

- With defrosting hot gas it must be ensured that at the point of defrosting enough other consumers are in the cold operation so that a big enough hot gas volume is available.
- The reciprocal influences of units in the refrigeration and cooling units in defrosting operation in conjunction with short defrosting times with hot gas operation are therefore limited to a low range of effect. These influences result on one hand from the extraction of the heat from the units to be defrosted and therefore in a defrost delay, and on the other hand in an additional stress with heat and moist air on the units in cooling/refrigerating operation.



Proposed defrosting sensor positioning

7.3.5. Water Defrost

- Actual defrost times must be determined from careful observation of defrost operation and adherence to the previously mentioned guidelines.
- Frost is usually heaviest on the air-entering side of the coil, and inspection of fins on this side can usually be used to determine if complete defrost has occurred.
- Periodic observation of the defrost cycle throughout the year is necessary to maintain a properly operating defrost system.
- If more than fifteen minutes is required to completely remove frost, it is an indication that something may be wrong, such as inadequate water supply.
- The frequency of defrosting will seldom exceed once per day for storage rooms with average traffic. Small rooms with heavy service may require a defrost cycle twice per day and only in unusual circumstances will more than two be required.
- Water flow rate is controlled by adjusting the balancing valve at each unit. Adjust flow rate to fully saturate the coil fin surfaces in defrost water, making sure not to overflow the distribution pan, which can result in undesirable splashing.
- In some areas, the water pressure may become very low during daytime hours due to usage in the same building or neighborhood. In such instances, it may be necessary to set the timer to defrost when adequate water pressure is available.



Water supply should be pressurized between 0,5 bar and 1 bar.

7.4. Shutting Down

Fan connection must be disconnected and working fluid circulation must be stopped to shut the product down.



Danger of cutting off, pulling in!

There is a danger of cutting off fingers on the rotating fan blades, injury hazard for the hands and pulling in danger for loose elements such as hair, necklaces or clothing parts.



Do not operate fans without guard grille. Pinch/trap point hazard!

With automatic fan start during maintenance work there is a danger of pinching/trap- ping for the hands and fingers.



After shutting the unit down, the operating pressure must be observed whether the operating pressure exceeds maximum operating pressure or not.



Before touching, it is recommended to ensure that the headers and the connection pipes are neither too hot nor too cold due to working conditions of the fluid inside.

The operation must be stopped and the supplier must be informed in case of any unusual working condition, such as abnormal operating noise. Intensive vibrations due to out-of-balance running of the fans may lead to outage.

Maintenance must not be performed while the product is in use (*See part 8 for details*).



Recommended starting value for fans is 6 per hour while maximum is 10.

8. MAINTENANCE

8.1. Maintenance Intervals

Maintenance operation is to be performed by qualified personnel only. Please be sure that safety regulations and the worker's protection rules are obeyed during the maintenance and service (DIN EN 50110).

The fluid circulation must be stopped and it must be ensured that no electrical supply connection exists during maintenance. It is advisable to wait till the product comes to thermal balance with its surroundings if possible.



If the tubes within the product or the connection pipes are to be repaired, the refrigerant in the line must be drained beforehand.

8.2. Fan motor Maintenance

- Regarding the bearings, the fans are maintenance-free for 30000-40000 hours under normal operating conditions.
- If the fans are to be maintained, the instruction manual prepared by the fan manufacturer must be followed. Please contact manufacturer when needed.
- After maintenance is performed, ensure that no tools or other foreign materials are left in or near the product.

NOTICE

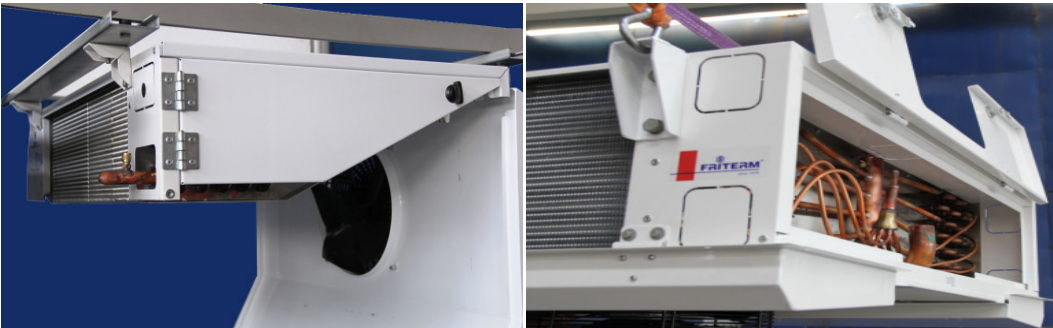
Follow to Initial Commissioning before operating the product after maintenance.

8.3. Periodical Controls (Once a year)

- Corrosion on the fins and tubes should be inspected. If the tubes are worn-out, leakage may occur.
- The pipeline must be controlled for damage and leakage.
- Mechanical and electrical connections of the fans must be checked. Fans must be able to rotate freely and finger guard must be stable.
- All the fixings, especially fan motor mountings and product installation fixings must be ensured to be secure.

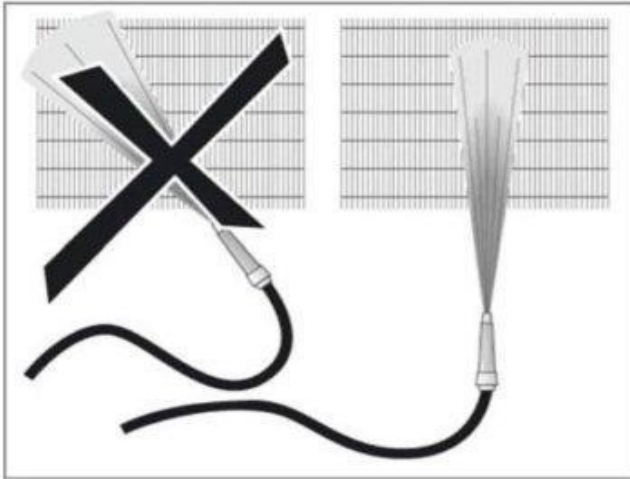
8.4. Cleaning

- Accesories with hinged can make cleaning easier.



Cleaning the fins

- One of the effective methods to clean up the fins is to spray pressurized air. This action should be conducted after stopping the fans and turning off the fluid supply valves. The air jet should be provided to be parallel to the fins for the best cleaning results.
- Fins could also be cleaned up by pressurized water jet. The water jet should be provided to be parallel to the fins for best result. . This action should be conducted after stopping the fans and turning off the fluid supply valves. The cleaning action should be carried out inside-out. Some harmless solvent/detergents could be added to the water to ease the removal of hardened dirt. Any known corrosive/aggressive chemical should be avoided to be used in cleaning action.
- The wiring and fans should not be wetted during the cleaning process
- The chemicals that can be in reaction with the product's material, should not be used. But, if necessary, adequate chemicals can be used on condition that they do not react with the product's material.



The cleaning operation must be done parallel to fin surface.

Cleaning Up the Fans

- Fans should be cleaned with the aid of pressurized air and a soft brush.
- Electrical connections and fan motors should not be wetted during cleaning

9. TROUBLESHOOTING

<i>Faults</i>	<i>Possible Causes</i>	<i>Remedy</i>
Unit capacity not achieved	Fans are not running properly	Repair or change fans
	Polluted coils	Clean
	Different brine working pressure	Adjust brine pressurising values to reference values
	Heat exchanger is very dirty, frosted, iced on the air side	Clean, defrost heat exchanger
Fan motor is not working	Fan blade stuck	Enable fan to rotate freely
	Power supply cut off	Fix power supply
Unusual noise	Defective Fan bearing	Replace bearing or fans
Vibration	Defective fan blades	Modify or change fan blades
	Fan fixtures loosened	Tighten the fixtures
Working fluid escaping	Unit working fluid-carrying components leaking	Switch off working fluid feed and fans, close leak

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