



# Gravity Coil FK, FKG

## MANUAL



- A. INSTALLATION INSTRUCTIONS**
- B. SERVICE INSTRUCTIONS**
- C. DECLARATION OF CONFORMITY**

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## A. INSTALLATION INSTRUCTIONS

### 1. GENERAL:

FK/FKG product range is designed for cold rooms with temperatures above +2°C. For temperatures under +2 °C, the air coolers can be provided with electric defrost. A plate drip tray, as an option, can also be provided with electric defrost. FK/FKG is suitable for refrigerants and liquids, which do not corrode copper.

### 2. TRANSPORT AND STORAGE:

FK gravity coils are packed in cardboard cases (length L = 810...2210 mm) or in wooden crates (length L >2210 mm). Do not store the units in humid outdoor spaces! Please note that max. 5 packages can be loaded on top of each other.

### 3. PLEASE NOTE AT INSTALLATION:

Before fastening the units at site, please check, if there are any transport damages, especially in the heat transfer section. The supplier is not responsible for the costs caused by broken unit, as a result of faulty handling or transport damage.

Please also check the bearing capacity of fixing points! NOTE: the weight of a frozen unit can be 5x the weight given in the leaflets!

The air coolers and liquid circulated air coolers must be installed with the tubes of the heat transfer section in horizontal position. Trouble-free operation requires good venting of the system. Please leave space enough for opening and removing the drip tray for cleaning and for changing of defrost heaters (plate drip tray).

All soldering in the heat transfer section is made by hard solder (FOSCO 710/DIN8513/LAg2P).

### 4. PLACING OF UNITS:

The distance between the heat transfer section and the ceiling, and that between the drip tray and the heat transfer section is stepwise adjustable. Take care that there is space enough for air circulation! The distance between the heat transfer section and the ceiling should be 80...220 mm (FK-2: min. 80 mm, FK-4: min.130 mm, FK-5: min.160 mm and FK-8: min. 220 mm). The distance between the unit and the construction by the side and below the unit must be min. 300 mm (fig. A).

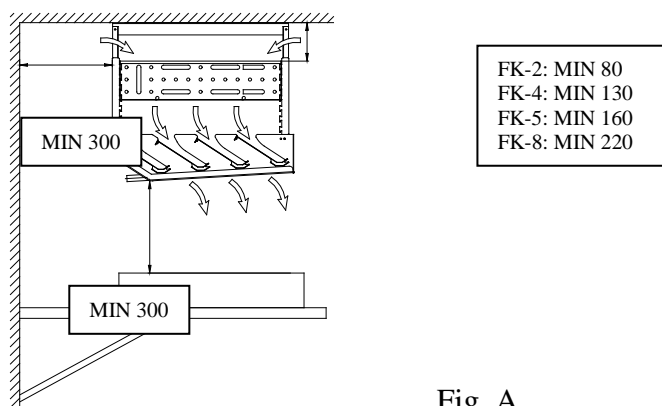


Fig. A

## 5. FIXING OF THE HEAT TRANSFER SECTION (fig. B) ONTO THE CEILING

The ceiling bracket (1) is fixed onto the ceiling by M8 stud bolts, included in the delivery (2), or alternatively by M8 bolts. There are vertical brackets (3) prefixed on the ceiling bracket. The distance between ceiling brackets is freely adjustable, recommendations are given in the table (dimension k).

The supporting rods (4) are laced below the upper tubes of the coil (5) so that their distance from each other is the same as that of the ceiling brackets (1). Please check that the heat transfer section is in correct position (holes for defrost heaters on the lower edge)!

Hang up the heat transfer section so that the grooves at the end of supporting rods settle in the holes of the vertical brackets. Please check that the heat transfer section is in horizontal position!

If there is a liquid distributor in the unit, please turn the distributor vertically, with the connection upwards, before fastening it into the liquid line.

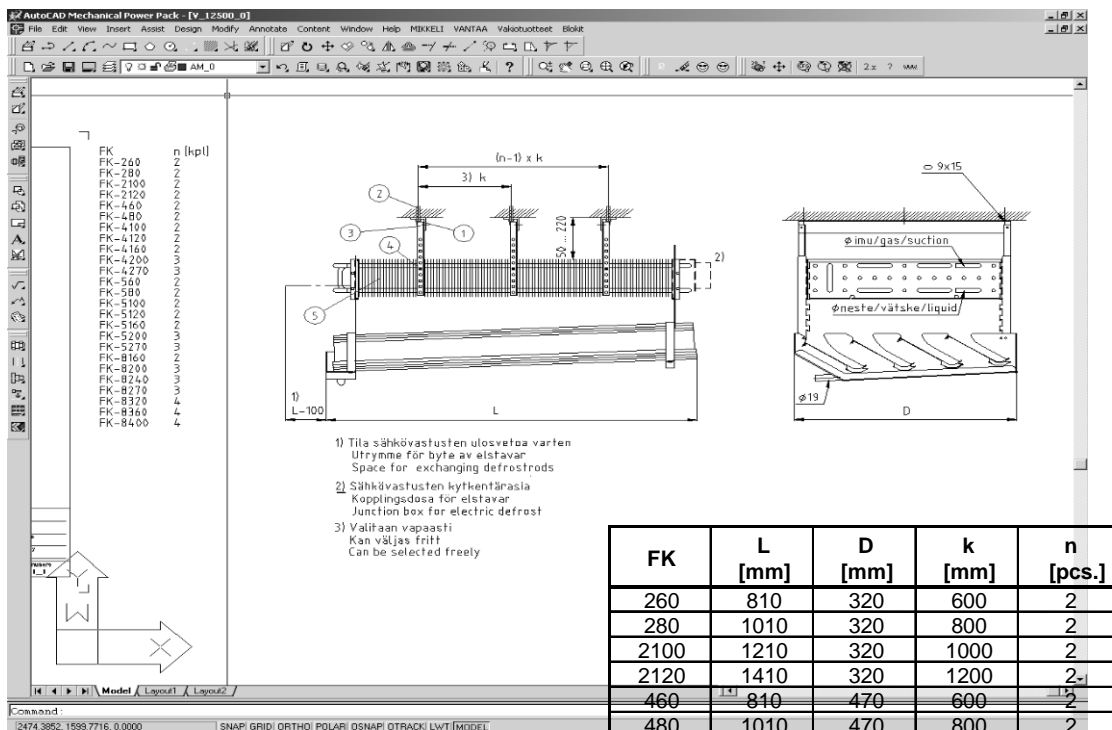


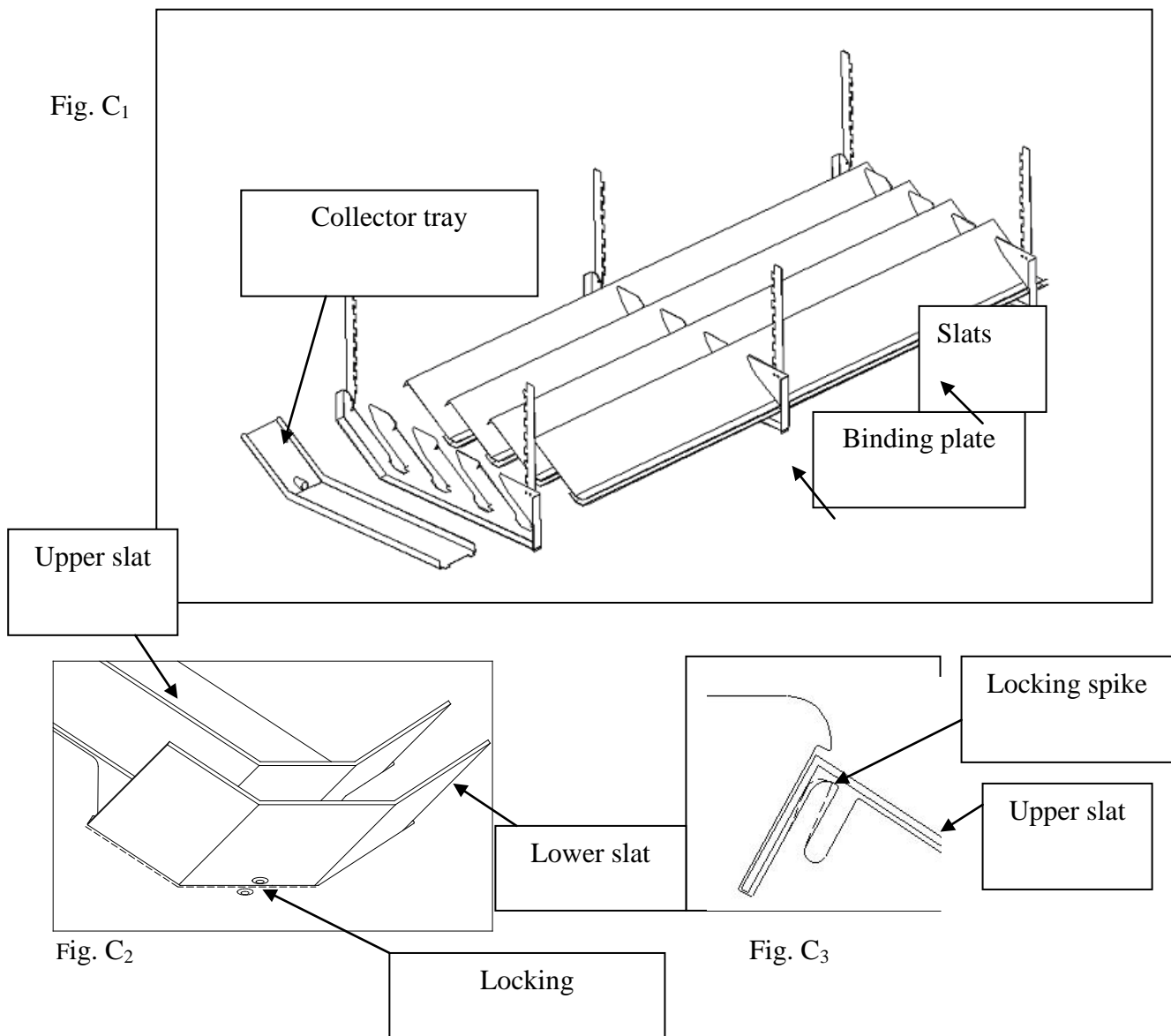
Fig. B

## 6. ASSEMBLY OF THE DRIP TRAY (fig. C<sub>1</sub>)

The drip tray can be assembled either on the heat transfer section directly (recommended!) or separately.

Assembly on the heat transfer section: Firstly, attach the binding plates onto the end of the heat transfer section, in longer models also onto the intermediate ends. By utilizing the cogged supports of the binding plates, adjust the inclination towards the collector tray. Lace the slats from above onto the grooves of the binding plate, first the lower slat (narrow) and then the upper slat, then the next lower slat etc., start from the back edge. Lock the lower slat by setting the studs on both sides of the binding plate (fig. C<sub>2</sub>). Lock the upper slat by bending the locking spike towards the slat (fig. C<sub>3</sub>). Place the upper slat 10 mm further inside than the lower slat. Fix the collector tray by a finger screw at the end of the unit.

Assembly separately: Lay the binding plates at a correct distance from each other and place the slats as described above. Place the drip tray by attaching it into the holes of the heat transfer section with help of the cogged supports on the end plates. Fix the end towards the collector tray lower to guarantee sufficient inclination. Lock the lower slat by setting the studs on both sides of the binding plate (fig. C<sub>2</sub>). Lock the upper slat by bending the locking spike towards the slat (fig. C<sub>3</sub>). Place the upper slat 10 mm further inside than the lower slat.



## 7. TUBING

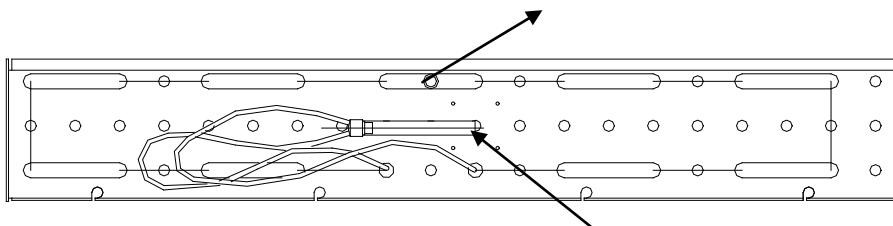
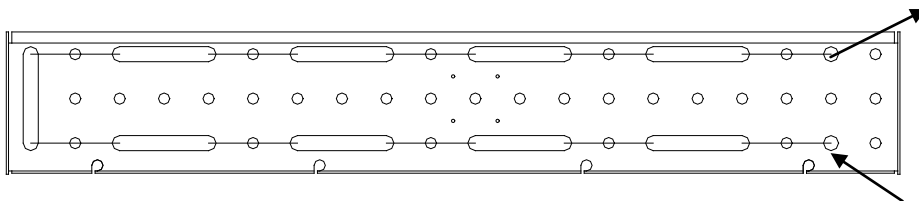
The direct expansion evaporators **with one circuit** use counter-flow principle in refrigerant feed = bottom feed, see the upper drawing!

- Thus the biggest part of the evaporator can be used for air cooling; superheating occurs in part of incoming air, whereby the required capacity can be achieved.

If the tubing is arranged downstream (=upper feed):

- Smaller part of the heat exchanger is used for air cooling, because the superheating occurs in part with cool air; thus the evaporator capacity is appr. 20% smaller than with counter-flow principle.
- When working with downstream principle, the biggest problem will be heavy freezing of air inlet side of the evaporator: the refrigerant, just fed into the air cooler, will vaporize in upper tubes on air inlet side (warm and humid) > freezing occurs quicker than in an air cooler working with counter-flow principle > more defrost periods, capacity reduction due to freezing follows rather quickly.

In evaporators **with two circuits** (see the lower drawing!) the superheating occurs as described above. The refrigerant feed = counter-flow, in standard units the downstream feed is not possible.



## 8. INSTALLATION OF ELECTRIC DEFROST HEATERS

**NOTE!** Electric heaters can be installed by an authorized electrician only.

The electric defrost heaters can be installed either inside or on the bottom of the heat transfer section. There are holes for the defrost heaters at the ends of the heat transfer section. If the heaters are installed on the bottom, it is easy to change or re-install them without detaching the unit. Depending on ambient conditions, the defrosting period is 10-20% longer with bottom installation than that with defrost heaters inside of the heat transfer section.

## 9. INSTALLATION OF ELECTRIC DEFROST HEATERS INSIDE OF THE HEAT TRANSFER SECTION ( fig. D)

Lace the heaters into the holes of the end fin and lock them by locking device. Bend the bracket for junction box as shown in fig. D. There is a hole for earth cable at the coil end.

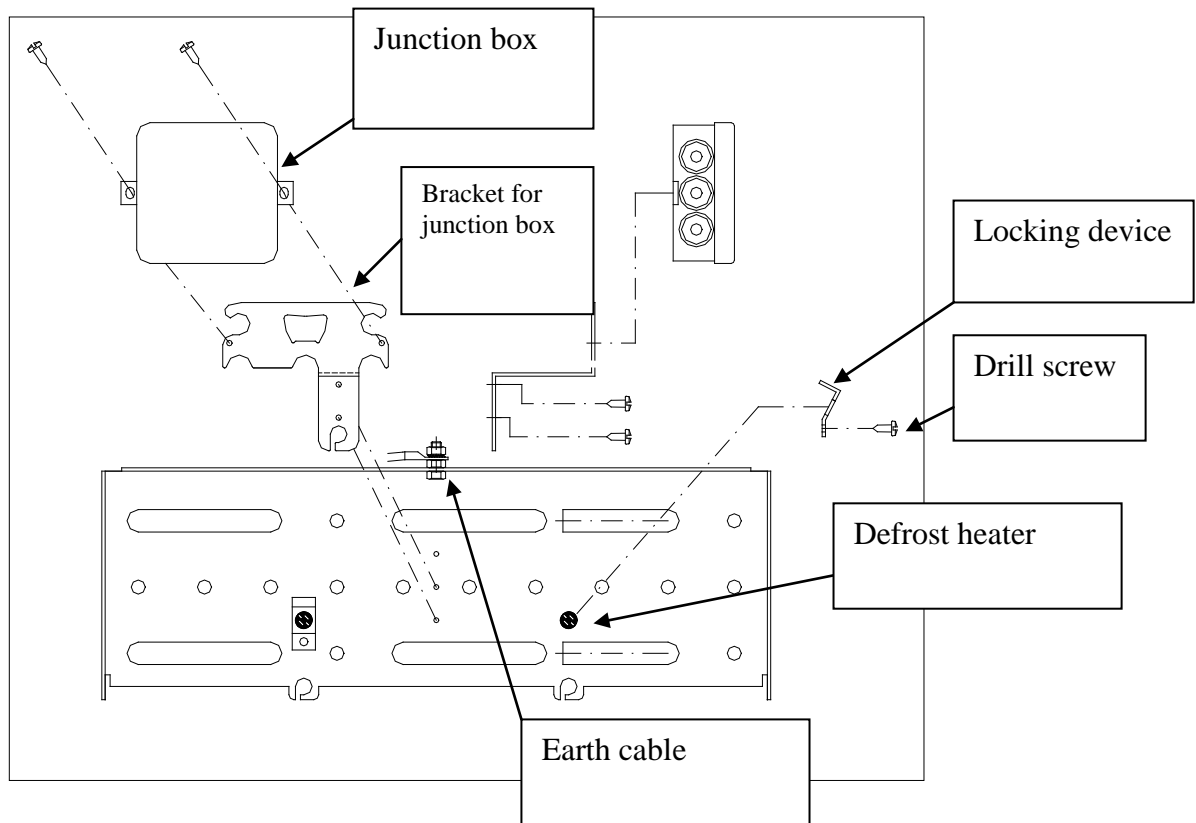


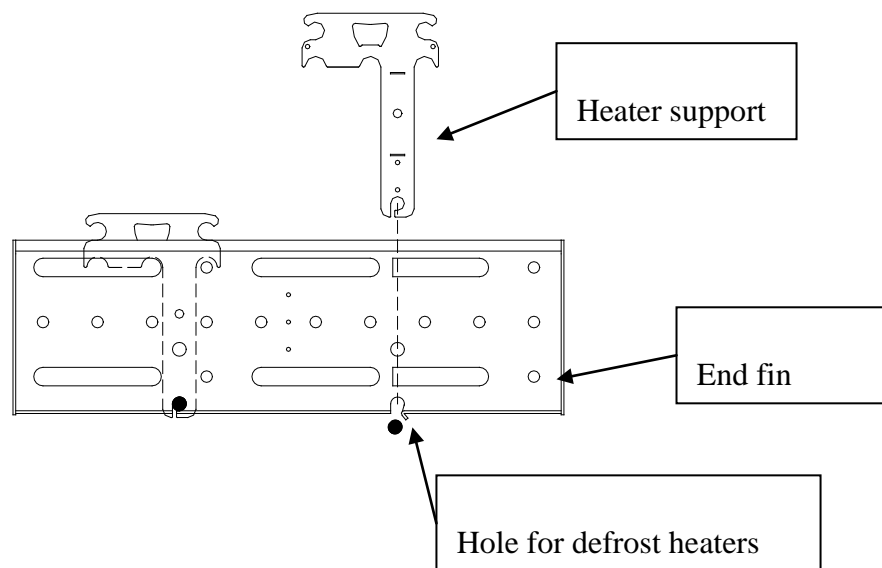
Fig. D

## 10. INSTALLATION OF ELECTRIC DEFROST HEATERS ON THE BOTTOM OF THE HEAT TRANSFER SECTION ( Fig. E)

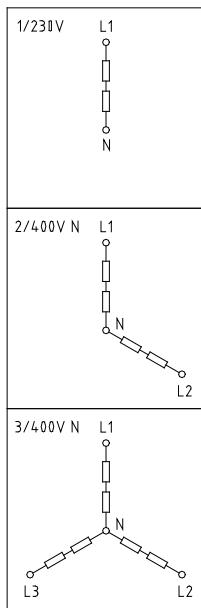
**NOTE!** Electric heaters can be installed by an authorized electrician only.

Bend the lower edge of the hole for defrost heaters on the end fins so that the heater fits into the hole (fig. E). Install the supports into fin spacings evenly on the surface of the heat transfer section. Bend/open the lower edge of the hole for defrost heaters on the support. Install the heaters and bend the edge back. Installation of the junction box, see fig. D above!

Fig. E.



## 11. ELECTRIC DEFROST CONNECTIONS (SS: defrost in coil block, SSA: defrost in tray)



Electric connection diagrams are attached to units equipped with options SS and SSA

FK	Defrost heater		SS heaters in coil block				SS+SSA heaters in coil block and in tray			
	Item no.	n x [W]	No. off heater pairs	Defrost capacity kW	Connection	[A]	No off heater pairs	Defrost capacity kW	Connection	[A]
260	187096	2 240	1	0,48	1/230 V	2,1	2	0,96	1/230 V	4,2
280	187104	2 320	1	0,64	1/230 V	2,8	2	1,28	1/230 V	5,6
2100	2584	2 320	1	0,64	1/230 V	2,8	2	1,28	1/230 V	5,6
2120	187112	2 480	1	0,96	1/230 V	4,2	2	1,92	1/230 V	8,3
460	187096	2 240	1	0,48	1/230 V	2,1	2	0,96	1/230 V	4,2
480	187104	2 320	1	0,64	1/230 V	2,8	2	1,28	1/230 V	5,6
4100	2584	2 320	1	0,64	1/230 V	2,8	2	1,28	1/230 V	5,6
4120	187112	2 480	1	0,96	1/230 V	4,2	2	1,92	1/230 V	8,3
4160	187120	2 640	1	1,28	1/230 V	5,6	2	2,56	1/230 V	11,1
4200	187138	2 800	1	1,6	1/230 V	7,0	2	3,20	1/230 V	13,9
4270	2717	2 870	1	1,74	1/230 V	7,6	2	3,48	1/230 V	15,1
560	187096	2 240	2	0,96	1/230 V	4,2	3	1,44	1/230 V	6,3
580	187104	2 320	2	1,28	1/230 V	5,6	3	1,92	1/230 V	8,3
5100	2584	2 320	2	1,28	1/230 V	5,6	3	1,92	1/230 V	8,3
5120	187112	2 480	2	1,92	1/230 V	8,3	3	2,88	1/230 V	12,5
5160	187120	2 640	2	2,56	1/230 V	11,1	3	3,84	3/400 V N	5,6
5200	187138	2 800	2	3,20	1/230 V	13,9	3	4,80	3/400 V N	7,0
5270	2717	2 870	2	3,48	1/230 V	15,1	3	5,22	3/400 V N	7,6
8100	2584	2 320	2	1,28	1/230 V	5,6	3	1,92	1/230 V	8,3
8120	187112	2 480	2	1,92	1/230 V	8,3	3	2,88	1/230 V	12,5
8160	187120	2 640	2	2,56	1/230 V	11,1	3	3,84	3/400 V N	5,6
8200	187138	2 800	2	3,20	1/230 V	13,9	3	4,80	3/400 V N	7,0
8240	187146	2 960	2	3,84	2/400 V	8,3	3	5,76	3/400 V N	8,3
8270	2717	2 870	2	3,48	1/230 V	15,1	3	5,22	3/400 V N	7,6
8320	187088	2 1280	2	5,12	2/400 V N	11,1	3	7,68	3/400 V N	11,1
8360	187161	2 1440	2	5,76	2/400 V N	12,5	3	8,64	3/400 V N	12,5
8400	5805	2 1400	2	5,60	2/400 V N	12,2	3	8,40	3/400 V N	12,2

## 12. DRYING CIRCUIT ( Fig. F)

The drying circuit is installed, held up by heater support, on the upper surface of the heat transfer section.

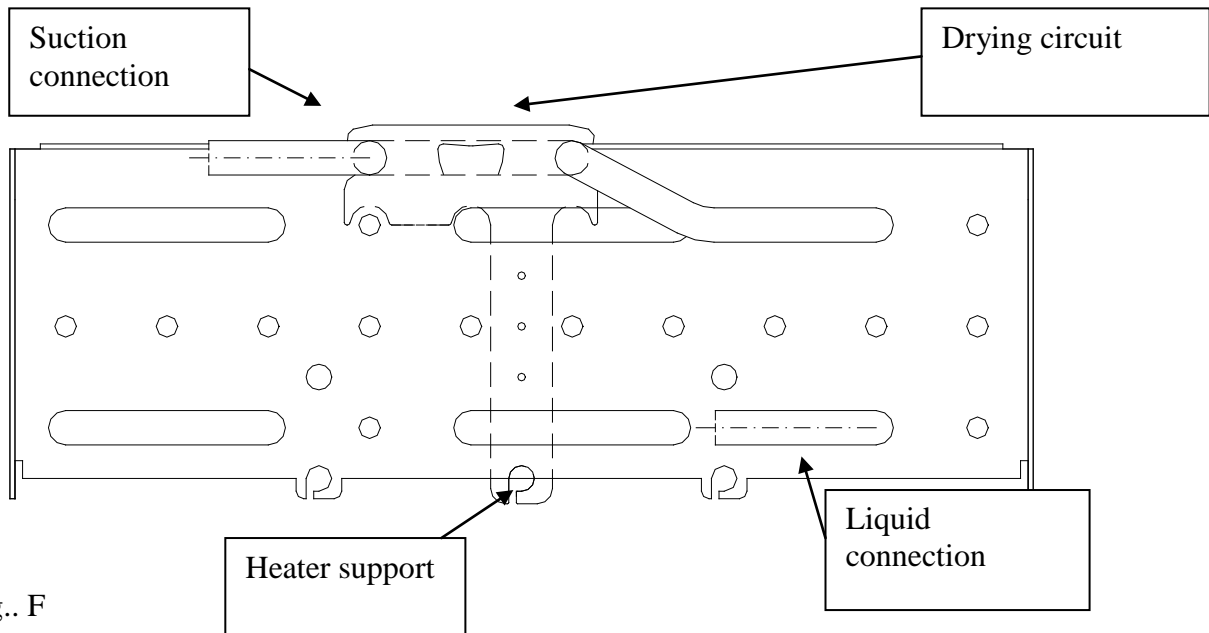


Fig.. F

## 13. PLATE DRIP TRAY (Fig. G)

Install a plate drip tray into the coggled supports at the ends of the heat transfer section, in the same way as a standard drip tray (see pos. 6). Place the plastic outlet connection into one of the drip tray outlets. Note that the inclination of the drip tray is settled towards the chosen drip tray outlet. If the drip tray is equipped with electric defrost, connect it by earth cable into the junction box.

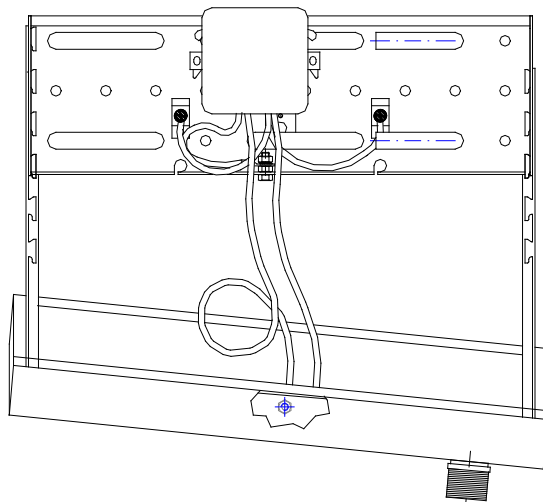


Fig. G

## **14. ADDITIONAL INFORMATION**

### **NOTE!**

Venting/draining valve of a liquid circulated standard model is not adapted for fluids based on potassium formate: **DANGER OF LEAKAGE!** When using heat transfer fluids based on potassium formate, please check from the product documentation that the piping system and venting/draining valves are adapted for the heat transfer fluid in question! Please follow the instructions of the fluid supplier at installation, pressure testing, starting-up, operation and maintenance.

### **NOTE!**

Applicability of the material of fins and heat transfer tubes to ambient conditions shall always be checked to avoid external corrosion.

In the air there should be no particles, which - together with water or other solvent condensing on the surface of the heat transfer section - might form corrosive combinations. These combinations can corrode the fins and tubes of the heat transfer section.

## B. SERVICE INSTRUCTIONS

### 1. CLEANING OF HEAT TRANSFER SECTION AND DRIP TRAY

The heat transfer section needs regular cleaning, if it is operated in dirty conditions or if the operating conditions require special cleanliness.

The coil block can be washed e.g. by a pressure washer. The water jet must be directed perpendicularly to the fin side not to make them bend. No strong alkaline detergents or acids may be used.

The drip tray can be removed for cleaning, so the heat transfer section can be washed from below.

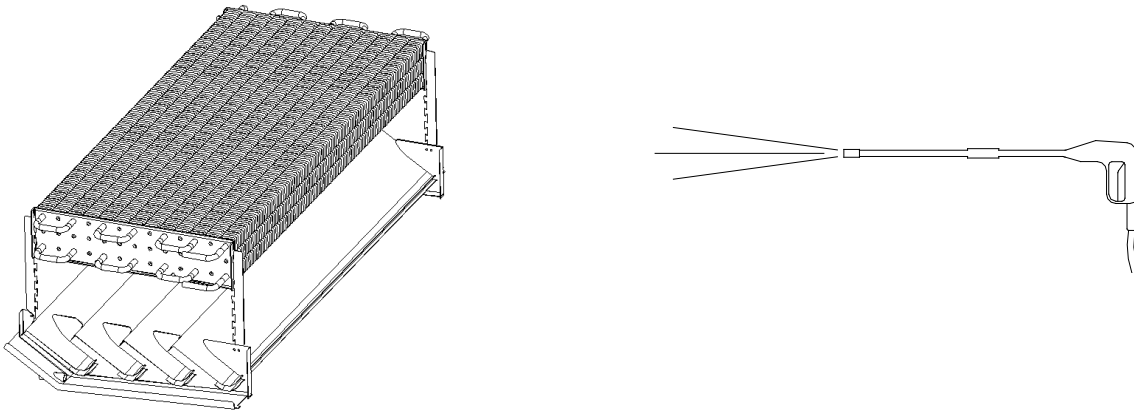


Fig. H

## 2. CHANGING OF ELECTRIC DEFROST HEATERS

**!WARNING: Before changing defrost heaters make sure that the circuit is reliably switched off!  
The defrost heaters may be installed by an authorized electrician only.**

- Open the cover of the junction box .
- Release cables of the damaged heater couple from the connection strip.
- Loosen the drill screw of the locking device for the heater.
- Draw out both parts of heater rod couple.
- Pass the rods of both heater pairs simultaneously in place. To facilitate this use a thin tube, into which the cable fits and which slides through the coil in front of the rod. Alternatively, the heaters can be installed on bottom of the heat transfer section (see installation instructions, pos. 10!).
- When the rods are in right position, fasten the locking plates at their ends.
- Fasten electric cables to their original places.
- Close the junction box cover.
- During the first defrost period make sure that the defrost system works perfectly.



## **Declaration by the manufacturer of the component incorporated to the machinery (Directive 2006/42/EC, Annex II, sub.B)**

ALFA LAVAL VANTAA OY

Ansatie 3, FIN-01740 Vantaa, Finland

herewith declares that the component

**F1, F2, F3, F4, F5 finned heat exchanger**  
**L, J, LX, JX, LG, JG airconditioning-, refrigerating- and heating coil**  
**FK, FS evaporator and FKG, FSG air cooler**

which is not able to function independently is intended to be incorporated into machinery or to be assembled with other machinery to constitute machinery covered by Directive 2006/42/EC and changes related to it and with national implementing legislation meant machinery.

By designing of the component the following directives have been applied:

**2006/42/EC, 97/23/EC**

and the following harmonized standards have been applied:

**EN ISO 12100:2010, SFS-EN ISO 13857, SFS-EN 60204-1**

and furthermore declares that is not allowed to put the machinery into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of Directive 2006/42/EC and with national implementing legislation including the machinery referred to in this declaration.

Vantaa, February 7, 2012

A handwritten signature in blue ink, appearing to read 'SBeierschoder', is located below the date.

Silja Beierschoder  
Quality Manager