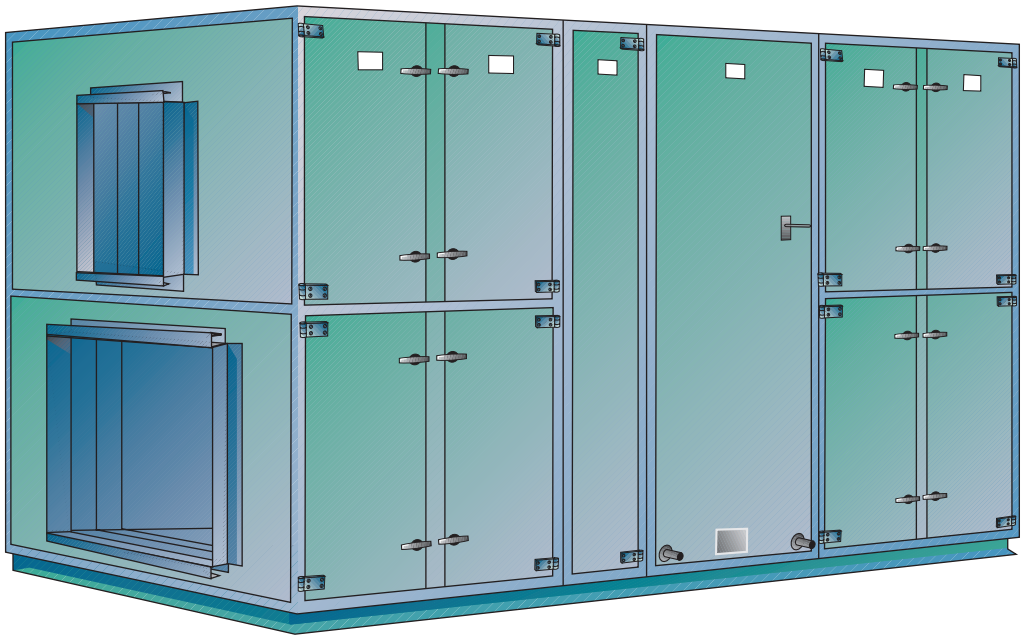
DIRECTIONS FOR CARE

AIR HANDLING UNIT



Place of installtion_____

AHU number _____

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Table of contents

General

Maintenance

The continuous maintenance of this unit can be carried out either by the caretaker responsible for the building, or a special agreement can be signed with IV Produkt.

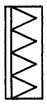
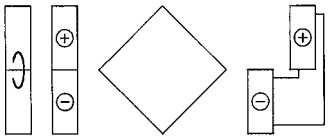
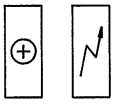
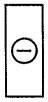
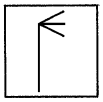
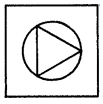
Check-up intervals

The servicing schedule on the next page contains service and supervisory steps to be taken on the working parts which comprise an air treatment unit. The unit contains one or several parts. Those applicable to your particular model will be marked in the service schedule.

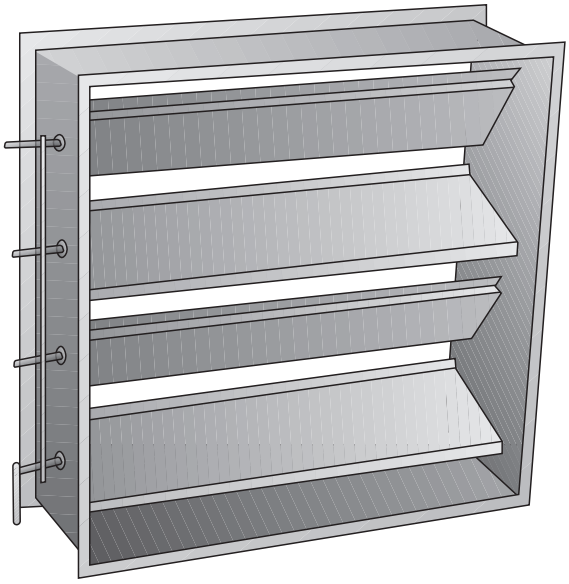
The time lapse is estimated to be approximately 2 000 working hours per 12 month period for a normal comfort installation. For environments with a high dust content in either the supply or exhaust air, check-ups should be done at shorter intervals.

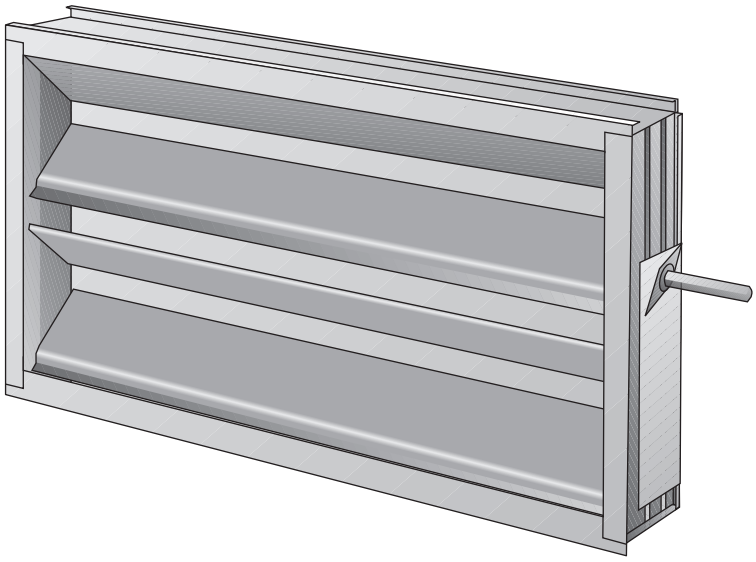
Spare parts

Spare parts and accessories for this unit can be ordered through our nearest sales office (see back cover of this booklet). Please give the product code when ordering. The codes can be found on a separate information sign placed on each working part.

Part	See page	3-month service 9-month service	6-month service	12-month service	Included in this unit
		What to do	What to do	What to do	
Damper Mixer 	4	Visual inspection	Cleaning	Cleaning	
Filters Disposable Cleanable 	5 6	Pressure drop check- replace if necessary Pressure drop check- clean if necessary	Pressure drop check- replace if necessary Pressure drop check- clean if necessary	Pressure drop check- replace if necessary Pressure drop check- clean if necessary	
Heating recovery Rotary Heat pipes Plate heat exchanger Run around coils 	7 8 9 10-12	Visual inspection Visual inspection Visual inspection Visual inspection	Cleaning Cleaning Cleaning Cleaning	Cleaning Cleaning Cleaning Cleaning	
Air heater Hot water Electrical heating 	10 11	Visual inspection Visual inspection	Cleaning Cleaning	Cleaning Cleaning	
Air cooler Chilled water Direct expansion 	12 13	Visual inspection Visual inspection	Cleaning Cleaning	Cleaning Cleaning	
Humidifier 	14	Visual inspection	Cleaning	Cleaning	
Meter 	15	Visual inspection	Cleaning	Cleaning	
Fan 	16	Visual inspection	Cleaning	Cleaning	

Damper





General

The purpose of the damper is to control, block and channel the air.
Defective function can lead to disruptions which can have serious consequences.
For example, if the outer air damper does not fully close when the unit stops, the hot water coil could freeze.
If the damper leaks, this will lead to increased use of energy because of leakage caused by thermal lift.
If the chimney damper leaks, the ventilation effect will be diminished and air will be heated to no advantage.
If the outer air damper does not open completely, the air flow will be reduced.

What to do: Metal damper

a) Check

Check the function of the apparatus (see control and regulating functions according to the opera tion card).
Check that the slewing brackets and the mount ing attachments are undamaged.
Check that the damper is airtight when closed. If not, adjust the louvres to make them as airtight as possible.
Check the insulation strips.

b) Cleaning

Clean the louvres and the linkage.
Grease if necessary.

What to do: IV's AJS and KJS

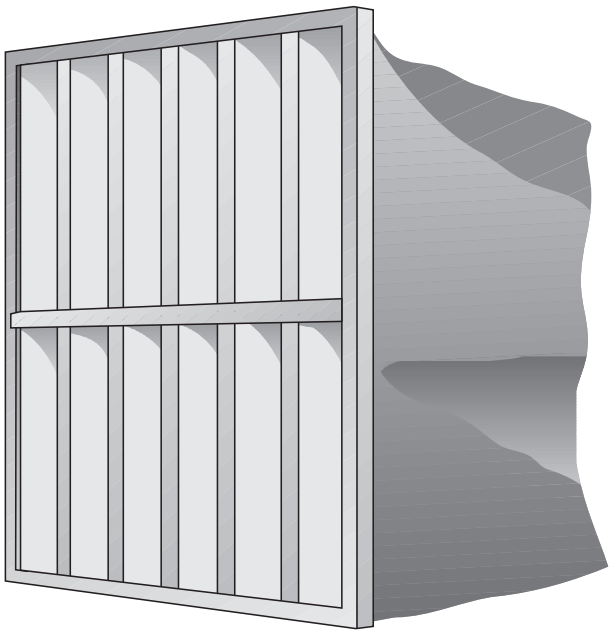
a) Check

Check the function of the apparatus (see control and regulating functions according to the operation card).
Check that the damper is airtight when it is closed. If not, adjust the damper louvres to make them as airtight as possible.
Check the insulation strips.

b) Cleaning

Clean the damper louvres.

Filter, Disposable



General

The purpose of a filter in an air conditioning unit is to prevent dust and small particles from entering the building. It should also protect the unit's sensitive parts, such as coils and heat recovery unit from contamination.

The filtration effect can vary considerably between different types of filter. The ability to accumulate dust also varies considerably. It is therefore important when changing the filter to ensure that the replacement is of the same quality and capacity.

The degree of filtration is specified in standard terms EU1 - EU9 where EU1 - EU4 are basic filters and EU5 - EU9 are fine filters. The higher the figure, the higher the degree of filtration.

The filter is intended for one-time use. If the filter is highly contaminated, the capacity of the unit will decrease.

The filter should therefore be replaced if the filter monitor indicator exceeds the recommended level.

It is important that the unit be switched off during a filter change so that no loose dust is sucked into the unit. The filter holder should therefore also be cleaned when changing the filter.

What to do

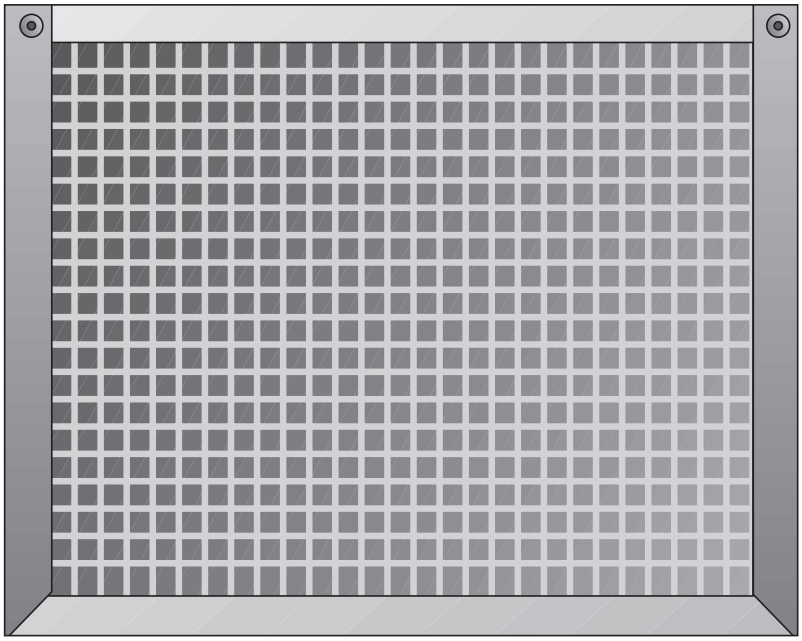
a) Check

Check the pressure drop of the filter. This is measured by means of a U-pipe pressure gauge connected to probes.
The probes are connected to each side of the filter. If the recommended fall of pressure has been reached, the filter should be changed.

b) Changing the filter

The unit must be switched off before work on changing the filter begins. Remove the old filter from its holder, and insert a new one. Clean the filter housing. If there is a fixed filter monitor, the probes must be attached to each side of the filter. The unit may then be switched on.

Filter, cleanable



General

The purpose of a filter in an air conditioning unit is to prevent dust from entering the building. It should also protect the unit's sensitive parts, such as coils and heat recovery unit from contamination.

The filtration effect can vary considerably between different types of filter. The ability to accumulate dust also varies considerably. It is therefore important when changing the filter to ensure that the replacement is of the same quality and capacity.

The filter can be cleaned. If the filter is highly contaminated without cleaning, the capacity of the unit will be decreased. This will lead to negative pressure in the building.

The filter should therefore be cleaned if the filter monitor indicator exceeds the recommended level. It is important that the unit be switched off during filter

cleaning so that no loose dust is sucked into the unit. The filter holder should therefore also be cleaned when cleaning the filter

What to do

a) **Check**

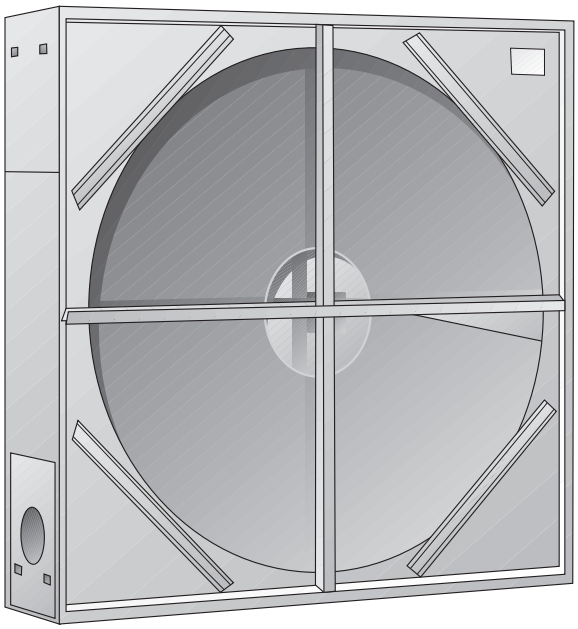
Check the pressure drop of the filter. This is measured by means of a U-pipe pressure gauge connected to probes. The probes are connected to each side of the filter. If the recommended fall in pressure has been reached, the filter should be cleaned.

b) Cleaning

Filters made of aluminium mesh should be cleaned according to any of the following methods:

1. Flush or wash with hot water and a detergent which does not corrode aluminium.
2. Use compressed air to blow clean from the clean side of the filter.
3. Vacuum clean from the dirty side of the filter.

Heat recovery unit, rotating



General

The purpose of the heat recovery unit is to recover heat from the exhaust air and transfer it to the supply air through which the effect requirement and use of energy is reduced.
Faulty function of a heat recovery unit through a reduced degree of recovery means increased energy consumption as well as the fact that the projected supply temperature cannot be maintained when the outside air temperature is low.
A possible cause of a reduced degree of recoverability could be that the rotor's revolution count is too low because the belt drive is slipping. Problems of the rotor's channels being clogged with dust are less frequent because the rotor is normally self-cleaning. Clogging can, however, occur if the dust is of a sticky nature.
A reduction in the exhaust air flow eg. through contamination of the exhaust filter, results in a reduced degree of recovery. This is applicable to all heat recovery units.

What to do

N.B! Before starting work on the unit, stop it functioning by means of the change-over switch. Then turn the contact switch to the "0" position. Avoid touching the rotor's inlet and outlet surfaces with hands or tools.

a) Check

Check that the rotor rotates easily. If it appears stiff, this could be because the insulation brush on the outside of the rotor is binding. Lubricate this with silicone oil.
Check that the belt drive is taut, and is not slipping. If the slack cannot be reduced, the belt must be shortened.
Check that the belt drive is clean and undamaged.
Check that the rotor's inlet surfaces are not clogged with dust or other impurities.

b) Cleaning

Dust should be removed by careful vacuum cleaning with a soft brush.
In the case of more serious contamination or greasy deposits, the rotor can be sprayed with a mixture of water and detergent which does not corrode aluminium.
Compressed air or low-pressure steam can be used to blow the apparatus clean.
The nozzle must not be held closer than 5-10 mm from the rotor at a maximum pressure of 6 above atmospheric pressure.
After cleaning, lubricate the insulation strip with silicone oil.

c) Lubrication

The bearings are permanently greased, and do not require further lubrication.
The motor is permanently greased and does not require further lubrication.
Certain types of gear box are oil lubricated. Here, the oil level must be checked and topped up if necessary.
(see manufacturer's recommendations).

Heat recovery unit, heat pipes Heatbank

General

The thermal heat pipe exchanger consists of a number of aluminium pipes with pressure-applied aluminium louvres.
The thermal heat pipe exchanger's exterior must be kept clean for optimum effect and economical operation. Heavily soiled louvres result in reduced air flow and decreased heat recovery.

Even if the unit is equipped with a good filter, dust will collect on the louvres on the front of the coil after a while (on the inlet air side).

If the louvres are dirty, they should be vacuum cleaned. They can also be carefully blown clean from the exhaust air side or washed clean with warm water.

N.B! When washing the thermal heat pipe exchanger, the temperature of the water should not exceed 50°C.

A drip tray with connections for the drainage of condensed water is located under the exchanger. Sometimes there is also a separator which prevents condensation entrainment.

What to do

a) Check

Check the coil's fins and stability. Check the drip tray and drainage system carefully, and clean thoroughly if necessary.

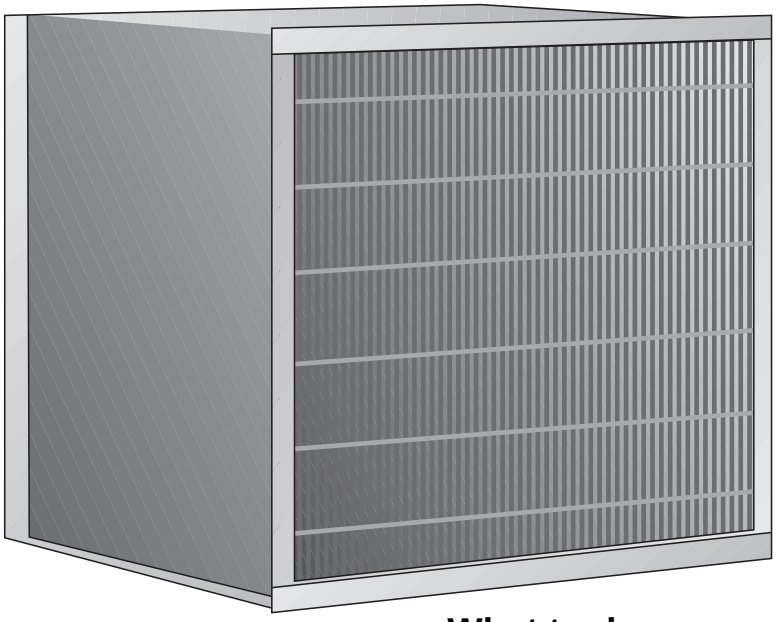
b) Cleaning

If the fins on the coils are dirty, they should be cleaned by vaccuming from the supply air side. They can also be blown clean from the exhaust air side.
In extreme cases, a mixture of warm water and a detergent which does not corrode aluminium can be used.

N.B! When washing the thermal heat pipe exchanger, the temperature of the water should not exceed 50°C.

Clean the drip tray and drainage system if necessary.

Heat recovery unit - plate heat exchanger



General

The purpose of the heat recovery unit is to recover heat from the exhaust air and transfer it to the supply air through which the effect requirement and use of energy is reduced.
Faulty function of a heat recovery unit through a reduced degree of recovery means increased energy consumption as well as the fact that the projected supply air temperature cannot be maintained when the outside air temperature is low.

Possible causes of reduced heat recovery could be contamination of the heat exchanger's surfaces or that the by-pass damper is not properly closed.

A reduction in the exhaust air flow eg. through contamination of the exhaust filter, results in a reduced degree of recovery. This is applicable to all heat recovery units.
The problem of ice build-up in the heat recovery unit's exhaust air section should be especially noted. If a breakdown in operation caused by ice build-up occurs, the unit's frost protection equipment must be checked.

N.B! If the insulation between the exchanger unit and the housing is not sufficiently tight, there is a great risk that the exhaust air is leaking out and being returned to the premises.

Air leakage can occur because of insufficiently tight insulation in the exchanger unit. It is important that possible leakage only occur from supply (air from outside) to exhaust air (outgoing air) so as not to recirculate exhaust air in the system. The pressure in the exhaust air duct (outgoing air) must therefore always be less than in the supply air duct (air from outside).

What to do
a) Check

Inspect the louvres for contamination. This can be done via the inspection panel for the filter.

Check the automatic defroster and make sure that the by-pass damper closes tightly when de frosting is not taking place (see function description on service card).

Check that the pressure distribution "around" the heat recovery unit is such that leakage only occurs towards the exhaust air. If this is not the case, the filter could be abnormally polluted or the manually-operated damper (in front of the unit) is open too wide. The difference in pressure should go up to at least 15 Pa.

b) Cleaning

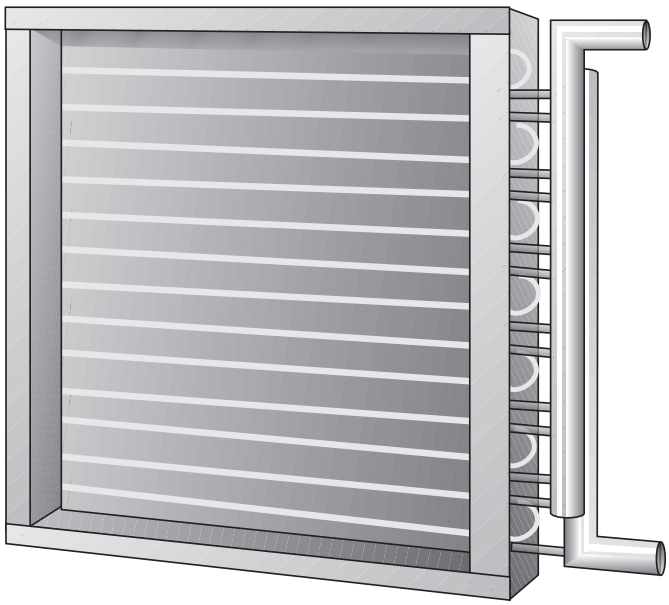
If cleaning is necessary, this can be done by vacuum cleaning, blowing with compressed air or by cleaning with detergent intended for aluminium, then rinsing with warm water.
The most effective cleaning method is to flush out each individual air duct with water (detergent which is not corrosive to aluminium may also be used) throughout the entire heat exchanger.

In operating temperatures below 0°C, the heat exchanger core must be completely dry before it is placed in the unit. When the heat exchanger is installed, ensure that the insulation strips in the upper and lower parts of the core are sufficiently tight across the entire breadth.

The drip tray under the heat exchanger and the accompanying drainage system should also be checked, and cleaned if necessary

Air heater, hot water

Run around coils, supply air



General

The heating coil consists of several pipes with pressure-applied fins - most commonly copper pipes with aluminium fins.

The coils' efficiency is impaired if dust accumulates on the coil surface. Besides the transfer of heat deteriorating, the pressure drop increases on the air side. Even if the unit is equipped with a good quality filter, dust will accumulate on the front of the coil fins (inlet side) in time.

f the fins are dirty, they should be vacuum cleaned. They can also be carefully air-blown clean from the exhaust side or washed clean with warm water. To obtain full effect of usage the coil must be well-ventilated. Ventilation takes place in the pipes through air screws in the pipe connections or via an air dome.

What to do

a) Mechanical damage - leakage.

Check the coil's fins and stability.
Check that the coil is not leaking.

b) Cleaning - venting

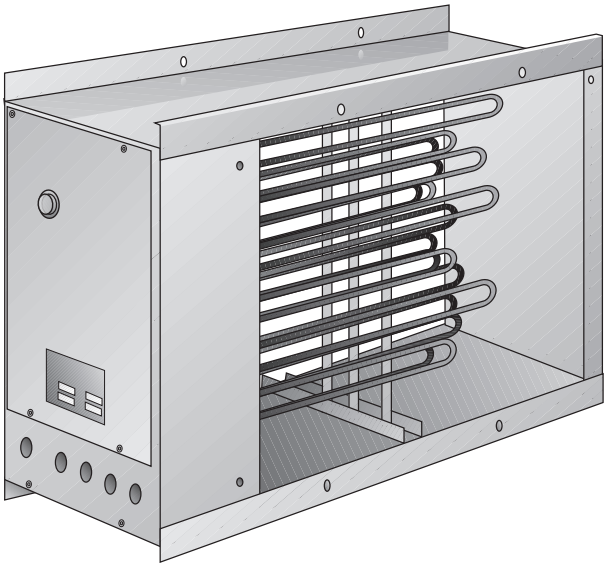
If the fins on the coils are dirty, they must be cleaned by vaccuming them from the supply air side. Alternatively, they can be carefully blown clean from the exhaust air side.

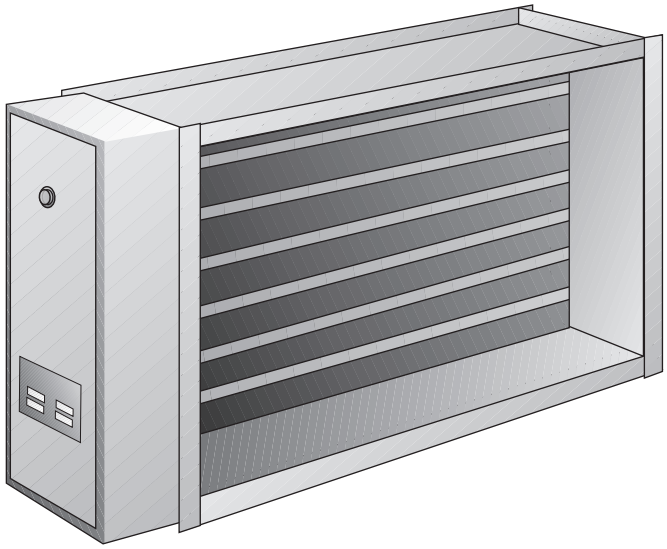
In extreme cases, a mixture of warm water and a detergent which does not corrode aluminium can be used.
If necessary, air bleed the coil and piping. Air screws are placed at the top of the coil or connecting pipes for this purpose.

c) Function

Check that the heating circulation is functioning. This can be done by temporarily increasing the temperature setting (above what it should be).

Air heater, electric heating





General

The heating coil consists of bare electrical rods or electrical rods with pressure-applied fins.

The surfaces of the fins must be clean. A high accumulation of dirt can result in the rods attaining too high a temperature. This can result in the life expectancy of the rods being reduced. It can also result in the smell of burnt dust, and in the worst instance, a fire hazard.

If the fins are dirty, they can be vacuum cleaned. Overheated bare electrical rods can become deformed or the rods can loosen from their suspension and result in uneven warming of the air.

What to do

a) Deformation

Check that the fins are not deformed.
Check that the bare electrical rods are in the correct position and are not deformed.

b) Soiling

Remove any dirt from the air heater's fin surfaces by vacuum cleaning.

c) Function

Simulate a reduced effect requirement by reducing the temperature at the control panel (below what it should be) so that all electrical stages (contacts) are turned off. Then increase the temperature setting substantially and check that each electrical stage takes place according to the order specified in the function description. Re-adjust the temperature setting.

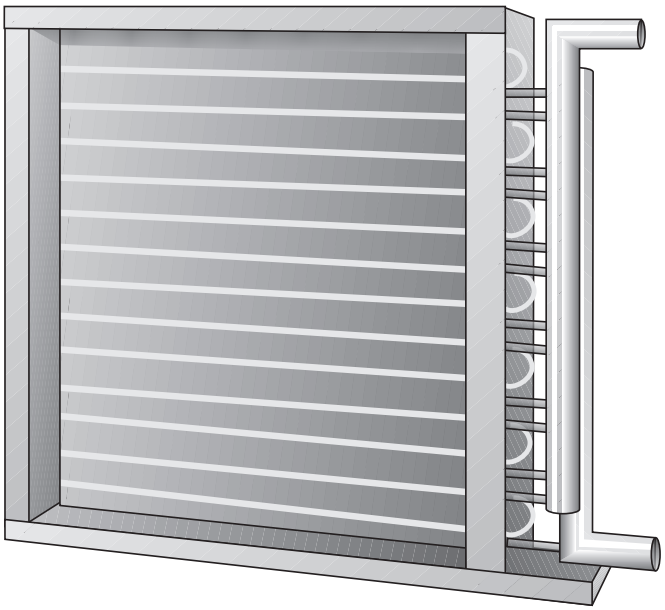
Temporarily shut down the unit by means of the change-over switch (**N.B!** do not use the circuit-breaker) or similar. All electrical stages should shut down (= the contacts are turned off). The unit's stoppage can be delayed (approximately 2 - 5 min.) in order to cool down the heat energy stored in the air heater.

The electrical coil is equipped with two temperature regulators. The one which reverts automatically should be set at 90°C. The overheating protection with manual control will break off at a temperature of 140°C, and is placed on the cover on the side of the coil. Before re-setting, the reason for overheating should be established and rectified.

Take note that the risk for overheating increases with reduced air flow. The air speed should not be less than 2 m/s.

Air cooler, chilled water

Run around coil, exhaust air



General

The cooling coil consists of a number of copper pipes with pressure-applied aluminium fins.

The coil's efficiency is impaired if dust accumulates on the coil surface. Besides the transfer of heat deteriorating, the pressure drop increases on the air side. Even if the unit is equipped with a good quality filter, dust will in time accumulate on the front of the coil fins (inlet side).

A drip tray with connections for the drainage of condensed water is located under the cooling coil. Sometimes there is also a separator which prevents condensation entrainment. To obtain full effect of usage the coil must be well-ventilated. Ventilation takes place in the pipes through air screws in the pipe connections or via an air dome.

What to do

a) Check

Check the coil's fins and stability.
Check that the coil is not leaking.
Check that cooling is evenly distributed over the surface of the coil. This check must of course take place while the coil is in commission.
The drip-tray and drainage must be checked carefully, and cleaned if necessary.

b) Cleaning

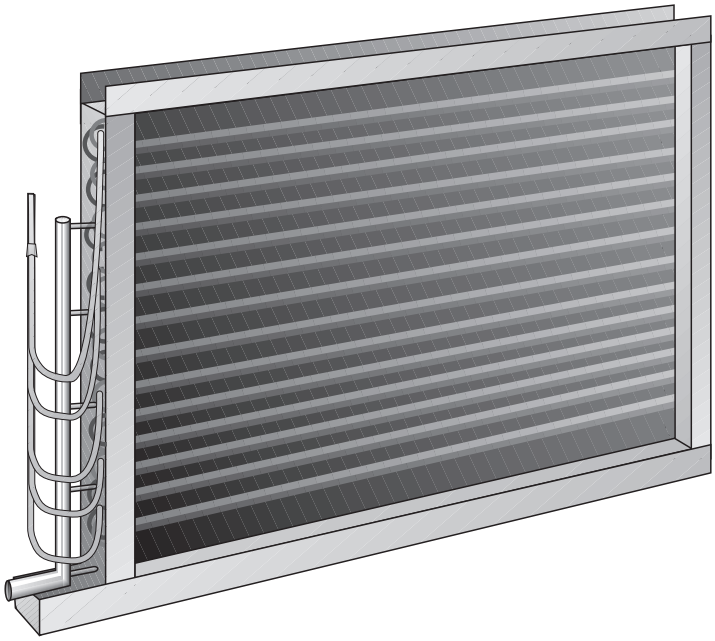
If the fins on the coil are dirty, they must be vacuum cleaned from the inlet side. Alternatively they can be carefully air blown clean from the outlet side.

In extreme cases, a mixture of warm water and a detergent which does not corrode aluminium can be used.

c) Venting

Air bleed the cooling coil and pipes. Air screws are placed at the top of the coil or connecting pipes for this purpose.

Air cooler, direct expansion



General

The cooling coil consists of a number of copper pipes with pressure-applied aluminium fins.

The coil's surfaces must be clean for the highest cooling effect and economical energy consumption to be achieved. Heavily soiled coils result in reduced air flow and decreased heat conversion which can damage the function of the cooling compressor.

Even if the unit is equipped with a good filter, dust will in time collect on the fins on the front of the coil (on the inlet air side).

If the fins are dirty, they can be vacuum cleaned. They can also be carefully blown clean from the exhaust side, or washed with warm water.

N.B! When washing direct expansion coils with warm water, the cooling system must be emptied (to be carried out by a trained installer). Otherwise there is a strong risk of explosion.

A drip tray with connections for the drainage of condensed water is located under the cooling coil. Sometimes there is also a separator which prevents condensation entrainment.

What to do

a) Check

Check the coil's fins and stabililty

The drip tray and drainage with water seal must be carefully checked, and cleaned if necessary.

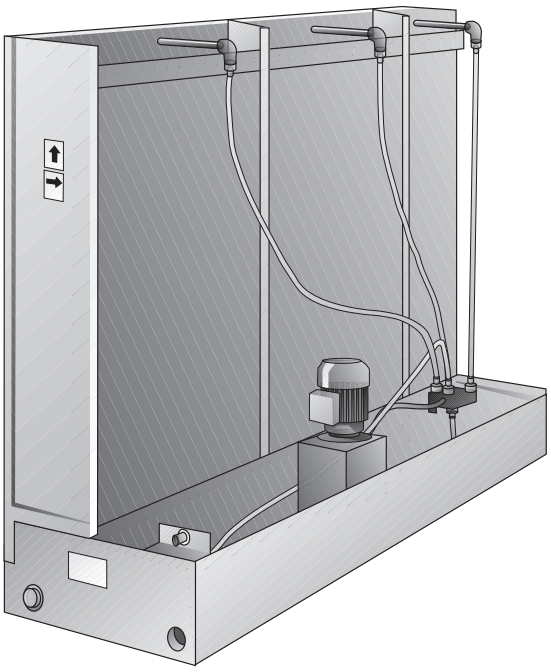
Water seals without a check valve must be filled with water.

b) Cleaning

If the fins on the coil are dirty, they must be vacuum cleaned from the inlet side. Alternatively they can be carefully air blown clean from the outlet side.
In extreme cases, a mixture of warm water and a detergent which does not corrode aluminium can be used.

N.B! When washing direct expansion coils with warm water, the cooling system must be emptied (to be carried out by a trained installer). Otherwise there is a strong risk of explosion.
Clean the drip tray and drainage if necessary.

Humidifier



General

The primary purpose of the humidifier is to moisten the flow of air.

One function is to moisten the supply air, another is to moisten the exhaust air so as to achieve a reduction in temperature of the air before it passes, for example, a rotating heat exchanger (evaporational cooling).

Defective functioning will result in reduced moisturization, and the projected value cannot be maintained.

The humidifier comes in two different models. The unit with direct water supply lacks its own pump. The unit with circulating water has a pump.

If the humidifier is going to be out of function for any length of time, the moistening block should be removed, cleaned and stored in a suitable place.

What to do

a) Check

When checking, make sure that:
The humidifier's surface is uniformly moist on both sides. If not, clean the spreader, which is above the humidifier cassette.
The humidifier cassettes are clean. Clean them if necessary.
Salt precipitation on either the front or reverse side of the humidifier does not occur. If this is the case, increase the run-off by 25%.

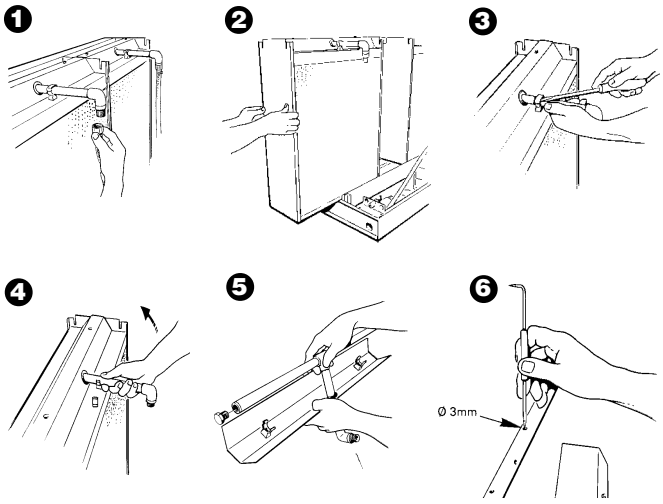
b) Cleaning

Measures which can be taken before major maintenance work is necessary:

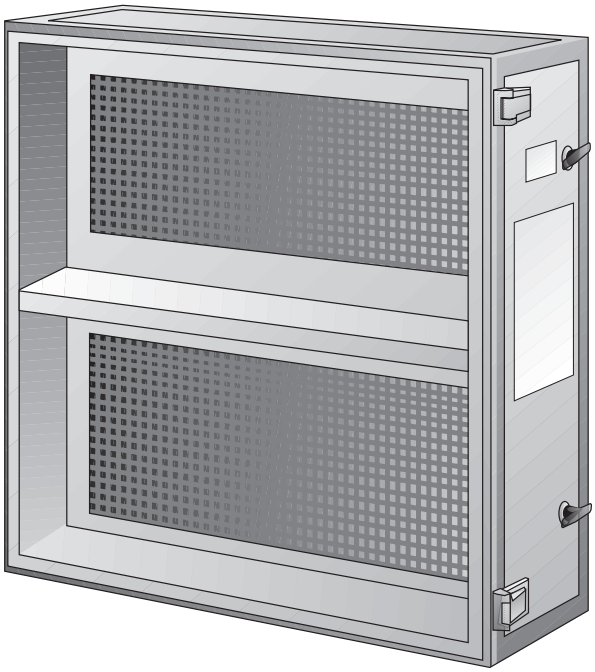
Cut off the water supply, but leave the fans in operation for approximately 30 minutes to allow the moisture to dry up. The humidifier cassettes are relatively fragile when wet and must be handled carefully.

Cleaning of the humidifier cassettes and diffusion pipe:

Loosen the connection (1) and pull out the cassettes (2). Loosen the spring clip (3) and lift up the metal diffuser holder (4). Remove the diffuser pipe from the metal holders and loosen the cleaning plugs (5). Clean the holes in the diffuser pipe (6) and flush the pipe and cassettes clean.



Meter



General

The meter is used to measure the air flow which passes through it.

This is done by measuring the pressure drop over a calibrated metal scale.

The rate of air flow is obtained by a pressure-flow diagram or through an electronic flow meter. Inadequate function will lead to uncertain results.

What to do

a) Check

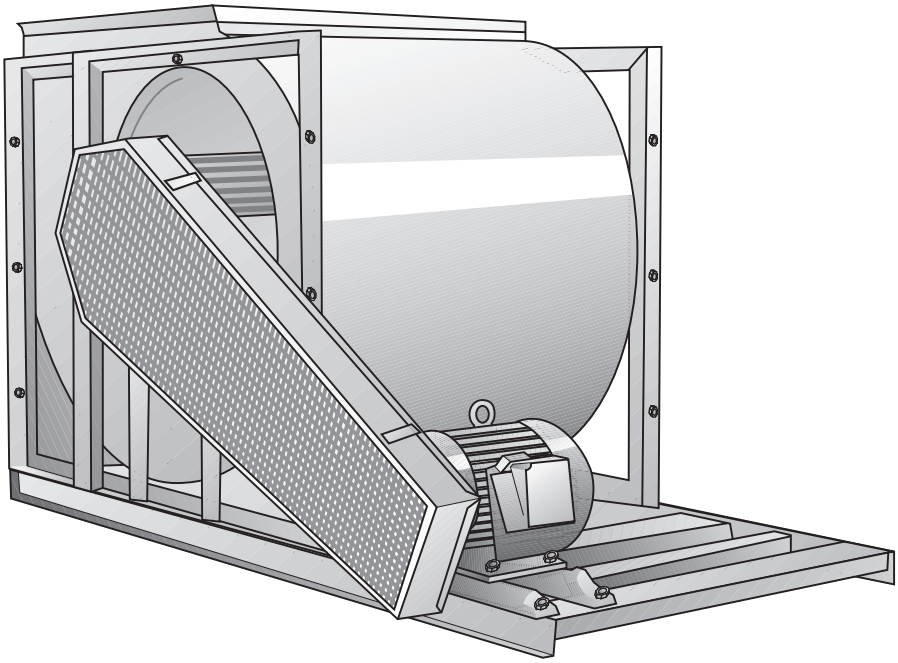
Check that the hoses are correctly connected and free from kinks. Also check that the meter is functioning as intended.

b) Cleaning

If the metal scales are dirty, they should be vacuumed or wiped clean.

The measuring tubes can be cleaned by means of compressed air or a grease-removing solvent which does not corrode aluminium. The air holes must be free from dirt.

Fan



General

The object of the fan is to transport air through the system, ie. the fan must overcome the resistance which exists in the air apparatus, ducts and unit. The fan's revolution count is adapted to produce the correct air flow. If the fan produces a lower flow, the normal operation of the system will be impaired.

If the supply air flow is too low, an imbalance in the system will result, which could cause problems in the movement of the air. The ventilation effect will be too low, which will result in a poor milieu in the room.

If the exhaust air flow is too low, the ventilation effect will be poor. Furthermore, this imbalance could lead to the humidity in the air impregnating the building construction. An inadequate exhaust air flow results in increased energy consumption if a heat recovery unit has been installed.

The cause of the fan giving too little air could be that the V-belt is slipping. There could also be a layer of dust on the impeller's blades.

If a radial fan rotates in the wrong direction, the air will flow in the right direction, but with much-reduced capacity. The direction of rotation could have been changed because of the electrical installation. It is therefore necessary to check that the fan is rotating in the correct direction.

What to do

N.B! Before commencing work, turn off the unit by means of the change-over switch. Then turn the contact switch to the "0" position. In the case of double motors, there could be two contact switches.

1. Fan

a) Check

Check that the impeller is rotating easily, is balanced and does not vibrate. Also check that the wheels are securely fastened to their axles and that they have not been displaced sideways towards the inlet cones.

An imbalance could be the result of coating on or damage to the impeller blades.

Check by listening if any damage has occurred. Hold a screwdriver or similar tool against the housing, then place your ear close to the other end of the tool. Normally, a soft spinning sound is all that should be heard.

If any noise such as squeaking is heard, the lubrication is inadequate. A scraping sound is caused by foreign particles. A metallic noise, which can be irregular, indicates that the housing is damaged. In both the aforementioned cases, the housing must be replaced.

The impeller, housing and motor are mounted on a vibration screen equipped with rubber dam pers. Check that the dampers are secure and undamaged.

Check the contact protection, mounting bolts as well as the suspension equipment and supports.
Check that the wheels are clean and free from dust accumulation.
Check that the belt pulley's screws are tight.

b) Cleaning

Clean the impeller's blades.A mixture of toluene and methylated spirits (2:1) or if necessary white spirit (mineral turpentine) can be used. Paraffin should not be used as this could lead to corrosion.

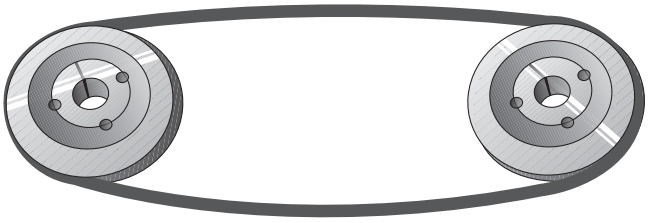
Vacuum clean the unit so that the dust will not be blown into the air ducts.

The fan covers can be cleaned in the same way as the impeller. Check that the covers and the intake cones are secure.

c) Lubrication

If the fan's bearing is equipped with a lubrication nipple, lubricate as necessary with SKF ALFA LUBE LG MT2 grease. Otherwise the bearings are permanently lubricated and normally do not need further attention in this regard.

2 Belt drive



c) Check

Check that the V-belt is not worn down, broken, dried out or damaged in any other way.

If the V-belt is damaged, it must be replaced. When replacing a belt drive where more than one belt is involved, all belts must be replaced simul taneously.

Check that the belts are correctly taut. When pressing hard on the middle, one should be able to press down a distance of the belt's own thick ness. See fig. 1.

Too much tension on the belt can lead to over heating in the housing and overloading of the motor.

Too little tension results in the belt slipping and becoming worn out quickly.

d) Changing the belt, or belt tension

The belt tension can be adjusted by moving the motor by means of the tension bolts on the motor's shelf.

The belt may not be pulled over the pulleys without first loosening the tension screws.

When changing the belt, check that the pulleys' contact surfaces are not worn down.

Use a ruler to check that the pulleys are parallel and that their tracks are aligned. See fig. 2.

N.B! The tension on new V-belts must be adjusted approximately 14 days after installa-tion.

Fig 1

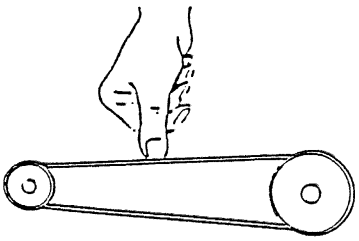
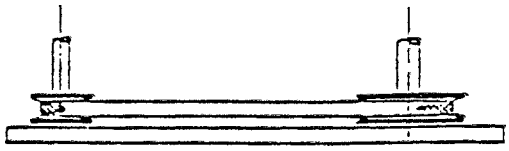
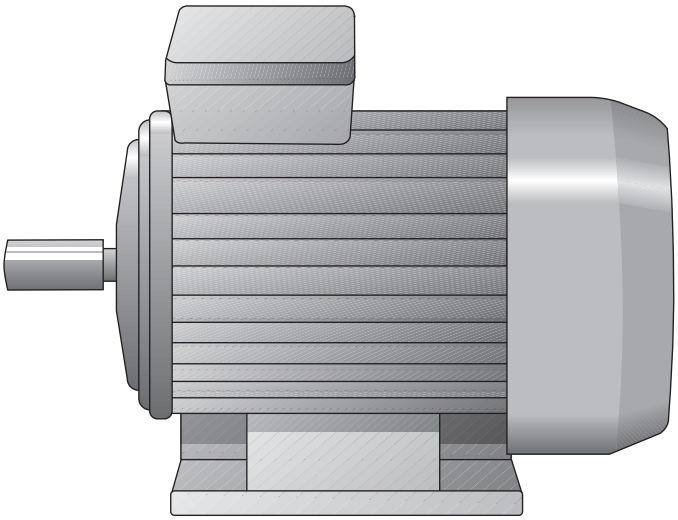


Fig 2





3 Motor

e) Check

Listen to the ball bearings. If all is in order, a weak humming sound will be heard. A squeaking sound indicates that the bearing is too dry. A scraping or thumping sound means that the balls or trajectory are damaged. These must be replaced.

Check that the motor's protective housing is undamaged and that the securing screws are tight.

f) Cleaning.

The motor must be kept free from dust, dirt and oil on the outside.

A normal cleaning cloth or duster can be used for cleaning. Mineral turpentine can be used as a solvent in severe cases.

There could be a risk of internal overheating if thick layers of dirt prevent cooling of the stator housing.

g) Lubrication

Motors equipped with a lubrication valve must be lubricated once every 750th working hour. Other wise no further lubrication other than for the ball bearings (eg. in conjunction with a ball bearing change) is necessary. Suitable lubrication is SKF C65.

Notes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