

Installation, Operation and Maintenance Instructions for the Swegon Type AT4 Air Handling Units



General information

The air handling units must be installed correctly and must be used precisely in accordance with our instructions. The buyer shall not be entitled to raise any claims for compensation for damages or guarantee if the unit has been installed in a way other than in accordance with the instructions in this manual, and if defects/damages have arisen as a result of unauthorised modification, incorrect installation, machining or other treatment. It is incumbent the buyer to prove that incorrect installation is not the cause of defects that arise.

Follow the general servicing information in the maintenance instructions for the AT 4 Series from Swegon.

Only qualified personnel shall be permitted to install, commission and maintain the air handling unit.

The air handling unit is designed solely for conditioning the supply air and extract air in spaces and buildings, in order to maintain the desired room temperature and to reduce the concentration of dust particles and other impurities in the air.

The air handling unit's range of application is documented on the configuration data sheet and on the type identification plates. If the air handling unit is to be used in a different way, this should be discussed with technicians at the factory or our service personnel so as not to adversely affect the way the unit operates.

The air handling unit is designed for risk-free use, and its design and model comply with the Standards given in the Manufacturer's Product Declaration. Other local standards in force shall be observed while installing the entire ventilation system to minimize possible risks involving the air handling unit to the fullest possible extent.

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Regulations

Local regulations, laws and statutes for installation and construction work must be observed in conjunction with transport, installation, commissioning, operation and maintenance.

1. Transport

The air handling units in the AT 4 series are supplied either fully assembled or as components, bolted to wooden beams with rectangular cross section, depending on the size of air handling unit.

The division into sections for delivery are shown in the air handling unit drawing (JL: = Division into sections for delivery).



Figure 1 Air handling unit components ready for transport

All the AT 4 air handling units are equipped with base beams with openings for lifting tubes for transport using a crane. The openings for the lifting tubes are blanked off by protective caps when the air handling units are delivered.

1.1 Lifting and transport using a forklift truck

Important!

Use a forklift truck with sufficiently long extended forks that will not damage the underside of the air handling unit.

Be careful if the unit has protruding parts (such as a floor drain connection).

The inspection doors must always be closed while the unit is being transported.

1.2 Lifting and transport using a crane

Important!

Take additional measures for protecting the protruding drip flashing when crane lifting and transporting the type AT 4 units in the weatherproof version (use line spreaders or spacers, for instance).

The inspection doors must always be closed while the unit is being transported.

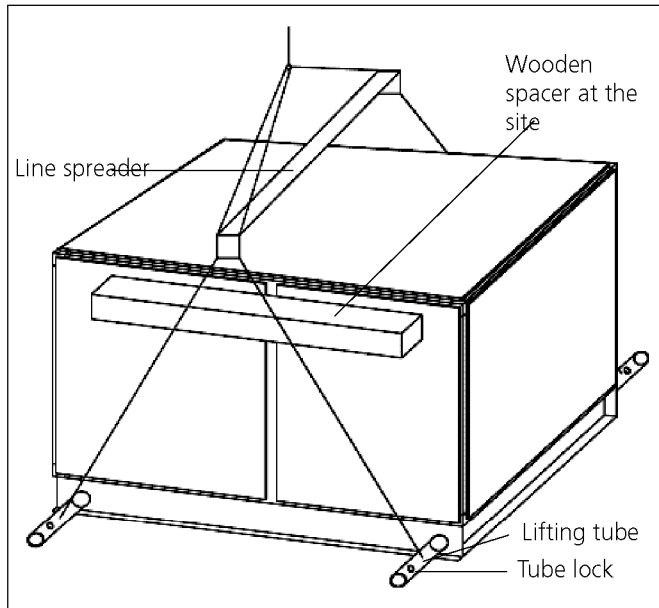
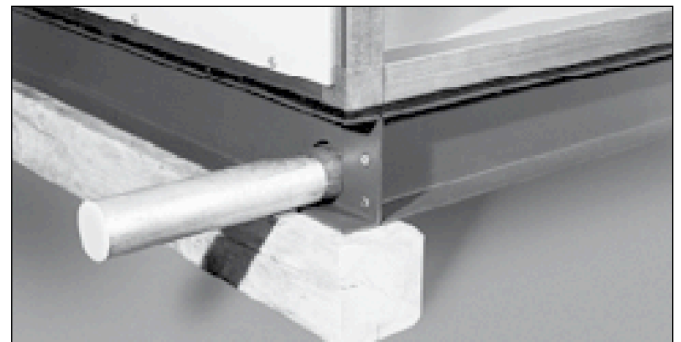


Fig. 2a

Width of the AHU in modular dimensions	Width of AHU in mm	Length (lifting tube)
08	688 mm	1,100 mm
12	994 mm	1,400 mm
16	1,300 mm	1,700 mm
20	1,606 mm	2,000 mm
24	1,912 mm	2,300 mm
28	2,218 mm	2,600 mm
32	2,524 mm	2,900 mm
41	3,213 mm	3,600 mm
49	3,825 mm	4,200 mm

Table 1



- Remove the protective enclosures.
- Insert the lifting tubes (special accessories: 1 1/2" tubes) and extend them through the transport openings in the base beam. Then lock them in position by means of the tube locking device.
- Attach hoisting aids (cables, chains, slings) onto the lifting tubes that protrude out from the sides (they should protrude at least 200 mm on both sides).

1.3 Hoisting with lifting lugs

Take additional measures to protect the protruding drip flashing when crane lifting and transporting the type AT 4 units in the weatherproof version (use line spreaders or spacers, for instance).

Remove the load-bearing plates after transporting the unit and close off the holes from which bolts have been removed.

Remarks:

Use a touch-up applicator (supplied as an accessory) to repair any scratches in the painted finish made in transport.

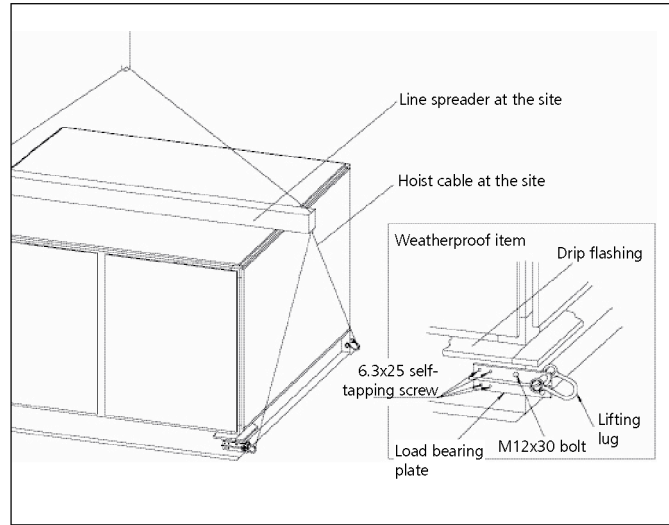


Fig. 2c

2. Installation

Be careful to avoid being cut by sharp metal edges.

Use personal protective equipment (such as protective gloves) when installing the air handling unit. This will minimize the risk of injury.

General

The air handling unit must be installed on a level base. The base must be full-size or consist of oblong flat plinths. If oblong plates are used for supporting air handling units wider than 2 m, crossbeams must be provided as support where the unit begins and ends and where unit sections are jointed to one another.

Provide sufficient open space in front of the air handling unit for opening inspection doors and servicing the unit.

Remarks!

On delivery, the accessories can be found inside the fan chamber.

Recommendation:

- Vibration-isolating strips can be fitted under the type AT 4 air handling unit to absorb vibrations. The vibration-isolating strips are not included in the supply. Follow the directions from the manufacturer of the strips.
- In general, Swegon recommends fitting vibration-isolating strips under the end walls of the unit, under the joints between components and in longitudinal direction under components that are longer than 1,200 mm.
- Swegon further recommends that flexible connections be fitted to duct connection flanges arranged on top of the air handling unit casing to prevent vibrations from being propagated to the building structure.

Important!

The order in which the various unit components are to be assembled is indicated in the drawing that applies to the relevant purchase order. This order must be followed.

- The procedure for assembling the AT4 unit begins with the unit components that include the outlet for air discharge (duct connection).
- Glue the sealing strips supplied onto the air handling unit's contact surfaces. They should fit tightly against the outer edge and inner edge of the unit.
- Position the connecting air handling unit components as close to one another as possible and joint them together using the self-centering unit connection. Use appropriate implements (slings) for pulling together and connecting the air handling unit components if they are large or heavy.
- Connect the air handling unit and potential duct connection components to the duct system.

Important!

The air handling unit must be mounted on a level supporting surface in order to operate properly.

Do not stand on top of the air handling unit. Protect it with scaffolding or stand-on support plates, for instance.

Carefully place a covering over the air handling unit before/after installing it and keep it covered to protect exterior surfaces from damage and dirt.

2.1 Installation of explosion-protected units

On a few components, the cover must be removed before the air handling unit can be connected. There are holes in these covers. When the components have been connected to one another, these holes must be blanked off using the poprivets supplied.

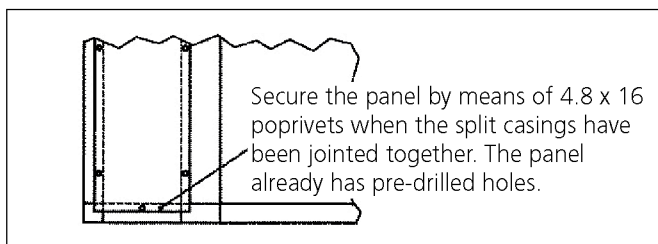


Fig. 3

2.2 Internal installation for split casings

- Glue the sealing strips, supplied, edge to edge along the outer edges of the air handling unit.
- Insert an Allen bolt and a connection angle (if fitted) in the reinforcing plate and secure them with a spacer washer and nut.

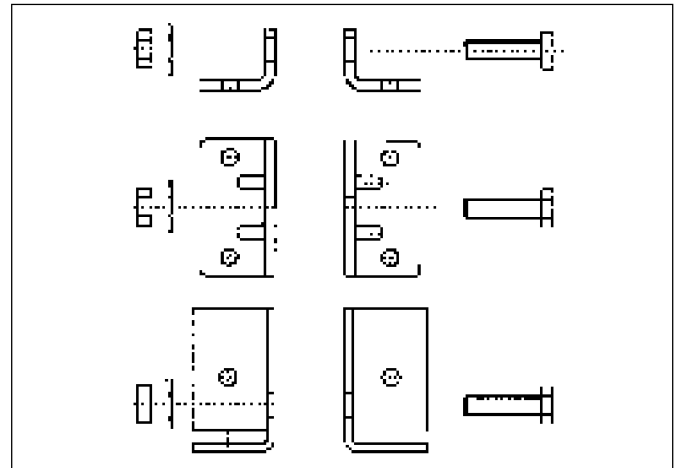


Fig. 4 Jointing of air handling unit sections

2.3 Connecting the type AT 4 stacked or side-by-side units

2.3.1 Stacked air handling units

- Use a crane to lift the upper unit components onto the lower air handling unit section.
- Secure the lower casing onto the base beams by means of Allen bolts.

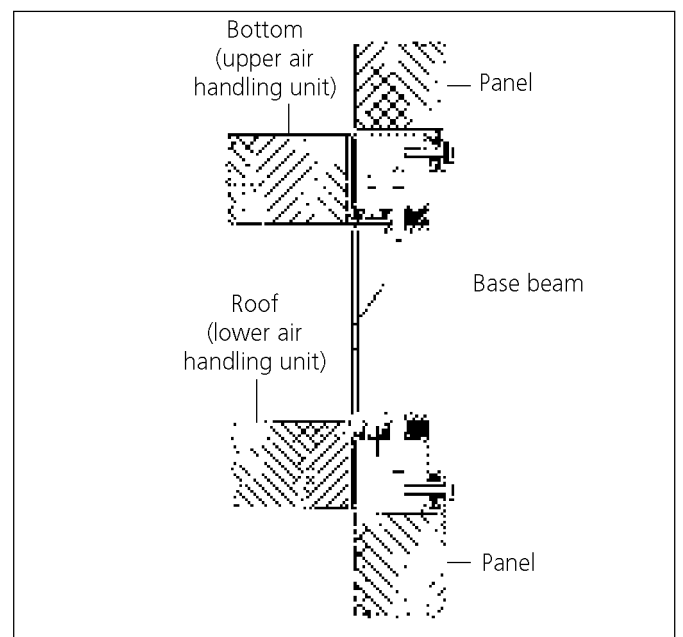


Fig. 5 Stacked air handling units

The bottom beam between the upper and the lower units must be sealed extra with liquid sealing compound around the mixing sections (connection on the air side).

Important!

If the upper unit components are longitudinally offset in relation to the lower unit components, the bottom crossbeam must be secured by screws in the cover panel.

Take further measures to protect the protruding drip flashing when crane lifting and transporting the type AT 4 units in the weatherproof version (use line spreaders or spacers, for instance).

Important!

If the left-hand unit components are longitudinally offset in relation to the right-hand unit components, the angle member must also be secured by screws in the cover panel. On the type AT 4 units in the weatherproof version, the angle member must also be sealed with liquid sealing compound.

On the type AT 4 units in the weatherproof version, the Allen bolts supplied must be fitted with rubber sealing washers.

Important!

If a humidifier is installed, a base will be required at the building site for compensating the difference in height between the humidifier water tray and the base beams of the adjacent unit components.

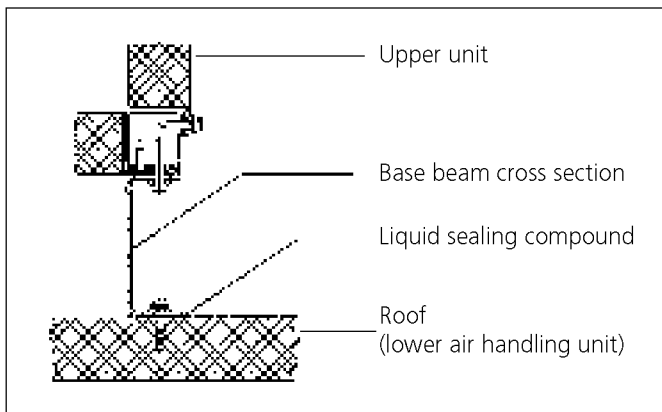


Fig. 6 Stacked air handling units longitudinally staggered

2.3.2 Air handling units arranged side-by-side

- Back off the Allen bolts on the factory-fitted spacer rail.
- Position the air handling unit components to the side using a forklift truck or a crane.
- Secure the distance rail with the Allen bolts.

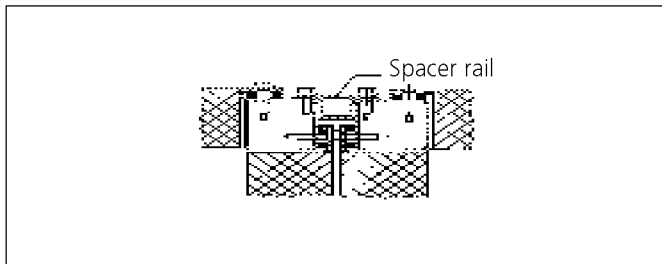


Fig. 7 Air handling units arranged side by side

In addition to the distance rail, a 25 mm wide strip of sealing tape must be applied all around at the mixing sections (connected from the air side). Check that the tape fits tightly after assembly.

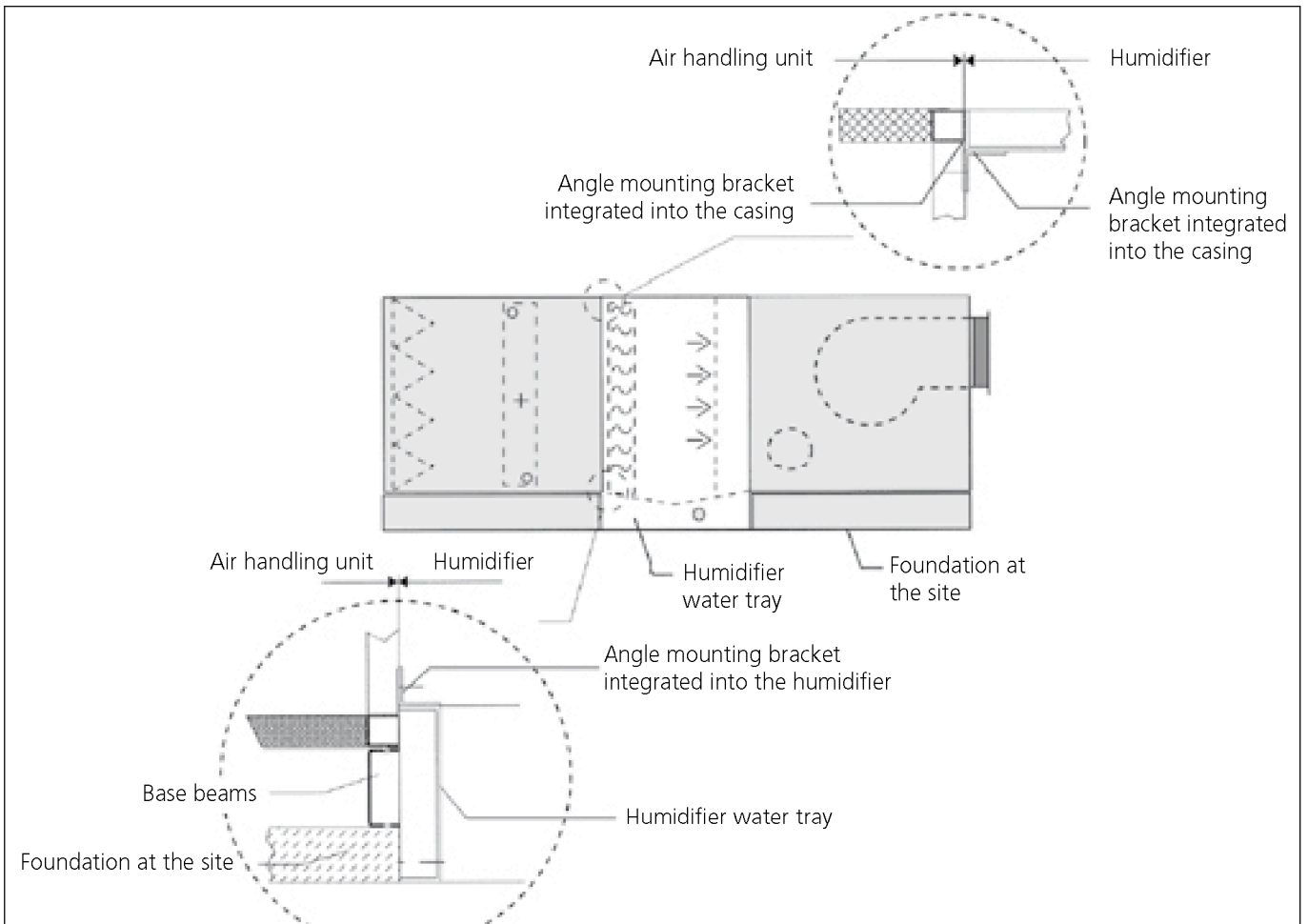


Fig. 8 To install the humidifier

2.4 Outdoor installation

Roof frame

1. Roof frame premounted at the site (compare Fig. 9)

- Mount the roof frame onto the base and bolt them together.
- Fit protective covers to the transport openings in the roof frame to blank them off.
- Apply sealing compound onto the roof frame.
- Place the air handling unit on the roof frame using a crane and secure the air handling unit to the roof frame (and the angle bracket of the cover plate).
- Fit protective covers to the transport openings in the base beams to blank them off.
- Pull the roof covering in place on the roof frame, and glue it under the flashing.
- Fasten the cover plate in the flashing and rivet it together with the angle bracket.

2. Base frame or roof frame mounted at the site (compare Fig. 10)

- Fit protective covers to the transport openings in the base beams/roof frame to blank them off.
 - Pull the roof covering on the base beams/roof frame in place, and fasten it under the flashing to seal properly.
3. Place air handling unit components together as close as possible where they are to be jointed, pull them together via the unit connections (reinforcing plate and angle bracket) and bolt them together. Use appropriate implements (such as slings) for pulling the air handling unit components together if they are large and heavy.
 4. Seal the joints of the unit (compare with Fig. 11).

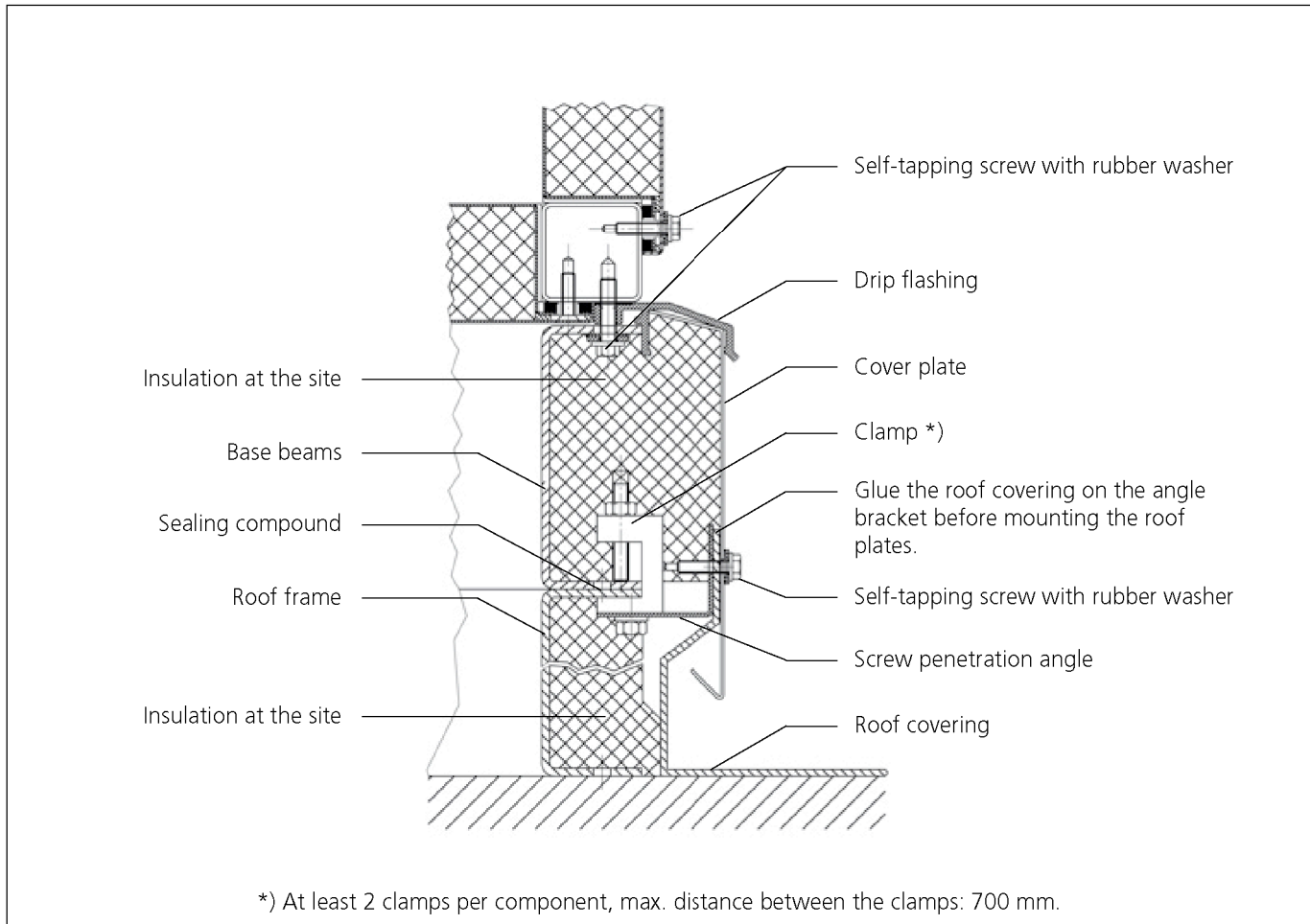


Fig. 9 Roof frame premounted at the site.

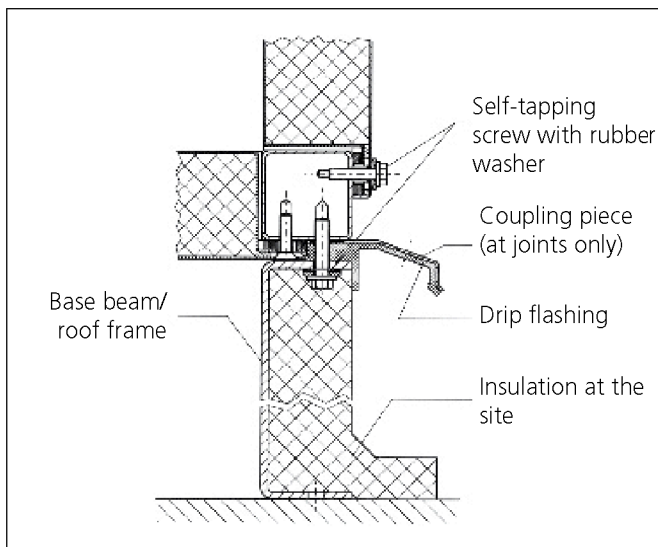


Fig. 10 Base beam or roof frame mounted at the site.

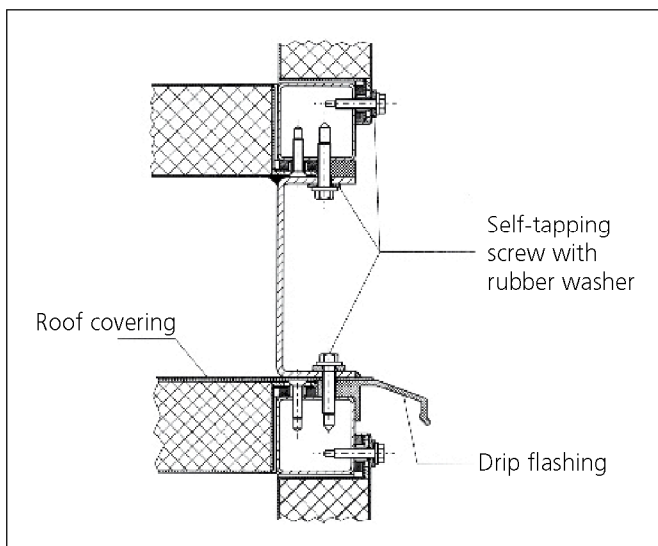


Fig. 10/1 Base beam (mounted at the site).

Important!

Contact the technicians at the factory for more information about lead-throughs for running cables downward (openings in roof).

To seal the joints of the air handling unit:

1. Check that the air handling unit joints are correctly sealed.
2. Clean along the air handling unit roof joints.
3. Fasten the coupling piece onto the unit joint under the drip flashing (both at the top and at the bottom).
4. Fold back the overlapping roof covering.
5. Apply welding fluid with a brush.
6. Fold the foil covering back into place.
7. Press well along the joints to prevent folds in the covering.

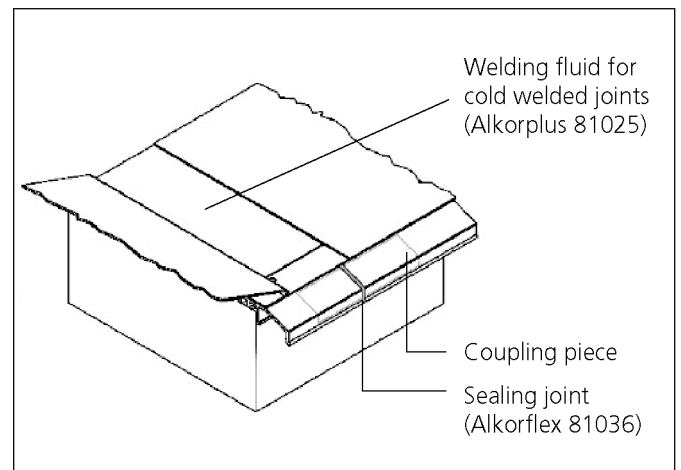


Fig. 11 Sealing the joints of the air handling unit

Important!

The welding fluid can be used as long as the outdoor temperature is $> 10\text{ }^{\circ}\text{C}$.

If the outdoor temperature is lower, the relevant surfaces will have to be preheated by means of a heat gun.

Carefully check the sealing properties of the casing.



Danger!

The welding fluid is inflammable – do not keep sources of sparks and flame nearby!

Follow the safety precautions on the packagings.

If you need more information, we can send you the current EEC safety data sheets.

3. Extra information about installation and maintenance of hygienic units

3.1 Installation

Important!

When the various air handling unit components have been installed and connected, the unit joints including the connection angle pieces inside the unit, must be sealed with liquid, disinfectant-resistant sealing compound.

When installing pipework and cables, make sure that they are not in the way of withdrawable unit components and that the components can easily be withdrawn from the unit casing.

It is not permissible to connect the hygienic unit's drainage discharge pipework to the sewerage line.

3.2 Commissioning and maintenance

Check that all the air filters, especially the particulate filter, are tightly mounted before you commission the air handling system.

Important!

Swegon recommends that you replace all the filters after the air handling system has been in operation for a short period of time. The reason for this is to rid the unit of impurities collected in the filters while the unit was being installed and after it has been commissioned.

Since the extract air contains health-hazardous gases, hygienic-toxicologic risks may exist if 100% recirculated air is used. If air is recirculated in the system, the operator must therefore make sure that the supply air contains a low volume of fresh air.

Cleaning:

The frost protection grille and the droplet eliminator can be withdrawn from the side for cleaning, and must be cleaned by high-pressure washing outside the air handling unit. The droplet eliminator can also be disassembled for cleaning.

All the mounted components are either easy to access for cleaning or can be withdrawn/dismantled from the air handling unit after having removed the cover panel.

If the cover panels are removed for maintenance, the interior of the casing must be sealed with disinfectant-resistant liquid sealing compound when the maintenance work has been finished.

General:

Follow the general information in the maintenance instructions for the AT 4 Series from Swegon.

4. Commissioning and maintenance



Danger!

Switch off the power before working on the air handling unit. Switch off the main switch and/or the safety switch (switch off all the poles) and secure them against unauthorized reactivation. Open the inspection doors only after the fans have been switched off and are idle.

The fans run an additional 1 to 3 minutes after the air handling unit has been switched off.

The fan impeller must never be braked by hand or by using some object.

After the work has been completed on the air handling unit, the person responsible for operations must check that no one is inside the ventilation system and that all the safety devices work as they should, before restarting the unit.

If the air handling unit is taken out of service for a period longer than one week, the motor shaft/generator shaft should be rotated once a week to avoid applying a load on the shaft bearings at one contact point which would cause bearing damage. See page 23 as well – Belt drive.

4.1 Fans (belt drive)

Commissioning:

1. Remove the transport safety devices on the fan stand.
2. Check that there are no foreign objects inside the duct system and the fan.
3. Rotate the fan impeller by hand to make sure that it rotates freely.
4. Check the direction of fan rotation (compare with the arrow on the fan casing) by briefly switching on the motor.
5. If the direction of rotation is wrong, transpose the phase wires on the motor.
6. Measure the power consumption while the inspection doors are closed and compare with the rated power specified on the motor rating plate.
7. Measure the differential pressure Δp_{fa} and if needed adjust the duty point by setting the opening clearance.
8. Check that the V-belt pulleys are correctly aligned.
9. Check that the V-belt is correctly tensioned and retention it if required. See also Item 4.9.2.
10. Check the protective earth wire for correct connection.

Important!

There is risk of overloading the motor if the direction of fan rotation is incorrect.

The power consumption must not exceed the specified rated current.

Do not exceed the max. permissible motor speed.

Do not exceed the max. permissible fan speed.

From a rated motor output of 3 kW: Star-delta starting.

Commissioning and maintenance:

- Check that the fan impeller is correctly balanced.
- Check the condition of the bearings and lubricate them if necessary.
- Tighten all the fastening bolts one more time.
- Check that the anti-vibration mountings work correctly.
- Check the drainage pipework (if fitted).
- Check whether the fan is dirty, damaged or rusty.
- Clean the fan unit regularly.

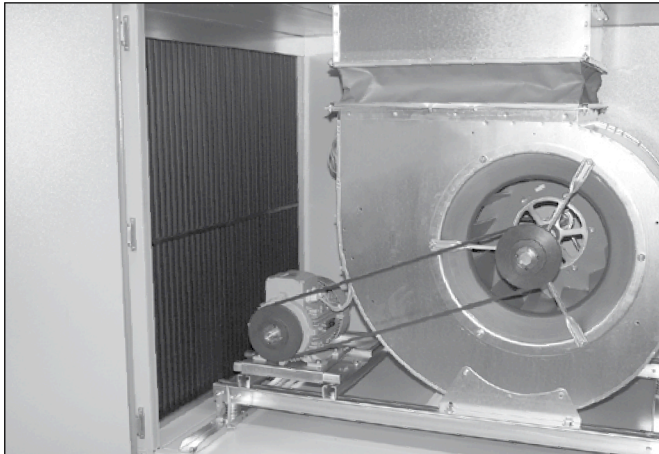


Fig. 12

The fan unit can be withdrawn from the side of the unit casing if it needs to be serviced.

1. Back off the four bolts on the C rails.
2. Loosen the flexible fan connection.
3. Withdraw the fan unit from the side of the unit casing.

Important!

Withdraw the fan unit carefully so as not to damage the surface finish of the casing.

4.1.1 Axi-centrifugal fans

Commissioning:

- Remove the transport safety devices on the fan stand.
- Check that the air handling unit has not been damaged in transport before you commission it.
- The fan impeller must not touch the fan inlet opening. You can check this by turning the fan impeller.
- Then check that the motor rotates in the correct direction. The correct direction of rotation is indicated by an arrow on the fan impeller/motor. Briefly switch on the motor to determine its direction of rotation. If the motor rotates in the wrong direction, you will have to transpose the phase wires of the motor.
- Check the protective earth wire for correct connection.

Inspection:

- Switch off the main switch and/or the safety switch and secure them against unauthorized reactivation (with a padlock, for instance).
- Inspect at least once a year.

- Check whether the fan is dirty, damaged or rusty and make sure that the bolts are tightened (see also Item 4.1.2).
- Check that the safety devices operate correctly (safety guards, protective grilles).

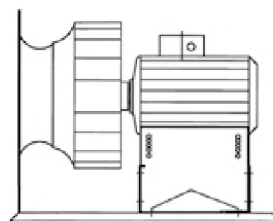
Fan position adjustment:

1. On air handling units with fan inlet clearance adjustment/without fan speed regulation:

The operating point (position of the fan) can be adjusted by axially moving the motor with fan impeller from the inlet opening. In this way, a portion of the amount of air that blows out can flow back through the clearance (bypass), the pressure then drops and this decreases the power consumption of the motor. The clearance can be set between +8 and -15 mm. Particulars of the appropriate clearance are specified in the ordering documentation (technical data sheet). Do not exceed the available motor output if the opening clearance must be changed. Check by measuring the power consumption.

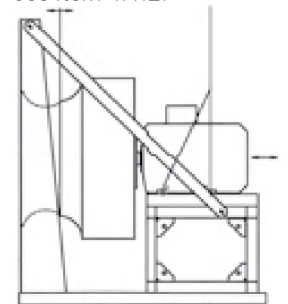
The clearance can be easily adjusted by backing off the four/six bolts on the motor block and the C rail. Move the motor block to the appropriate position and then tighten the bolts. Tightening torque, see Item 4.1.2.

+ clearance –

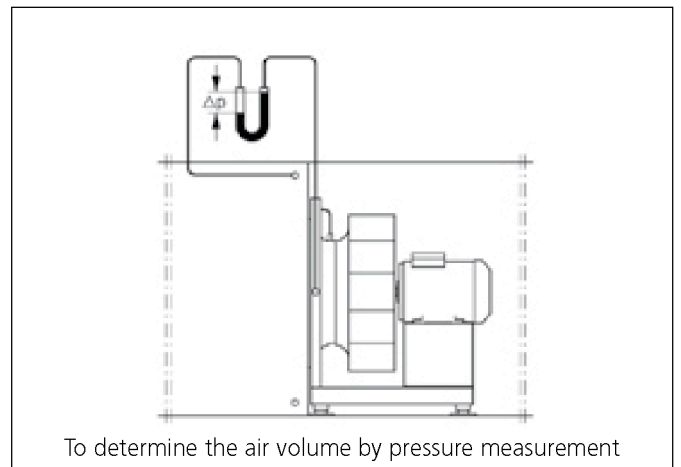


Unit sizes 08 x 08 to 20 x 16

The clearance can be easily adjusted by backing off the four bolts on the motor. Move the motor with fan impeller to the appropriate position and then tighten the bolts. Tightening torque, see Item 4.1.2.



Unit sizes 20 x 20 to 24 x 24



To determine the air volume by pressure measurement

Fig. 13

- On air handling units with fan speed regulation (frequency inverter operation, for instance):

The operator can set the exact duty point with the adjustable fan speed. If the unit is operating in the speed regulation mode, the settings must not exceed or be below the max. or min. permissible fan speeds and the permissible motor outputs. The opening clearance must not be changed. It must always be set to the preset clearance of + 8 mm.

To determine the air volume:

The fans can be equipped with an optional flow measurement device. The pressure differential between the static pressure inside the chamber on the suction side of the fan and the pressure at the fan inlet opening is measured at a measurement point on the inlet opening. This differential pressure is continuously conditional on the flow. A detailed description is available on inquiry.

4.1.2 Tightening torques for bolted joints on the fan section

Check the bolted joints for tightness after the fan has been in service for approx. 1 hour. Use a torque spanner, if needed, to tighten the bolts uniformly to the appropriate tightening torque specified in Table 2 below.

Thread dimension	Bolt tightening torque (Nm)
M6	10
M8	25
M10	49
M12	85

Maintenance/inspection of the bushings:

- Clean and degrease all the bare surfaces such as the bushing holes and the conical surface as well as the conical hole in the disc. Place the bushing in the hub and check that all the connection holes are aligned right over one another (half of the threaded holes must be opposite half of the smooth holes).
- Apply a thin layer of Loctite onto the stud bolts (sizes 1008-3030) and cylinder screws (sizes 3535-5050) and screw them in. Do not tighten the screws yet!
- Clean and degrease the shaft. Push the disc with the bushing onto the shaft.
- If a feather key is used, first place it in the shaft keyway. There must be clearance between the feather key and the hole groove.
- Use a torque spanner to tighten the stud bolts uniformly to the appropriate tightening torque specified in Table 3.

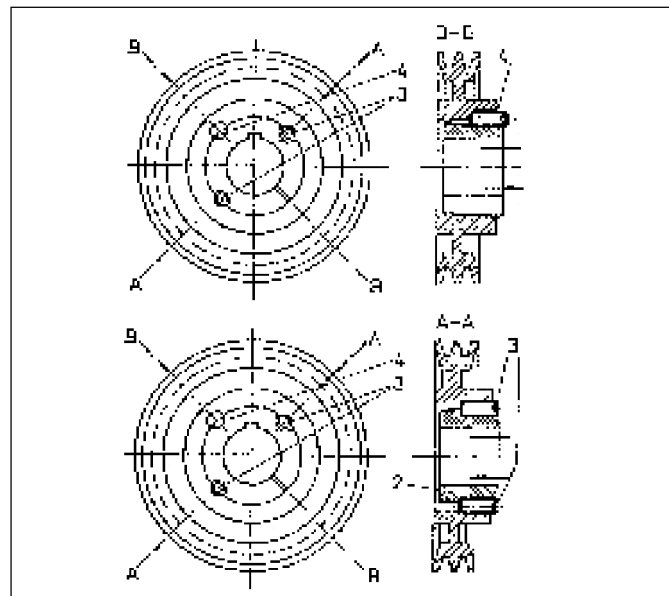
Bushing	Bolt tightening torque (Nm)	Bolts	
		Number	Size
1008/1108	6	2	1/4" BSW
1310/1315	20	2	3/8" BSW
1210/1215	20	2	3/8" BSW
1610/1615	20	2	3/8" BSW
2012	31	2	7/16" BSW
2517	48	2	1/2" BSW
3020/3030	90	2	5/8" BSW
3535	112	3	1/2" BSW
4040	170	3	5/8" BSW
4545	192	3	3/4" BSW
5050	271	2	7/8" BSW

Table 3

To change the pulley:

To loosen the pulleys (I):

- Unscrew the bolts (3).
- Screw in the Allen bolts in the threaded holes (4).
- Press the bushing out of the conical hole.
- The pulley can now be easily moved on the shaft.



To fasten the pulley (II):

Pull the pulley and the bushing together by means of the Allen bolts (3). **Check that the motor and the fan drive pulley are aligned with one another. Fit and tension the drive belt according to the instructions.**

See Item 4.9.2.

4.2 Heat Exchangers

4.2.1 Coil heat exchangers

The heat exchangers are in principle maintenance-free. However their face surfaces must be cleaned regularly to enable them to transfer heat correctly. The performance of the ventilation system will not be affected if the heat exchanger fins have been pressed in or if the finned tubes are out of alignment. Such deformations shall therefore not be considered grounds for filing a warranty claim. The fins can be "combed out" at the site. The tool required can be purchased from the manufacturer, if needed.

Remarks!

The venting and drainage valves must be installed in the pipework at the site.

Important!

The air handling unit must be kept free of obstruction and accessible for maintenance. During installation, especially when connecting the pipework to the unit, the inspection covers must always be left open. It must be possible to withdraw the heat exchangers (and droplet eliminators, if required) from air handling units with a free height of up to 1.6 m.

Mounting:

1. Connect the heat exchanger for a counter-flow configuration (the water flows through the coil tubes in a direction contrary to the direction of airflow through the air handling unit).
2. Connect the supply water pipe to the bottom or top coil connection depending on the air flow direction.

Important!

Use an appropriate tool (such as a pipe wrench) to restrain the pipe connections of the heat exchanger to avoid damaging them when tightening the external pipe connections. Arrange the pipework and connections to enable easy access to the heat exchangers for maintenance.

Max. permissible operating pressure: 16 Bar

Max. permissible inlet flow temperature for hot water: 120 °C

Maintenance:

- Check whether the heat exchanger is dirty, damaged or rusty on the air side.
- Blow compressed air through the heat exchangers to clean them. Galvanised heat exchangers can also be cleaned by steam washing.
- Check the connections and the bolted joints.
- Check the supply and return pipework for correct function.
- Check the air purging valve and the filling connection of the heat exchanger.
- Check that the freeze guard thermostat operates correctly.
- Check the concentration of anti-freeze agent (if used).
- Check the water trap (if fitted) and top up if needed.
- Check the water drain and the water trap for correct function, if needed.
- Check the condition of the droplet eliminators and clean them if necessary.

Important!

If the ambient temperature is likely to drop below freezing and cause frosting and corrosion, the heat exchangers should be **emptied** and blown through with compressed air, or filled with an ordinary anti-freeze agent containing corrosion protection.

Sulphate-reducing bacteria inside the heat exchanger may cause corrosion if the liquid in the coil is stagnant for a longer period of time. These sulphides first corrode the brazed joints but also the copper base material itself. We recommend the following measures for reducing this type of copper corrosion.

- Use sulphate-free water in the entire water coil circuit.
- Check the water coil circuit for tightness.
- Avoid longer periods of stagnation when the water coil circuit is filled.
- Do not fill with fresh water so often.
- Use an appropriate inhibitor for the material.
- Use biocides.

Extra information for use of direct expansion coils:

Installation must be carried out by an authorized cooling system technicians.

Only the use of approved refrigerant is permissible.

A water trap must also be fitted to air coolers and direct expansion coils. See the description below! All drain water discharge connections from a drip tray must be equipped with an individual water trap..

Water trap:

The water trap with screw cover for filling and inspection is a fillable water trap for draining the air handling unit around the air cooler, humidifier and other wet areas having higher pressure than the surroundings.

Positive pressure in the air handling unit:

$$H_1 = 50 \text{ mm}$$

$$H_2 = \Delta p + 50 \text{ mm}$$

Sub-atmospheric pressure in the air handling unit:

$$H_1 = \Delta p + 50 \text{ mm}$$

$$H_2 = \Delta p/2 + 50 \text{ mm}$$

Δp = Pressure in the AHU in mm liquid column
(100 Pa = 10 mm liquid column)

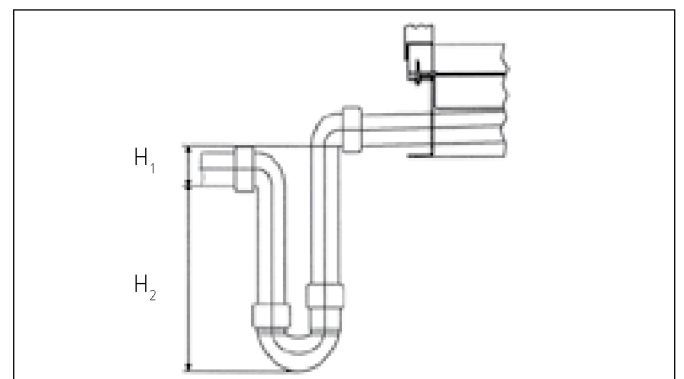


Fig. 14 To size the water trap

Ball-float water trap (at site only):

The ball-float water trap is a self-filling water trap for draining air coolers, steam humidifiers and other wet spaces where there is sub-atmospheric pressure. If the drain discharge line is dry, a ball float placed in the trap prevents air from being sucked in, so that the initial condensate can fill the water trap. The ball also functions as a non-return valve if there are any pressure surges in the system and prevents the trap from being sucked empty.

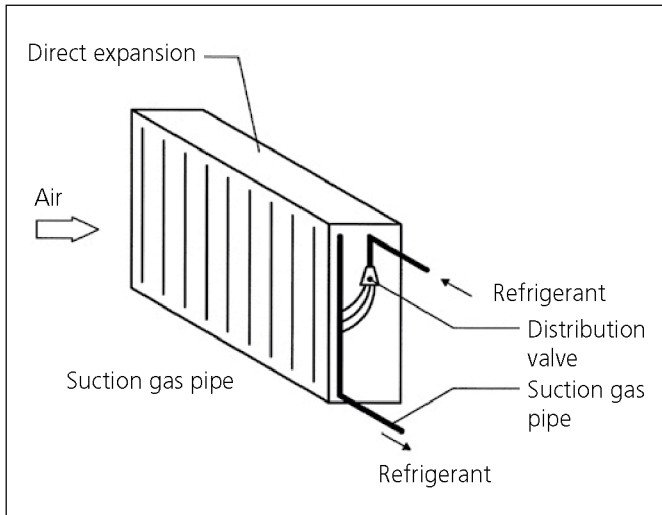


Fig. 15 Direction of airflow – Installation of direct expansion

Important!

An opening for the suction gas pipe must be made at the site.

4.2.2 Air heater, electric

Specific information about the electric air heater:

- Use the wiring diagram supplied with the air heater.
- Follow the service instructions for the air heater.
- The air heater should only be used in combination with an air flow monitor. Installation and adjustments must be carried out at the site.
- The temperature monitor and the safety thermostat must be integrated into the control circuit of the air heater.
- For the units with speed-controlled fans, a capacity reduction of the air heater corresponding to variations in the airflow must be implemented.
- Up to BG 16 (free height 1,224 mm): 300 mm
Larger than BG 16: 450 mm
- Check the ventilation system after a power failure or an alarm to make sure that no damage has occurred. Replace any damaged components.
- Check to make sure that no heat is generated around the air heater due to insufficient free space around the heater.

Common causes of malfunction:

Cause	Remedial measure
No airflow	The electric air heater groups must not generate heat until a flow monitor measures sufficient air flow across the electric air heater. —> Use a flow monitor Swegon recommends integrating the controls of the air heater into the safety switch circuit.
Too little air flow due to regulated fans	The heat generated must be adjusted according to the reduced air flow —> Stepless regulation of the heating energy or rewiring the heating groups according to the specified air flow
The temperature monitor is not connected	When commissioning, check that the temperature-dependent switch-off function operates correctly
The safety thermostat is not connected	When commissioning, check that the switch-off function operates correctly
No prolonged fan operation	The fans must continue to run at least 5 minutes after the electric heating has been switched off. As an alternative, prolonged fan operation can also be controlled via a thermostat
Incorrect start-up – check of electric heating performance indicates insufficient airflow, due to closed damper or air leakage	Check whether the airflow rate is sufficient by the air heater.
Air temperature above 60 °C	Check that the air temperature never exceeds 60 °C (briefly). Under normal operating conditions, the air temperature must not exceed 40 °C (long-term operation)
The warranty does not cover damages due to high temperatures caused by too little free space!	

4.3 Heat recovery

4.3.1 Plate heat exchanger

Maintenance:

- Clean the plates regularly.
 - a Use an appropriate brush to remove dust and fibres etc.
 - b Flush heat exchanger surfaces with hot water, blow them with steam or use degreasing agent to remove oil and grease deposits.
- Clean the drain tray and drain.
- Check the condition of the water trap and top up if necessary.
- Inspect the damper connections, the damper actuator and the control functions.

4.3.2 Rotary heat exchanger

Maintenance:

- Check the rotor drive and controls.
- Clean the rotor regularly by blowing with compressed air, spraying with water, steam or degreasing agent.

Heat exchanger rotor:

Before commissioning, check that no foreign objects or excessively pressed-in felt sealing strips are blocking the face area (this applies especially to horizontal rotors). The rotary heat exchanger rotor consists of corrugated aluminium foil. The counter-flow principle utilised creates a self-cleaning effect, which in most cases is sufficient for preventing dust from forming on rotor surfaces.

If this self-cleaning effect is not enough, the rotor can be blown with compressed air at regular intervals, depending on how much it is fouled. If it becomes excessively dirty, it can be cleaned with high-pressure washing equipment. Use only water without additives.

Important!

The jet of water must be aimed at right angles to the rotor structure!

Direction of rotor rotation:

Check that the rotor always rotates from the extract air path to the supply air path via the purging sector.

The correct direction of rotation is indicated by an arrow in the corner by the motor.

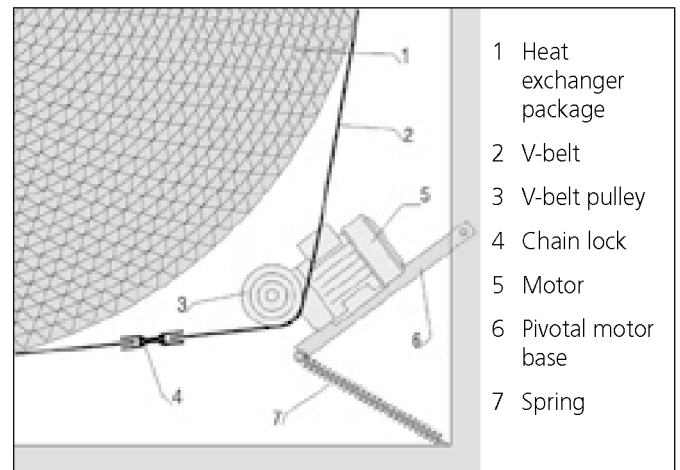
Important!

Check the direction of rotation when commissioning!

V-belt

The motor V-belt is identifiable as a type SPZ or SPA V-belt.

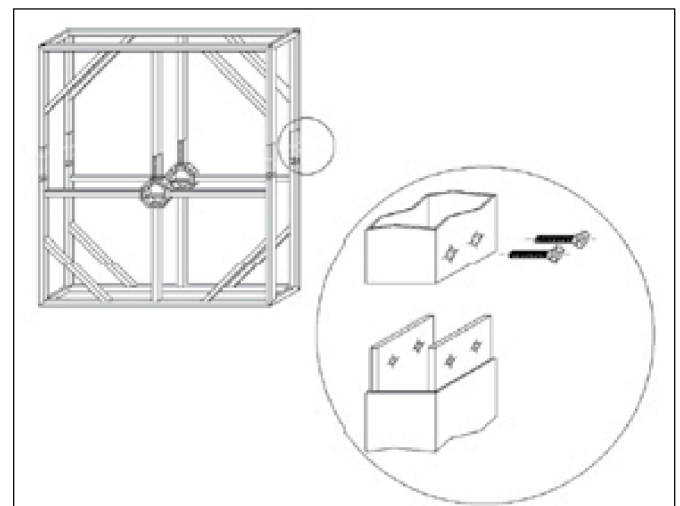
A chain lock is used for connecting the belt ends. The V-belt tension should be checked regularly, since the belt stretches with time and this stretching may eventually exceed the limit of adjustment of the belt tensioner. This is especially important during the first 400 hours of operation. The V-belt should be shortened if it is too loosely tensioned and the motor pulley can no longer drive the rotor.



Split design

The size 1,800 mm and larger rotors are of split design.

From frame dimensions in excess of 2,500 mm, The frame is also of split design. The upper part of the casing is fitted after the bearing support segment has been mounted.



Seals

Felt sealing strips of NF-PES-LE 0,32 grey quality are fastened on the rotors for normal temperature. The felt sealing strips must be pushed on as close to the exchanger package as possible, but must not touch it. The felt sealing strips are pressed on at the factory, however they may shift while being transported. Important! Check the condition and position of the felt sealing strips/seals before commissioning and put the felt sealing strips on while the fans are operating.

Ball bearings

The ball bearings used are almost maintenance-free and are sized for up to 100,000 hours of operation. They can generally be used at temperatures of up to + 120 °C. No maintenance is required under normal operating circumstances.

Cleaning:

The rotors can be cleaned by blowing them with compressed air. The jet of air must be aimed at right angles to the rotor structure! Use a filter to minimize the amount of impurities.

4.3.3 Recuperative energy recovery: coil heat exchangers

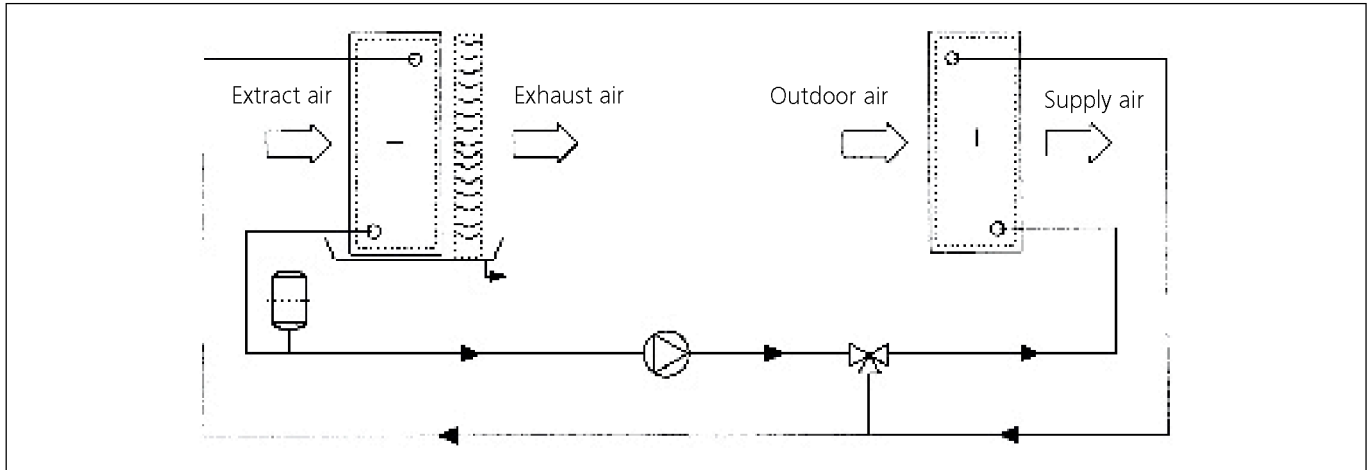


Fig. 16 Coil heat exchangers

Clean the heat exchangers regularly.

Important!

The pipework must be installed at the building site.

The circulation pump must be sized as specified in the technical data sheet.

The heat exchangers should be connected for a counter-flow configuration.

The concentration of anti-freeze agent mixed into the liquid must be equivalent to ratio specified in the technical data sheet.

Connect the supply water pipe to the bottom or top coil connection depending on the air flow direction.

We recommend that glycol be used with a mixture ratio of 25–35 %.

After the testing the pressure, thoroughly check the entire plant.

Flush the liquid circuit until no residual particles or other objects come out any longer.

4.4 Filters

4.4.1 Bag filters

Maintenance:

- Check all the bag filters at least every third month to make sure that they are not fouled or damaged and replace them if necessary.
- Replace the first set of filters at least after the first year of use.
- Replace the second set of filters at least every other year.
- Size 08 x 08: The filter clamps must be removed when firmly mounted filters are placed.



Fig. 17

Bag filters can be replaced either on the extract air side or the supply air side.

The frame of filters, up to and including Filter Class G4 and 1,300 mm casing width, can be withdrawn from the side of the casing.

The bag filters up to and including size 20 x 20 are mounted in unit. The filters up to and including size 24 x 20 are pre-packaged in a carton among the marked components.



Fig. 18

An optional quick-release locking mechanism is available for all filters sized for up to 1.836 mm free height inside the air handling unit.

To change the bag filter:

- Pull out the extractor bolt (included) to release the tensioner.
- Withdraw the bag filters from the unit casing, one at a time.
- Clean the filter sealing strips, check their condition and replace any damaged sealing strips.
- Install new bag filters.
- Close the tensioner by pushing the bolt in.

Important!

In general, the bag filters should be changed when the permissible final pressure differential across the filters specified on the identification plate is reached.

4.4.2 Carbon filters

The activated carbon filter medium must be replaced when it is saturated. Maintenance and installation is usually carried out from the clean air side.

In general, the carbon cartridges are prepackaged in a carton among the marked components.

To change filter cartridges:

1. Release the bayonet lock on the base plate (the key is a special accessory).
2. Remove the filter cartridge between both cylinders made of perforated sheet metal.
3. Refit the filter cartridges and secure them with the bayonet lock on the base plate.
4. Check that the filter cartridges are seated properly.

4.4.3 Grease filters

The grease filter should be cleaned with hot water (> 80 °C) or steam if it is contaminated by grease or dust or when the recommended final pressure differential is reached (see the identification plate). Maintenance and installation is usually carried out from the extract air side.

To clean the filter:

1. Up to unit size 16 x 16:
 - Withdraw the filter with the mounting frame and the collection tray from the air handling unit.
 - Release the locking clamps on the filter frame and clean the filter and the collection tray.
2. As from unit size 20 x 16:
 - Release the locking clamp on the filter frame.
 - Withdraw the filter and clean it.
 - Clean the collection tray.

4.4.4 Panel filters

The particulate filter should be changed when the recommended final pressure differential has been reached (see the identification plate).

Maintenance and installation is usually carried out from the dust-laden air side. In general, the particulate filter is prepackaged in a carton among the marked components.

To change the filter:

1. Release the bolts on the filter frame.
2. Replace the filter.
3. Insert the new filter and secure it by means of bolts.

4.5 Louvre damper

Maintenance:

- Check whether the louvre damper is dirty, damaged or rusty.
- Check the louvre damper's mechanical function.
- Lubricate the bearings.
- Clean the louvre damper regularly.
- Check the damper motor's limit of travel and readjust if necessary.

4.6 Silencers

The silencers are maintenance-free.

Recommendation:

Use a vacuum cleaner to clean the silencer sound baffles after a longer period of use.

4.7 Droplet eliminator



Fig. 19

The droplet eliminator can be withdrawn from the side of the unit casing and can be disassembled for cleaning.

Maintenance:

- Check whether the droplet eliminator is dirty, damaged or rusty.
- Clean the droplet eliminator and the condensate tray by blowing with compressed air, spraying with water, steam or degreasing agent.
- Check the water drain and the water trap.

When the pipework is installed at the site, the droplet eliminator must still be withdrawable.

4.8 Humidifier

4.8.1 Evaporative humidifier

Important!

- If an evaporative humidifier is installed, a water trap must be fitted at the site.
(compare with Fig. 14: To size the water trap on page 14.)

Recommendation:

Swegon recommends the installation of an electrical device for preventing the water circulation pump from running dry.

Operate the humidifier with distilled water only to prevent corrosion damage.

Place the humidifier as the last component in the air handling system directly by the floor gully to the sewerage system.

Installation and commissioning:

- Check that the spray air humidifier is complete and whether any damage in transport has occurred.

- Remove any coarse impurities from the humidifier water tray and check that the pump suction basket is correctly positioned.
- Check the spray direction and that the nozzle is properly seated.
- Fill the humidifier water tray up to approx. 10 mm below the upper edge of the adjacent water trap/overflow branch and then set the float of the valve at this water level.
- Check the outflow pipe and the overflow outflow pipe and at the same time clean the dirt trap (strainer) and the water trap.
- Then check the direction of rotation of the water circulation pump.
- Check that the bolted flange joints on the pump's discharge pipework for tightness.
- Set the bleed-off (if included) so that the bleed-off rate is twice the rate of water evaporation.
- Check how the water filter is mounted.
- Start the fans of the ventilation system and, if needed, set the spray air humidifier's duty point by regulating volume of water used.
- Check that the droplet eliminator is not in danger of being punctured.
- Maintain the specified water quality and make corrections on a regular basis.
- Whenever airflow reduction is employed, (if frequency inverters are used, for instance) it must also be possible to reduce the output of the pump.

Important!

Check the direction of rotation of the water circulation pump impeller only when the water tray is filled with water. The water level in the humidifier water tray must be sufficiently high so that the circulation pump cannot be dry run. The bleed-off rate can be reduced by 50% if completely distilled water is used. If droplet eliminators made of plastic profiled sections are used, in exceptional cases a slight amount of water can briefly seep through, because their surface is still not moisture resistant due the method used in their manufacture. The surface will be moisture resistant after approx. 24 hours of operation.

Maintenance:

- Check whether the dehumidifier is dirty, damaged or rusty.
- Clean the dehumidifier and the nozzles and the main nozzle holder at least once a year.
- Check the condition of the water trap and top up if necessary.
- Check the condition of the float valve.
- Check the bleed-off device and clean it if necessary.
- Check the droplet eliminator/water separator and clean it.

Important!

Follow the manufacturer's maintenance instructions! The humidifier must not be cleaned with foaming cleaning detergent.

4.8.2 Steam humidifier

Important!

Only steam generated from water drinking quality or better should be supplied to the steam humidifier.

Maintenance:

- Check whether the steam humidifier is dirty, damaged or rusty.
- Clean the steam humidifier and dirt trap (strainer) regularly.
- Check the steam and condensate pipework for tightness.
- Check that the steam distributor operates correctly.
- Check that the solenoid valves operate as they should.
- Check the measuring and control devices.

Extra maintenance for steam humidifiers with individual steam generator:

- Check the water supply rate concerning function and water level.
- Measure the power consumption.
- Check whether there are any deposits on the steam cylinder and replace it if necessary.

Extra maintenance work for steam humidifiers without individual steam generator:

- Check that the regulation valve operates correctly.
- Readjust the gasket ring of the regulating valve.

Remarks!

Swegon does not assume responsibility for the installation of steam humidifiers, lead-throughs cut into the casing at the site, incorrect treatment of floor-mounted collection trays or incorrectly connected drain branches. This also applies to incorrectly used humidifiers/humidifier capacity.

4.9 Fan motors and drives

4.9.1 Electric motors

Electric motors with at least 3 kW rated output must be star-delta started. Increased switching frequency in the motor ("cycling") will lead to premature loss of motor performance. The electric motors generally have permanently lubricated motor bearings.

On the electric motors with motor bearings, which can be lubricated, the bearings should be inspected regularly and be lubricated if necessary. The intervals between maintenance and the amount of grease required for relubrication are specified on the motor rating plate.

Commissioning:

1. Connect the cable leads to the motor according to the wiring diagram supplied.
2. Measure the amount of power consumed in all three phases and compare with the particulars specified on the technical data sheet.

Important!

The electrical cables must be run according to local electrical safety standards. Run the motor cables to enable the motor to be moved on its mount for tensioning the V-belt. The power consumption should be measured only while the inspection doors and panels are closed to prevent overloading the motor. The power consumption must not exceed the rated current specified on the rating plate.

Important!

Multi-speed motors must not be operated via frequency inverters.

Important!

Motors with thermostatic contacts and PTC resistance must be protected by a protective motor switch with reclosing locking device.

All other motors must be protected by a fuse with a safety isolating switch.

Important!

For units with variable-speed motors, do not exceed the max. permissible current consumption of the transformer and motor. The motor protection of the variable-speed motors must be sized accordingly.

Maintenance:

- Check whether the motor is dirty, damaged or rusty.
- Inspect the motor bracket and tighten all the fastening bolts one more time.
- Check the condition of the bearings and lubricate them if necessary.
- Regularly clean the motor and the motor base.
- Check that the safety guards' and protective devices operate correctly.

4.9.2 Belt drives

Commissioning:

1. Check the V-belt drive and retension the belt if required.
2. Check that the V-belt pulleys are fixed at their positions and check that they are aligned with one another (parallelism).
3. Check and tighten the bolts of the V-belt pulleys, motor and fan once again if necessary, after approx. 1 hour of operation.

Check the belt tension and retension if necessary.

See also Item 4.1.2.

Important!

An improperly tensioned V-belt may damage the bearings in the fan and in the motor. If the air handling unit is out-of-service for 3 months or more, the drive belts must be slackened or removed to prevent bearing damage. If this is not done, the guarantee will be void.

If the belt drive is altered compared with Swegons sizing recommendations, bear in mind the fan's limit speed and limit value diagram for belt propulsive forces specified in the relevant technical catalogue. Only electrostatically conductive belts should be used for the ex-fan units.

Maintenance:

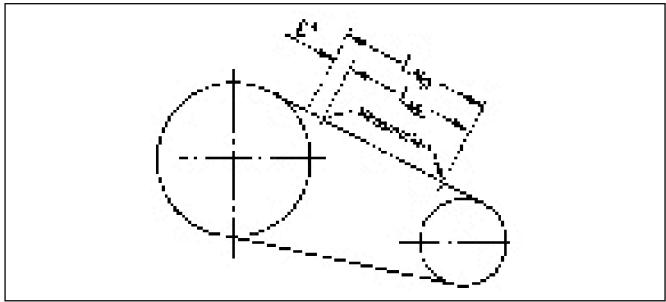
- Check whether the V-belt drive is dirty, damaged or worn.
- Check the belt tension and readjust the tension if necessary. See also Item 4.1.
- Check that the motor and the V-belt pulleys are aligned with one another.
- Clean the V-belt drive regularly.

Important!

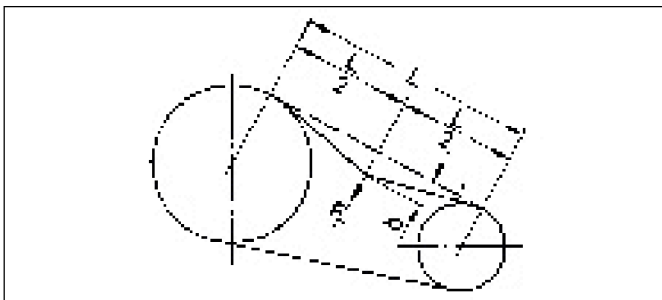
If V-belts are changed in multi-groove drives, the entire set of belts must always be replaced.

Instructions for adjusting the V-belt tension (1)

The drive belts are correctly tensioned when the individual test force F_p causes a belt deflection b of 16 mm per 1000 mm of distance between the centres.



- LM_u = Measuring mark distance for untensioned flat belt
- LM_{Mg} = Measuring mark distance for correctly tensioned flat belt
- E^* = Belt deflection in mm from enclosed Swegon document.



- L = Distance between the centres
- b = Deflection under test force F_p
- F_p = Test force in N from Swegon document.

Instructions for adjusting the flat belt tension (2)

The belts are correctly tensioned when the measuring mark distance L_{Mu} has increased by belt deflection E^* . The adjustment should be carried out in two steps at a few hours' interval so as not to overload the bearings.

4.9.3 To connect three-phase motors

Important!

Do not switch directly to the upper speed. The wiring diagram in the junction box must be observed for the motors with PTC resistance or thermostatic contacts.

Couplings for one speed:

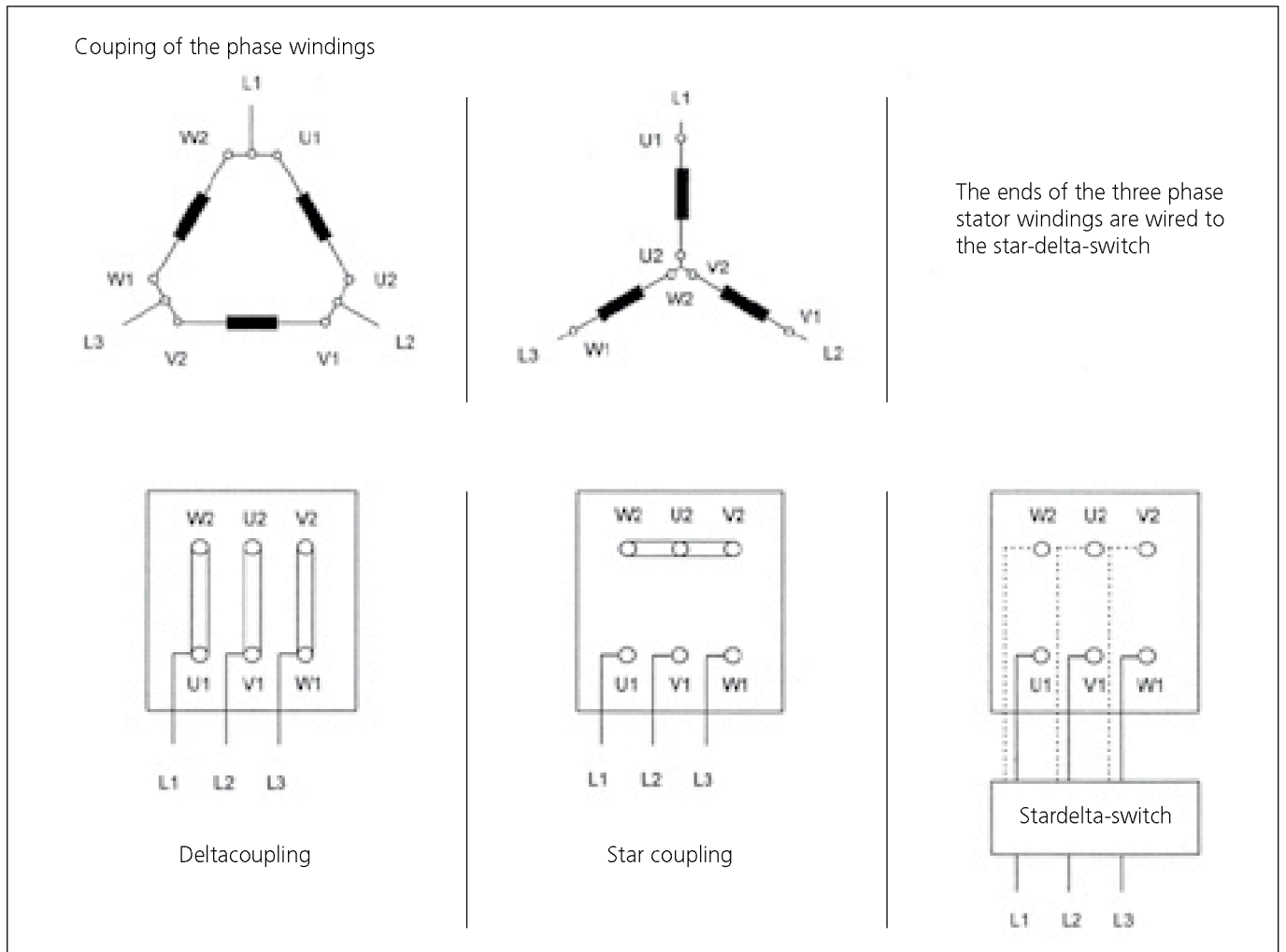


Fig. 20

Coupling for two speeds with a ratio of 1 : 2 (stator winding in Dahlander coupling)

Version for e.g. 1500/3000 r/min. and 4/2 poles respectively, or 750/1500 r/min. and 8/6 poles respectively

On the Dahlander-wound motors, the six stator winding ends 1U, 1V, 1W and 2U, 2V, 2W are connected to the six terminals in a normal junction box.

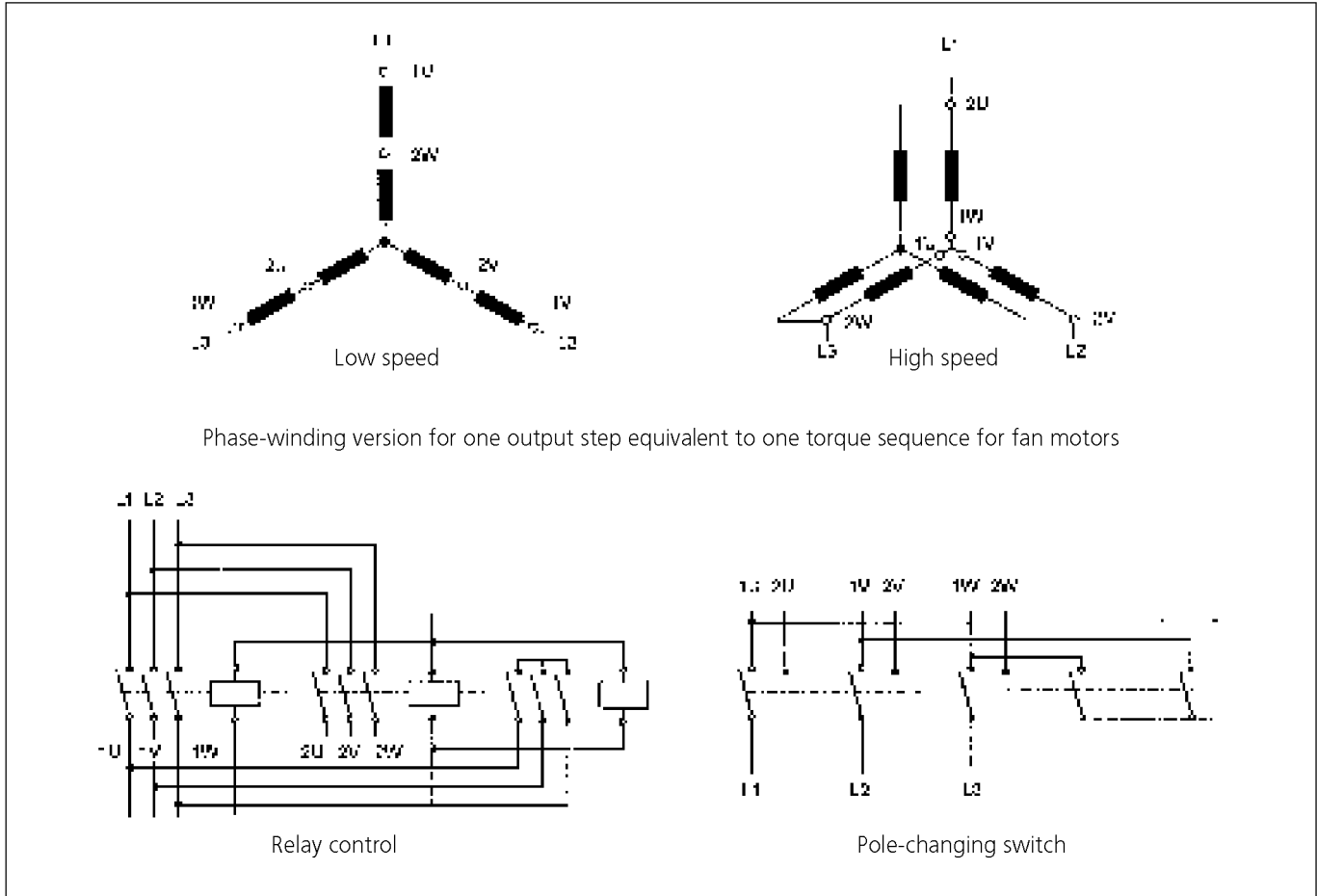


Fig. 21

Coupling for two speeds (two separate stator windings)

Version e.g. for 1000/1500 r/min. and 6/4 poles, or 750/1000 r/min. and 8/6 poles respectively

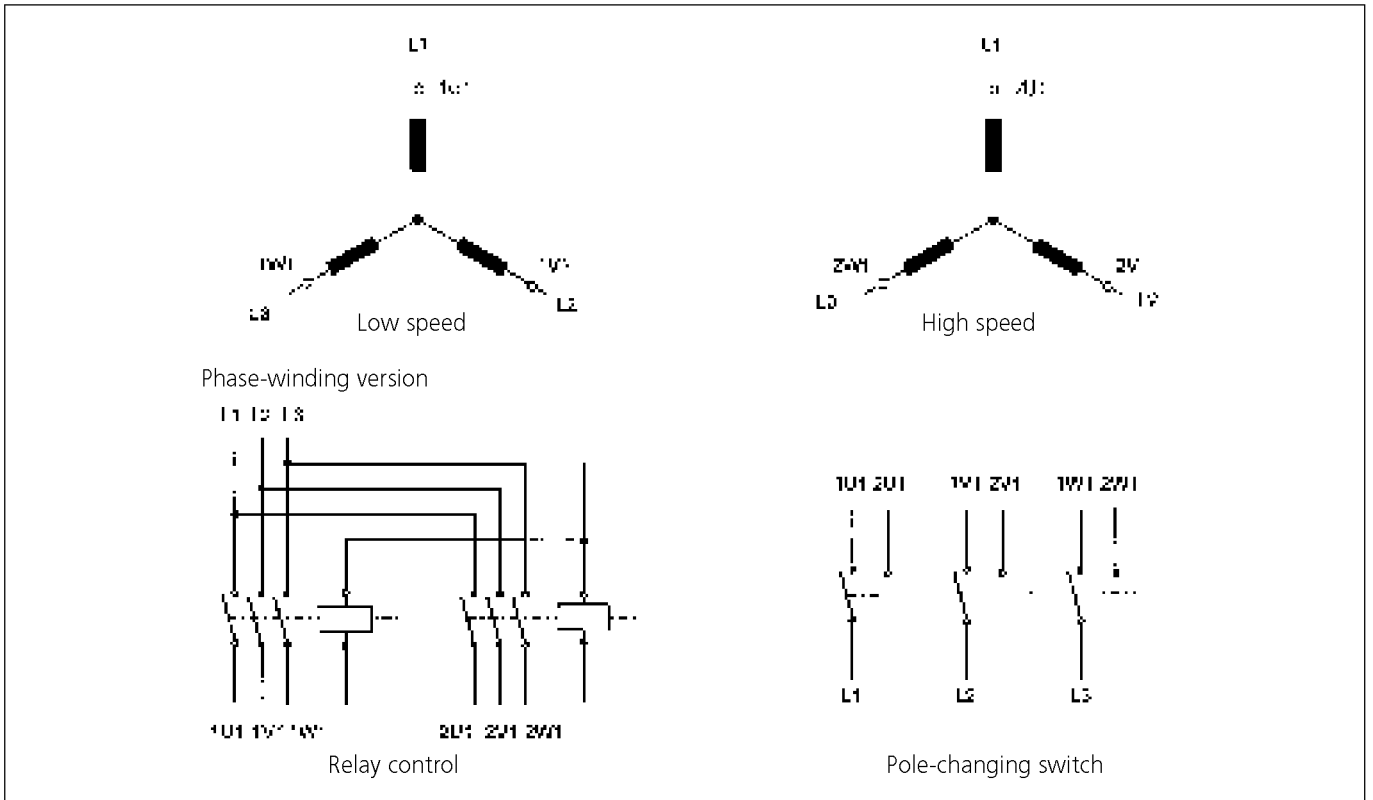


Fig. 22

Couplings for three speeds

Two separate stator windings one of which is Dahlander wound) Nine terminals are required here.

Version for 750/1000/1500 r/min. fan drives and 8/6/4 poles respectively; 750/1500 r/min. in Dahlander coupling.

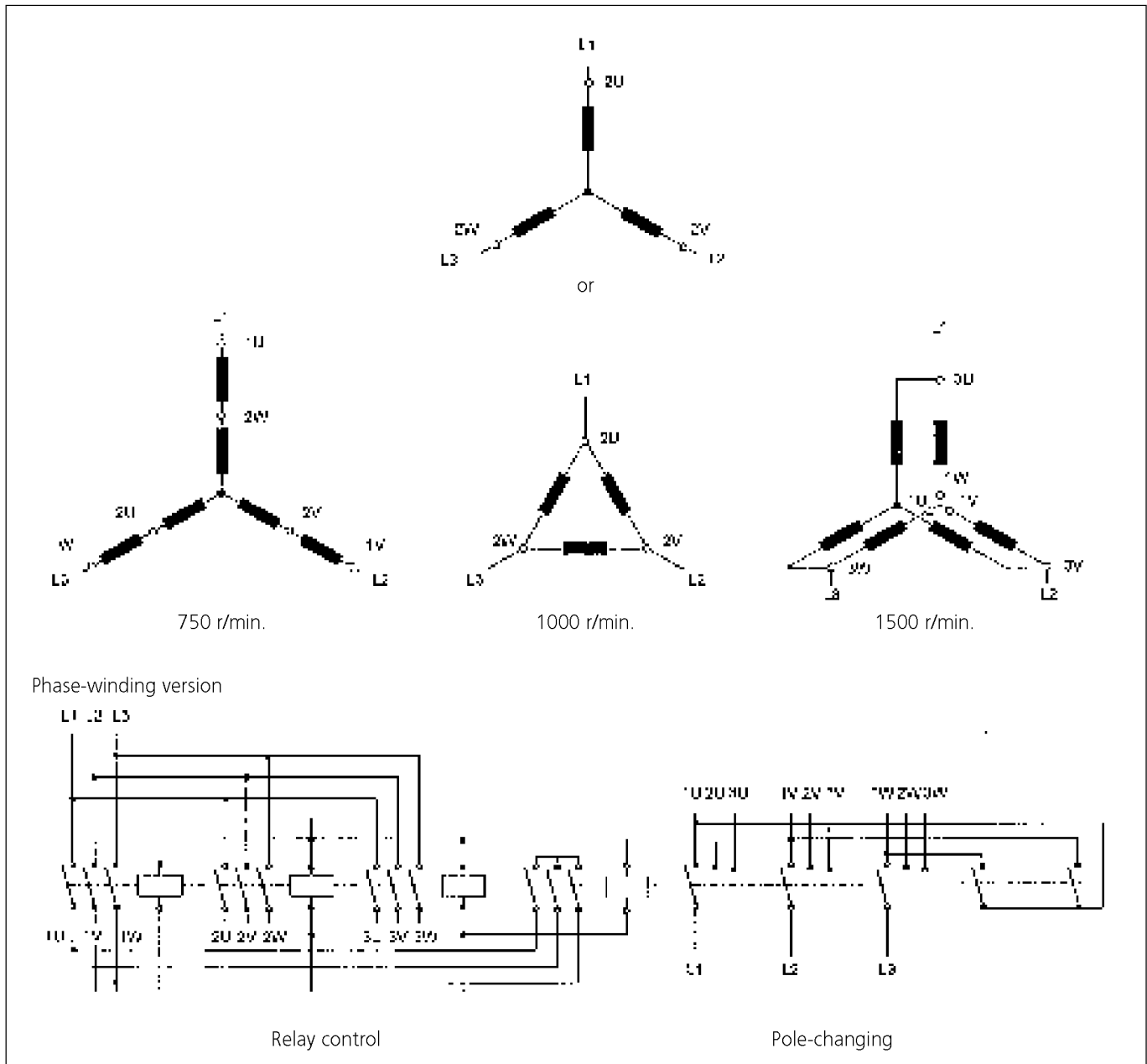


Fig. 23

4.9.4 Wiring with frequency inverters

Typical wiring diagram:

Frequency inverter with load measuring device, safety switch and PTC resistor

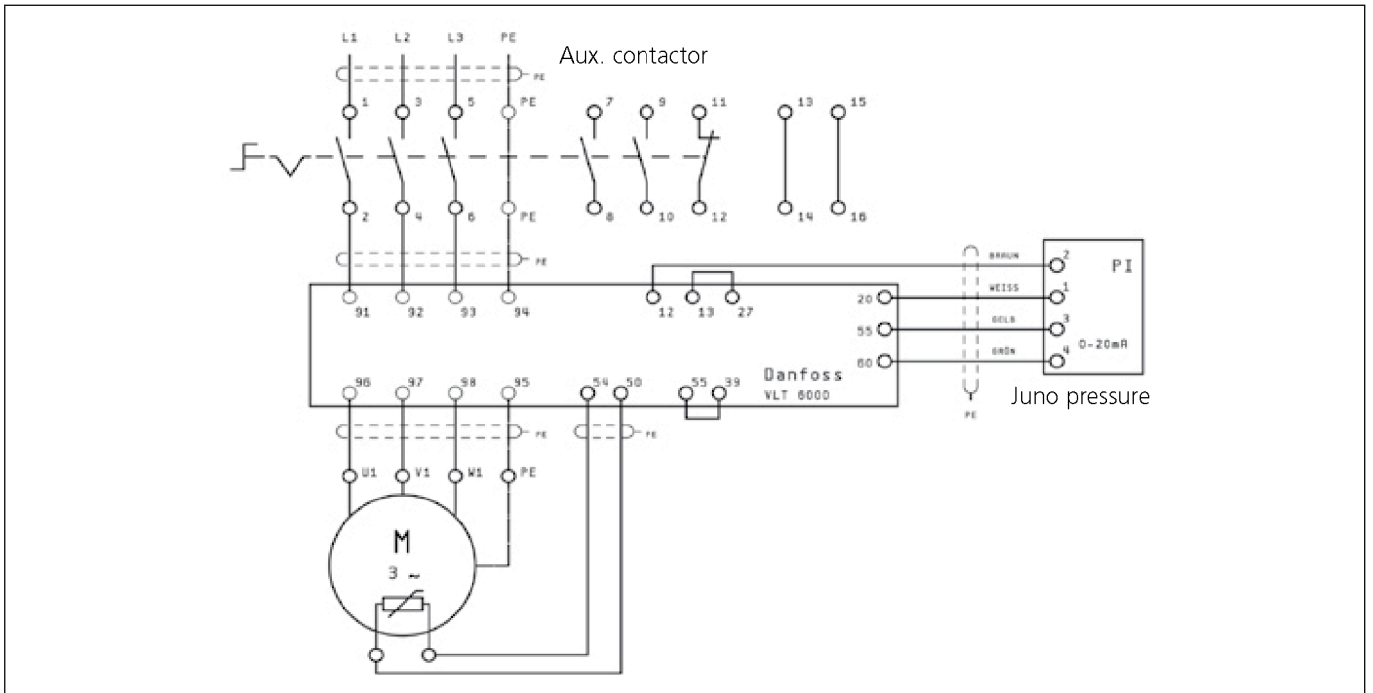


Fig. 24

Consider the following if frequency inverters are used:

1. The fan motor must be designed for operation with a frequency inverter.
2. The motor must be protected against overloading and heating; i.e. have a PTC resistor, for instance. A switch-type motor protection with bimetallic trip is not appropriate.
3. Shielded motor – PTC resistor cables must be run to the frequency inverters.
4. The motor and fan must absolutely not exceed the max. permissible speed.
5. In other respects, we refer to the maintenance instructions from each individual manufacturer of frequency inverters.

Example: EMC-compatible installation

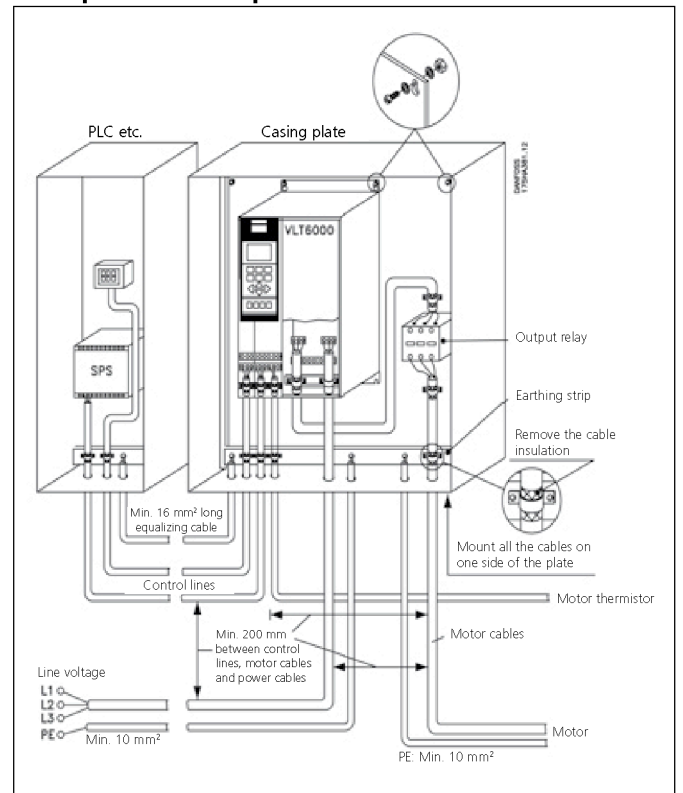


Fig. 25

5. Emergency situations

In the event of fire, the dampers must be closed and the air handling unit must be isolated from the power supply with the main switch. Close off spaces to minimize the supply of air. Alarm the fire brigade

Important!

The spaces should only be entered by personnel wearing a protective mask to filter out hazardous substances released into the air.

6. Dismantling and recycling

Dismantling and recycling should be carried out according to local laws and regulations.

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