

General Technical information



General

The Liberty air handling units are ideally delivered fully assembled in one part on a support frame. Optionally, the air handling unit can be supplied in sections or completely disassembled (flat pack) for assembly on site.

The units are supplied for indoor or outdoor installation in a single-layer version (E), stacked version (DV) or supply and return sections side by side (DH).

The air handling units can be factory wired and additionally equipped with a pre-programmed integrated controller from the manufacturer Priva.

It is also possible to build in a control panel supplied by a third party and wire components from the terminal strip.

Detailed information about the construction and performance of the air handling unit(s) offered and the comprised components, can be found in the technical specification accompanying the quotation!

Casing construction

The Liberty air handling unit is constructed as a cage construction consisting of corner profiles and mullions with embedded double-skin panels and hatches. The unit as a whole is mounted on a reinforced composite support frame.

Corner posts and mullions consist of composite profiles of fiberglass-reinforced polyester which are interconnected by corner pieces and T-caps of fiberglass-reinforced polyamide.

The panels and hatches consist of a 2 mm thick composite inner and outer panel with 70 mm polyurethane insulation in between. The inner panel is equipped with a PET film top layer. All panels and hatches have our unique permanent double polyurethane seal on the inside and outside.

The joining method of the inner and outer panel results in a high vapor resistancy of the panel.

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The hatches are equipped with recessed, thermal (cold) bridge free lift-and-turn latches with overpressure protection, key operation and a mounting facility for a padlock (if required).

As an option, both the panels and the hatches can be fitted with double-walled port holes/viewing windows with a black finishing ring.

The casing construction meets the best classes for mechanical strength, air leakage, filter bypass leakage, thermal transmission and thermal cold bridges according to NEN-EN 1886.

Mechanical strength	CLASS D1 (M)
Casing air leakage	CLASS L1 (M)
Filter bypass leakage	CLASS F9 (M)
Thermal transmittance	CLASS T1 (M)
Thermal bridging	CLASS TB1 (M)

The air handling unit is built on a frame consisting of fiberglass-reinforced polyester U-profiles according to EN 13706 grade E23. Air handling units for outdoor installation are equipped with a roof covering with aluminium finishing strip.

Standard colors:

- Panels RAL 7036
- Corner posts and mullions RAL 7015
- Supporting frame RAL 7036
- Roof covering RAL 7042
- Locks RAL 7015

Warranty:

- 5 year warranty on the casing*
- Roof covering with a minimum lifetime of 35 years

*warranty conditions can be subject to application, situation and other agreements. Ask Liberty Composite AHU for specific warranty conditions.

Inlet – outlet section

Inlet and outlet sections are designed as air distribution and inspection sections of sufficient length to allow an even airflow and routine inspection of the ventilation components. Inlet and outlet openings which are not intended for connecting ducts, are equipped with a plastic, flat protective grille with an internal concealed droplet eliminator. The droplet eliminator, consisting of polypropylene eliminator blades mounted in a composite frame, is designed to prevent water penetration into the unit. This design offers a shorter overall length as there are no inlet/outlet hoods required.

The sections can be supplied with a damper to isolate the air handling unit from its environment during downtime. Usually aluminium blade dampers are used with opposed blades, plastic bearings and rubber sealings on the damper blades. The construction depth and the damper blade construction depend on the size of the damper. The damper blades are linked with polypropylene gear wheels. A drive shaft in one of the middle gear wheels can be equipped for use with an actuator.

Multi-blade dampers, manufactured of other materials such as sendzimir galvanized, stainless steel or composite and dampers with a higher airtightness class (NEN-EN 1751) are also available according to your specific customer requirements.



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Filter section

Filter sections are fitted with front withdrawal filter frames in stainless steel 316 with a foamed polyurethane seal. Galvanized steel frames are used in chlorinated air (swimming pools).

Thanks to the high clamping force of the compression springs, it is possible to opt for a mounting method in which the filters can be removed on the dirty side or on the clean side.

ISO ePM10 (M5) bag filters are used as standard in the exhaust air and ISO ePM1 (F7) bag filters for in the supply air section.

With this filtration, during normal operation, the air handling unit and the duct system are adequately protected against dust depositions and a normal indoor air quality can be maintained.

There is a wide choice of filter types (panel filters, bag filters, compact filters), filter classes (from ISO coarse filters (G4) up to ISO ePM1-85% (F9) according to ISO

16890), filter medium (synthetic, fiberglass), filter frames (plastic, metal) and energy labels (Eurovent label A + to E). The installation of special filters (active carbon filters, chemical filters) for removing unwanted odours and gases is also possible.

The synthetic and fiberglass filters are pre-installed in the filter frames upon delivery of the unit.

Heat recovery section

Heat recovery sections are matched to the heat recovery type.

• Rotary heat exchanger section

The applied rotary heat exchangers are suitable for transferring both sensible and latent heat from the exhaust air to the supply air (winter) and vice versa (summer). The rotor is made up of flat and corrugated aluminium strips and can be supplied as a condensation rotor, hygroscopic rotor or sorption rotor, where the latent efficiency increases successively.

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The rotor is built into a sendzimir galvanized steel or aluminium housing with circumference seal and radial seal. The housing also contains the electric motor that drives the rotor by means of a belt.

By varying the rotational speed of the rotor, the heat recovery performance can be proportionally controlled.

The rotary heat exchanger can be provided with a purging sector which, in combination with a correct pressure hierarchy, ensures a minimal carry over of exhaust air to supply air.

• Plate heat exchanger section

In stacked air handling units, cross-flow plate exchangers with a vertical standing plate package are used. In side-by-side units, plate exchangers are installed horizontally with a horizontal plate package.

The cross flow heat exchange in the plate package between outdoor air and extract air, transfers sensible heat from one air stream to the other. The air flows in the plate package remain separated from each other by the construction and installation method of the aluminium plates in the housing of the plate exchanger.

At low outdoor temperatures, condensation of water vapor can occur on the exhaust side. That is why we include a drip tray with condensation drains mounted under the entire plate exchanger.

Overpressure or underpressure siphons can be supplied separately on order.

The cross-flow exchanger has a bypass opening for performance control and by means of a face and bypass damper upstream the plate package and the bypass opening, the amount of air over the bypass can be proportionally controlled between 0% and 100%. An integrated recirculation damper on the bypass opening can be supplied as an option.

In addition to the standard version, the cross-flow exchanger can also be supplied in a fully corrosion-resistant version. Cross-flow plate exchangers made of other materials (stainless steel, plastic) or with a higher airtightness class are also available according to specific customer requirements.

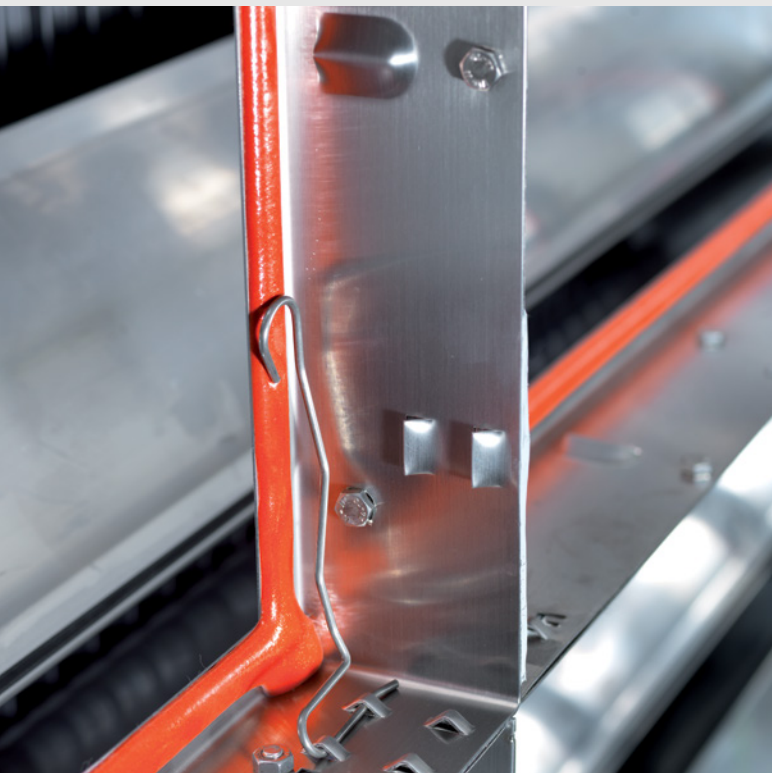
• Run around coil sections

A run around coil system consists of a cooler section in the extract part and a heater section in the supply part for installing a cooling coil and a heating coil.

The coils for cooling and heating are connected by means of a piping system with circulating pump and accessories and filled with a mixture of water and glycol. The circulating water/glycol mixture is heated in winter by the cooling coil in the extract air and cooled by the heating coil in the supply air. The process can be reversed in the summer. In this way, sensible heat is transferred from one air stream to the other. By varying the medium flow rate or the medium temperature, the heat recovery performance can be proportionally controlled.

The pipe-work between the heater and the cooler with pump and accessories is not included with the unit; so would need to be supplied and installation carried out by a specified contractor.

The cooler section and the heater section are described separately further on.



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Heater section

The heating coil consists of copper tubes on which aluminium fins are pressed and the tubes are connected to a copper distributor and collector (headers) with water connections with threaded fitting.

The fin package with copper tubes are mounted in a sendzimir galvanized steel frame.

The circulating hot water heats the tubes and fins, that transfer the heat to the airflow across the coil.

Besides the construction described above, the coil can also be supplied with other materials for the tubes (stainless steel), fins (aluminium pre-paint, copper, stainless steel), headers (coated steel, stainless steel) and frames (aluminium, stainless steel).

Water connections can also be provided with flanges or "Victaulic" grooves.

Cooler section

The structure of a cooling coil and the available construction materials are the same as for a heating coil. The heat transfer also takes place in an identical manner. In addition to sensible heat, the latent heat is often extracted from the air (dehumidification) by condensation of water vapor in air on the cold fins.

A droplet eliminator is fitted downstream the cooler for separating water droplets released from the fins. The blades of the droplet eliminator are made of polypropylene and are mounted in a composite frame.

A stainless-steel drip tray with a 1" drain connection or a drip tray with Marothaan coating is mounted under the cooler and droplet eliminator.

An overpressure or underpressure siphon is supplied separately on order.

Fan section

The fan section is sized to the type of fan being installed. The fans are designed to transport the design air volume through the system at the calculated internal pressure drop in the unit and the specified external pressure for the duct system.

• EC fan

An EC fan consists of a single-inlet centrifugal impeller with backward-curved blades, driven by an EC motor that is partially built into the impeller. The inlet cone and the motor/impeller combination are compactly assembled into one unit by means of aluminium profiles or a manufactured steel frame.

The fan is speed-adjustable with a 0-10 V=control signal which can be connected directly to the terminal strip in the electronics compartment of the motor.

Depending on the size of the air handling unit, one or more fans are mounted on a vertical wall in the AHU that forms the partition between the suction and discharge sides of the fan (s).



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The impeller is made of aluminium, composite material or coated steel. Other construction components are made of sendzimir galvanized steel with a coating on the steel pipes.

• Plug fan

This type of centrifugal fan is mounted on a steel frame and consists of a single- inlet impeller with backward-curved blades mounted on the shaft of an electric motor. The inlet cone is also screwed on the fan frame, so that the fan can be mounted in its entirety on anti-vibration mounts at the bottom of the fan section.

The fan is attached with a flexible connection to a vertical wall in the unit section that forms the partition between the suction and discharge side of the fan. In case of wide units, two or more fans can be placed next to each other.

The fan is driven by a standard motor IE2 or IE3 or a permanent magnet motor (IE4). The motors must be controlled by a frequency inverter to be set at the correct operating point.

Some motors can be equipped with a pre-programmed integrated inverter, so that the wiring between inverter and motor is not required.

• Belt driven fans

This fan assembly consists of a double-width double inlet centrifugal impeller with backward-curved blades in a spiral housing.

The impeller is driven by an electric motor with a belt transmission between the motor shaft and the impeller shaft. The design speed of the fan can be realized with the correct pulley diameter ratio.

The entire structure, consisting of a housing with inlet cones, an electric motor, bearing supports and belt transmission, is built on a steel support frame which is mounted on vibration dampers on the floor of the fan section. The impeller is made of coated steel. Other construction parts are made of sendzimir galvanised steel. On demand the fan can be delivered with enhanced corrosion protected materials.

The discharge opening of the fan housing is connected with a flexible sleeve to the partition wall in the cross section of the unit.

A frequency inverter must be used for an air handling unit that complies with the ErP regulation 1253/2014!

Attenuator section

The length of the section depends on the length of the applied splitters. Absorption splitters with RAL-Gütezeichen (quality seal) with fixed thickness and fixed air ways are used as standard.

As the air flow passes through the air ways, the sound is muffled by absorption of vibrational energy in the splitters.

The splitters are made of a galvanized steel frame with rounded edges with mineral wool inside, covered with glass fibre fabric.

Insertion losses, air generated noise and pressure drop are determined in accordance with EN ISO 7235.

Attenuators are hygienically tested and meet the hygiene requirements according to VDI 6022, VDI 3803 and DIN 1946.



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Accessories and options

Isolator switches

Isolator switches are mounted on the outside on the operating side of the casing, near the fan inspection hatch, and pre-wired to the motor.

In case of multiple fans, each fan is equipped with an isolator switch

Regardless of the rated motor power, the contacts of the isolator switch are in the mains to the motor, a control current switch is only supplied on written request.

Motors that are to be controlled by means of a frequency inverter, are connected using a shielded cable to an EMC connection in the isolator switch.

The isolator switches are designed in IP 66 with a locking facility and without auxiliary contact as standard.

Rotary heat exchanger controller

The rotary heat exchanger controller is mounted in or on the air handling unit, near the drive motor of the rotor. The power supply of the controller is wired up to the isolator switch. The controller is wired with a shielded cable, including the built-in PTC sensors and rotation monitoring, between controller and motor. A functional test is always performed at the factory before delivery.

Actuators

Actuators are mounted on the spindle/shaft of the damper. For outdoor installation, these are mounted in the air handling unit or outside on the unit and provided with a composite weatherproof cover.

Internal illumination

Illumination consists of the supply and mounting a 230 Volt lighting fixture, including lamp and wiring up to a panel switch or, if indicated, to 1 or more lighting switches (IP 65 with lamp).

Δp Meter

Differential pressure gauge with pointer display (scale suitable for the calculated pressure drop of the component), mounted in a panel of the casing of the air handling unit and equipped with mounted measuring tubes across the component to be measured.

Δp Switch

Differential pressure switch mounted in or on the casing of the air handling unit and equipped with mounted measuring tubes across the component to be measured. (IP 20). The differential pressure switch has a changeover contact and an adjustable switching range.

Δp Sensor

Pressure differential sensor, 24 Volt with a 0-10 Volt output signal, mounted in or on the casing of the air handling unit and equipped with mounted measuring tubes over the component or with separate hose and grommet for measurement in the duct (IP 65 with adjustable scale).

Frost protection thermostat

Frost protection thermostat (IP 20), switching at adjustable temperature, mounted on the heating coil and accessible from the inspection side, housing inside or on the outside of the air handling unit, with the capillary distributed over the coldest part of the finned tube surface. Increased degree of protection (IP 66) for swimming pool applications. Active (two-phase) frost thermostats or mounting on a change-over coil on request.



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Frequency inverter

Generally, frequency inverters are supplied separately, without parameter settings. At additional costs, the inverter is mounted on or in the air handling unit and connected with shielded cable to the isolator switch with EMC connection and from there connected to the motor. The PTC sensors of the motor are connected directly to the inverter. Functional test including setting of the nominal frequency at the offered operating point and other parameter settings are pre-set at the factory. Frequency inverters can be installed on request in an air handling unit with air containing aggressive components in an enclosed space, with forced ventilation.

Internal wiring

The internal wiring option includes cabling of all components that are included in the order and/or components for which mounting has been included based on third party supply.

Where possible, this wiring is installed internally using cable duct and plastic conduits. Grommets are made for each individual cable with a rubber grommet or a cable gland.

The wiring runs from the component to a terminal strip at a position to be specified. The terminal strip is placed in a casing (IP 65) with several cable glands. The isolator switches are wired as indicated in the "Isolator switches" section.

On request, the terminal strip can be designed as a switch panel for control components to be fitted later by others. Space will then be made available for this panel and the casing with panel layout will be adjusted.

Cable penetrations from the position of the terminal strip to locations outside the casing can only be made if specified and the locations signed off for approval.

**For more information
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