

AL-KO LUCHTTECHNIEK BV

Dwazziewegen 24
9301 ZR Roden
(088) 50 50 900
www.alkonl.com



richard ammerlaan / External

AL-KO

AL-KO THERM GMBH
Hauptstrasse 248-250
D-89343 Jettingen-Scheppach
alko-airtechnology.com

Tel.:N/A

General specifications

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Project: **227741 -**

Order #:

Description: WBC / Appeldoorn

Quotation

Date Printed: 18.04.2024

Edition Date: 18.04.2024

Editor: richard ammerlaan

UNIT DESIGN AT4-T / AT4-F

The following descriptions define the design of the units to be offered for the listed individual items. All technical details and values are listed in the individual items.

Mechanical stability: _____ Class D1 (M)
Housing leakage: _____ Class L1 (M)
Thermal insulation: _____ Class T2 (M)
Thermal bridge factor AT4-T: _____ Class TB1 (M)
Thermal bridge factor AT4-F: _____ Class TB2 (M)
Filter bypass leakage: _____ < 0.1% (M)
Acoustic insulation dimension DIN ISO EN 140:– 41dB

The insertion insulation value De is measured according to EN 1886 and refers to the entire device.

The acoustic insulation value RW relates to the housing panel.

_____ De(dB)	_____ RW(dB)
* 125 Hz _____ 15.8 dB	_____ 23.0 dB
* 250 Hz _____ 25.2 dB	_____ 37.0 dB
* 500 Hz _____ 28.4 dB	_____ 47.0 dB
* 1000 Hz _____ 29.7 dB	_____ 53.0 dB
* 2000 Hz _____ 32.4 dB	_____ 59.0 dB
* 4000 Hz _____ 36.9 dB	_____ 65.0 dB
* 8000 Hz _____ 40.4 dB	_____

The unit casing corresponds inside and outside to the corrosion protection class C4 in accordance with DIN EN ISO 12944-2 on request, a version in corrosion protection class C5 is available as an option.

The housing frame construction consists of glass-fiber reinforced special plastic profiles (TB1 - unit type AT4-T), optionally of seawater resistant aluminum profile (according to DIN 81249-1) (TB2 - unit type AT4-F) with 38 mm edge dimension, which are thermally decoupled via plastic profiles.

All unit panels are a cold bridges.
free design, removable, 48 mm thick, double-skinned and insulated with non-combustible material (DIN 4102, A1).
The inner and outer shells are made of galvanized sheet steel, which is after processing additional power coated, also on the cut edges with 60µm coat thickness (color RAL 7001).

The use of pre-coated, uncoated housing parts or a wet painting does not comply with the quality requirements

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The mechanical stability complies with
DIN EN 1886 class D1.

Variable separation of the functional units
is achieved by means of decoupled
and thus free of cold bridges supports, made of seawater-
resistant aluminum material (according to DIN 81249-1).
There is thermal decoupling between the
Inside and outside of the support bars.

The unit connections are internal
and self-centering.
The base frame of the unit is galvanized and
additionally powder-coated 60 µm coat thickness
(RAL 7001).

Design and construction according to DIN EN 1886
and VDI 6022 (type-tested).

For conformity to VDI 6022 standard, a type test must be
demonstrated. Additionally according
VDI 6022, it must also be demonstrated that the
processed gaskets, plastic parts and
plastic parts and sealing compounds are hygienically harmless
and proof of non-interchangeability
Class 0 or 1 in accordance with DIN EN
ISO 846.

The frame is plain with the inner surfaces of the
unit and completely smooth, without any cut edges
and welded seams.

The enclosure panel and the frame construction
form a flat unit, which makes the
the inner surfaces of the unit aerodynamically
optimized.

Frame profiles sticking out in the air
stream are not permissible,
as the resulting air turbulence is conducive to the
accumulation of dirt in dead zones.
Joints and holes outside the
unit separating points in the floor are not permitted
and must be sealed with sealing profiles.
Residue-free cleanability must be
be ensured. The sealing materials are
resistant to disinfectants for
wipe disinfection.

All sealing materials are
closed-pored and microbially inert.

The tray is to be designed as a component of the enclosure
without reducing the free cross-section of the air
cross-section.

The drainage behavior of the drip tray construction

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is documented as part of the hygiene type test.

This hygienically smooth interior housing construction of thermally decoupled frame and flange panels results in an integral TB1 or TB2 outer casing without weak points such as door gaps or frames that are not uncoupled. All functional units are accessible on both sides for cleaning.

All heat exchangers used are cleanable down to the core. The cleanability is documented as part of the type examination.

The door and lid seals can be replaced if necessary and are and are temperature-resistant up to up to 80°C.

All service doors are optionally available with with clamps or hand lever locks.

The inner shells of humidity-relevant components are at least galvanized with an additional powder coating and shall be fitted with a fully drainable condensate drip tray made of stainless steel 1.4301.

All components are cleaned in the factory according the hygiene guideline.

For an improvement of the cleaning possibilities, a jointless construction is used in the roof and floor areas, depending on the application. The necessary stability is achieved by the vertical frame profiles to the base profiles with the base frames and the and the roof assembly.

Required multifunctional chambers are optionally designed as intake, discharge, piping, inspection or maintenance chamber.

Optionally with door, tray, lighting. The allocation and required lengths are in the technical data.

Multifunctional chambers as inspection chambers from a clear unit height of 1300 mm have an operating door with sight glass and optionally a lighting system wired to the outside. The position is specified in the technical data for the respective functional units.

Potential free bonding in accordance with DIN EN 60204-1 on all panels, intermediate crossbars and frame elements by means of low-impedance between the inner and outer shell of the unit and the frame. The AHU thus has a continuous functional potential

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free bonding to prevent static charging and thus improves the electromagnetic compatibility (EMC), which can lead to malfunctions.

The following documents must be enclosed in order to verify the offer:

- Eurovent certification certificate of the series with guarantee of the design tolerances required therein
- Proof of the hygiene type examination
- Proof of the test for material changeability
- Proof of cleanability of the heat exchangers down to the core
- Proof of compliance with DIN ISO 9000
- Noise emission calculation at the duct connections and the radiation from the enclosure wall according to EN 1886 and ISO 3744

Confirmation of CE conformity of the of the ventilation unit upon delivery in accordance with of the following EU directives:

- Machinery Directive 2006/42/EC
- Ventilation unit Ecodesign regulation (EU) 1253/2014
- EMC Directive 2014/30/EU

If the technical values deviate from the tender, the following information must also be enclosed:

- Technical data sheets, unit drawings with dimensions, delivery divisions and module weights

The specified drive power values are maximum values and must not be exceeded.

The specification of the specific fan power SFP and the Eurovent energy efficiency class is mandatory.

The performance data must be determined in accordance with Eurovent specifications.

When specifying of the electrical power consumption of the fan, all losses that occur must be taken into account (installation losses, belt losses, motor losses, losses due to FC).

The following power values must be guaranteed by the bidder:

- The efficiency of the heat and moisture recovery of the heat recovery system.
- The electrical power consumption of the fan.
- Sound emission level

The building owner reserves the right to consult an expert to check the technical data.

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Specification as before but with
following additions:

DELIVERY RECORD
AL-KO THERM GMBH
Maschinenfabrik
Hauptstrasse 248 - 250
89343 Jettingen - Scheppach

responsible person:
richard ammerlaan
N/A

Part Description

HAND LEVER

Hand lever for easy opening and closing
of unit doors made of UV resistant
glass-fibre reinforced plastic.
Optionally with lock and safety catch.

SIPHON

UNIT CONNECTION WITH ACOUSTIC DECOUPLING

Foam rubber connection for accommodating
a connection frame, attached to the frame
by screw connection and Dämmgulast panels.
Including equipotential bonding.

MULTI-LEAF DAMPER

With counter-rotating, torsionally
rigid hollow section steel section
louvres, sealed by special section
rubber.

Airtight according to DIN

EN 1751 class 2. Frame made of
galvanised steel sheet,
depth 180 mm.

For hygiene reasons, the driver
linkage is located outside the
airflow.

This means thorough and rapid
cleaning is possible at any time.

EMPTY CHAMBER

Empty chamber according to specification.

BAG FILTER

wedge shaped filter bags made of synthetic fibre

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fleece. Mikrobiel inert synthetic filter medium.
No abrasion of the medium fibres.
Tear proof up to 450 Pa pressure difference.
Bag filter made of nano wave material reach
a 2.5 higher filtersurface due to a layer of
corrugated extra fine fibres and gives
highest possible dust holding capacity.
Filter acc. ISO 16890 and EUROVENT
certified. Tested acc. CE 1935/2004
to determine the ability for food contact.

FILTER QUICK CLAMPING DEVICE FSV 1.4301

Complete filter insert for continuous sealed
seat in special installation frame with quick
clamping device mounted in the housing.
The filters can be pulled out to the side for
maintenance purposes.

HEAT EXCHANGER CLOSED-CYCLE SYSTEM

High-performance closed-cycle system heat
exchanger configured for operation with
water / glycol mixes comprising copper
pipes with mechanically pressed-on
aluminium louvers.

Louvre spacing 2.5 mm, optimised for low
air-side pressure losses.

Manifold pipes made of copper. With high
efficiency levels (>70%) from 2 heat
exchanger blocks per air path connected
together at the factory with sufficient
space for cleaning possibilities.

The heat exchangers have verification of
cleaning capability into the core area.

Exhaust air heat exchanger equipped with
condensation trays as well as eliminators.

Venting and drainage pipes provided by
the clients.

The eliminator is configured without a
frame structure for hygiene reasons, and
can easily be pulled out of the device.

HEAT EXCHANGER INSTALLATION STAINLESS STEEL

Rails for installation of the heat exchanger
made of stainless steel 1.4301.

SPECIAL HEAT EXCHANGER

Heat exchanger can be removed
to the side.

Manifolds, louvers and housing
parts according to the technical
data in the appendix.

ELIMINATOR

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Eliminator made of PP louvres with stainless steel pull-out rails.

Access via a removable inspection cover from the operating side of the ventilation unit.

For optimum hygienic condensation drain, the eliminator block is completely open at the bottom.

The continuous temperature resistance is 80 °C.

EC FAN RQM

Complete installation module with highest system efficiency, specially developed and optimized for use in Ventilation and air conditioning units. Multi-spiral guiding device made of galvanized sheet steel to increase the pressure and the static fan efficiency. Newly developed high performance impeller with optimized geometry and maximum efficiency, consisting of backward curved hollow profile blades with real flow profile and rounded, oblique from cover plate to support plate the leading edges for optimal impact over the entire blade width. Impeller made of high-strength sheet steel out of automated production, robot welded, degreased, iron-phosphated and with high-quality epoxy-polyester mixed powder coated, with clamping bush on the shaft of the mounted motor. Static and dynamically balanced according to DIN ISO 21940-11. System inlet nozzle made of galvanized sheet steel for optimum flow of the impeller. Ultra-premium engine in highly efficient permanent magnet technology with efficiency class IE5, free of magnets from rare earths. At the motor support plate mounted, integrated control electronics, optimal matched to the high-performance impeller. Inverter pre-parameterized, immediately ready for operation for use with analogue 0...10 V signal. With modbus interface. The drive system is 100 % speed adjustable. Performance data in accuracy class 1 to DIN 24166.

In order to increase the product quality the mounted fans in the AHU housing, before leaving the factory, are tested in a vibration check and in their function.

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FREQUENCY INVERTER WITH INTEGRATED REP. SWITCH

Voltage DC link converter for infinitely variable speed control of three-phase asynchronous motors specially for driving continuous-flow machines (pumps and fans with square-wave load moment), without power reduction at nominal motor speed compared to direct mains operation, complete installation unit with built-in choke to reduce mains feedback, integrated radio interference suppression filter for complying with the limit values of EN 55011 class A and class B, with automatic energy optimisation for maximum motor efficiency in the part-load range.

At standstill and in operation short-circuit, ground fault and switching-proof at the output, multi-motor operation permitted, maintenance-free, suitable for maximum ambient temperatures of 45 degrees C.

Integrated rep. switch:

Mains-side, with all-pole separation;

Control panel with plain text display for start-up settings and display of all data relevant to operation (in IP20 devices removable and copy function), with keys for start, stop, manual and automatic mode.

Devices from ISO 9001 certified quality production with CE marking (conformity with EMC Directive 89/336/EEC and low-voltage directive 73/23/EEC), EN 50081-1 emitted interference, EN 50082-2 interference resistance and EN 50178 PELV, safe electrical isolation of the control inputs.

Standard functions:

Automatic motor adaptation, automatic run-up and delay time adaptation, min. and max. speed limiting, fixed speed selection, speed masking, fast stop, DC brake, Synchronisation with already running motor, motor PTC thermistor evaluation, V-belt monitoring, operating hours counter, fault message memory, PID controller (scalable in process parameters).

Control inputs:

2 analog inputs, scalable for external nominal values and actual value feedback

0 - 20mA or 0 to 10V,

Also for motor PTC thermistor connection, 4 digital inputs electrically isolated, programmable speed up/ speed down/ fixed speed selection / start / stop / change of direction of rotation / fault acknowledgement / manual-O automatic.

2/1 programmable pulse/rotation encoder inputs

Internal electrical power supply: 10V DC,

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30mA for potentiometer 1kohm and 24V DC,
200 mA for connecting the digital inputs.

Control outputs:

2 programmable digital/pulse outputs:

Electrically isolated;

2 programmable relay outputs:

2 potential-free changeover contacts,

240V AC/max. 2A,

24V DC/max 10 mA

1 programmable analog output:

0/4 - 20 mA, max. load 500 ohm

Serial interface:

RS 485 - Two-way interface for carrying setting values,
control signals and status information.

The interface must permit direct connection to a higher-level
control system (no integrator required) and support the
following transfer profiles as standard:

FC Danfoss / JCI - Metasys N2 / Landis + Staefa FLN (P1)

Optional:

LC motor filter (sinusoidal filter),

Installation kit for IP54-compliant mounting of the control

section in external housing, bus connection for

Profibus (FMS/DP) and LON (free topology).

SILENCER M

Vertically arranged panels mounted

in the housing using angle rails

made of sound-absorbent mineral

fibre panels, non-flammable

according to DIN 4102 A2.

With half-side sheet metal cover,

framed in galvanised, powder-coated,

steel sheet frame with profile for

favourable flow (radius > 15 mm).

Surface made of glass silk,

abrasion-resistant up to 20 m/s

flow speed.

BAG FILTER

wedge shaped filter bags made of synthetic fibre

fleece. Mikrobiel inert synthetic filter medium.

No abrasion of the medium fibres.

Tear proof up to 450 Pa pressure difference.

Filter acc. ISO 16890 and EUROVENT

certified. Tested acc. CE 1935/2004

to determine the ability for food contact.

FILTER FRAME POWDER-COATED

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Complete powder-coated filter insert attached in EURO installation frame with special holding springs and mounted in the housing.

Up to housing width 1300 mm - filter inserts with installation frame can be pulled sideways out of the housing.

From housing width 1606 mm onward or filter quality F5 - filter inserts with installation frame permanently mounted in the housing according to DIN 1946 part 4.

Filter change on dust or clean air side.

(according to VDI 6022 only dust air side)

REPAIR SWITCH WIRED UP

Wiring on all-pole switch-off repair

switch with index of protection IP 65

REPAIR SWITCH

As load switch:

With 2 auxiliary contacts

(1 NC contact, 1 NO contact).

Index of protection IP65.

Mounted on the fan part

As control switch: Index of

protection IP65.

Mounted on the fan part

GS-Pos.: Aircloud

Supply / Exhaust air unit

Supply air:

Air flow	20.000 m ³ /h
External pressure	400 Pa
Air velocity	1,7 m/s
Eurovent Efficiency Wint./Sum.	A (2016) / A (2020)
RLT energy efficiency class	- (2018)
Calculated ERP compliance	Compliant 2016/2017

Exhaust air:

Air flow	15.000 m ³ /h
External pressure	400 Pa
Air velocity	1,3 m/s

Flexible connection - Rubber (FU 0)

Supply air

- acoustically decoupled unit connector

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Damper inside Supply air (FU 0)
- Damper standard gal. Steel leverage

Empty section Supply air (FU 1)
- Empty section
- Maintenance panel

Filter Supply air (FU 2)
- Bag filter Deltrian NW F7 F9
- FILTER QUICK-RELEASE FSV 1.4301
- Maintenance door
- Hand Lever

Run-around heater Supply air (FU 18)
- Special heat exchanger KVS
- Heat exchanger installation kit SS304
- Maintenance panel

Heating coil Supply air (FU 4)
- Special heat exchanger

Cooling coil Supply air (FU 5)
- Special heat exchanger
- Cooler eliminator
- Maintenance panel
- Base tub stainless steel 1.4301

Empty section Supply air (FU 0)

Fan - Plug fan (airvent direct driven) Supply air (FU 8)
- Fan EC RQM
- FC102 FC with integrated repair switch
- Maintenance door
- Hand Lever
- Safety lock

Soundabsorber - D12M Supply air (FU 9)
- sound attenuator M

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Flexible connection - Rubber (FU 0)**Supply air**

- acoustically decoupled unit connector

Flexible connection - Rubber (FU 0)**Exhaust air**

- acoustically decoupled unit connector

Filter Exhaust air (FU 11)

- Bag filter Deltrian M5
- FILTER FRAME, POWDER-COATED 7001
- Maintenance door
- Hand Lever

Soundabsorber - D12M Exhaust air (FU 12)

- sound attenuator M

Empty section Exhaust air (FU 0)**Fan - Wheel - EC Exhaust air** (FU 13)

- EC fan EBM
- Repair switch wiring
- repair switch
- Maintenance door
- Hand Lever
- Safety lock

Run-around cooler Exhaust air (FU 19)

- Special heat exchanger KVS
- Maintenance panel
- Base tub stainless steel 1.4301

Empty section Exhaust air (FU 0)**Soundabsorber - D12M Exhaust air** (FU 14)

- sound attenuator M

Empty section Exhaust air (FU 0)

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Empty section Exhaust air (FU 15)

- Empty section
- Maintenance panel

Damper inside Exhaust air (FU 0)

- Damper standard gal. Steel leverage

Flexible connection - Rubber Exhaust air (FU 0)

- acoustically decoupled unit connector

Technical data

Flexible connection - Rubber (FU 0)

Supply air

Type:	Flexible connection
Width:	2.142 mm
Height:	1.530 mm
Material:	Rubber

Damper inside Supply air (FU 0)

Type:	Damper inside
Width:	1.953 mm
Height:	1.453 mm
Connector:	A20
Needed torque:	25,00 Nm
Design pressure:	5 Pa
Actuator type:	linkage outside one-sided
Number of axis:	1
Axis type:	square 15mm

Accessory

- Damper leak tight class 2

Empty section Supply air (FU 1)

Specification:	Empty section
Length:	230 mm

Accessory

- Maintenance panel

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Filter Supply air	(FU 2)
Type:	BF - Bag Filter
Class:	ePM1-60 % / F7
eff. class:	A
Design pressure:	82 Pa
Initial pressure:	41 Pa
End pressure:	123 Pa
air velocity cross section:	1,7 m/s
Filter surface:	71,2 m ²
Filter length:	635 mm
Filter element 592x592:	6
Filter element 287x592:	5
Filter element 287x287:	1
Maintenance:	F - quick change filter frame
Air flow:	20.000 m ³ /h

Accessory

- Maintenance door
- Hand Lever
- Quick change filter frame out of stainless steel (1.4301)

Run-around heater Supply air	(FU 18)
Type:	KVS - Copper/Aluminium - A
Total Thermal Capacity:	111,27 kW
Exchange rate:	57,6 %
HRS class (EN13053/2020):	H3
Balanced Efficiency (dry / 5-25°C):	67,2 %
pressure loss (dry):	125 Pa
Air flow speed:	1,79 m/s
Temperature Inlet:	-10,0 °C
Rel. Humidity Inlet:	71,1 %
Abs. Humidity Inlet:	1,1 g/kgL
Temperature Outlet:	6,5 °C
Rel. Humidity Outlet:	19,1 %
Abs. Humidity Outlet:	1,1 g/kgL
Medium:	Water - Antifrogen N (Standard)
Glycol content:	30 %
Medium flow quantity:	7.341,7 l/h
Δp medium:	70,1 kPa
Δ fins:	2,5 mm
Content:	190,0 l
Pipes:	Copper
Fins:	Aluminium
Header:	Copper
Frame:	Galvanised steel
Frame to hold frost protection equipment:	Without
Connection type:	A - water connection straight sideways
Connection width:	DN 50 (R 2)

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Connections per circuit: 2
Air flow: 20.000 m³/h

Accessory

- Maintenance panel
- Coil installation rail made of stainless steel 1.4301

Heating coil Supply air (FU 4)
Type: PWW - Copper/Aluminium - A
Total Thermal Capacity: 90,77 kW
pressure loss (dry): 21 Pa
Air flow speed: 2,01 m/s
Temperature Inlet: 6,5 °C
Rel. Humidity Inlet: 19,1 %
Abs. Humidity Inlet: 1,1 g/kgL
Temperature Outlet: 20,0 °C
Power reserve: 17 %
Rel. Humidity Outlet: 7,9 %
Abs. Humidity Outlet: 1,1 g/kgL
Medium: Water
Medium temperature IN: 55,0 °C
Medium temperature OUT: 45,0 °C
Max. medium pressure: 16,0 bar
Medium flow quantity: 7.910 l/h
 Δp medium: 14,5 kPa
 Δ fins: 2,1 mm
Rows: 1
Circuits: 21
Content: 13,4 l
Pipes: Copper
Fins: Aluminium
Header: Copper
Frame: Galvanised steel
Frame to hold frost protection equipment: Without
Connection type: A - water connection straight sideways
Connection width: DN 40 (R 1-1/2)
Connections per circuit: 2
Air flow: 20.000 m³/h

Cooling coil Supply air (FU 5)
Type: PCW - Copper/Aluminium - A
Total Thermal Capacity: 122,77 kW
pressure loss (dry): 105 Pa
Pressure loss eliminator: 13 Pa
Air flow speed: 2,04 m/s
Temperature Inlet: 26,7 °C
Rel. Humidity Inlet: 64,9 %
Abs. Humidity Inlet: 14,3 g/kgL

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Temperature Outlet:	16,0 °C
Power reserve:	22 %
Rel. Humidity Outlet:	100,0 %
Abs. Humidity Outlet:	11,4 g/kgL
Medium:	Water
Medium temperature IN:	12,0 °C
Medium temperature OUT:	18,0 °C
Max. medium pressure:	16,0 bar
Medium flow quantity:	17.610 l/h
Δp medium:	29,8 kPa
Δ fins:	2,5 mm
Rows:	8
Circuits:	52
Content:	89,1 l
Pipes:	Copper
Fins:	Aluminium
Header:	Copper
Frame:	Aluminium
Connection type:	A - water connection straight sideways
Connection width:	DN 65 (R 2-1/2)
Connections per circuit:	2
Air flow:	20.000 m ³ /h

Accessory

- Maintenance panel
- Base tub stainless steel 1.4301
- droplet eliminator convertible
- Coil installation rail made of stainless steel 1.4301

Empty section Supply air (FU 0)
Length: 383 mm

Fan - Plug fan (airvent direct driven) Supply air (FU 8)
Fan type: Plug fan (airvent direct driven) 800 (5412)
Air flow: 20.000 m³/h
Static increase of pressure: 786 Pa
Casing pressure loss: 23 Pa
Capacity on shaft: 5,28 kW
Static efficiency: 83 %
Efficiency class N (EU 327/2011): 79,5
Speed: 1.121 1/min
Max. speed: 1.588 1/min
Motor: 0
Motor type: Synchronous motor
Control type: FC
Speed: 1.121 1/min
Volume / rotation reserve: 42 %
Power PM-FU: 6,05 kW

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Efficiency class:	IE 5							
SFP value (GEG 2020):	732 W/(m³/s)							
SFPv (EN 16798-3):	1.032 W/(m³/s)							
SFP class:	SFP 2							
Speed Class:	V2							
Nominal rated voltage:	400 V							
Nominal rated capacity:	15 kW							
Nominal rated current:	32,0 A							
Nominal rated speed(s):	1200 1/min							
Protection class:	IP54							
Insulation class:	F							
P Class:	P1							
System Efficiency:	70 %							
bush number:	2012							
bush diameter:	42 mm							
Sound Power Level Inlet:	80,0 dB(A)							
Sound Power Level Outlet:	82,9 dB(A)							
Octave band:	63 125 250 500 1k 2k 4k 8k Hz							
Lw Inlet:	79 84 80 77 75 70 69 62 dB							
Lw Outlet:	80 87 81 78 78 75 73 66 dB							
Air flow:	20.000 m³/h							
K factor:	621							
volume flow [m³/h]:	K factor x $\sqrt{\text{nozzle-pressure [Pa]}}$							

- Accessory
- Volume flow measuring for fan
 - FC with rep.-switch
 - Wiring FC/Ventilator
 - Maintenance door
 - Hand Lever
 - Safety lock

Soundabsorber - D12M Supply air	(FU 9)							
Sound attenuator type:	D12M							
Design pressure:	13 Pa							
Sound attenuator length:	918 mm							
Number of silencers cartridges:	7							
Gap width:	90 mm							
Pullable:	No							
Octave band:	63 125 250 500 1k 2k 4k 8k Hz							
Lw (oct):	4 10 21 23 26 20 14 11 dB							
Air flow:	20.000 m³/h							

Flexible connection - Rubber Supply air	(FU 0)							
Type:	Flexible connection							
Width:	2.142 mm							
Height:	1.530 mm							

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Material: Rubber

Flexible connection - Rubber (FU 0)

Exhaust air

Type: Flexible connection
Width: 2.142 mm
Height: 1.530 mm
Material: Rubber

Filter Exhaust air (FU 11)

Type: BF - Bag Filter
Class: ePM10-55 % / M5
eff. class: E
Design pressure: 30 Pa
Initial pressure: 15 Pa
End pressure: 46 Pa
air velocity cross section: 1,3 m/s
Filter surface: 37,8 m²
Filter length: 600 mm
Filter element 592x592: 6
Filter element 287x592: 5
Filter element 287x287: 1
Maintenance: F - quick change filter frame
Air flow: 15.000 m³/h

Accessory

- Maintenance door
- Hand Lever
- Quick change filter frame coated

Soundabsorber - D12M Exhaust air (FU 12)

Sound attenuator type: D12M
Design pressure: 7 Pa
Sound attenuator length: 918 mm
Number of silencers cartridges: 7
Gap width: 90 mm
Pullable: No
Octave band: 63 125 250 500 1k 2k 4k 8k Hz
Lw (oct): 4 10 21 23 26 20 14 11 dB
Air flow: 15.000 m³/h

Empty section Exhaust air (FU 0)

Length: 383 mm

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Fan - Wheel - EC Exhaust air	(FU 13)						
Fan type:	Wheel - EC 800 (5412)						
Air flow:	15.000 m³/h						
Static increase of pressure:	556 Pa						
Casing pressure loss:	9 Pa						
Static efficiency:	66 %						
Manufacturer efficiency:	69 %						
Efficiency class N (EU 327/2011):	70,9						
Speed:	905 1/min						
Max. speed:	1.215 1/min						
Motor:	0						
Motor type:							
Control type:	EC - controlled						
Speed:	905 1/min						
Control voltage:	6,5 V						
Volume / rotation reserve:	34 %						
Power input:	3,49 kW						
Efficiency class:	IE 5						
SFP value (GEG 2020):	514 W/(m³/s)						
SFPv (EN 16798-3):	814 W/(m³/s)						
SFP class:	SFP 2						
Speed Class:	V1						
Nominal rated voltage:	380 .. 480 V						
Power Frequency:	50 Hz						
Nominal rated capacity:	7.95 kW						
Nominal rated current:	12.10 A						
Protection class:	IP54						
Overload protection:	Power control						
Insulation class:	F						
P Class:	P1						
System Efficiency:	65 %						
Sound Power Level Inlet:	76,2 dB(A)						
Sound Power Level Outlet:	79,0 dB(A)						
Octave band:	63 125 250 500 1k 2k 4k 8k Hz						
Lw Inlet:	80 72 71 71 71 70 66 65 dB						
Lw Outlet:	83 75 76 77 74 71 67 66 dB						
Air flow:	15.000 m³/h						
K factor:	695						
volume flow [m³/h]:	K factor x $\sqrt{\text{nozzle-pressure [Pa]}}$						

- Accessory
- Volume flow measuring for fan
 - Wiring repair switch/fan
 - Repair switch
 - Maintenance door
 - Hand Lever
 - Safety lock

Run-around cooler Exhaust air (FU 19)
Type: KVS - Copper/Aluminium - A

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Total Thermal Capacity:	121,15 kW
Exchange rate:	62,1 %
HRS class (EN13053/2020):	H2
Balanced Efficiency (dry / 5-25°C):	72,5 %
pressure loss (dry):	100 Pa
Pressure loss eliminator:	
Air flow speed:	1,40 m/s
Temperature Inlet:	21,0 °C
Rel. Humidity Inlet:	15,9 %
Abs. Humidity Inlet:	2,5 g/kgL
Temperature Outlet:	-2,9 °C
Rel. Humidity Outlet:	82,7 %
Abs. Humidity Outlet:	2,5 g/kgL
Medium:	Water - Antifrogen N (Standard)
Glycol content:	30 %
Medium flow quantity:	6.512,4 l/h
Δp medium:	104,6 kPa
Δ fins:	2,5 mm
Content:	235,0 l
Pipes:	Copper
Fins:	Aluminium
Header:	Copper
Frame:	Aluminium
Connection type:	A - water connection straight sideways
Connection width:	DN 50 (R 2)
Connections per circuit:	2
Air flow:	15.000 m³/h

- Accessory
- Maintenance panel
 - Base tub stainless steel 1.4301
 - Coil installation rail made of stainless steel 1.4301

Empty section Exhaust air (FU 0)
Length: 153 mm

Soundabsorber - D12M Exhaust air (FU 14)
Sound attenuator type: D12M
Design pressure: 7 Pa
Sound attenuator length: 918 mm
Number of silencers cartridges: 7
Gap width: 90 mm
Pullable: No
Octave band: 63 125 250 500 1k 2k 4k 8k Hz
Lw (oct): 4 10 21 23 26 20 14 11 dB
Air flow: 15.000 m³/h

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Empty section Exhaust air (FU 0)
Length: 230 mm

Empty section Exhaust air (FU 15)
Specification: Empty section
Length: 230 mm

Accessory
- Maintenance panel

Damper inside Exhaust air (FU 0)
Type: Damper inside
Width: 1.953 mm
Height: 1.453 mm
Connector: A20
Needed torque: 25,00 Nm
Design pressure: 3 Pa
Actuator type: linkage outside one-sided
Number of axis: 1
Axis type: square 15mm

Accessory
- Damper leak tight class 2

Flexible connection - Rubber (FU 0)
Exhaust air
Type: Flexible connection
Width: 2.142 mm
Height: 1.530 mm
Material: Rubber

Unit features:
Frame material AT4-F: Alu
Panel Isolation: Decoupled [T2(M)]
MB-Reference: AT4-F-02
Panel material: 7001/7001
Unit corner material (frame): Alu / TB2
Siphon: Standard siphon
Transport: Standard transport
Base frame: 130 mm

Sound level Exhaust air

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sum of sound power level unitwall	53,0 dB(A)
Sum of sound pressure level Unit wall in 1.000 mm distance	36,8 dB(A)
sum of sound power level ABL nozzle	52,5 dB(A)
Sum of sound pressure level EA Nozzle in 1.000 mm distance	35,5 dB(A)
sum of sound power level FOL nozzle	58,2 dB(A)
Sum of sound pressure level OA Nozzle in 1.000 mm distance	41,2 dB(A)

Sound level Supply air

sum of sound power level unitwall	59,5 dB(A)
Sum of sound pressure level Unit wall in 1.000 mm distance	43,2 dB(A)
sum of sound power level AUL nozzle	70,7 dB(A)
Sum of sound pressure level OA Nozzle in 1.000 mm distance	53,7 dB(A)
sum of sound power level ZUL nozzle	65,4 dB(A)
Sum of sound pressure level SA Nozzle in 1.000 mm distance	48,4 dB(A)

Unit dimensions:

Length	5.967 mm
Width	4.457 mm
Height	1.716 mm
transport weight	5.482 kg
Manufacturer	AL-KO THERM
Type	AT4-F 28x20/28x20 - Interior
KS-Number	227741

***** END OF LIST *****