Air Handling Unit
Technical Data

Compact L

Index

Changes compared previous version:

1. Updating information about the modulating actuator for water valves in the following chapters:
   - *6.1. Accessories list*
   - *6.3.1 Useful information*
   - *6.3.2 Coils*
   - *6.3.5 Valves and actuators*

   ATE00AMVA item has been replaced by ALE00AMVA.

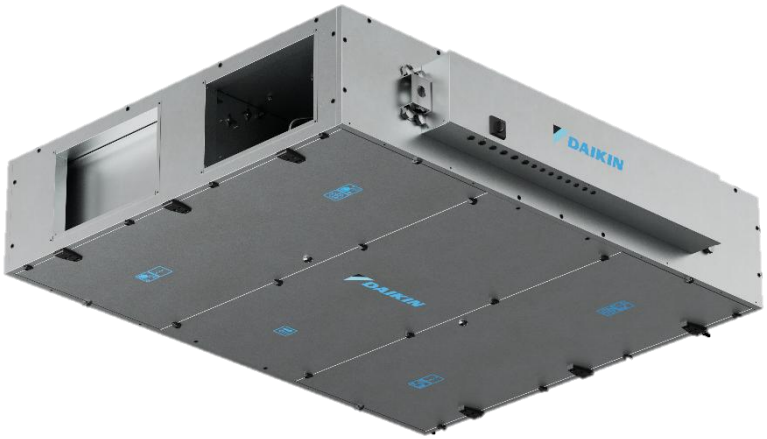
2. Adding information about the expansion module to control additional components for Compact L Pro in the following chapters:
   - *5.9.1. Pro control*

3. Replacing Aluzinc with Magnelis within the whole document as concern the panels and internal part materials.

1. Features

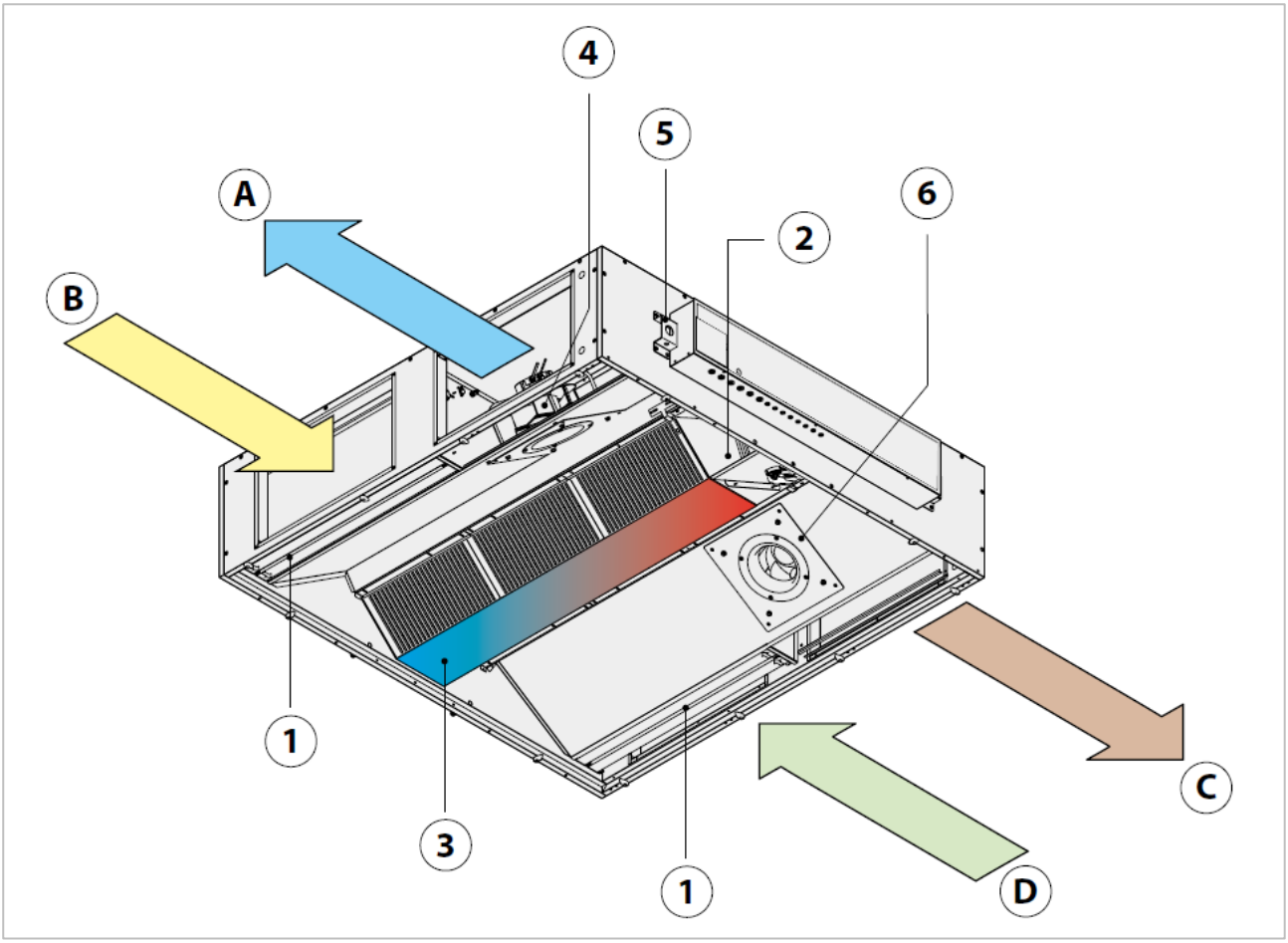
Heat recovery unit for decentralised ventilation system

- Available in 6 sizes with an air flow from 150 up to 4000 m^3/h
- Up to 700 Pa of external static pressure, depending on the model sizes
- Smallest size is 280 mm of height, while the biggest size is 500 mm of height
- Energy saving solution thanks to the modulating automatic bypass
- Reduced energy consumption thanks to EC fans with IE4 motor efficiency
- Free-cooling operation and energy efficient defrost logic
- Counter flow plate heat exchanger with efficiency up to 93%
- Double filter on supply and return, up to ePM_1 50% (F7) + ePM_1 80% (F9)
- Possibility to have pre – filter (ISO Coarse 55% (G4), ePM_{10} 55% (M5), ePM_1 50% (F7)
- CO_2 level management thanks to optional CO_2 sensor
- Water, DX and electric coil for a fully air treatment
- 50mm double skin panels, mineral wool insulated
- Modbus and BACnet compatible (accessory)
- Ideal solution for light commercial applications as: retail shops, small and large offices, hotels, cinemas, theatres, school, colleges, universities, etc
- Left or right versions*
- Available also with integrated water heating coil
- Smart (Daikin F1-F2/P1-P2 communication protocol) or Pro (Open protocol) version
- CAV and VAV control solutions



* For left/right handing please refer to page 7

2. Unit description



Components

1. Filter and pre – filter
2. By-pass
3. Heat Exchanger
4. Supply Fan
5. Bracket for ceiling suspension
6. Return Fan

Airflow direction

A. Supply Air
B. Return Air
C. Exhaust Air
D. Fresh Air

3. Standard material name – Base module

	Product		Components	Size		Connection side	Model revision	Controls
Digit	1	2	3	4	5	6	7	8
Character	A	L	B	0	2	R	C	S
	A = AHU	L = Compact L	B = Base Module	02 = Size 02		R = Right	A = 1st release	M = Microtech
				03 = Size 03		L = Left	B = 2nd release	S = Smart solution
				..			C = 3rd release	
				07 = Size 07				

Standard unit will be provided with:

- aluminium counter flow plate heat exchanger
- EC Fan with IE4/IE5 motor efficiency class
- ePM_1 50% (F7) filter on supply air
- ePM_{10} 55% (M5) filter on return air
- Double skin panel (inner Magnelis ZM310, outer Magnelis ZM310)
- Control:
    - Pro version: programmable controller
    - Smart version: Smart controller (VAM control)

For Pro version, the room thermostat and user interface ALC00822A is included with the main unit.

For Smart version, the BRC thermostat/remocon is not included with the main unit and has to be provided separately.

Nomenclature:

Compact L Pro	Main Unit	
	Right	Left
Size 02	ALB02RCM	ALB02LCM
Size 03	ALB03RCM	ALB03LCM
Size 04	ALB04RCM	ALB04LCM
Size 05	ALB05RCM	ALB05LCM
Size 06	ALB06RCM	ALB06LCM
Size 07	ALB07RCM	ALB07LCM

Compact L Smart	Main Unit	
	Right	Left
Size 02	ALB02RCS	ALB02LCS
Size 03	ALB03RCS	ALB03LCS
Size 04	ALB04RCS	ALB04LCS
Size 05	ALB05RCS	ALB05LCS
Size 06	ALB06RCS	ALB06LCS
Size 07	ALB07RCS	ALB07LCS

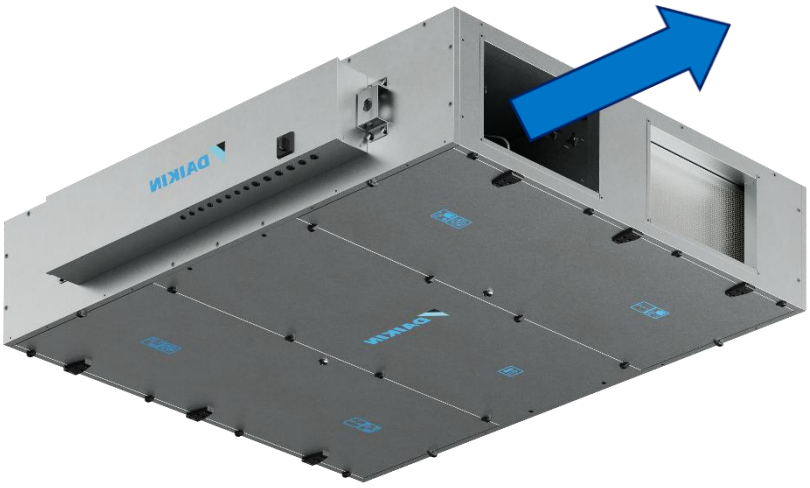
Compact L Pro with water coil	Main Unit	
	Right	Left
Size 02	ALB02RCMW	ALB02LCMW
Size 03	ALB03RCMW	ALB03LCMW
Size 04	ALB04RCMW	ALB04LCMW
Size 05	ALB05RCMW	ALB05LCMW
Size 06	ALB06RCMW	ALB06LCMW
Size 07	ALB07RCMW	ALB07LCMW

4. Connection side: right and left handing

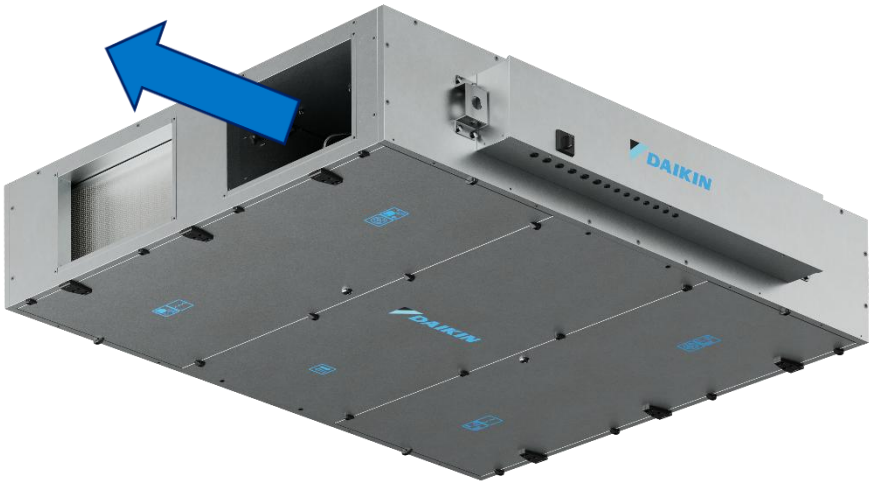
The below images refer to a bottom view of the Compact L Pro installed in the false ceiling.
The rule that is used to determine the connection side (right or left handing) is the following:

“Location of the electrical box looking in the supply air direction (bigger blue, standing below the unit ceiling suspended”.

Right handing



Left handing



5. Specifications

5.1. Technical data Compact L Pro

5.1.1. Nominal data

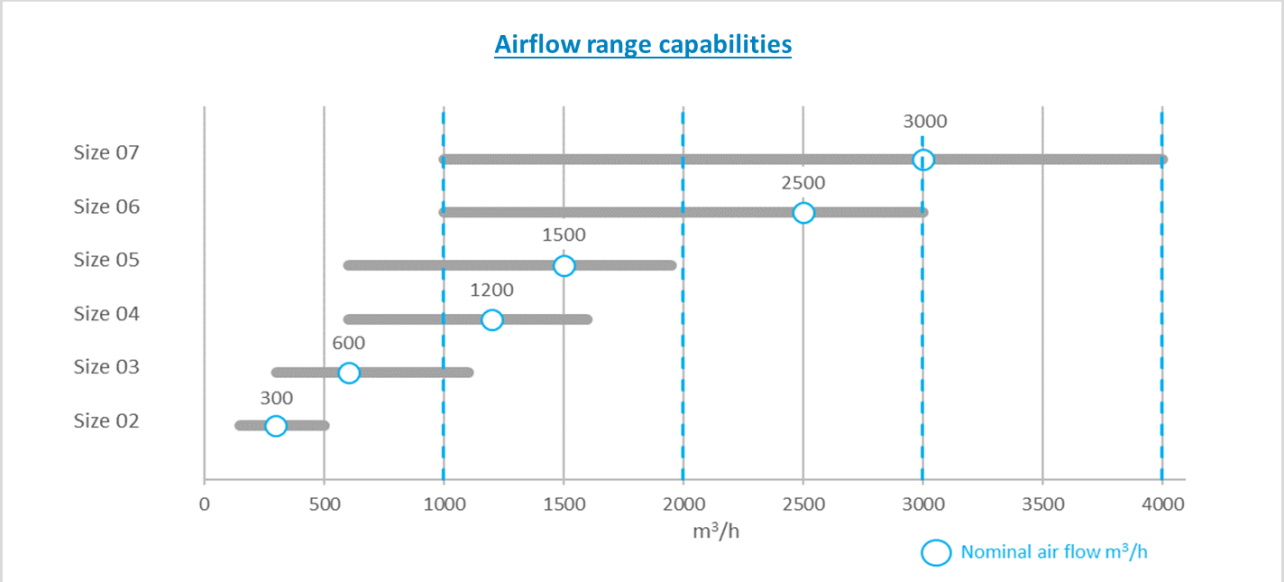
		ALB02*C*	ALB03*C*	ALB04*C*	ALB05*C*	ALB06*C*	ALB07*C*
Airflow	m3/h	300	600	1200	1500	2500	3000
HE Thermal efficiency [1].	%	86	86,5	87,6	86,4	82,3	81,6
External static pressure	Pa	100	100	100	100	100	100
Current	A	0,57	1,26	2,13	3,00	4,13	5,52
Power input	kW	0,13	0,29	0,49	0,69	0,95	1,27
SFPv [2]	kW/m3/s	1,07	1,41	1,21	1,34	1,17	1,35
Electrical supply	Phase (ph)	1					
	Frequency (Hz)	50/60					
	Voltage (V)	220/240 Vac					
	Max internal fuse (A)	16					
Main unit Dimensions	Width (mm)	920	1100	1600	1600	2000	2000
	Height (mm)	280	350	415	415	500	500
	Length (mm)	1660	1800	2000	2000	2000	2000
Rectangular duct flange	Width (mm)	250	400	500	500	700	700
	Height (mm)	150	200	300	300	400	400
Unit sound power level	dBA	52	55	57	58	59	62
Unit sound pressure level [3]	dBA	45	48	50	51	52	55
Net weight	Kg	125	170	255	265	310	320
Gross weight	Kg	135	180	270	280	325	335

1. Winter design condition: Outdoor: -5°C/80% Indoor: 22°C/50%

2. SFPv is a parameter that quantifies the fan efficiency (the lower it is the better will be). This reduces if airflow decreases.

3. EN 3744. Surrounding, Directivity (Q) = 4, @1m distance in non-reverberant field. Allowances on declared values: +/- 3dB.

5.1.2. Nominal Air flow



For any performances out of the nominal condition here above mentioned kindly refer to the online selection available online at tools.daikinapplied.eu

5.2. Declaration EU. REG. 1253/2014

			ALB02*B*	ALB03*B*	ALB04*B*	ALB05*B*	ALB06*B*	ALB07*B*
Manufacturer's name			Daikin Applied Europe S.p.A.					
Typology (NRVU, UVU / BVU) *			NRVU BVU					
Type of drive			Variable Speed Drive					
Type of HRS			Other					
HRS Thermal efficiency		*%*	78,3	80,4	80,4	79,1	75,0	74,2
Nominal NVRU Flow rate	Supply	*m3/s*	0,08	0,17	0,33	0,44	0,69	0,83
	Return	*m3/s*	0,08	0,17	0,33	0,44	0,69	0,83
Effective Electric Power input	Total	*kW*	0,13	0,29	0,49	0,69	0,95	1,27
SFP internal	*W/(m3/s)*		450	615	519	631	533	645
Face velocity at design air flow rate	Supply	*m/s*	0,83	1,06	1,18	1,57	1,58	1,9
	Return	*m/s*	0,83	1,06	1,18	1,57	1,58	1,9
Internal Pressure Drop of Ventilation Components	Supply	*Pa*	115	163	135	194	172	220
	Return	*Pa*	86	130	113	166	139	181
Nominal External Pressure	Supply	*Pa*	100	100	100	100	100	100
	Return	*Pa*	100	100	100	100	100	100
Static efficiency of fans **	Supply	*%*	63	60	60	68	61	64
	Return	*%*	63	60	60	68	61	64
Maximum external Leakage Rate	+400	*%*	< 5 %	< 5 %	< 4 %	< 3 %	< 3 %	< 2 %
	-400	*%*	< 3 %	< 3 %	< 2 %	< 2 %	< 2 %	< 1 %
Maximum internal Leakage Rate		*%*	1,5 %	1,5 %	1,5 %	1,5 %	1,5 %	1,5 %
Summer Outdoor Conditions	Temp.	*°C*	34					
	Humidity	*%*	50					
Winter Outdoor Conditions	Temp.	*°C*	-5					
	Humidity	*%*	80					
Filter Energy Classification			-					
Filter Service Warning ***			Displayed on HMI controller					
Sound Power Level		*dBA*	52	55	57	58	59	62
Pre-/Dis- assembly instructions			https://www.daikinapplied.eu/ahu-instructions-for-pre-disassembly/					

* In accordance with Commission Regulation (EU) No 1253/2014 of July 2014
** In accordance with Regulation (EU) No 327/2011
***Clean/Replace Filter(s) when maximum pressure drop is reached or when warning is displayed on HMI Controller

5.3. Electrical data

			ALB02*C*	ALB03*C*	ALB04*C*	ALB05*C*	ALB06*C*	ALB07*C*
Power supply	Phase	ph	1					
	Frequency	Hz	50/60					
	Voltage	V	220-240					
Full load condition	FLA [1]	A	2,9	4,5	4,5	4,7	7,1	11,7
	FLI	W	371	1033	1033	1073	1633	2733

1. Calculated at 230V

5.4. Bearing structure

The units feature double-skin panels that consist of two folded steel sheets. Panel thickness is 50 mm for all unit sides. The standard version is provided with Magnelis steel for outer and inner skin. The units are constructed with removable or hinged doors allowing full maintenance access. The units are equipped with rectangular flanges to be connected to a rectangular ducts network. If needed transitions from rectangular to circular flange can be ordered as accessory.

5.5. Insulation

Insulation material used is mineral wool with a density of 90 kg/m3 (EN 1602).
Thermal conductivity is 0,036 W/m*K and mineral wool is A1 class for fire classification (EN13501-1)

5.6. Heat exchanger

The units feature a counterflow plate heat exchanger (PHE).
The PHE is able to recover up to 93% of thermal energy in wet conditions.
They are made of aluminium alloy with a minimum content of iron and copper (to avoid corrosion issues).
PHE is Eurovent certificated and protected by minimum M5 (ePM_{10} 55%) & F7 (ePM_1 50%) grade pleated filters on extract and supply.
PHE incorporates an automatic bypass with actuator and a condensation drain pan with opportune slope.

5.7. Fan

5.7.1. Pro version

The units have IP54 EC fan/motor assemblies conform with Reg. EU No. 327/2011. Fans provide low specific fan power (SFP) and a stepless speed control.
According to their energy balance, performances, flow and noise characteristics the rotor shall be made by plastic (reinforced if necessary). The airflow rate shall be measured on the fan arrangement in real time.

Fans can provide a constant air volume regardless filter clogging or duct/system pressure drops (within the fans operation limits).
They are also able to provide a fixed pressure value regardless the supplied air volume or the pressure drops' changes in the system, while keeping the airflow information coming from the fans.
In terms of power supply, the unit must operate on 220/240 V AC, 50/60 Hz single-phase main supply.

5.7.2. Smart version

The units have IP54 EC fan/motor assemblies conform to Reg. EU No. 327/2011. Fans provide low specific fan power (SFP) and a stepless speed control.
According to their energy balance, performances, flow and noise characteristics the rotor shall be made by plastic (reinforced if necessary).
Fans can run at least at 2 speeds (to be selected among 45 different operating points).
In terms of power supply, the unit must operate on 220/240 V AC, 50/60 Hz single-phase main supply.

5.8. Filter

Filter types and filter efficiencies are classified in accordance with ISO 16890 Group Classification.
Filter types shall be panel (compact) made in synthetic material and 48mm thickness maximum.
All the filters - regardless of their type – are mounted in opportune rails equipped with a mechanical frame that maintains the filters in pressure and ensure minimum leakage.
The total filter list is: G4 (ISO Coarse 55%), M5 (ePM_{10} 55%), F7 (ePM_1 50%) and F9 (ePM_1 80%). They can be combined in order to meet any kind of requirement.
The units come standard with M5 (ePM_{10} 55%), and F7 (ePM_1 50%) filters respectively for extract and supply air side.
In accordance with the ISO 16890, the unit is able to reach SUP 1 level from ODA 3 level (See the table at the next page).

	Supply air class			
Outdoor Air Quality	SUP 1 (High)	SUP 2 (Medium)	SUP 3 (Moderate)	SUP 4 (Low)
ODA 1 (Pure Air)	ePM_1 70%	ePM_1 50%	$ePM_{2.5}$ 50%	ePM_{10} 50%
ODA 2 (Dust)	ePM_1 80%	ePM_1 70%	$ePM_{2.5}$ 70%	ePM_{10} 80%
ODA 3 (Very high concentration of dust)	ePM_1 90%	ePM_1 80%	$ePM_{2.5}$ 80%	ePM_{10} 90%

The recommended filter combination depending on ODA and SUP categories are summarised in the following table.

	Supply air class			
Outdoor Air Quality	SUP 1 (High)	SUP 2 (Medium)	SUP 3 (Moderate)	SUP 4 (Low)
ODA 1 (Pure Air)	F9 (ePM_1 80%)	F7 (ePM_1 50%)	F7 (ePM_1 50%)	F7 (ePM_1 50%)
ODA 2 (Dust)	F9 (ePM_1 80%)	F9 (ePM_1 80%)	F9 (ePM_1 80%)	F7 (ePM_1 50%)
ODA 3 (Very high concentration of dust)	F7 (ePM_1 50%) + F9 (ePM_1 80%)	F9 (ePM_1 80%)	F9 (ePM_1 80%)	F9 (ePM_1 80%)

For easy reference, the EN779 has been replaced by the ISO 16890. The new naming is included in the following table.

Filter name (EN 779)	Filter name (ISO 16890)	ePM_1	$ePM_{2,5}$	ePM_{10}
G4	ISO Coarse 55%	N/A	N/A	N/A
M5	ePM_{10} 55%	-	-	55%
F7	ePM_1 50%	50%	65%	85%
F9	ePM_1 80%	80%	85%	95%

The units, in fact, can accommodate on supply air stream two filters: F7 (ePM_1 50%) and F9 (ePM_1 80%).
In order to avoid the fast clogging of the fine filter from gross particles, units can also provide a class G4 pre - filter either on supply or exhaust side.
According to the hygienic requirements of the VDI 6022, filter frames are designed in such a way so they can be easily extracted and cleaned.
The filter maintenance is carried out from the bottom side opening the hinged doors.
The filters replacement trigger is activated through pressure differential switches, following the provision of EU 1253.
Replacement filters are available as a standard accessory.

5.9. Control

5.9.1. Pro version

Unit control system is provided on the basis of a programmable direct digital controller (DDC). Its software allows user configuration settings based on original manufacturer logics.
The unit controls are factory mounted and fully operational at site.
A web server (HMI) is also provided as a standard feature.
The unit offers the possibility to be integrated into BACnet/IP or Modbus-RS485 based BMS through dedicated accessories. The unit is connectable to a Cloud monitoring system (optional).
The unit is able to operate either in CAV or VAV systems.

For the constant air volume (CAV) logic the unit provides a constant airflow regardless of system pressure drops.
For the variable air volume (VAV) logic the unit guarantees a constant static pressure in a specific point of the system through dedicated accessory (pressure transducer: AUE00PTUA). VAV control works with a master and slave configuration. Supply side (master) keeps constant static pressure in a specific point while the return (slave) follows the supply air flow rate (or vice versa). The supply or return airflow measurement remains available for reading.
The unit is able to control the indoor air quality by controlling and monitoring the CO_2 level (CO_2 sensor is optional). In fact, when the threshold value is overcome, the control forces the fan to increase the extracted and supplied air volume in order to decrease the CO_2 level faster.
When signals are received, the units vary its fan speed proportionally until the desired set points are met.
An optional humidity sensor is available for the control of the humidity condition when a cooling coil is present. If temperature control is also needed, a post heating coil has to be present too.
The automatic operation of the bypass, instead, is determined by an algorithm that varies output based on temperature evaluations. Bypass control provides free cooling operation based on dry bulb temperatures and enthalpies (optional) through additional humidity probes (accessories). Defrost operation together with a modulating internal water heating coil (if available) is also possible, in order to give the best solution in terms of energy efficiency and cost reduction.
Units fit four temperature probes to measure: Supply air temperature, Return Air temperature, Fresh air and Exhaust Air Temperature.

Compact L Pro Control	
Control platform	Programmable controller
Remote controller	Room controller: ALC00822A
	Commissioning tool: ALC00895A
CO_2 control	Yes, ALP00COA (mandatory accessory)
RH% control	Yes, ALP00HUA (mandatory accessory)
BMS Connectivity	BACnet/IP: ALC00908A (accessory)
	Modbus – RS485: ALC00902A (accessory)
Ethernet connection	WEB – Human Machine Interface (web server)
Cloud connection	Daikin on Site

To manage accessories, one or more expansion modules, with a maximum of two, which are defined as expansion modules “A” and “B”, must be installed on site based on the selected additional components.
The extension module is equipped with a DIP switch to communicate with the controller.
Both expansion modules have the same material name and must be configured on-site. The configuration can be easily performed through the DIP switch.

The table below shows which accessories are connected to each expansion module.

	Components	Expansion module “A”	Expansion module “B”
1.	Water Coil (incompatible with item 2)	X	
2.	DX Coil (incompatible with item 1)	X	
3.	Water heating/post heating coil (incompatible with item 4)	X	
4.	Electrical heating/post heating (incompatible with item 3)	X	
5.	Pressure transducer for supply additional filter	X	
6.	CO_2 probe	X	
7.	Humidity return probe	X	
8.	Water pre-heating coil (incompatible with item 9)		X
9.	Electrical pre-heating coil (incompatible with item 8)		X
10.	Pressure transducer for return additional filter		X
11.	Economy mode		X

The following table provides some examples for a complete and clear explanation.

	Accessories	Expansion module “A”	Expansion module “B”
1.	No accessories		
2.	Pre-heating coil		X
3.	Water coil	X	
4.	DX coil + CO_2 probe	X	
5.	Dx Coil + pre-heating coil	X	X

Astra selection software automatically adds them when needed.

Further details can be found within the dedicated wiring diagram.

5.9.2. Smart version

Compact L Smart can be directly integrated into DIII-net ecosystem and controlled through any Daikin local, centralised controllers (iTAB, iTM, iTC) or Cloud controllers (Daikin Cloud Service).
This communication, based on the common F1-F2 and P1-P2 protocols, also guarantees full compatibility with SkyAir and VRV systems.
The remote controller BRC1[E/H] is not provided with the main module and has to be provided separately. Compact L Smart comes standard with 2 sensors fitted on the fresh and return air side.
The temperature control done by the unit is to compare outside temperature with inside temperature, to decide whether to operate in “heat exchange” or in “bypass mode” in case the user selects “auto mode” (please refer to the table below).

Mode	Description
Auto mode	Using information from the air conditioner (cooling, heating, fan and set temperature) and heat reclaim ventilation unit (indoor and outdoor temperatures), this mode automatically changes between Energy Reclaim Ventilation and Bypass mode
Energy Reclaim Ventilation mode	The outdoor air is supplied to the room after passing through a heat exchanger element, where heat is exchanged with the return air
Bypass mode	The outdoor air bypasses the heat exchanger element. This means that outdoor air is supplied to the room without exchanging heat with the return air

The unit is connectable to a Cloud monitoring system (optional).
BACnet or Modbus integration is possible through interfaces (optional).
The unit is able to control the indoor air quality by controlling and monitoring the CO_2 level (CO_2 sensor is optional).

Compact L Smart Control	
Control platform	Daikin Control PCB
Remote controller	Room controller: Optional BRC 1 [E/H]
CO_2 control	Optional, BRYMA2000 sensor
BACnet or Modbus integration	Through interfaces (optional)
Cloud connection	Daikin Cloud Service

5.10. Default values

5.10.1. Pro version

Compact L	Material Name	ALB02*C*	ALB03*C*	ALB04*C*	ALB05*C*	ALB06*C*	ALB07*C*
Costant air volume (CAV) [1]	Auto (m^3/h)	300	600	1200	1500	2500	3000
	Eco (m^3/h)	150	300	600	750	1250	1500
Variable air volume (VAV) [2]	Auto (Pa)	100					
	Eco (Pa)	50					
Supply air Temperature	Winter	22° C					
	Summer	22° C					
CO_2 Control [3]	Trigger value (ppm)	1000					
	Max forcing %	25 of the maximum fan speed					
Schedule	Time	08:00 – 18:00					
	Day	Monday - Friday					
Filter Replacement [4]	ePM10 55% ePM1 50%	250 Pa					

1. Pre-set values (Default)
2. Values fixed but not enabled (VAV kit required: AUE00PTUA)
3. Values fixed but not enabled (ALP00COA CO_2 probe accessory mandatory)
4. Trigger value for filters' replacement. In case of non – standard filters, the installer needs to change manually the differential pressure value in accordance with the filter class. The recommended values are mentioned in the filter accessory section.

Note:

The unit gets delivered with its nominal air flow rate set up at factory. To adjust its operation to the selected parameters, kindly select the optional commissioning module ALC00895A or refer to Daikin Service Dept. Alternatively, you can also commission the units using the web server access.

5.10.2. Smart version

Factory set values for nominal operating airflow and corresponding setting for the BRC1[E/H]. Please refer to the IOM, in order to determine new operating points and new unit setting for various speeds.

Size 02			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
300	100	300	100
RPM		RPM	
2966		2773	
Fan speed (High – Ultra High)			
17(27)-4-01			
Fan Curve Supply		Fan Curve Return	
19(29)-2-09		19(29)-3-03	

Size 03			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
600	150	600	150
RPM		RPM	
2508		2400	
Fan speed (High – Ultra High)			
17(27)-4-01			
Fan Curve Supply		Fan Curve Return	
19(29)-2-06		19(29)-3-01	

Size 04			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
1200	100	1200	100
RPM		RPM	
2912		2885	
Fan speed (High – Ultra High)			
17(27)-4-01			
Fan Curve Supply		Fan Curve Return	
19(29)-2-12		19(29)-3-08	

Size 05			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
1500	100	1500	100
RPM		RPM	
2565		2455	
Fan speed (High – Ultra High)			
17(27)-4-02			
Fan Curve Supply		Fan Curve Return	
19(29)-2-09		19(29)-3-04	

Size 06			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
2500	100	2500	100
RPM		RPM	
2546		2487	
Fan speed (High – Ultra High)			
17(27)-4-02			
Fan Curve Supply		Fan Curve Return	
19(29)-2-09		19(29)-3-05	

Size 07			
Supply		Exhaust	
Volume Flow rate	ESP	Volume Flow rate	ESP
3000	100	3000	100
RPM		RPM	
2191		2105	
Fan speed (High – Ultra High)			
17(27)-4-01			
Fan Curve Supply		Fan Curve Return	
19(29)-2-12		19(29)-3-07	

5.11. Antifreeze Logic

5.11.1. Pro version

This function is used to avoid plate heat exchanger freezing as it activates a sequence of actions to counteract the risk of frost formation.

The antifreeze logic is activated whenever exhaust temperatures fall below pre-set configurable value (T_{FREEZE}) and pressure drop across the heat exchanger, monitored thanks to a pressure transducer, exceeds a pre-set threshold (warning threshold) while it's being disabled when the T_{EXH} has returned higher than T_{FREEZE} or pressure drop on PHE comes back below the calculated threshold.

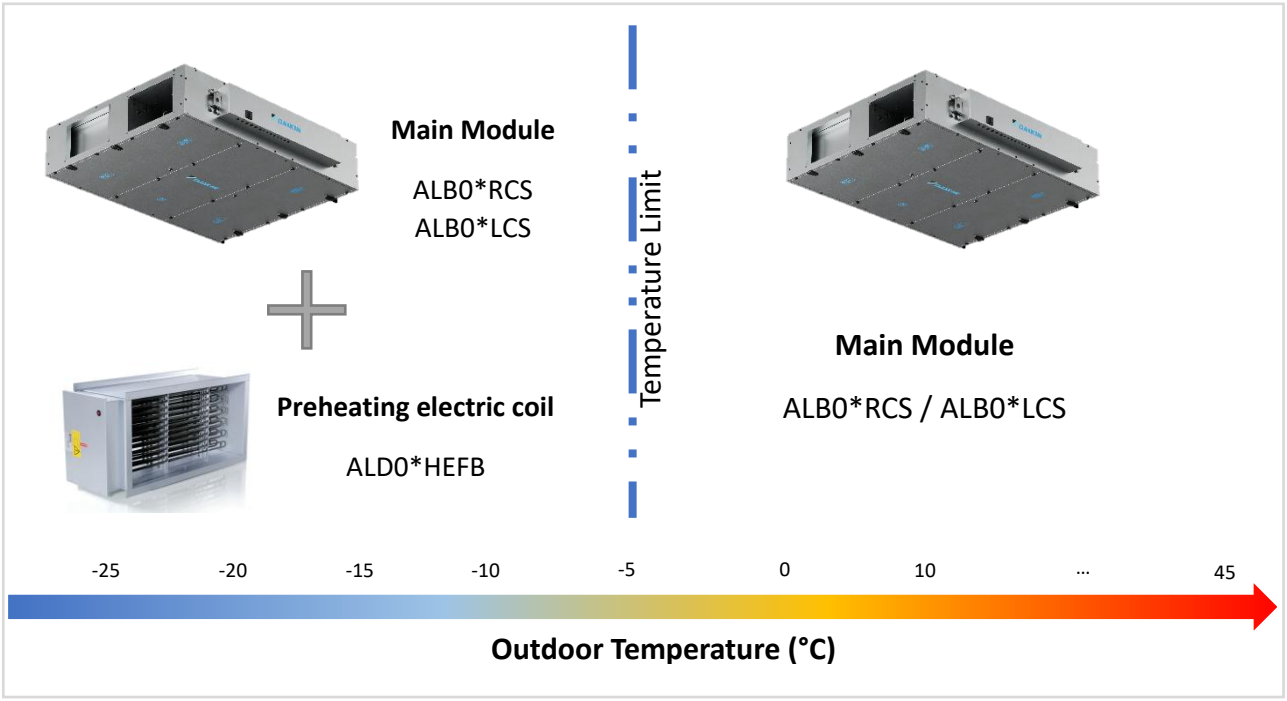
- $T_{EXH} < T_{FREEZE}$ & pressure drop on PHE > warning threshold → **Enable Antifreeze logic**
- $T_{EXH} > T_{FREEZE}$ or pressure drop on PHE < warning threshold → **Disable Antifreeze logic**

Once the logic is active, the actions performed are the following:

Antifreeze enabled	1) Bypass damper is gradually open up to 100% and heating coils (pre, main, post) or electric heaters (pre, post) are activated if present
	2) Supply airflow is gradually reduced
	3) Unit goes in alarm and stops if the pressure drop on the PHE increase a pre-configured value (fault threshold)
	4) A manual reset is required to turn on the AHU

5.11.2. Smart version

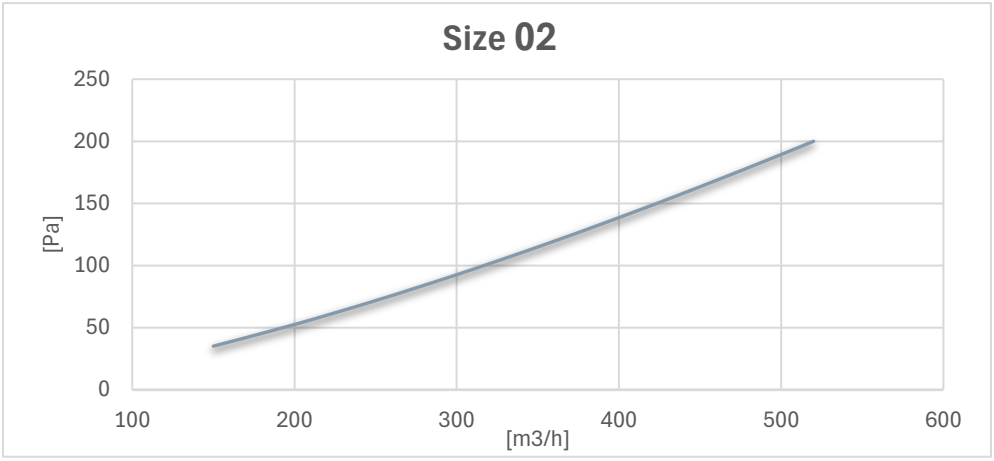
In accordance with the image here below showed, adding a pre-electrical heater (ALD0*HEFB) is mandatory for outdoor temperature lower than -5°C for either tackling or preventing frost issue.

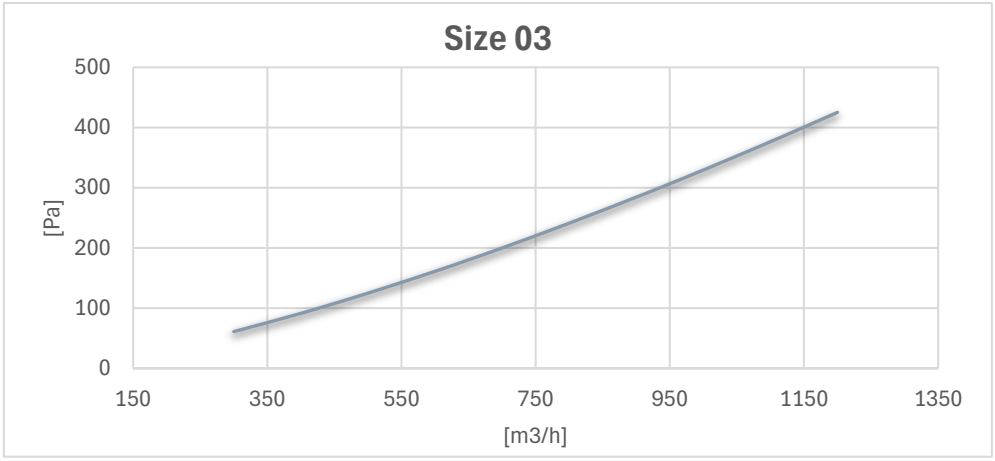


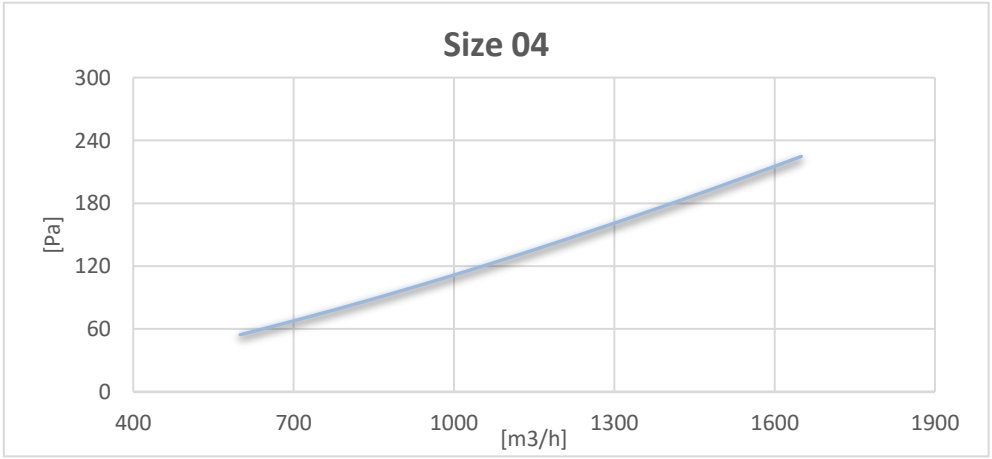
The unit has been equipped with a differential pressure switch to prevent a possible risk of icing at heat exchanger level which is factory setted according to the following table.

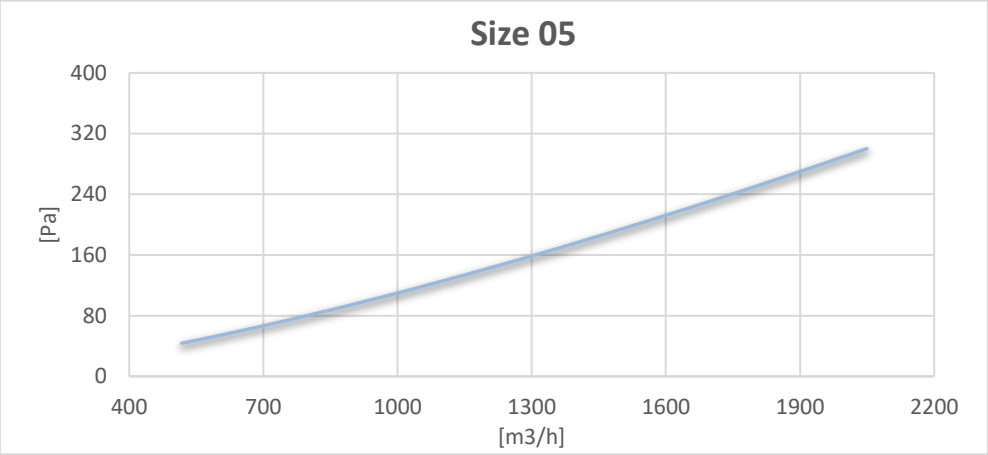
Frost prevents differential pressure switch factory settings						
Size	02	03	04	05	06	07
Pa	200	425	225	300	250	375

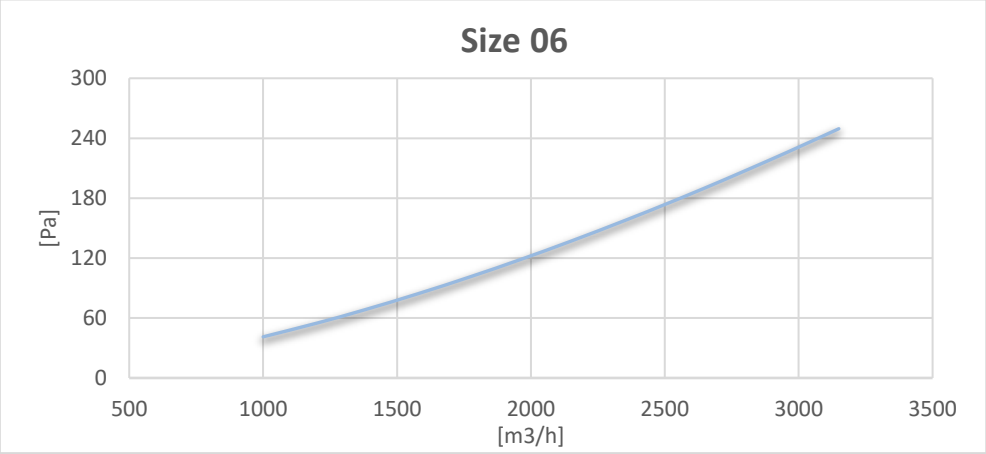
Depending on the working condition, the installer must adjust the setting according the charts below.

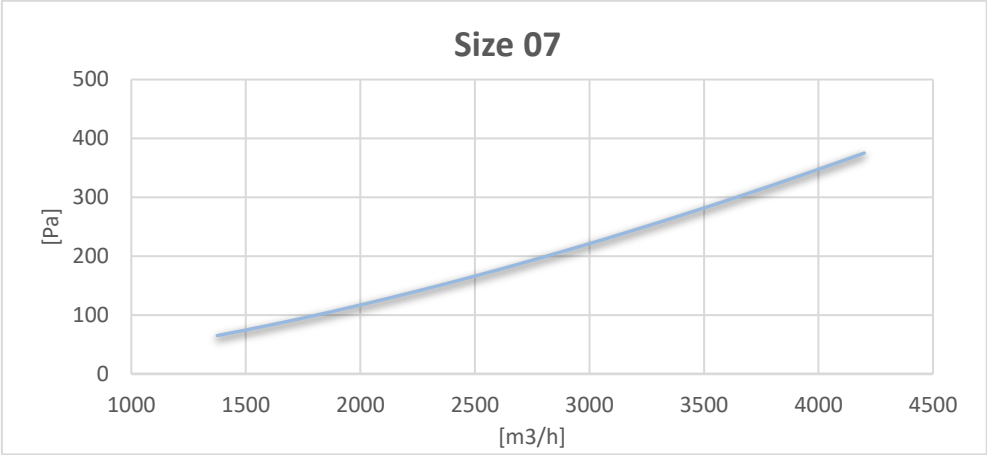












5.12. Operating limits

Compact L heat recovery units are designed for use in indoor environments, installed in a false ceiling. The unit cannot operate in environments containing explosive material and with a high concentration of dust. Thanks to its compactness, each machine is able to adapt to different needs in terms of air flow and thermodynamic treatments. The optimised choice of every detail, the search for maximum efficiency in each component, the adoption of specific materials and constructive solutions transform environment friendliness and energy savings into valid and advanced technological solutions.

5.12.1. Pro version

Please note the Compact T Pro controller automatically activates the antifreeze logic as explained in the dedicated paragraph *4.11 "Antifreeze logic"* . The antifreeze function can be also enabled/disabled in the software through the commissioning module (material name ALC00895A). The unit cannot operate in permanent way in the antifreeze mode.
In the report, downloaded from Astra web selection software, the heat recovery system performance calculation doesn't consider the frost formation.

	Size	Lower limit temperature (°C)	Upper limit temperature (°C)
Outside air temperature	All	-38°C	46°C
Operating environment temperature	All	-5°C	46°C
Temperature of environment with the machine off (e.g., storage, transport, etc.)	All	-40°C	60°C

In case the inlet outdoor air temperature is below -15°C an electric preheater or water preheating coil is advised.

5.12.2. Smart version

	Size	Lower limit temperature (°C)	Upper limit temperature (°C)
Inlet outdoor air temperature	All	-5	46
Operating environment temperature	All	5	46
Temperature of environment with the machine off (e.g., storage, transport, etc.)	All	-40	60

Inlet air temperature has to be higher than -5°C. In case the outdoor air temperature is below -5°C electric preheater (ALD0*HEFB) is required.

6. Accessories

6.1. Accessories list

Category	Accessories	ALB02*C*	ALB03*C*	ALB04*C* ALB05*C*	ALB06*C* ALB07*C*
Compact filter	ISO Coarse 55% (G4)	ALF02G4A	ALF03G4A	ALF05G4A	ALF07G4A
	ePM10 55% (M5)	ALF02M5A	ALF03M5A	ALF05M5A	ALF07M5A
	ePM1 50% (F7)	ALF02F7A	ALF03F7A	ALF05F7A	ALF07F7A
	ePM1 80% (F9)	ALF02F9A	ALF03F9A	ALF05F9A	ALF07F9A
Silencer	900 mm depth	ALS0290A	ALS0390A	ALS0590A	ALS0790A
Probes	CO_2	ALP00COA			
	Humidity (%RH)	ALP00HUA			
	Temperature	ALP00TEA			
Coil module	Electric preheater (Pro version)	ALD02HEFA	ALD03HEFA	ALD05HEFA	ALD07HEFA
	Electric preheater (Smart version)	ALD02HEFB	ALD03HEFB	ALD05HEFB	ALD07HEFB
	Electric Post heater	ALD02HESA	ALD03HESA	ALD05HESA	ALD07HESA
	Water coil (cool/heat)	ALD02CWSA	ALD03CWSA	ALD05CWSA	ALD07CWSA
	Water heating (pre/post - heating)	ALD02HWUA	ALD03HWUA	ALD05HWUA	ALD07HWUA
	DX coil (cool/heat)			ALD05CDSA	ALD07CDSA
Mechanical accessories	Rail	ALA02RLA	ALA03RLA	ALA05RLA	ALA07RLA
	Duct transition	ALA02RCA	ALA03RCA	ALA05RCA	ALA07RCA
	Flexible joints	ALA02FXB	ALA03FXB	ALA05FXB	ALA07FXB
	Droplet eliminator	ALA02DEA	ALA03DEA	ALA05DEA	ALA07DEA
	External damper	ALA02EDA	ALA03EDA	ALA05EDA	ALA07EDA
Valves	2-way water cool/heat	ALV02CW2A	ALV03CW2A	ALV05CW2A	ALV07CW2A
	3-way water cool/heat	ALV02CW3A	ALV03CW3A	ALV05CW3A	ALV07CW3A
Electrical Accessories	Modulating actuator	ALE00AMVA (for water valves)			
	Modulating actuator	ATE00AMDA (for external damper)			
	Spring return actuator	AUE00ASUA (for external damper)			
	Frost switch	ALE00FSUA			
	Pressure transducer	AUE00PTUA			
Controls	Bacnet Interface	ALC00908A (POL908)			
	Modbus Interface	ALC00902A (POL902)			
	Room Thermostat	ALC00822A (POL822 - included in the main unit)			
	Commissioning module	ALC00895A (POL895)			
	Expansion module	ALC00955A (POL955)			

6.2. Accessories for Pro & Smart version

6.2.1. Compact filter

The unit is provided as standard with ePM_1 50% (F7) filter on supply side and ePM_{10} 55% (M5) filter on return. On both side, supply and return, up to two filtration stages as available. Other filters available are ePM_1 80% (F9) filter and ISO Coarse 55% (G4).
A pressure transducer (AUE00PTUA) is available in the option list to monitor pressure drop on additional filters indipendetly from first stage (VDI6022 requirement). It is also possible to monitor two filtration stage without the pressure transducer. Please refer to the dedicated IOM for more details. The table below summarizes the material names and the pressure drop for each filter, when it is clean, at nominal air flow for all the sizes.

Material Name	Main Unit Size	Description	ΔP Clean (Pa)
ALF02G4A	02	ISO Coarse 55% (G4)	35
ALF03G4A	03		45
ALF05G4A	04		33
	05		42
ALF07G4A	06		47
	07		58
ALF02M5A	02	ePM_{10} 55% (M5)	26
ALF03M5A	03		32
ALF05M5A	04		24
	05		31
ALF07M5A	06		35
	07		43
ALF02F7A	02	ePM_1 50% (F7)	62
ALF03F7A	03		77
ALF05F7A	04		57
	05		72
ALF07F7A	06		82
	07		101
ALF02F9A	02	ePM_1 80% (F9)	124
ALF03F9A	03		157
ALF05F9A	04		116
	05		147
ALF07F9A	06		167
	07		205

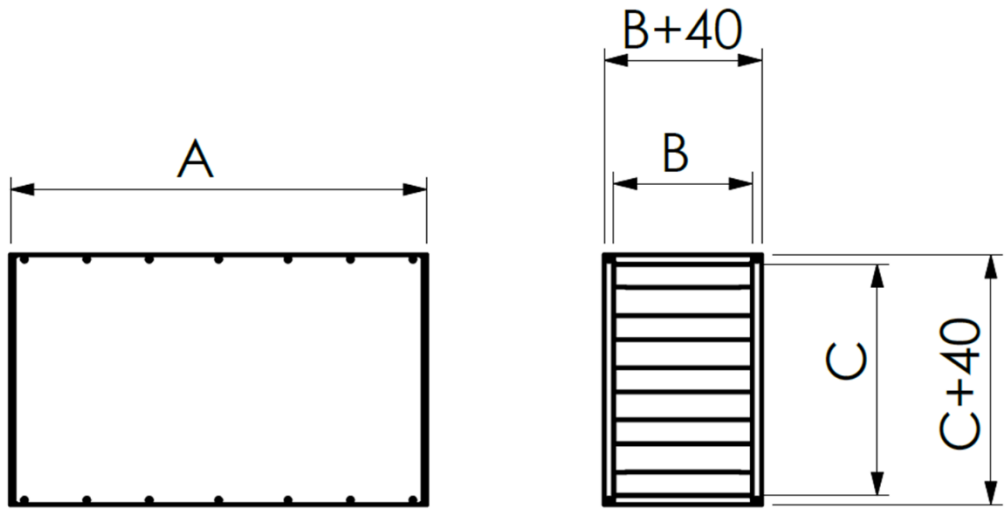
The pressure drop is referring to nominal airflow.

6.2.2. Silencer

Some installations can require a low sound level. Silencer for supply and or return duct is available for each size to decrease the noise. The length of silencer is 900mm. They are rectangular, in this way no duct transitions are needed. In the next table there are attenuation data for each frequency:

Frequency [Hz]	63	125	250	500	1000	2000	4000	8000
Attenuation [dB]	5	9	16	30	39	39	31	26

The values in the table are valid for all sizes.



Material Name	Size	A (mm)	B (mm)	C (mm)	Weight (kg)	Pressure drop [2] (Pa)
ALS0290A	02	900	150	250	16	7
ALS0390A	03		250	400	28	8
ALS0590A	04		300	500	33	9
ALS0590A	05				33	12
ALS0790A	06		400	700	47	13
ALS0790A	07				47	15

1. External measures. For Duct measures please to refer at table at page 8 (nominal data)
2. The pressure drop is referring to nominal airflow.

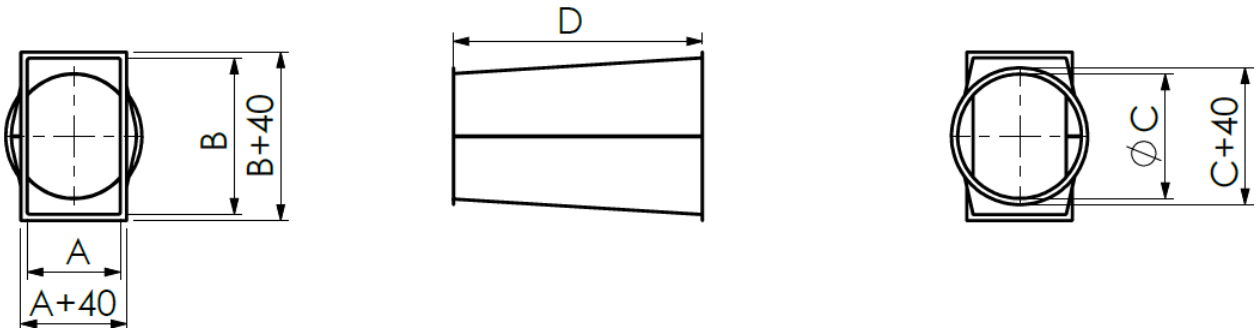
6.2.3. Rails

Maintenance is very important for air handling units. The filters have to be replaced many times during work life of an air handling unit. Rails allow to have sliding doors to an easy and quick maintenance even when the space available is limited. Following table contains main info about the rails.

Material Name	Main unit size	Description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)
ALA02RLA	02	Rail	1660	101,5	51	4
ALA03RLA	03		1800	101,5	51	4
ALA05RLA	04		2000	101,5	51	5
	05					
ALA07RLA	06		2000	101,5	51	5
	07					

6.2.4. Duct transitions

Duct transitions are useful when the installation requires circular connections. Compact L Duct connections are rectangular and through this accessory it is possible switch from rectangular to circular connections.



In the following table main info for transitions (dimensions, material name) are summarized.

Material Name	Size	A (mm)	B (mm)	C (mm)	D (mm)
ALA02RCA	02	150	200	160	800
ALA03RCA	03	200	400	250	800
ALA05RCA	04	300	500	400	800
	05	300	500	400	800
ALA07RCA	06	400	700	500	800
	07	400	700	500	800

6.2.5. Flexible joints

Flexible joints allow to absorb vibrations and prevent their transmission to the ductwork structure. They are strongly recommended to avoid any kind of problems due to vibrations.

Material Name	Size	A (mm)	B (mm)	C (mm)
ALA02FXB	02	150	200	150
ALA03FXB	03	200	400	150
ALA05FXB	04	300	500	150
	05	300	500	150
ALA07FXB	06	400	700	150
	07	400	700	150

6.3. Accessories for Pro version only

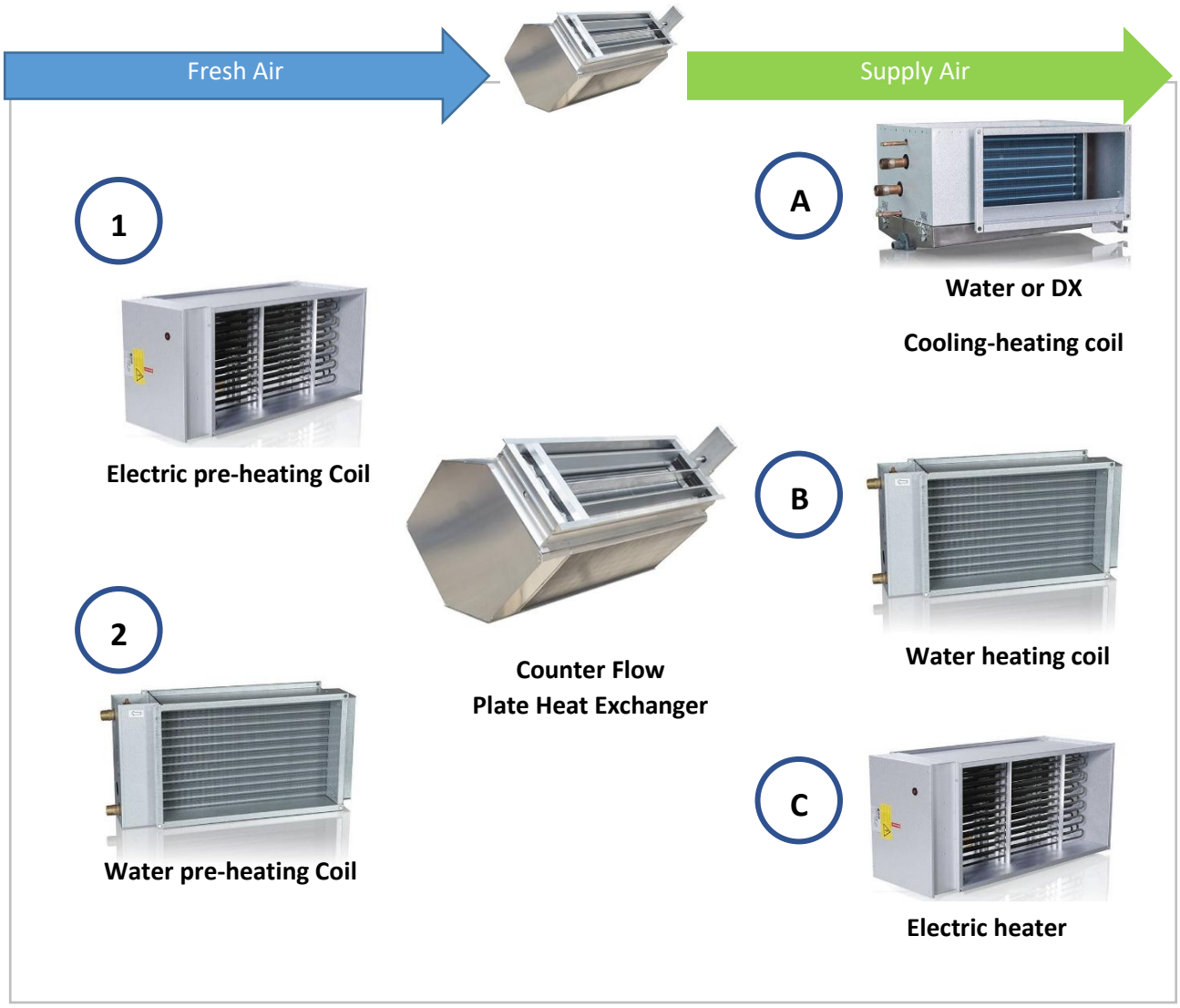
6.3.1. Useful information

- Both pre (ALD**HEFA) and post (ALD**HESA) electric coils must be equipped with an additional temperature probe (ALP00TEA) fitted in the duct and wired to the terminal.
  Both electric heaters work in modulating way.
- Both water heating (ALD**HWSA) and water-cooling (ALD**CWSA) coil must be equipped with an additional temperature probe (ALP00TEA) fitted in the duct and wired to the terminal. In addition, either a 2- or 3-ways valves (ALV**CW2A, ALV**CW3A) must be ordered along with its modulating actuators for water valve (mandatory option ALE00AMVA)
- On Astra Web selection software for Compact L Pro version, the temperature probe is automatically added when a coil is selected.
- On Astra Web selection software for Compact L Pro version, the modulating actuators is automatically added when a water valve is selected.
- The accessory compatibility might be limited on the basis of the control features and/or for the position of the accessories. Kindly refer to your sales representative in case of doubts. Main incompatibilities are summarised below:
    - Electric pre heating and water pre heating
    - Electric post heating and water post heating
    - Water and DX coil
- For Modbus (ALC00902A) and BACnet (ALC00908A) modules selection there is no exclusion
- Room thermostat (ALC00822A) is supplied with the main unit (ALB0**CM) as a standard item
- Commissioning module (ALC00895A) is required for purpose of either airflow volumes or static pressure value changes from the ones set at factory

- The unit gets delivered with its nominal air flow rate set up at factory. To adjust its operation to the project-specific parameters, kindly select the optional commissioning module ALC00895A or refer to Daikin Service Dept. Alternatively, you can also commission the units using the web server HMI access (default feature)

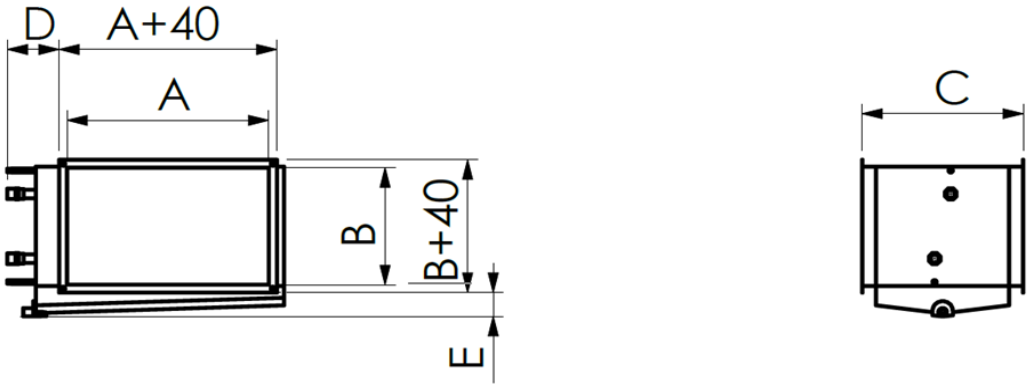
6.3.2. Coils

Compact L Pro version can be equipped with different types of coils, all provided as accessory, to guarantee the thermal comfort. Compact L Pro can be equipped with up to three coils (pre, main and post) and all of them work on modulating way at the same time.
An electric heater (1) or water heating coil (2) are available as accessories as preheating coil.
To manage the thermal load in both winter and summer seasons, a DX or water-based coils (A) are available as main coil option. A water coil (B) and an electric heater (C) are available as heating only or post heating options.
Astra Web selection software automatically adds a temperature probe (ALP00TEA) whenever needed.



6.3.2.1. DX Coil

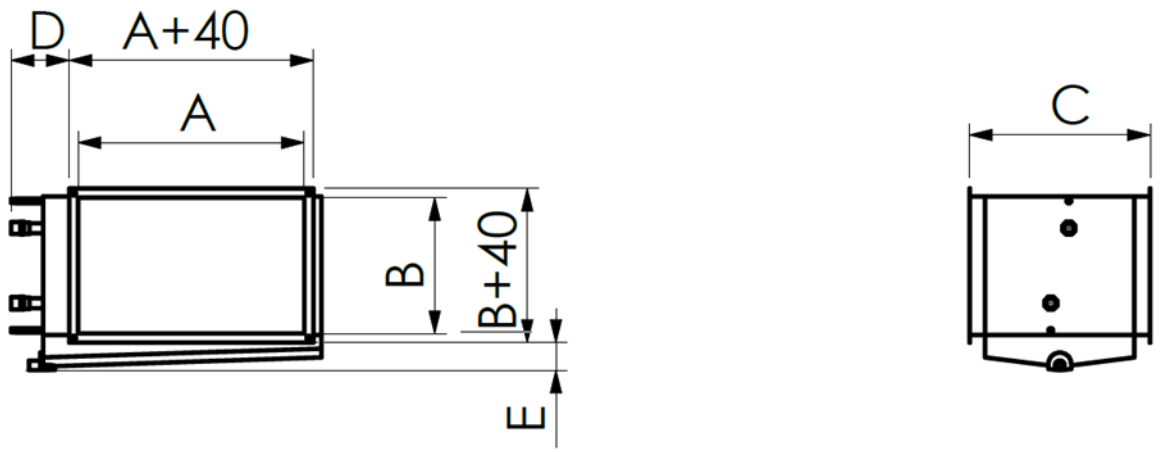
A cooling and heating DX coil, starting from size 04, is available as accessory to guarantee the thermal treatment. The coil is mounted outside the main module and it must be ducted. Please follow the dedicated IOM for further information on the installation procedure.
The Daikin Electronic Valve Kit (EKEXVA*) model, which has to be site fitted, is specified in the tehcnical report. It has to be ordered separately along with the control box.
The Daikin Electronic Valve Kit (EKEXV*) model which has to be site installed, is specified in the tehcnical report. It has to be ordered separately along with the control box (EKEACB).
DX coil can work with R410 and R32 refrigerant. On Astra web selection software, user can select the type of refrigerant and the selection software automitically adds the additional temperature probe (ALP00TEA) when a DX coil is selected.
External dampers are available as an option and they can be required with spring return actuators in case R32 refrigerant is used to be compliant with the IEC60335-2-40 ed. 7 standard where applicable. In the following table, main technical data of the DX coil for Compact L are summarized.



Material Name	ALD05CDSA		ALD07CDSA	
Size	04	05	06	07
Type of coil	P22			
Rows	3			
Finning space (mm)	2,5			
Fluid Volume (dm^3)	1,46		2,5	
Min Power (kw)	5,0		7,9	
Max Power (kw)	9,9		15,4	
Recommended EXV	50 – 63 – 80		80 – 100 – 125	
Manifolds (“)	3/8”			
Distributors (“)	5/8”			
A (mm)	500		700	
B (mm)	300		400	
C (mm)	395			
D (mm)	125			
E (mm)	60			
Weight (kg)	15		23	

6.3.2.2. Water cooling/heating coil

A cooling and heating water coil is available as accessory to guarantee the thermal treatment.
In addition, either a 2- or 3-way valves (ALV**CW2A, ALV**CW3A) has to be ordered along with modulating actuators (ALE00AMVA). Astra Web selection software will automatically add the actuator wenever the valve option is selected.
In the Astra Web selection software the additional temperature probe (ALP00TEA) is automatically added when a DX coil is selected.
The coil is mounted outside the main module and it must be ducted. Please follow the dedicated IOM for further information on the installation procedure.



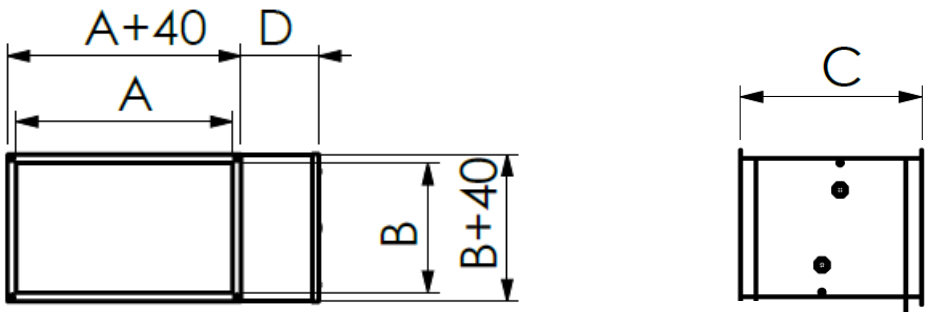
In the following table, main technical info of the water coil for Compact L are summarized.

Material Name	ALD02CWSA	ALD03CWSA	ALD05CWSA	ALD07CWSA
Size	02	03	04 – 05	06 - 07
Description	Water coil			
Type of coil	P22			P32
Rows	4			
Finning space (mm)	2			
Fluid Volume (dm^3)	0,47	0,95	1,76	4,46
Connection	¾”	¾”	¾”	1”
A (mm)	250	400	500	700
B (mm)	150	200	300	400
C (mm)	395			
D (mm)	114			
E (mm)	60			
Weight (kg)	5	11	15	23

The overall dimensions include the coil connections.

6.3.2.3. Water heating coil

A heating coil is available as accessory as pre heating, heating only (in case main coil is not installed) or post heating.
In the Astra Web selection software the additional temperature probe (ALP00TEA) is automatically added when a DX coil is selected. The coil is mounted outside the main module and it must be ducted. Please follow the dedicated IOM for further information on the installation procedure.



Following table summarizes main technical data pre heating water coil.

Material Name	ALD02HWUA	ALD03HWUA	ALD05HWUA	ALD07HWUA
Size	02	03	04 – 05	06 - 07
Description	Water coil			
Type of coil	P22			P32
Rows	2			
Finning space (mm)	2.5			
Fluid Volume (dm^3)	0,23	0,47	0,88	2,22
Connection	½”	¾”	¾”	1”
A (mm)	415	565	665	865
B (mm)	150	200	300	400
C (mm)	190			
D (mm)	86			
Weight (kg)	5	5	7	11

6.3.2.4. Electric heater (pre and post)

To guarantee a complete air treatment an electric heater can be selected:

- as preheating (ALD0*HEFA)
- as post heating (ALD0*HESA)
- As heating only (ALD0*HEFA)

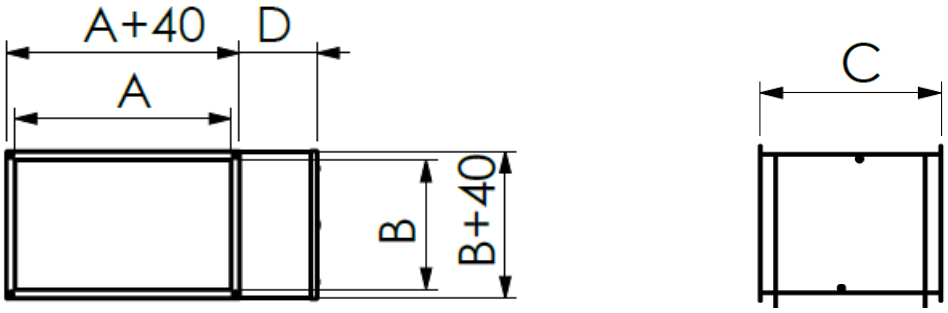


Table below summarizes main information about electric heaters.

Material Name	Main Unit Size	Description	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	Electric Data	Max Output (kW)
ALD02HEFA	02	Electric Pre heating	250	150	370	200	7,5	230/1/50	1,5
ALD03HEFA	03		400	200	370		10	230/1/50	3
ALD05HEFA	04		500	300	370		14	400/3/50	7,5
	05								
ALD07HEFA	06		700	400	370		21	400/3/50	15
	07								
ALD02HESA	02	Electric post heating	250	150	370	200	7,5	230/1/50	2,1
ALD03HESA	03		400	200	370		10	400/1/50	4
ALD05HESA	04		500	300	370		18	400/3/50	10
	05								
ALD07HESA	06		700	400	370		21	400/3/50	15
	07								

6.3.3. Droplet eliminator

A droplet eliminator can be added when a cooling water or DX coil is used, in order to avoid the risk of water droplets being carried over to the supply duct. Warning in the selection software appears whenever the project conditions require to have it. Please refer to the dedicated IOM for coils for further information. Table below summarizes main information about droplet eliminator.

Material Name	ALD02DEA	ALD03DEA	ALD05DEA	ALD07DEA
Size	02	03	04 – 05	06 - 07
Description	Droplet Eliminator			
Lenght (mm)	250	400	500	700
Depth (mm)	120			
Height (mm)	150	200	300	400

6.3.4. Frost switch

The frost switch (ALE00FSUA) protects the water coils from freezing and when air temperature is below 5°C, the unit stops to operate. The frost switch auto resets if conditions allow a safe functioning of the AHU again. It can be mounted only after pre heating water coil (in the fresh duct) or in supply duct, just after the main module.
Please refer to the dedicated IOM for more details.

6.3.5. Valves and actuators

The valves need when a water coil is selected. Four types of valves are available, according to the type of coil installed, heating or cooling, and the number of ways, two or three.
The table below summarize the material name for Compact L valves.

Material Name	Size	Cooling/Heating	2 or 3 ways	DN	KVs (m^3/h)
ALV02CW2A	02	Cooling/Heating	2	15	0,6
ALV03CW2A	03	Cooling/Heating	2	15	1,6
ALV05CW2A	04 - 05	Cooling/Heating	2	20	2,5
ALV07CW2A	06 - 07	Cooling/Heating	2	20	6,0
ALV02CW3A	02	Cooling/Heating	3	15	0,6
ALV03CW3A	03	Cooling/Heating	3	15	1,6
ALV05CW3A	04 - 05	Cooling/Heating	3	20	2,5
ALV07CW3A	06 - 07	Cooling/Heating	3	20	6,0

The modulating actuator (ALE00AMVA) is automatically added in Astra when a valve is selected.

Control Type	DC 0-10 V
Voltage AC/DC	AC/DC 24V
Degree of protection	IP44

6.3.6. External Damper and actuators

External dampers can be installed on all the four air flow connections at the same time.
For the external dampers it is possible to select:

- modulating actuator (ATE00AMDA)
- spring return modulating actuator (AUE00ASDA)

On Asta web selection software, dampers can only be selected in pairs, for exhaust and outdoor or for fresh and return air flow and the user can choose the type of actuator.

In the table below the material names for external dampers are summarized.

Size	02	03	04-05	06-07
Material Name	ALA02EDA	ALA03EDA	ALA05EDA	ALA05EDA

Please note the items in the table refers to one damper only (i.e., 1 ALA0*EDA → 1 external damper).

6.3.7. Pressure transducer

A pressure transducer (AUE00PTUA) can be added from the option list in Astra web selection software for following functionalities:

- Pressure drop monitoring of additional supply and/or return filter (please refer to the dedicated IOM for more details.
- Variable air volume control in master and slave configuration

6.4. Accessories for Smart version only

6.4.1. Electric preheater

Only coil available for Smart version is pre heating electric coil. In the following table, main info is summarized:

Material Name	Main unit size	Description	Depth (mm)	Width (mm)	Height (mm)	Weigh t (kg)	V, ph, Hz	Output (kW)
ALD02HEFB	02	Electric preheater	370	470	195	7	230/1/50	1,5
ALD03HEFB	03			620	245	10		3
ALD05HEFB	04			720	345	15	400/3/50	7,5
	05							
ALD07HEFB	06			920	445	21		15
	07							

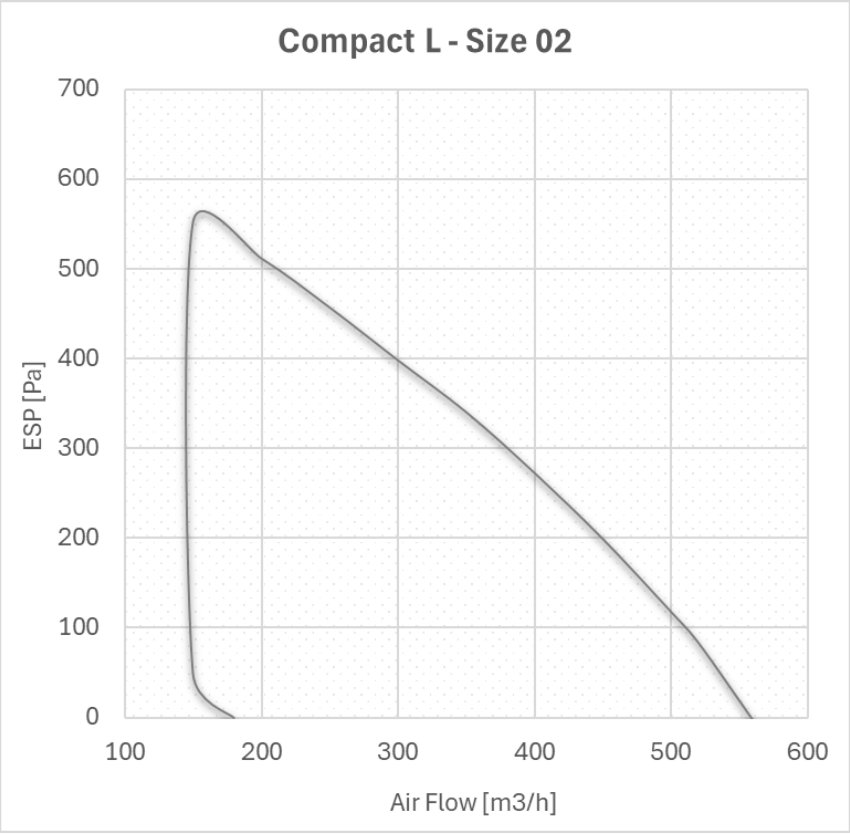
7. Performance

This section summarizes the main technical data for each size: envelope for each unit, thermal efficiency of the heat exchanger and sound emission at different operating points. More details about measurements done are collected in the next paragraphs.

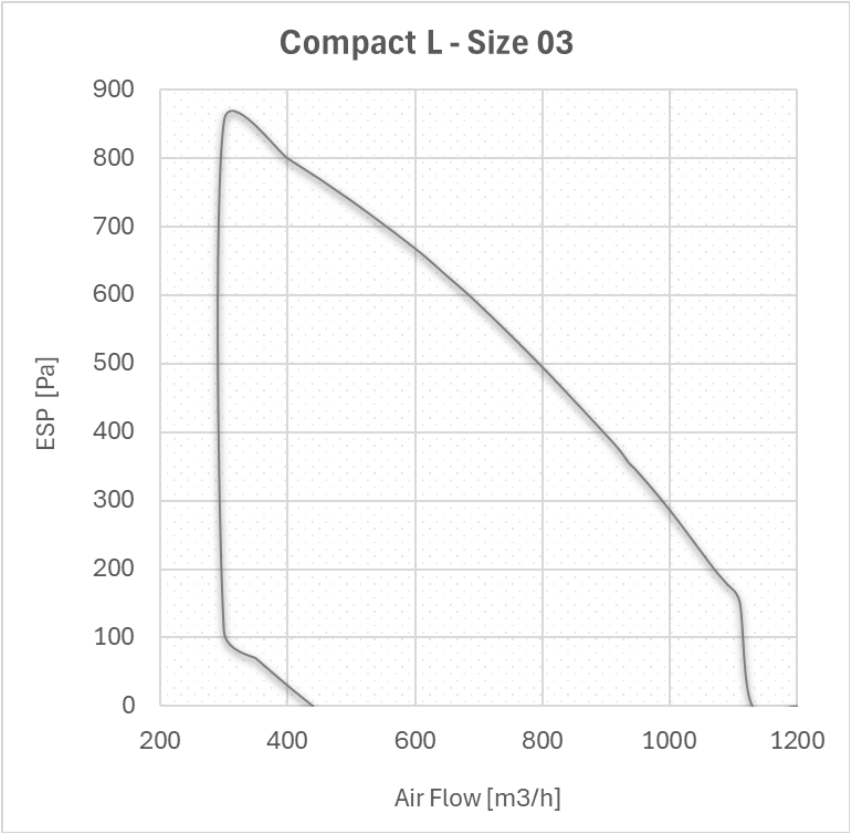
7.1. Performance data

The diagrams show the available external pressure for the duct system given the airflow.

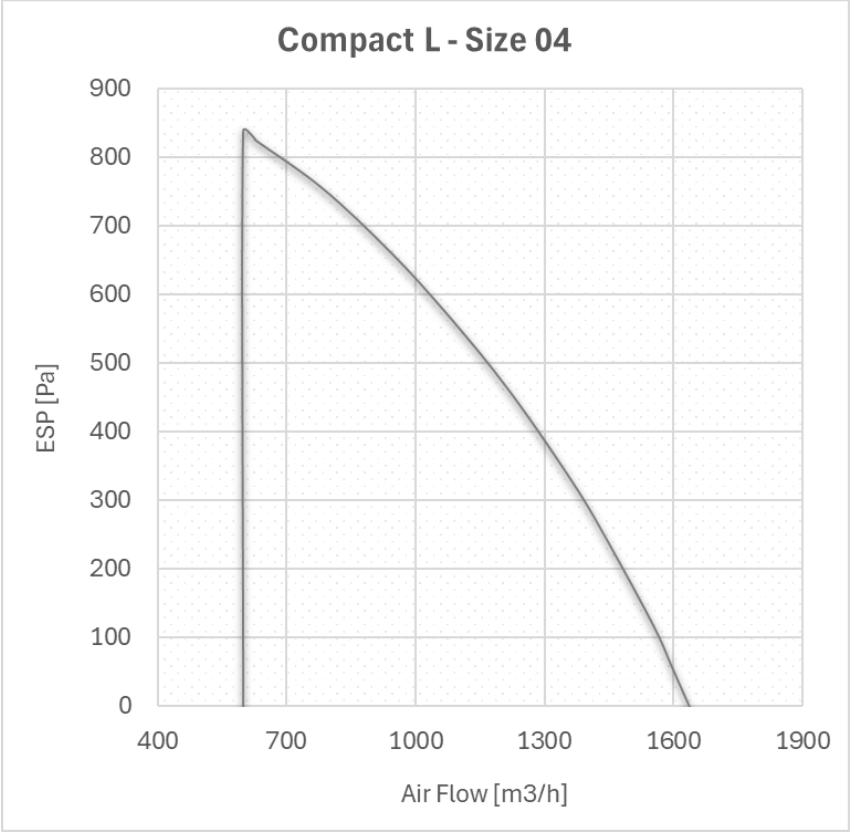
Size 02



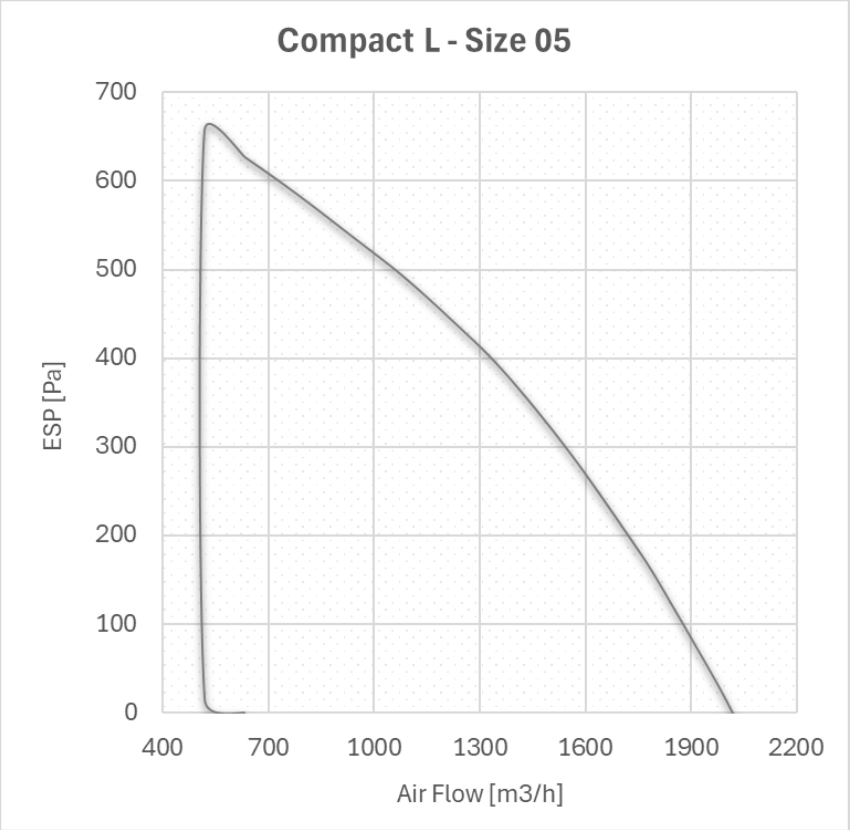
Size 03



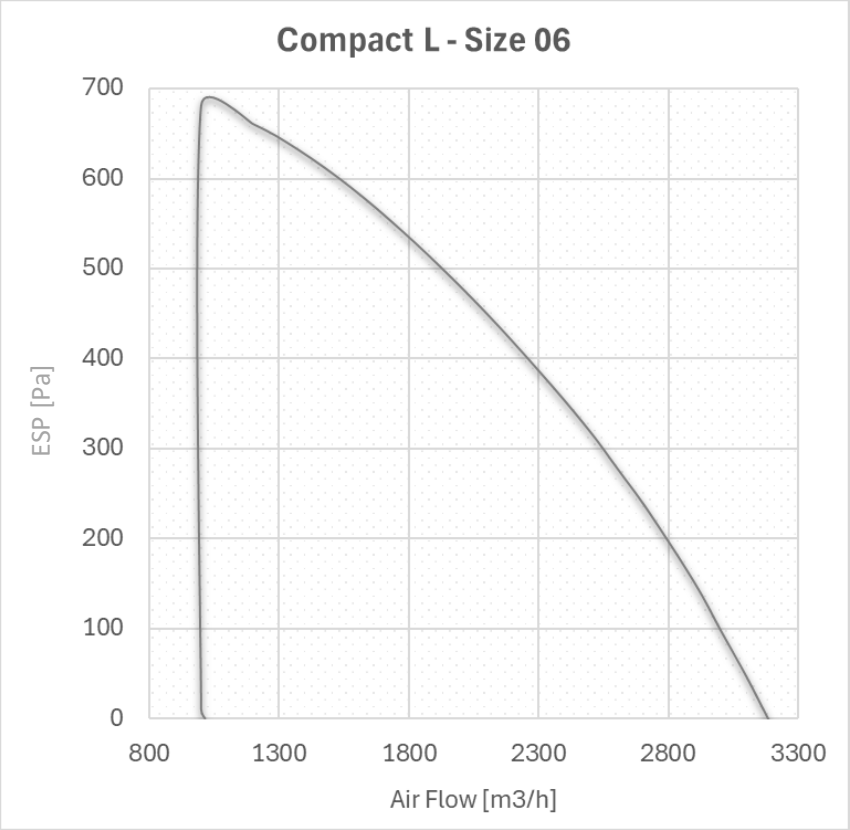
Size 04



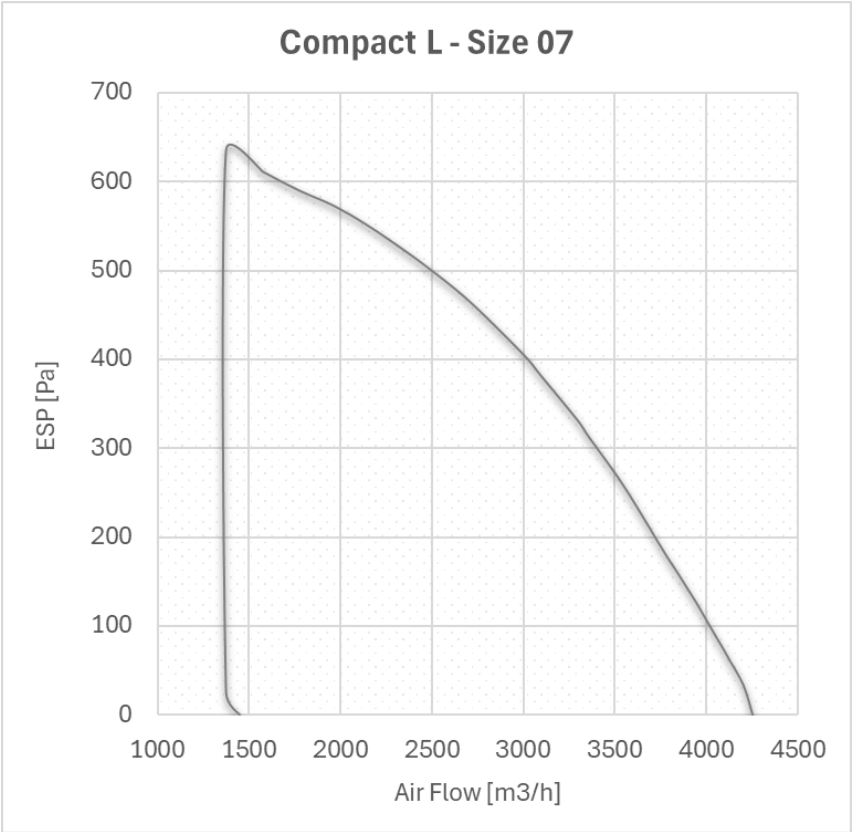
Size 05



Size 06



Size 07

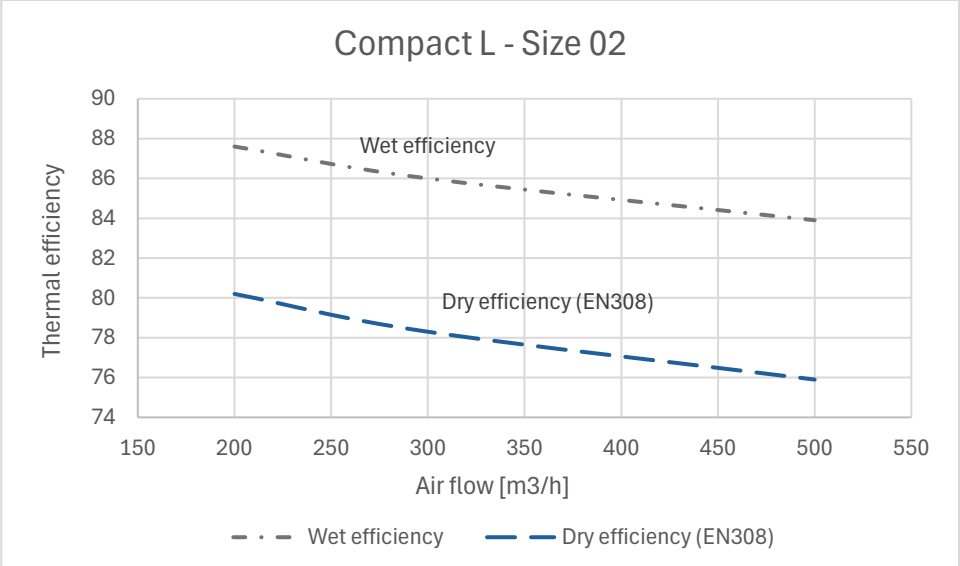


7.2. Thermal efficiency

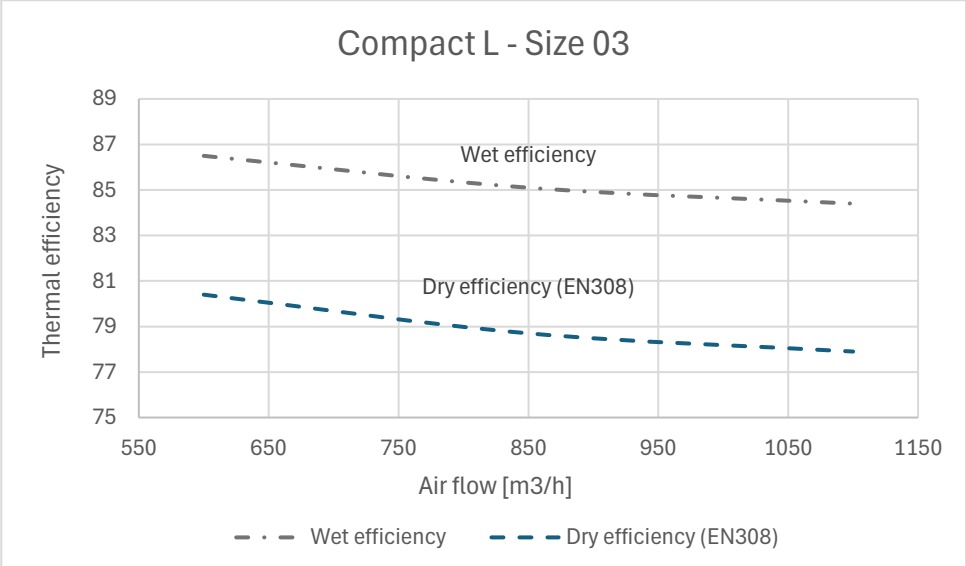
The charts indicate the thermal efficiency of the heat exchanger at the follwing conditions:

- Wet efficiency: -5°C/ RH 80% Outdoor and +22°C/50% Indoor
- With air ratio 1:1 and according to EN308

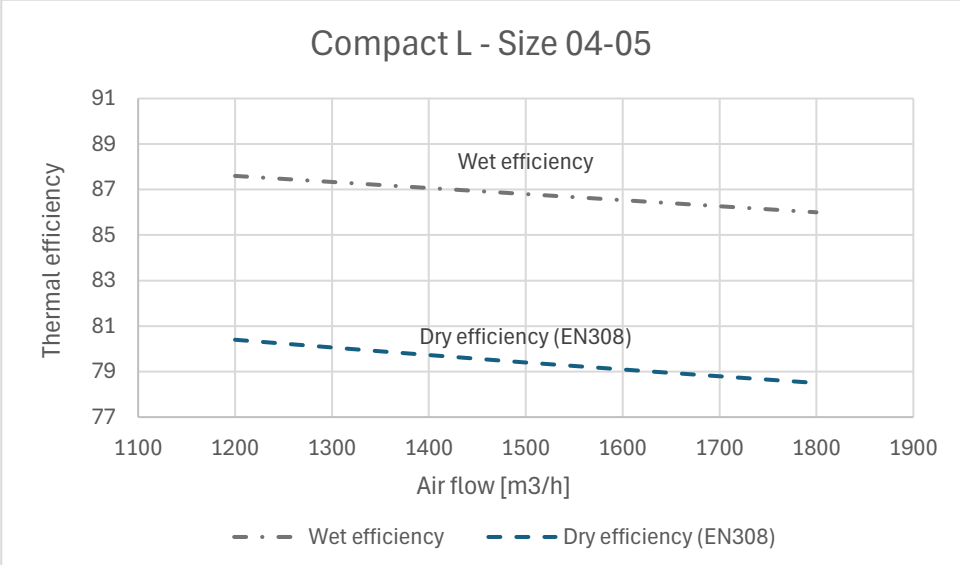
Thermal efficiency: Size 02



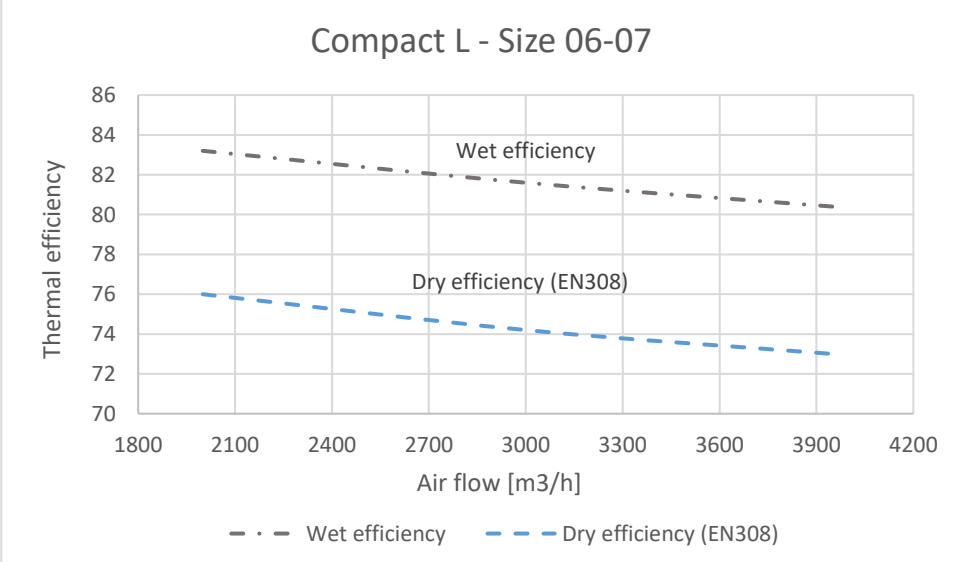
Thermal efficiency: Size 03



Thermal efficiency: Size 04 - 05



Thermal efficiency: Size 06 - 07



7.3. Sound emission

Surrounding power level: The airborne is the sound power emitted by the unit. The surrounding power level is the logarithmic sum of the two airborne values (supply and return).
Surrounding pressure level: It is calculated in accordance with EN3744. The evaluation is done at 1 meter from the source and with a directivity factor equal to 4, in non-reverberant field.

Sound Level Size 02

Air flow: 200 m^3/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	59	61	55	48	43	42	28	17	52
	Supply outlet	59	64	64	64	52	55	47	40	64
	Return inlet	58	59	52	46	40	39	25	15	49
	Return outlet	58	62	61	61	50	53	45	38	61
	Surrounding power	53	55	50	51	41	35	25	13	49
Surrounding pressure (dBA)										42

Air flow: 400 m^3/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	63	66	56	49	44	45	34	28	54
	Supply outlet	63	69	65	64	54	59	54	51	66
	Return inlet	62	65	54	46	43	44	33	26	53
	Return outlet	62	68	63	62	52	58	52	49	64
	Surrounding power	57	60	51	51	42	39	32	24	51
Surrounding pressure (dBA)										44

Air flow: 200 m^3/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	63	65	63	56	51	48	34	24	59
	Supply outlet	63	68	72	72	60	62	54	47	71
	Return inlet	62	64	61	54	49	47	33	22	57
	Return outlet	62	67	70	70	58	61	52	46	69
	Surrounding power	58	59	58	59	48	42	31	20	57
Surrounding pressure (dBA)										50

Air flow: 400 m^3/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	65	68	60	53	48	49	38	31	57
	Supply outlet	65	71	68	69	57	62	57	55	69
	Return inlet	64	67	57	51	45	47	36	30	55
	Return outlet	64	70	66	66	55	60	56	53	67
	Surrounding power	59	62	54	55	45	42	35	28	54
Surrounding pressure (dBA)										47

Allowances on declared data: +/- 3 dB(A)

Sound Level Size 03

Air flow: 600 m³/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	64	65	61	49	49	46	33	22	56
	Supply outlet	64	68	69	65	59	60	53	45	67
	Return inlet	63	64	59	47	47	44	32	20	54
	Return outlet	63	67	67	63	56	58	51	43	65
	Surrounding power	58	59	55	52	47	40	31	18	53
Surrounding pressure (dBA)										46

Air flow: 1000 m³/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	70	71	66	53	54	53	42	33	62
	Supply outlet	70	74	74	69	63	66	61	56	73
	Return inlet	69	70	64	52	53	52	41	31	60
	Return outlet	69	73	73	68	62	65	60	55	71
	Surrounding power	64	65	61	56	52	46	39	29	58
Surrounding pressure (dBA)										51

Air flow: 600 m³/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	65	68	64	54	53	49	36	26	60
	Supply outlet	65	70	73	70	62	63	56	49	71
	Return inlet	65	66	63	52	51	48	35	24	58
	Return outlet	65	69	71	68	60	61	54	47	69
	Surrounding power	60	61	59	56	51	43	34	22	57
Surrounding pressure (dBA)										50

Air flow: 1000 m³/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	71	72	68	56	56	54	44	35	63
	Supply outlet	71	75	76	72	66	68	63	58	75
	Return inlet	70	71	66	54	55	53	42	33	62
	Return outlet	70	74	75	69	64	67	62	56	73
	Surrounding power	65	66	63	58	54	48	41	31	60
Surrounding pressure (dBA)										53

Allowances on declared data: +/- 3 dB(A)

Sound Level Size 04

Air flow: 1200 m^3/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	62	64	61	53	54	53	42	33	59
	Supply outlet	62	67	70	68	63	67	61	56	72
	Return inlet	63	65	61	53	54	53	42	33	59
	Return outlet	63	68	69	68	63	67	61	56	72
	Surrounding power	57	59	57	56	53	47	40	30	57
Surrounding pressure (dBA)										50

Air flow: 1500 m^3/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	67	69	66	58	59	58	48	40	64
	Supply outlet	67	72	74	74	69	72	67	64	77
	Return inlet	66	68	66	58	59	58	47	40	64
	Return outlet	66	71	74	74	69	72	67	64	77
	Surrounding power	61	63	61	62	58	53	45	37	62
Surrounding pressure (dBA)										55

Air flow: 1200 m^3/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	60	62	62	52	54	53	42	34	59
	Supply outlet	60	65	70	68	63	67	62	57	72
	Return inlet	61	63	61	52	54	53	42	34	59
	Return outlet	61	66	70	68	63	67	62	57	72
	Surrounding power	55	57	57	56	52	47	40	31	57
Surrounding pressure (dBA)										50

Air flow: 1500 m^3/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	66	68	66	58	59	58	48	41	64
	Supply outlet	66	71	75	74	68	72	67	64	77
	Return inlet	67	69	66	58	59	58	48	41	65
	Return outlet	67	72	74	74	68	72	67	64	77
	Surrounding power	61	63	62	62	58	53	46	38	62
Surrounding pressure (dBA)										55

Allowances on declared data: +/- 3 dB(A)

Sound Level Size 05

Air flow: 1600 m³/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	72	68	62	50	50	47	39	31	58
	Supply outlet	63	66	74	68	64	68	62	58	73
	Return inlet	70	66	61	50	49	47	38	31	57
	Return outlet	62	65	74	68	63	68	62	58	73
	Surrounding power	57	57	61	56	53	49	40	32	58
Surrounding pressure (dBA)										51

Air flow: 1800 m³/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	74	70	64	52	52	49	41	34	60
	Supply outlet	68	67	75	70	66	71	64	62	75
	Return inlet	72	68	63	51	51	49	41	34	59
	Return outlet	63	67	76	70	66	71	64	62	75
	Surrounding power	61	59	63	58	55	51	43	36	60
Surrounding pressure (dBA)										53

Air flow: 1600 m³/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	74	71	64	52	51	48	40	32	60
	Supply outlet	68	68	75	70	65	70	63	59	74
	Return inlet	73	70	63	51	50	48	40	32	59
	Return outlet	65	67	74	69	64	69	62	58	73
	Surrounding power	61	59	62	57	54	50	41	33	59
Surrounding pressure (dBA)										52

Air flow: 1800 m³/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	74	72	65	53	53	50	42	34	61
	Supply outlet	69	69	78	73	69	74	67	66	78
	Return inlet	74	71	64	53	52	49	41	34	60
	Return outlet	69	68	75	71	67	72	65	63	76
	Surrounding power	64	60	64	60	58	54	45	38	62
Surrounding pressure (dBA)										55

Allowances on declared data: +/- 3 dB(A)

Sound Level Size 06

Air flow: 2100 m³/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	64	64	56	45	46	45	39	26	54
	Supply outlet	66	68	67	64	62	67	63	54	71
	Return inlet	64	63	54	44	45	45	39	25	53
	Return outlet	66	67	65	64	61	66	62	53	70
	Surrounding power	61	59	54	52	51	47	41	27	55
Surrounding pressure (dBA)										48

Air flow: 2600 m³/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	67	67	61	49	50	49	44	33	57
	Supply outlet	69	71	73	68	67	71	67	60	75
	Return inlet	68	67	61	49	50	48	44	32	57
	Return outlet	70	71	73	68	66	70	67	59	75
	Surrounding power	64	62	60	56	56	51	46	33	59
Surrounding pressure (dBA)										52

Air flow: 2100 m³/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	65	66	61	47	48	47	40	28	56
	Supply outlet	67	70	72	66	64	69	64	56	73
	Return inlet	65	65	59	46	47	46	40	27	55
	Return outlet	67	69	70	66	63	68	64	55	72
	Surrounding power	62	61	58	54	53	49	43	30	57
Surrounding pressure (dBA)										50

Air flow: 2600 m³/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	66	68	64	50	50	50	44	34	59
	Supply outlet	69	72	74	70	68	73	68	62	77
	Return inlet	66	67	62	50	50	49	44	34	58
	Return outlet	69	72	73	69	67	72	68	61	76
	Surrounding power	64	64	61	57	57	53	46	35	60
Surrounding pressure (dBA)										53

Allowances on declared data: +/- 3 dB(A)

Sound Level Size 07

Air flow: 3100 m³/h, ESP: 50 Pa

Point A	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	64	63	66	53	53	51	39	31	60
	Supply outlet	64	68	78	71	69	75	65	58	78
	Return inlet	62	63	65	51	51	49	38	29	59
	Return outlet	62	68	76	69	68	73	64	56	76
	Surrounding power	58	59	64	58	58	54	43	31	62
Surrounding pressure (dBA)										55

Air flow: 3600 m³/h, ESP: 50 Pa

Point B	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	65	63	69	55	55	53	42	34	62
	Supply outlet	65	68	79	73	72	78	69	61	81
	Return inlet	63	62	67	53	54	52	42	33	61
	Return outlet	64	67	78	71	71	76	68	60	80
	Surrounding power	59	59	66	60	60	58	47	34	64
Surrounding pressure (dBA)										57

Air flow: 3100 m³/h, ESP: 150 Pa

Point C	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	66	66	70	55	54	53	41	33	63
	Supply outlet	66	71	82	73	71	77	68	60	80
	Return inlet	64	64	68	53	53	51	40	31	61
	Return outlet	64	69	79	71	70	75	66	58	79
	Surrounding power	60	61	68	60	60	57	45	33	64
Surrounding pressure (dBA)										57

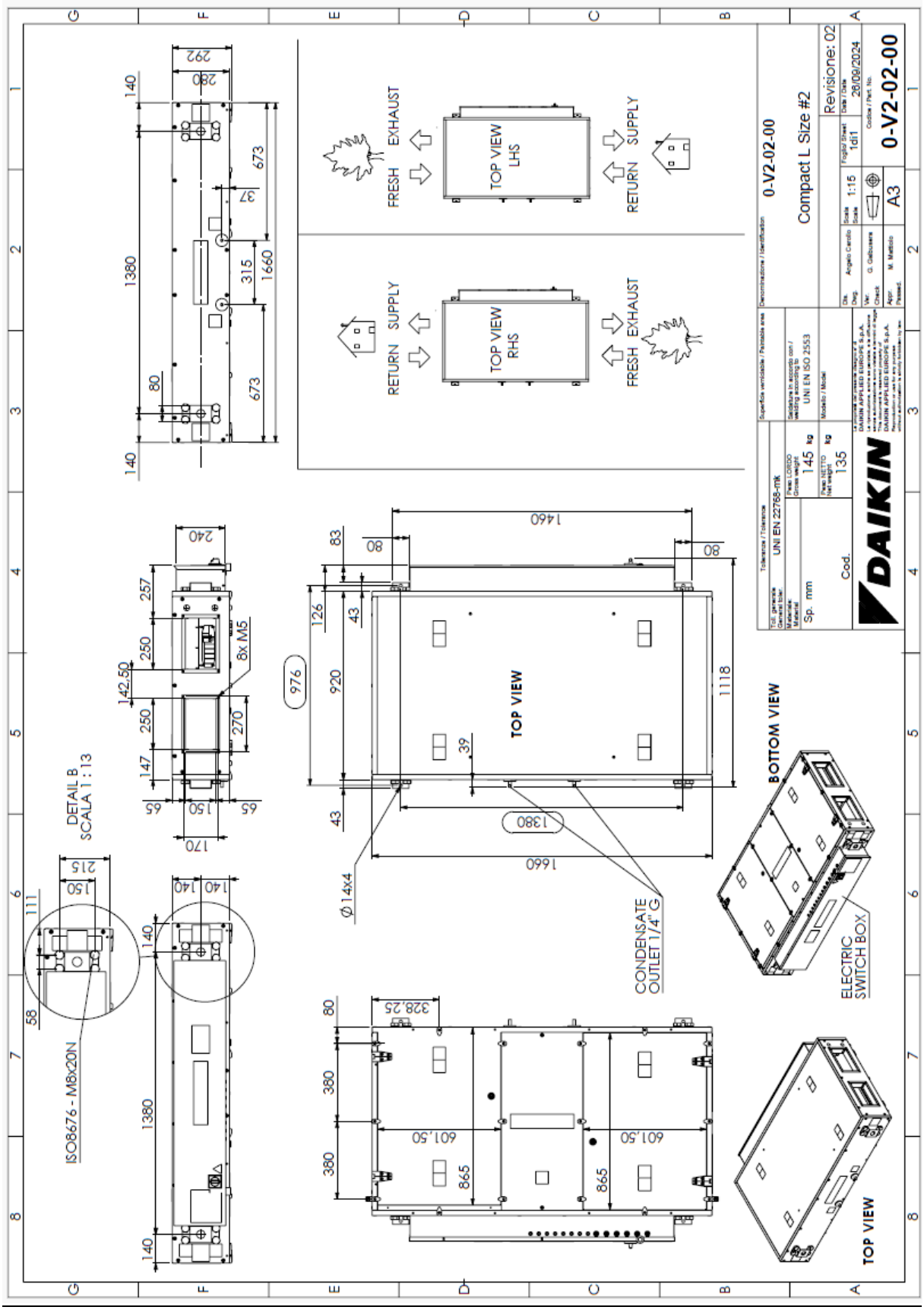
Air flow: 3600 m³/h, ESP: 150 Pa

Point D	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Avg (dBA)
Sound power (dB)	Supply inlet	66	65	71	56	57	55	43	36	64
	Supply outlet	67	70	82	75	73	79	70	63	82
	Return inlet	65	64	69	55	55	54	42	35	63
	Return outlet	66	69	80	73	72	78	69	62	81
	Surrounding power	61	61	68	62	62	59	48	36	66
Surrounding pressure (dBA)										59

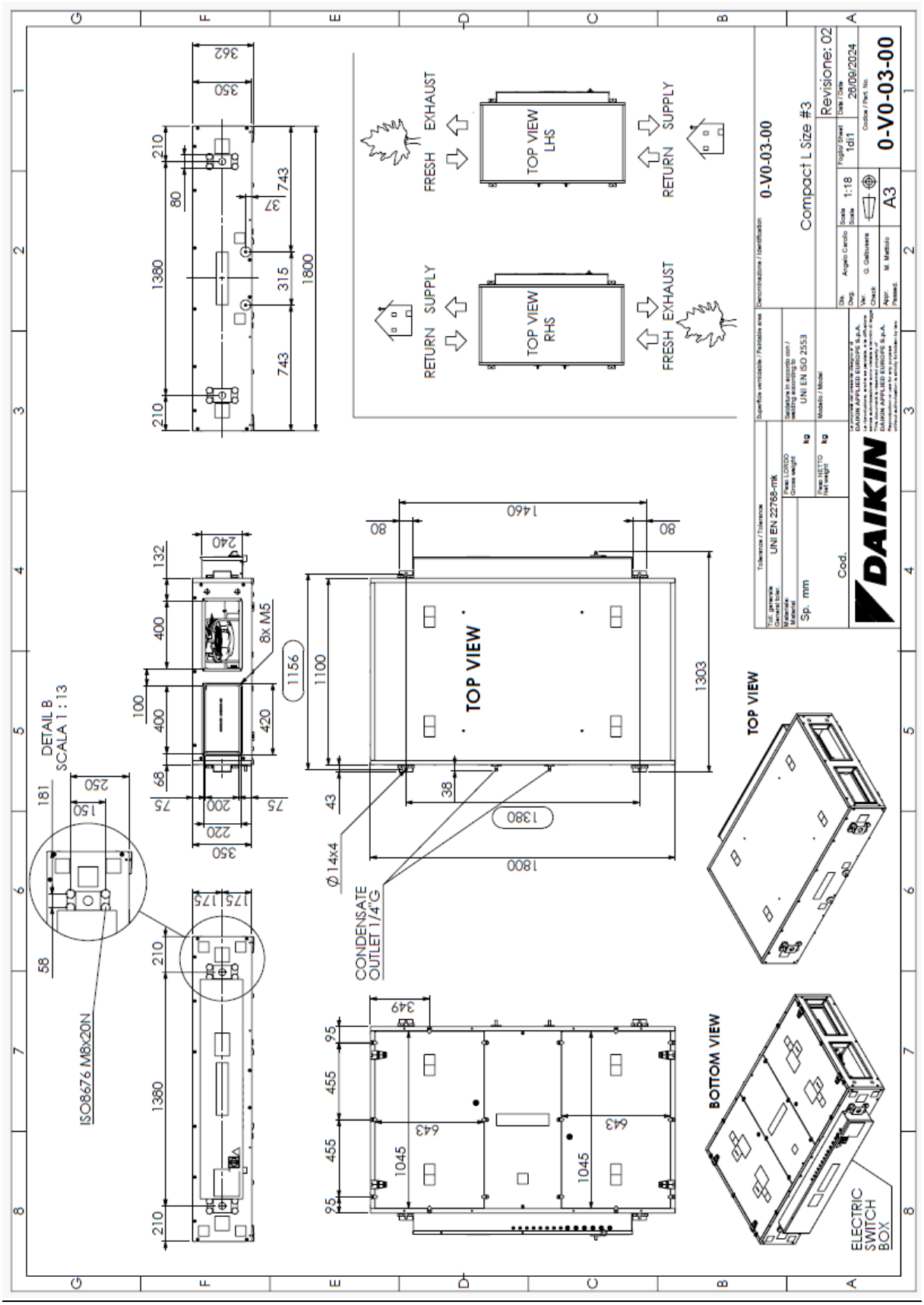
Allowances on declared data: +/- 3 dB(A)

7.4. Dimensional Drawings

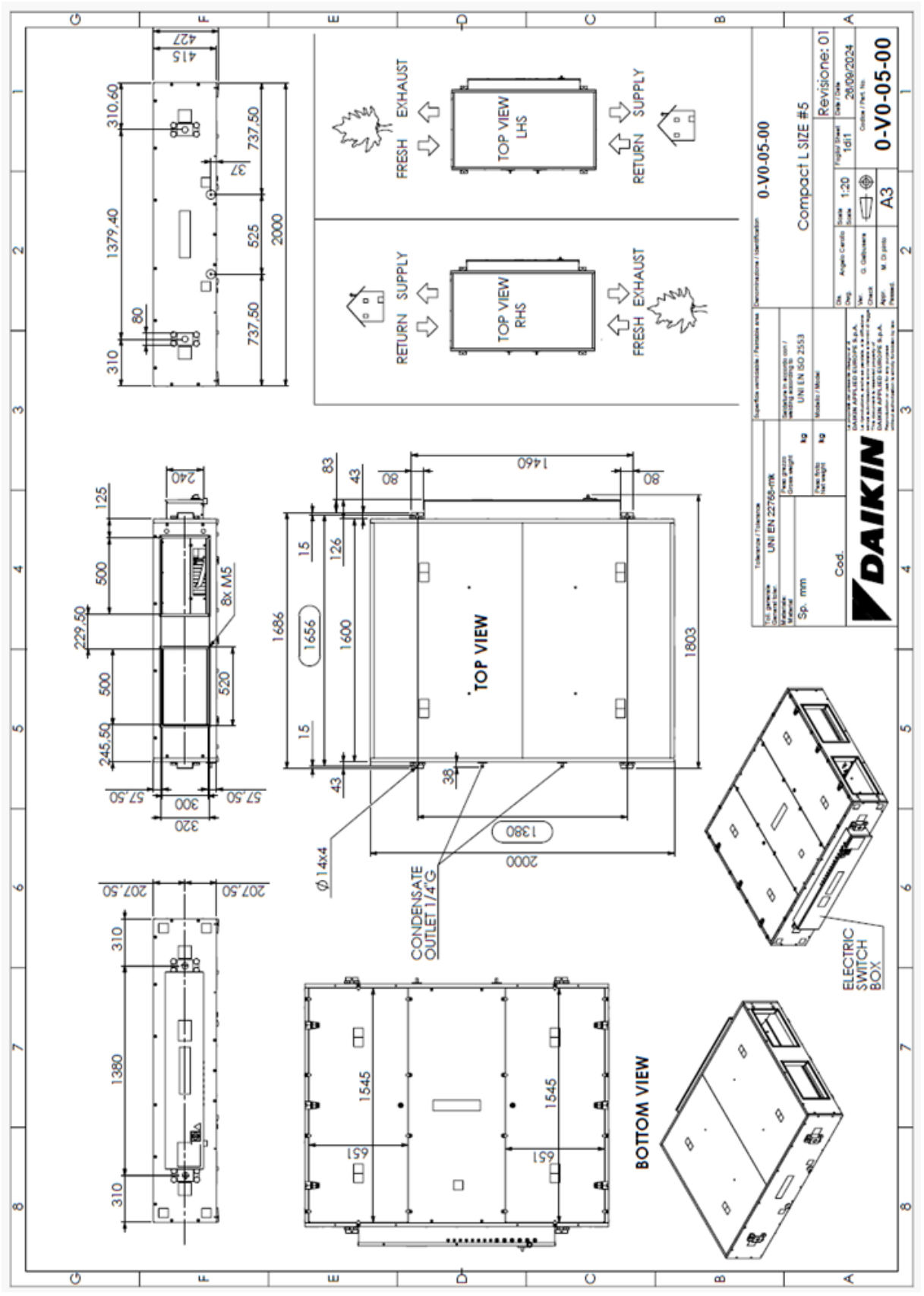
Dimension Drawing: Size 02



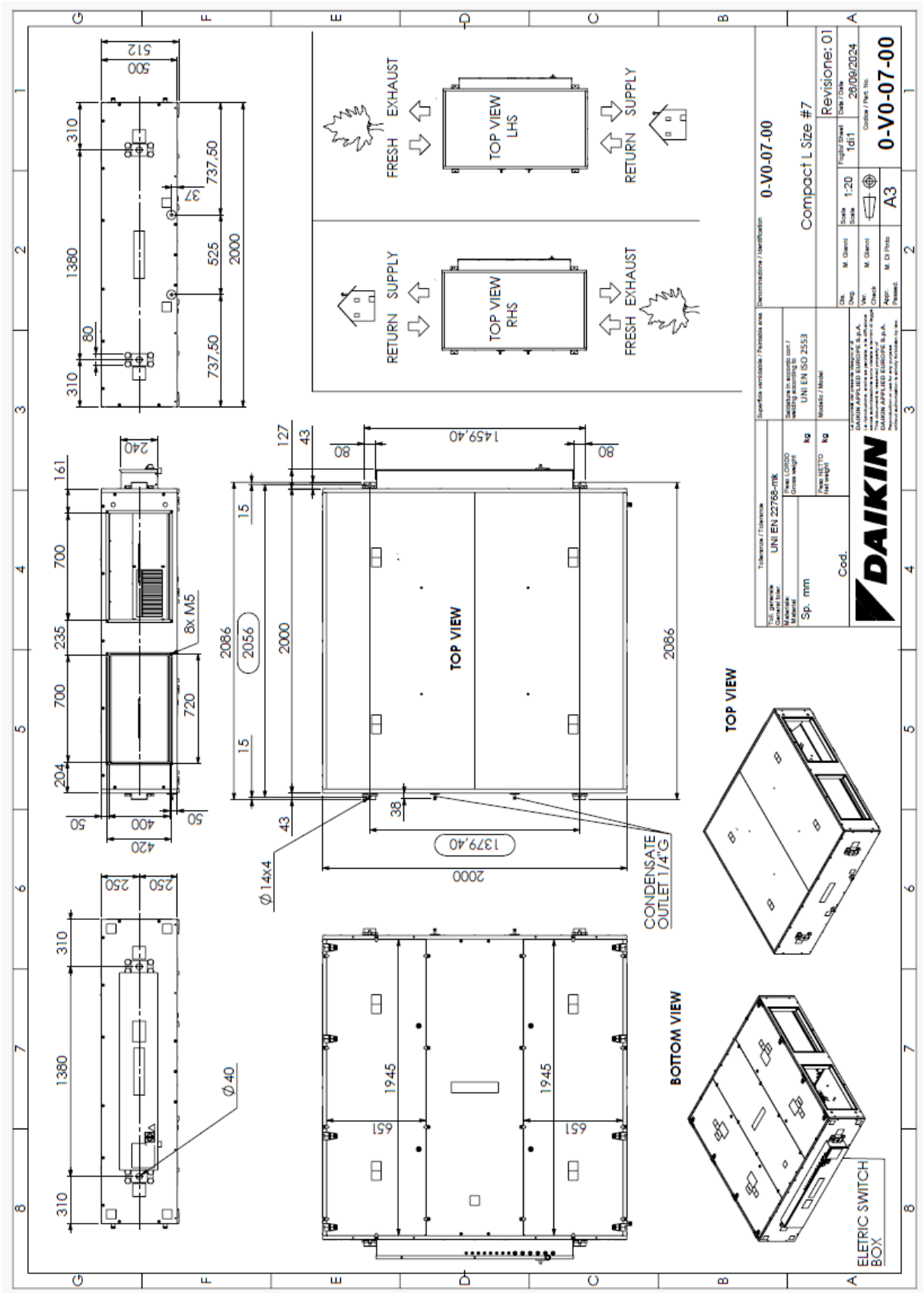
Dimension Drawing: Size 03



Dimension Drawing: Size 04-05



Dimension Drawing: Size 06-07



8. Compact L Pro with integrated heating water coil

Compact L Pro is available with an integrated heating water coil. This version of Compact L Pro allows saving space and time to install an external coil.

Nomenclature:

Compact L Pro with Internal water heating coil		
Size	Right	Left
Size 02	ALB02RCMW	ALB02LCMW
Size 03	ALB03RCMW	ALB03LCMW
Size 04	ALB04RCMW	ALB04LCMW
Size 05	ALB05RCMW	ALB05LCMW
Size 06	ALB06RCMW	ALB06LCMW
Size 07	ALB07RCMW	ALB07LCMW

Note 1: For air inlet temperature below 0°C ethylene glycol has to be added for antifreeze protection reason. Please find in the below table the percentage of ethylene glycol based on outdoor temperature:

Freezing Point							
Ethylene glycol solution (% by volume)	0	10	20	30	40	50	60
Temperature °C	0	-3,2	-7,8	-14,1	-22,3	-33,8	-48,3

Following table summarise main information about the water coils installed inside the main unit.

Description	Size 02	Size 03	Size 04	Size 05	Size 06	Size 07
Type of coil	P22					
Rows	2					
Fin space (mm)	2,5					
Fluid volume (dm^3)	0,21	0,46	0,73		1,50	
Connections	½"	½"	¾"		¾"	
Length (mm)	220	380	450		700	
Height (mm)	150	200	275		375	

An additional temperature probes has to be added in Astra selection software and it has to be wired according to the IOM while the POL955 (expansion module A) is already installed in the main unit.

In the next table for each size, some technical data are reported.
For an accurate performance evaluation, please refer to Astra selection software.

Air Flow (m^3/h)	Size	Air Temperature (°C)		Power (kW)	Air pressure drop (Pa)	Water Temperature (°C)		Water flow (l/s)	Water pressure drop (kPa)
		Inlet	Outlet			Inlet	Outlet		
150	02	0	22,7	1,2	8	45	40	0,06	7
300	02	0	17,7	1,8	25	45	40	0,09	16
450	02	0	15,0	2,3	48	45	40	0,11	25
500	03	0	20,1	3,4	15	45	40	0,16	13
600	03	0	18,8	3,9	20	45	40	0,18	16
800	03	0	16,8	4,6	31	45	40	0,22	22
1000	04	0	18,4	6,3	20	45	40	0,30	8
1200	04	0	17,1	7,0	28	45	40	0,34	10
1350	04	0	16,3	7.6	33	45	40	0,36	12
1500	05	0	15,6	8,0	40	45	40	0,38	13
1600	05	0	15,2	8,3	44	45	40	0,40	14
1750	05	0	14,6	8,8	51	45	40	0,42	15
2000	06	0	18,9	13,0	19	45	40	0,62	8
2250	06	0	18,1	13,9	22	45	40	0,66	9
2500	06	0	17,3	14,9	27	45	40	0,71	10
2750	07	0	16,7	15,7	31	45	40	0,75	12
3000	07	0	16,1	16,5	36	45	40	0,79	13
3250	07	0	15,6	17,3	41	45	40	0,83	14

Water without glycol

Please consider that with this Compact L Pro version, it is possible to install only preheating coil (water or electric).