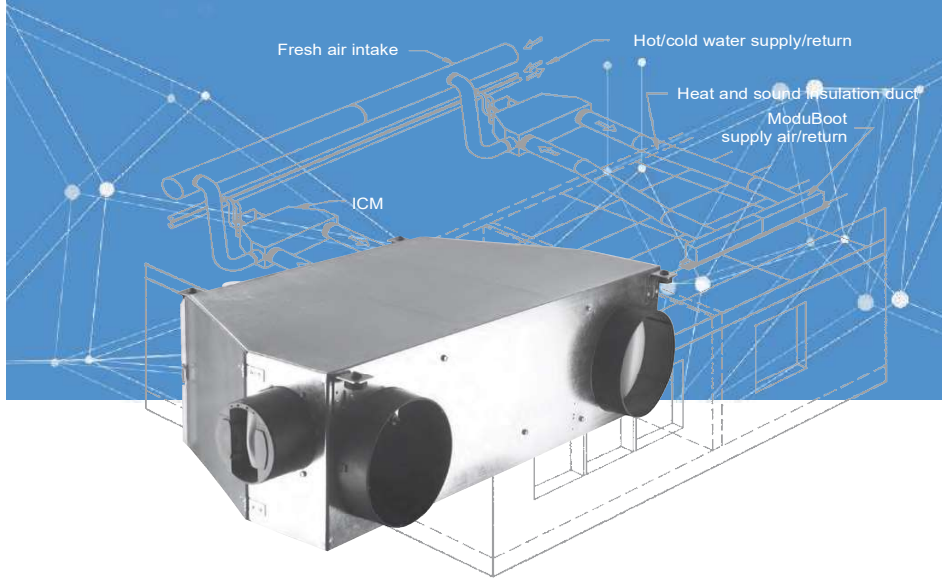




## LOW-CONSUMPTION INDIVIDUAL COMFORT MODULE FOR VARIABLE AIR VOLUME SYSTEMS



All-in-one offer: minimal installation costs thanks to factory-tested and -fitted options

Easy integration into a centralised zone

Very low sound level

Available static pressure: 100 to 350 Pa

# 42BJ ICM LEC

Total cooling capacity 0.5 – 6.0 kW  
Total heating capacity 0.5 - 12.2 kW

The Carrier 42BJ ICM (Individual Comfort Module) is a compact air conditioning system available in 3 sizes, designed for conditioning rooms measuring 25 to 50 m<sup>2</sup>.

PRESENTATION

COOLING

HEATING

AIR TREATMENT

CONTROLS

## OVERVIEW AND ADVANTAGES

The 42BJ module is connected by flexible sound-absorbing ducts (heat insulated air discharge duct) to one or more plenums incorporating a linear diffuser which is seamlessly integrated into the suspended ceiling of the room to be air-conditioned (CARRIER ModuBoots 35BD/35SR range).

The units can be fitted in suspended ceilings or raised floors, ideally in corridors, where they are connected to hot water, chilled water and fresh air circuits.

These circuits installed in the building's circulation zones (for easy maintenance) never cross into air-conditioned spaces. Only the 35BD/35SR diffuser(s), inert components of the system, are located in the occupied space. This means that maintenance is performed outside of the occupied space and facilitates programming when the building is occupied.

The Individual Comfort Module has been designed to be ultra quiet; moreover, thanks to its available static pressure, it can be located away from the air-conditioned space.

### ■ Comfort

The 42BJ ICM LEC can be equipped with a Carrier digital control, providing each occupant with a remote user interface located on their desktop or wall, enabling individual selection of preferred comfort conditions:

- Room temperature of the room
- Forced air function (quick renewal of air in the office)
- Set to occupied or unoccupied mode by the user of each ICM LEC to meet energy-saving requirements.

The Aquasmart Evolution is used to control and optimise each module according to the requirements of the operator or local regulations. Thanks to this central energy-monitoring system, the comfort conditions can be controlled at all times to obtain the best balance between energy savings and individual comfort.

If the product is supplied without a Carrier control device, the integrator is responsible for ensuring EMC conformity.

### Air quality

#### ■ Indoor Air quality (IAQ)

Carrier is committed to developing a system for managing Indoor Air Quality (IAQ) built into air conditioning units. A major innovation which paves the way for the air conditioning systems of the future.

In this application, each individual comfort module (ICM LEC) is equipped with a fresh air intake control and high-efficiency filtration to successfully protect against any type of pollutant.

This therefore guarantees excellent indoor air quality as explained below in 2 steps:

- High-efficiency filtration: type F5 or F6
- Fresh air flow modulation: CARRIER units may be equipped with a fresh air flow modulation system to control the air flow diffused in a room.

#### ■ Three objectives:

Adapt the ventilation flow rate to the actual occupancy of the rooms.

Maintain excellent indoor air quality to ensure the comfort and health of occupants, in accordance with the labour code.

Control energy costs relating to air change in rooms to avoid "over-ventilating" the building and to minimise operating costs, particularly when the building is unoccupied.

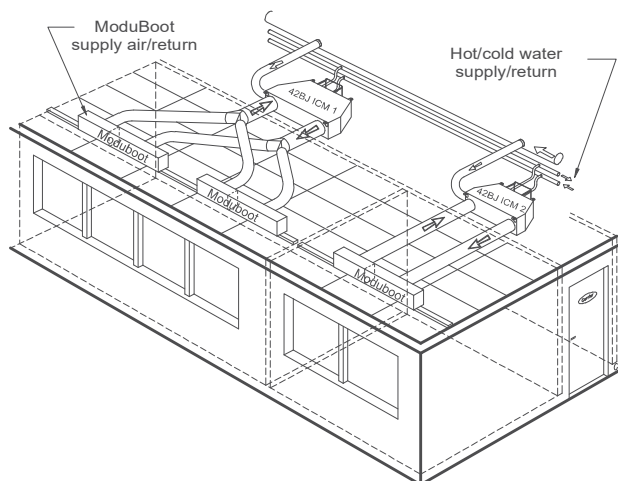
#### ■ Operating principle

The occupants of a room release an average of 0.0045 l/s (16.2 l/h) of CO<sub>2</sub>. A CO<sub>2</sub> sensor, located in the terminal's return air duct, measures the concentration of the room air conditioned by the unit. This concentration measured represents the actual occupancy of the room.

This sensor sends a signal to the Carrier digital controller which, in turn, sends a signal to actuate the fresh air valve:

If the concentration of CO<sub>2</sub> is below a threshold value: the fresh air flow is at minimum or zero,

if it is above: the flow rate is increased to the maximum level set.



CODES

Product ref.	Range				Size		Modification index	Coils	Supply and return air plenum	Valves	Valve actuators	Control	Sensors	Filters and access	Fresh air	Motor wiring
Digit	4	2	B	J	1	9	D	A	T	C	A	A	A	G	-	W
Digit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Digit 5/6	
1	9
2	9
4	9

Digit 7
D

Digit 8
A = 2 RH pipes
B = 2 LH pipes
C = 4 RH pipes
D = 4 LH pipes
E = 2 pipes/2 RH wires (LP) (PTC 2 wired stages)
F = 2 pipes/2 LH wires (LP) (PTC 2 wired stages)
G = 2 pipes/2 RH wires (HP) (PTC 5 wired stages)
H = 2 pipes/2 LH wires (HP) (PTC 5 wired stages)
J = 2 pipes/2 RH wires (MP) (PTC 4 wired stages)
K = 2 pipes/2 LH wires (MP) (PTC 4 wired stages)

Digit 9
T = 1x supply air collar, 1x return air collar
Sizes 19-29: Ø200 mm
Size 49: Ø250 mm

Digit 10
- = No valves
C = 2-way valve
D = 4-way valve
J = 2-way valve + insulated flexible connections
K = 4-way valves + insulated flexible connections

Digit 15
- = None
A = Ø125 mm collar (without flow controller)
B = Ø125 mm fixed 30 m <sup>3</sup> /h flow controller
C = Ø125 mm adjustable 60 -160 m <sup>3</sup> /h flow controller
E = Ø125 mm adapter for motorised fresh air valve

Digit 14
F = Access from under filter F5
G = Access from side STANDARD filter F5
H = Access from above filter F5
K = Access from under filter F6
L = Access from side filter F6
M = Access from above filter F6

Digit 13
- = None
A = Return sensor
B = Supply air sensor
C = Changeover sensor
D = Supply air + return sensors
F = Return + Changeover sensors
G = Supply air + Changeover sensors
E = Return + Supply air + Changeover sensors
H = CO <sub>2</sub> sensor
J = Return air + CO <sub>2</sub> sensors
K = Supply air + CO <sub>2</sub> sensors
L = Changeover + CO <sub>2</sub> sensors
M = Return + Supply air + CO <sub>2</sub> sensors
N = Return air + Changeover + CO <sub>2</sub> sensors
P = Supply air + Changeover + CO <sub>2</sub> sensors
Q = Return + Supply air + Changeover + CO <sub>2</sub> sensors

Digit 12
- = None
A = NTC control
K = NTC control + fuse disconnect switch
D = NTC control + IAQ board
L = NTC control + IAQ board + fuse disconnect switch
S = WTC LON control
T = WTC BACNET control
U = WTC LON control + fuse disconnect switch
V = WTC BACNET control + fuse disconnect switch

Digit 11
- = None
A = 230 V ON/OFF actuator
C = 3-POINT 230 V actuator (with NTC or WTC)

## TECHNICAL DESCRIPTION

### ■ Frame:

The 42BJ ICM LEC features a galvanised steel sheet metal box; the inside is covered with sound and heat insulation (fire protection rating M1)

- "LEC" fan motor assembly with electronically commutated variable-speed direct-drive motor (commonly called an "EC motor"), controlled by a 0-10 V signal enabling it to operate over a broad range of rotation speeds

### ■ Water coil

Aluminium fins mechanically bonded by expansion onto a copper tube.

1/2" gas union nut inlet/outlet connections. Air bleed valves as standard. Coil attached to the condensate pan and coil access door forming a drawer which is easily removed for maintenance.

Coils available:

- 2 pipes with changeover or for use with an electric heater
- 4 pipes.

### ■ PTC electric heater

Positive Temperature Coefficient

The PTC electric heater belongs to a new generation of powerful heater rods which combine two technologies: electric heating and surface temperature limitation (cutting-edge technology based on the use of ceramics).

The actual cooling capacity depends on the air flow and its inlet temperature.

This modern technology guarantees safe, self-regulation of the cooling capacity. Moreover, each coil is equipped with a safety thermostat with automatic reset (contact opens when the temperature rises, triggered at 70 °C and average differential 20 K).

**Warning:** Before carrying out any work on the electric heater, the mains power supply to the unit must be disconnected.

Enhanced comfort without stratification: Supply air temperature = 35 °C



### ■ Thermoformed condensate pan

Main condensate pan under the coil and auxiliary pan under the valves forming a packaged assembly to prevent any risks of leaks. As the coil is placed on the fan intake to facilitate spraying, condensate is drained via a check valve, the height of the water between the main pan and the auxiliary pan is sufficient to overcome the negative pressure inside the unit. A siphon does not need to be fitted with this device.

Insulated auxiliary pan.

Drain ext. dia. 16 mm.

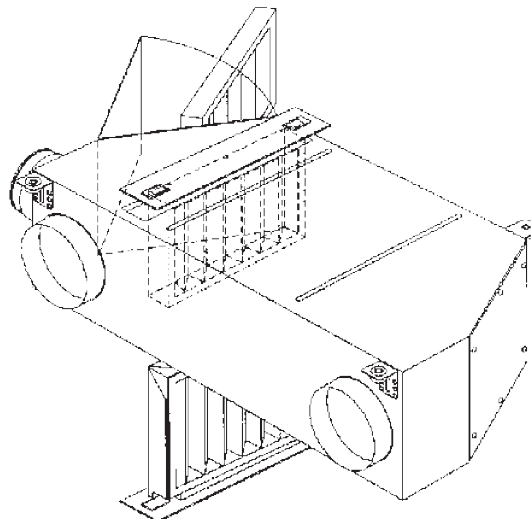
### ■ Filter and access

The Carrier Individual Comfort Module is equipped with a high-efficiency type F5 or F6 filter.

Fire protection rating for the medium is M1, metal frame.

The filter can be accessed via one of 3 sides of the 42BJ ICM LEC:

- Access from above: for use in a raised floor
- Access from below: for use in a suspended ceiling
- Side access: all uses



## TECHNICAL DESCRIPTION

### ■ Constant fresh air flow controller (optional)

The Individual Comfort Module can be equipped with a constant fresh air flow controller, for controlling the air intake and air change. Depending on the room occupancy, the constant fresh air flow controller may prove essential.

Range of fresh air flow controllers available:

8.3 l/s or 30 m<sup>3</sup>/h (-10%; + 20%)

16.6 l/s or 60 m<sup>3</sup>/h (-10%; + 20%)

The fresh air feed is located before the water coils. The collar retaining the controller is made from ABS, connection diameter:

- 125 mm for 16.6 l/s (60 m<sup>3</sup>/h controller)
- 74 mm for 8.3 l/s (30 m<sup>3</sup>/h controller).

**Important:** if the 42BJ ICM LEC is equipped with a return air temperature sensor, the constant fresh air flow must not exceed 50% of the unit supply air flow rate at low speed.

**Note:** The 16.6 l/s (60 m<sup>3</sup>/h) fresh air controller can be modified on site by moving or removing two plastic restrictors to increase capacity up to a maximum constant fresh air flow of 44.4 l/s (160 m<sup>3</sup>/h).

A label affixed to the 42BJ explains how to adjust the setting of the two plastic restrictors.

Note: the 8.3 l/s (30 m<sup>3</sup>/h) constant fresh air flow controller requires a differential pressure of 50 Pa to 200 Pa to operate. The 16.6 l/s (60 m<sup>3</sup>/h) constant fresh air flow controller requires a differential pressure of 70 Pa to 200 Pa.

	l/s	m <sup>3</sup> /h	A	B
<b>MR60</b>	17	60	4-4	4-4
<b>MR75</b>	21	75	4-3	4-3
<b>MR85</b>	24	85	3-3	3-2
<b>MR90</b>	25	90	3-2	2-2
<b>MR100</b>	28	100	2-1	2-1
<b>MR105</b>	29	105	2-1	1-1
<b>MR110</b>	31	110	1-1	1-1
<b>MR120</b>	33	120	3-3	-
<b>MR130</b>	36	130	2-1	-
<b>MR140</b>	39	140	1-1	-
<b>MR160</b>	44	160	-	-

## OPTIONS

### Valves

#### ■ Valve actuators

A range of actuators is available with two- or four-way valve bodies (three-way with integral bypass) to offer the appropriate solution for any controller type and customer requirement, from on/off to proportional types, with 230 V power supply

- 230 V ON/OFF actuator
- Floating 3-point 230 V actuator

When combined with LEC motors and WTC or NTC controllers, floating 3-point 230-V actuators are recommended to increase energy savings and enhance comfort.

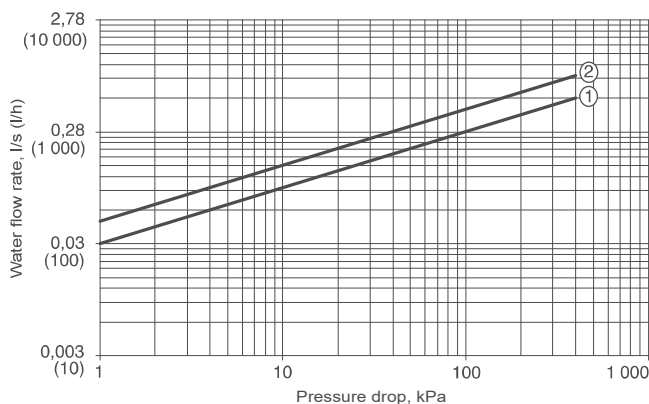
#### ■ 1/2" two-way valve body

- G1/2" male BSP connection for union nuts
- Straight valve body with arrow indicating direction of flow embossed on valve body.
- DN 15 for 1/2" valve
- Fluid: water and glycol solution (max. 40% glycol)
- Operating range: 2-90 °C
- Rated pressure: 1600 kPa (RP 16 bar)
- Kvs = 1.6

#### ■ Three-way 1/2" valve body (with integral bypass)

- G1/2" male BSP connection for union nuts
- Straight valve body with arrow indicating direction of flow embossed on valve body.
- DN 15 for 1/2" valve
- Fluid: water and glycol solution (max. 40% glycol)
- Operating range: 2-90 °C
- Rated pressure: 1600 kPa (RP 16 bar)
- Kvs = 1

### Valve pressure drop



1 Kvs = 1  
2 Kvs = 1.6

### Flexible connections

- Pipe: EPDM elastomer
- 304L stainless braid
- Connections: brass
- Insulation: cellular elastomer with M1 fire resistance rating, Ø18 mm
- thickness 9 mm, class 3 (in accordance with standard EN 12828).
- Maximum hot operating temperature 90 °C
- water mixture max. 40% ethylene glycol or propylene glycol
- Operating pressure: 1600 kPa (16 bar)
- Minimum curve radius: 106 mm
- 1/2" union nut connections
- Length: approx. 1 m

### Transducers and sensors

#### ■ Water temperature sensor

A water temperature sensor can be provided as an option for NTC and WTC controllers

- For 2-pipe coil: The sensor is installed on a hot/cold water pipe (for changeover function).
- For 4-pipe coil: The sensor is installed on a hot water pipe (for cold-draught function that prevents the operation of the unit when the hot water network is off).

#### ■ Air temperature sensors

Two air temperature sensors, factory fitted, are available as an option for NTC and WTC controllers. They measure the air temperature at the inlet and/or at the outlet side.

#### ■ CO<sub>2</sub> sensor

For indoor air quality control, a CO<sub>2</sub> sensor is available as an option for NTC and WTC controllers. The sensor is factory fitted at the inlet side.

## OPTIONS

### Accessories

There are many accessories available to facilitate installation of the 42BJ ICM LEC. Contact your local representative.

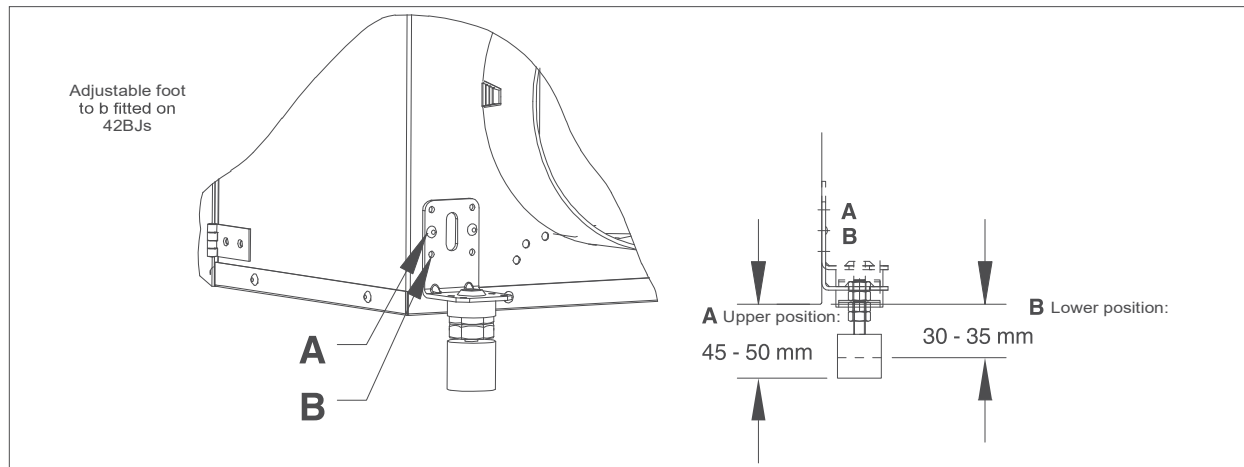
■ **Condensate drain pump**

A condensate drain pump can be installed on 42BJ ICM LECs either before (ideally) or after the units are installed in suspended ceilings or raised floors.

■ **Adjustable feet for installation of the 42BJ ICM LEC in a raised floor:** Allow for filter access from above or the side.

The 42BJ ICM LEC can be installed in a raised floor; anti-vibration adjustable feet are sold as accessories and designed to be installed on site. Contact your local representative.

### Fitting procedure



## CONTROL

The unit can be supplied with a wide range of Carrier controls. These controls offer functions to suit the various application requirements, summarised in the table below.

	Thermostats	NTC	WTC
<b>Communication Protocols</b>			
Carrier Communication Network (CCN) Aquasmart compatible		x	
BACnet MSTP			x
LON			x
<b>Control algorithms</b>			
On-off	x		
Proportional-integral		x	x
Carrier Energy saving algorithm		x	x
<b>Fan control</b>			
3 fixed speeds for AC motors	Type A&B	x	x
Automatic optimum fan speed selection	x	x	x
3 fixed speeds for EC motors	Type C&D	x	x
EC motors Variable speed		x	x
<b>Water Valve management</b>			
Air flow control only (no water valve)	x		
230 V On-off actuators	x	x	x
230 V Modulating actuators (floating 3pts)		x	x
<b>Main functions</b>			
Setpoint control	x	x	x
Occupied/unoccupied mode	x	x	x
Frost protection mode	x	x	x
Window/Door switch input	x	x	x
Measurement of water inlet temperature for automatic seasonal changeover (2 pipes)	Type A&C	x	x
Measurement of water inlet temperature to prevent cold-draught (4 pipes and 2 pipes + electric heater)	Type B&D	x	x
Manual changeover	x	x	x
Frost protection mode	x	x	x
Continuous ventilation within dead-band	x	x	x
Periodical ventilation within dead-band	x	x	x
On-site configuration	x	x	x
Unit grouping Master/Slave	x	x	x
Cassette Louvers control		x	x
Supply air temperature monitoring limiting		x	x
Electrical heater loadshed		x	x
Dirty filter alarm		x	x
Alarm reporting		x	x
Indoor Air Quality control (CO <sub>2</sub> sensor)		o	o
Demand-controlled ventilation (DCV) (0-10 V fresh air valve)		o	o
Free cooling mode			o
Presence detection			o
<b>User interfaces</b>			
Automatic or manual fan speed control	x	x	x
Setpoint adjustment	x	x	x
Occupancy (eco) button	x	x	o
Digital display		o	o
Remote control (infra-red)		o	o
CO <sub>2</sub> sensor		o	o
Luminosity sensor			o
Motion detection			o
Easy connection RJ45 jack (on wall mounted UI)			x
<b>Light &amp; Blinds management</b>			
Light power modules			o
Blinds power modules			o
<b>Control kit</b>			
On site control kit solution			o

**Key**

- X Feature available as standard
- O Optional

**NOTE:** Please refer to the technical documentation for the aforementioned Carrier controller for details of the applicable specifications and characteristics. Upon special request other controller types can be factory-installed on the units (supplied by Carrier or the customer).



## TECHNICAL AND ELECTRICAL CHARACTERISTICS

42BJ	1.9			2.9			4.9			
Ventilation speeds <sup>(1)</sup>	L	M	H	L	M	H	L	M	H	
<b>Voltage</b>	V	2	5	10	2	6	10	2	8	10
Air flow	l/s	40	113	189	52	160	223	69	231	244
	m <sup>3</sup> /h	144	405	680	187	576	804	250	831	880
Available static pressure	Pa	6	50	141	5	50	97	5	50	56
<b>Cooling mode <sup>(2)</sup></b>										
Total cooling capacity	kW	1,06	2,46	3,43	1,37	3,88	5,09	2,09	5,23	5,41
Sensible cooling capacity	kW	0,77	1,88	2,7	0,96	2,84	3,77	1,45	3,81	3,95
Water flow rate	l/h	180	430	620	240	680	910	360	920	960
	l/s	0,05	0,12	0,17	0,07	0,19	0,25	0,10	0,26	0,27
Water pressure drop	kPa	4,3	17,3	31,6	4,4	25,8	42,1	11,9	60,9	65,2
<b>Heating mode, two pipes <sup>(3)</sup></b>										
Heating capacity	kW	1,04	2,46	3,55	1,33	3,93	5,27	1,97	5,54	5,79
Water flow rate	l/h	180	430	620	230	680	920	340	960	1010
	l/s	0,05	0,12	0,17	0,06	0,19	0,26	0,09	0,27	0,28
Water pressure drop	kPa	4,1	14,9	27,7	4,3	23	37,9	12,4	70,9	76,6
Water capacity	L	0,9	0,9	0,9	1,2	1,2	1,2	1,5	1,5	1,5
<b>Heating mode, four pipes <sup>(4)</sup></b>										
Heating capacity	kW	1,32	2,62	3,48	1,76	3,76	4,52	2,63	5,73	5,92
Water flow rate	l/h	120	230	300	150	330	400	230	500	520
	l/s	0,03	0,06	0,08	0,04	0,09	0,11	0,06	0,14	0,14
Water pressure drop	kPa	2,4	5,8	9	3,5	10,4	14,1	14,1	53,6	56,7
Water capacity	L	0,2	0,2	0,2	0,29	0,29	0,29	0,45	0,45	0,45
<b>Electric heater</b>										
1 ph - 50 Hz - 230 V										
Maximum capacity	kW	0,5	1,9	2,23	0,75	2,12	2,25	1	2,25	2,25
Maximum input current	A	11	11	11	11	11	11	11	11	11
<b>Sound levels</b>										
Lw (global): Global sound power level	dB(A)	38	58	67	38	63	69	42	70	72
Lw (inlet + radiated): Sound power level, return + radiated	dB(A)	35	50	59	35	52	59	38	60	61
Lw (outlet): Sound power level, supply air	dB(A)	36	57	66	34	63	69	40	70	72
Lp (global): Sound pressure level <sup>(5)</sup>	dB(A)	21	41	50	21	46	52	25	53	55
NC value <sup>(5)</sup>	dB(A)	14	35	46	18	42	48	18	48	50
NR value <sup>(5)</sup>	dB(A)	16	37	48	20	44	50	20	50	52
<b>Electrical data, motor</b>										
1 ph - 50 Hz - 230 V; low energy consumption EC type										
Power input	W	6	46	159	8	67	175	7	148	186
<b>F5 or F6 air filter</b>	mm	240 x 400			240 x 550			315 x 550		
<b>Physical data</b>										
1/2" gas										
Heating and cooling coils connection diameter	in	1/2" gas			1/2" gas			1/2" gas		
Connection collar diameter	mm	200			200			250		
Height (standard)	mm	270			270			345		
Width (standard)	mm	665			815			815		
Length (standard)	mm	900			1100			1100		
Unit weight (standard)	kg	31			40			50		

(1) Fan speed: L = Low, M = Medium, H = High

(2) Conditions: Air inlet temperature 27 °C/47% RH, water inlet temperature 7 °C, water temperature difference 5 K.

(3) Conditions: Air inlet temperature 20 °C/% RH, water inlet temperature 45 °C, water temperature difference 5 K.

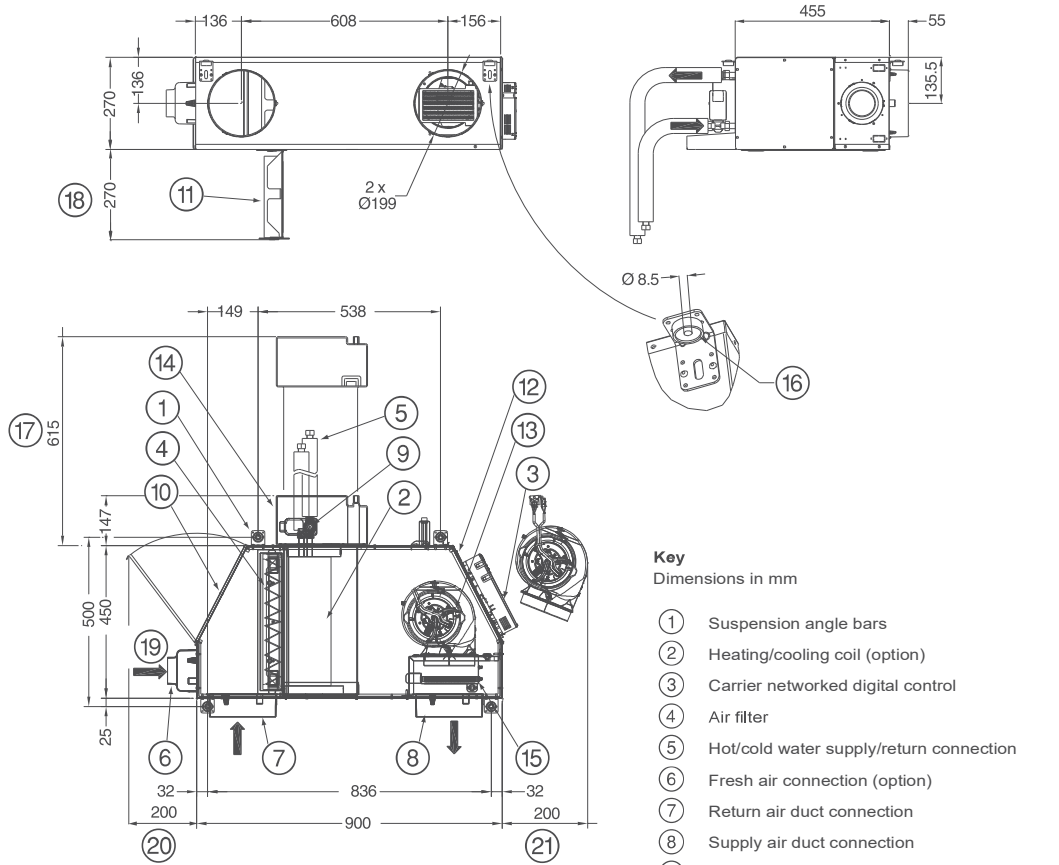
(4) Conditions: Air inlet temperature 20 °C/% RH, water inlet temperature 65 °C, water temperature difference 10 K.

(5) Based on hypothetical noise attenuation of the room and the system of -17 dB(A).

## DIMENSIONS AND CLEARANCE

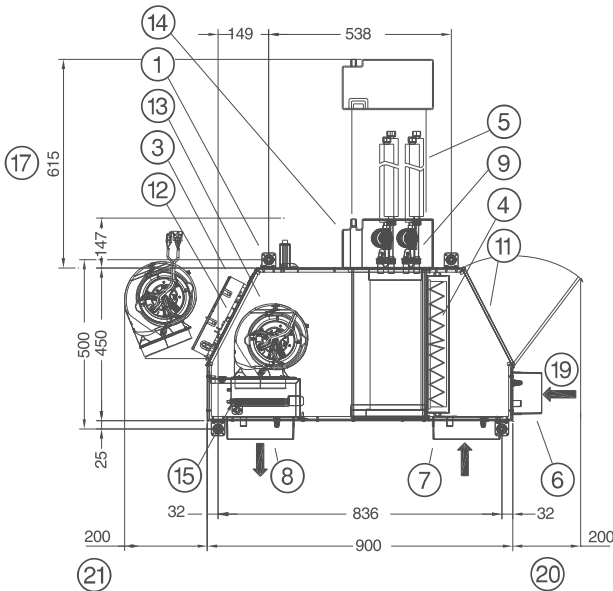
### 42BJ ICM LEC 1.9

Servo on left



- Key**  
Dimensions in mm
- ① Suspension angle bars
  - ② Heating/cooling coil (option)
  - ③ Carrier networked digital control
  - ④ Air filter
  - ⑤ Hot/cold water supply/return connection
  - ⑥ Fresh air connection (option)
  - ⑦ Return air duct connection
  - ⑧ Supply air duct connection
  - ⑨ Water flow control valves (option)
  - ⑩ Side filter access door
  - ⑪ Motor access door
  - ⑫ LEC fan motor assembly
  - ⑬ Condensate drain pan
  - ⑭ Electric heater (option)
  - ⑮ Electric heater
  - ⑯ Rubber damper
  - ⑰ Coil-pan assembly free space
  - ⑱ Free space for filter access via base (option)
  - ⑲ Fresh air (option)
  - ⑳ Side filter access free space
  - ㉑ Fan free space

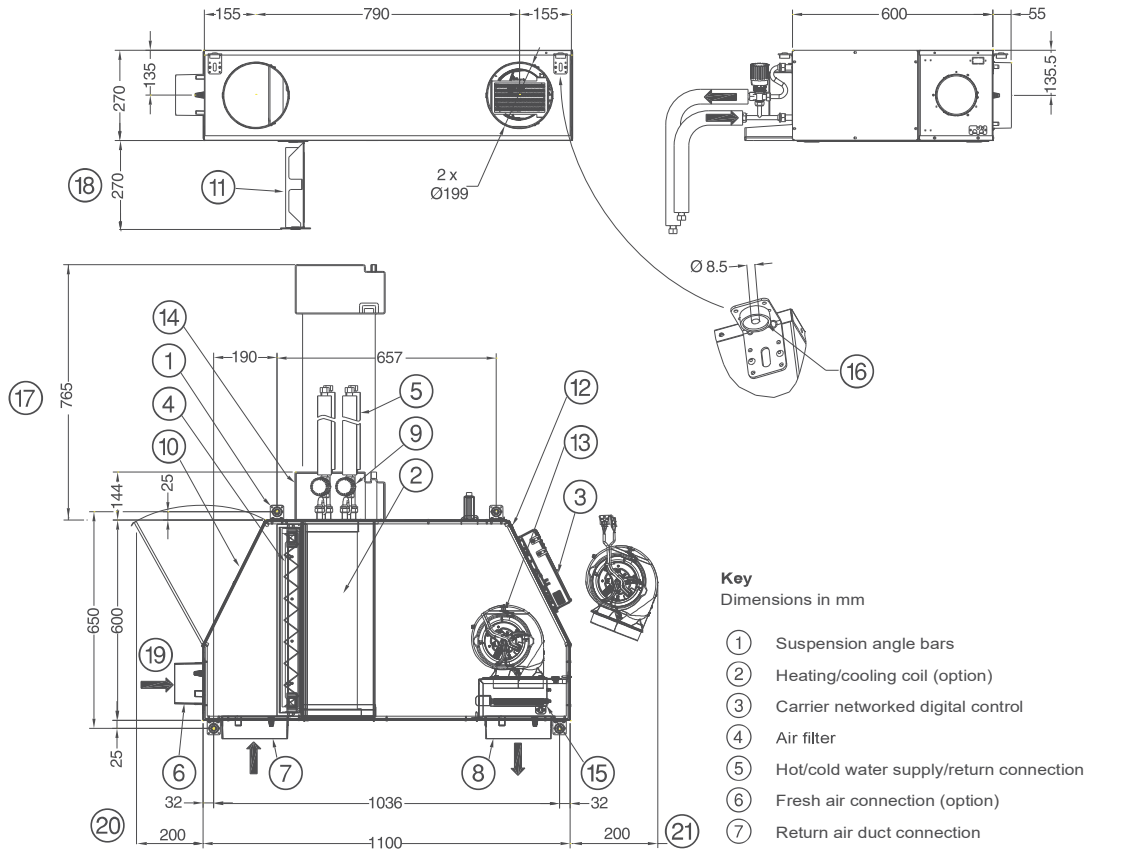
Servo on right



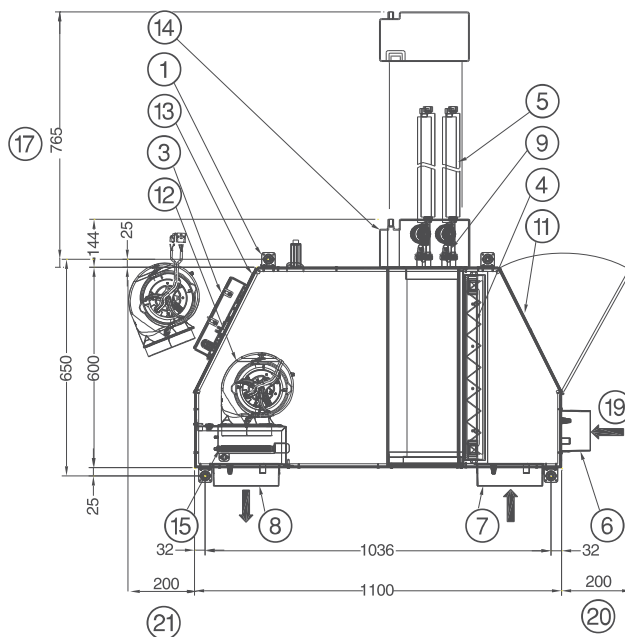
## DIMENSIONS AND CLEARANCE

### 42BJ ICM LEC 2.9

#### Servo on left



#### Servo on right



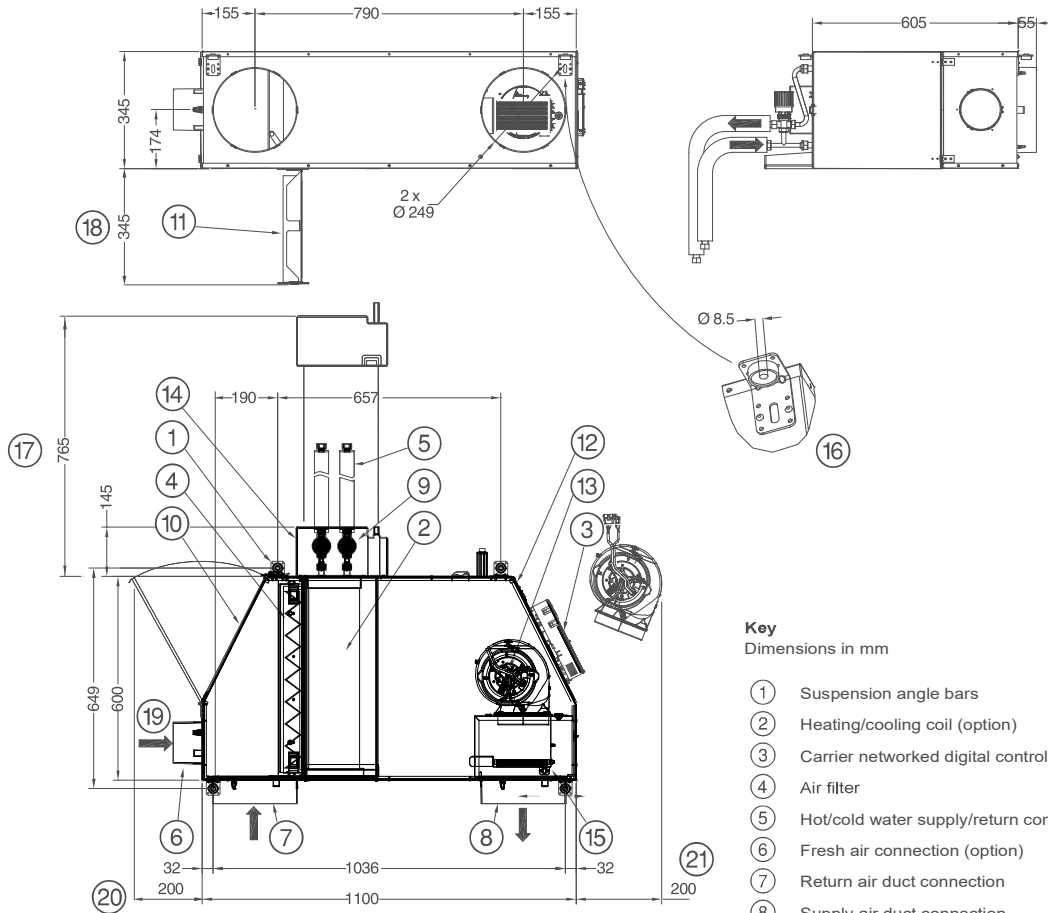
**Key**  
Dimensions in mm

- ① Suspension angle bars
- ② Heating/cooling coil (option)
- ③ Carrier networked digital control
- ④ Air filter
- ⑤ Hot/cold water supply/return connection
- ⑥ Fresh air connection (option)
- ⑦ Return air duct connection
- ⑧ Supply air duct connection
- ⑨ Water flow control valves (option)
- ⑩ Side filter access door
- ⑪ Motor access door
- ⑫ LEC fan motor assembly
- ⑬ Condensate drain pan
- ⑭ Electric heater (option)
- ⑮ Electric heater
- ⑯ Rubber damper
- ⑰ Coil-pan assembly free space
- ⑱ Free space for filter access via base (option)
- ⑲ Fresh air (option)
- ⑳ Side filter access free space
- ㉑ Fan free space

## DIMENSIONS AND CLEARANCE

### 42BJ ICM LEC 4.9

Servo on left



**Key**

Dimensions in mm

- ① Suspension angle bars
- ② Heating/cooling coil (option)
- ③ Carrier networked digital control
- ④ Air filter
- ⑤ Hot/cold water supply/return connection
- ⑥ Fresh air connection (option)
- ⑦ Return air duct connection
- ⑧ Supply air duct connection
- ⑨ Water flow control valves (option)
- ⑩ Side filter access door
- ⑪ Motor access door
- ⑫ LEC fan motor assembly
- ⑬ Condensate drain pan
- ⑭ Electric heater (option)
- ⑮ Electric heater
- ⑯ Rubber damper
- ⑰ Coil-pan assembly free space
- ⑱ Free space for filter access via base (option)
- ⑲ Fresh air (option)
- ⑳ Side filter access free space
- ㉑ Fan free space

Servo on right

