



Technical cooling solutions



With
R-32
refrigerant

For server rooms, telecom shelters, laboratories, IT applications

Advantages

With this interactive PDF we want to ensure you quickly find back the information you are looking for. Within this catalogue or via direct links to our business portal.

Focus on your business, we are here to help you.

Navigation



Sidebar links

The different chapters in the catalogue are shown at the side. You will be taken directly to the index page of the chapter with a single click.

All page numbers clickable

Click any page number you see and you will go directly to the page.


Always in control,
no matter where you are



Infrastructure cooling

Why is it needed?

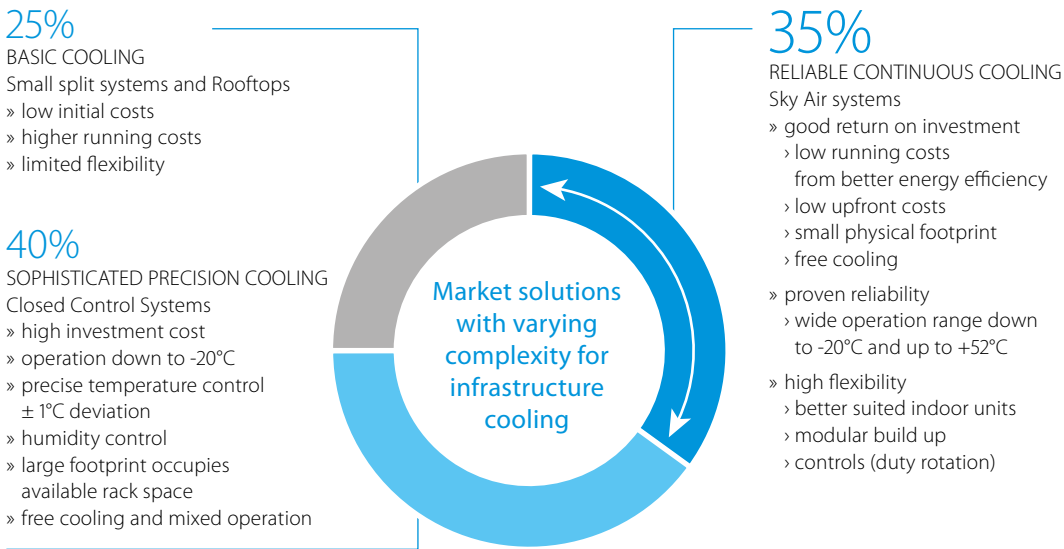
An infrastructure cooling system removes the heat that is constantly generated by IT equipment, servers and business supporting equipment.



- › For rooms and enclosures that require round-the-clock cooling
- › Where continuous uptime is the absolute requirement for
 - › server data protection
 - › equipment protection

To serve the increasing digital and mobile data requirements of businesses and online consumers, the IT equipment, telecom and server infrastructure have to function round the clock. Unexpected or unplanned downtime is not only costly to businesses but also impacts end-consumers who depend on the continuous access to data connections

for day-to-day activities. 24/7 operations of the infrastructure in turn increase the heat loads generated within the IT/server rooms and telecom shelters. Therefore your business infrastructure requires **reliable, efficient** and **flexible** cooling to ensure maximum uptime while offering the best return on investment.



Infrastructure cooling environments



Telecom shelters



Server rooms



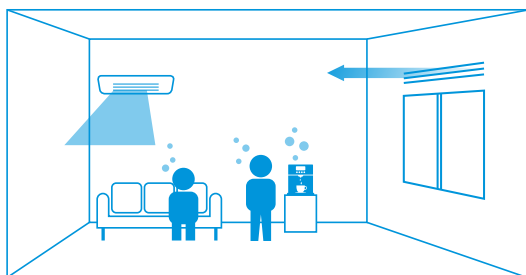
Laboratories

Specifically designed for infrastructure cooling applications

Understanding the mission-critical cooling application environment

Comfort cooling

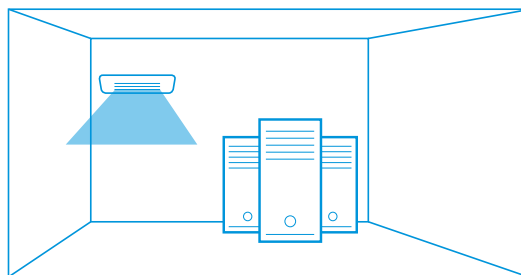
- Humidity is present
- Balanced sensible and latent capacity



- 60-70% temperature control
- 30-40% humidity control

Infrastructure cooling

- No or limited humidity
- Pure sensible capacity



- 80-90% temperature control
- 10-20% humidity control

Low humidity levels

Unlike a normal living environment, a typical server room or technology infrastructure environment does not generate or minimally generates humidity and moisture. Continuous cooling of such rooms also removes the humidity. Average relative humidity (RH) levels in server rooms or infrastructure rooms are lower than 30%.

These low humidity levels reduce the ability to transfer heat loads (to cool down the server rooms). Therefore the need **to boost** the cooling capacity of the indoor system.

Constant cooling set at 20-22°C

- › Protection of server equipment and back up power supply
- › Emergency power supply lifetime is temperature dependant
- › There is adequate buffer to compensate a potential rise in temperature
- › In general, servers and other equipment infrastructure fluctuate in activity, so have increased flexibility to maintain constant temperature level

Need for a reliable backup system

- › When a failure occurs (error or shutdown by the temperature protection function), a dependable backup system should take over instantly
- › Flexible control is needed to improve the reliability of the backup system

Correct system selection is critical

- › Failure of the cooling system to provide the required capacity at any time can lead to infrastructure downtime and result in business costs
- › It is critical to install the right combination of a split cooling system which can guarantee reliable operation 24/7, year-round

Why choose Daikin?

Daikin is the world leader when it comes to heating and cooling.

With over 90 years of innovation and engineering expertise in specialised cooling, Daikin offers a Sky Air solution that is **reliable**, **efficient** and **flexible** to meet the demanding needs of infrastructure cooling environments.

Reliable

Guaranteed system operation:

- › Oversized indoor units boost cooling capacity and prevent freeze-ups on the indoor side
- › Wide operating range envelope: operation range in cooling down to -20°C and up to +52°C

Efficient

Optimum return on investment:

- › Lowers running costs by using highly efficient direct expansion cooling systems
- › Lower running costs compared to other DX systems and water based chillers.
- › Reduces mechanical cooling and energy consumption with the free cooling option for single phase systems

Flexible

- › Scalable in capacity
- › Improved infrastructure control and management
- › Lower physical footprint since no floor space is occupied
- › Wide range of indoor units to suit application preferences (ceiling suspended cassettes, wall mounted indoors, concealed ceiling ducted type indoors)

PAGE 5 **UNIQUE**

Boosted capacity system combinations for high sensible cooling

Benefits

1. Boost the heat transfer capacity of the indoor system
2. Ability to work with higher evaporation temperatures (Te) avoids downtime and enables continuous operation
3. Official energy labels for indoor and outdoor system combinations provide standardized and reliable performance data

PAGE 6 **UNIQUE**

2-step solution for system selection

Benefits

1. Daikin makes the system selection procedure easy and reliable by providing detailed capacity tables based on extensive testing.
2. Choose the best product combination that meets end-user requirements

PAGE 10 **UNIQUE**

Efficient cooling

Benefits

1. Free cooling: optimum energy efficiency using cold ambient air
2. Widest range of indoor systems with best in class energy efficiency
3. Wide indoor and outdoor operation range, reliable performance even in extreme conditions

PAGE 12 **UNIQUE**

Flexible control

Benefits

1. Optimal backup supported by duty rotation control, automatic backup activation and remote alarms
2. Guaranteed continuous operation from extended compressor limits
3. Controller settings to adapt to specific infrastructure cooling environment conditions
4. Fewer start/stop cycles

Boosted capacity indoor systems

High reliability at lower running costs for infrastructure cooling

Split air conditioning systems for normal comfort cooling applications usually combine indoor systems with matching capacities, or multiple indoor systems with capacities lower than the outdoor system's capacity. This works because the indoor system's cooling capacity is sufficient to handle the higher humidity conditions and varying indoor temperature requirements that are common in a normal living environment.

Indoor systems for infrastructure cooling environments need enhanced capabilities for continuous heat transfer because they work harder to extract energy by cooling dry air. Daikin recommends and offers asymmetric combinations (boosted capacity indoor combinations: e.g. 71 class outdoor + 100 class indoor).

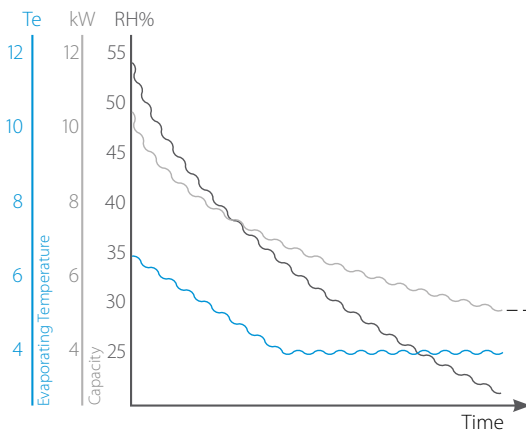
Applying this design logic to infrastructure cooling environments can lead to risky situations that might compromise overall system reliability and frequent downtimes of 15 minutes.

You can now confidently combine indoor systems with higher capacities than the outdoor system. This will boost heat transfer inside the technology or server room environments.

Infrastructure cooling application system solutions

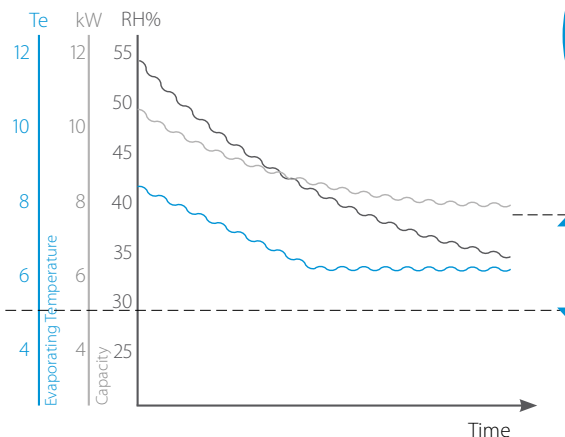
TRADITIONAL SOLUTION

Symmetric indoor-outdoor system combination



- Relative Humidity: ■ reduces over time
- Capacity: ■ reduced
- Evaporating temp: ■ drops to compensate reduced capacity
- too low Te can lead to freeze-up prevention, causing system downtime

DEDICATED SOLUTION



Improved solution

- 👍 Boosted capacity indoors increase the heat transfer capacity at low relative humidity
- 👍 Allows the system to operate with higher Te, guaranteeing continuous operation and reducing unwanted dehumidification

Between 20-40% sensible capacity increase

Low humidity + Low ambient environment

Outside temperature Ta	-5 °C
Set-point	22 °C
Humidity	35 %
Indoor wet-bulb temperature	13 °C

traditional solution

RZAG71 + FAA71	
Total Capacity (TC)	5.63 kW
Sensible Heat Capacity (SHC)	4.28 kW
Power Input (PI)	2 kW
Co-efficient of Power Input (CPI)	0.39
Corrected PI	0.78 kW
EER*	5.5

EER



dedicated system combination solution

RZAG71 + FAA100	
Total Capacity (TC)	6.02 kW
Sensible Heat Capacity (SHC)	6.02 kW
Power Input (PI)	1.72 kW
Co-efficient of Power Input (CPI)	0.45
Corrected PI	0.77 kW
EER*	7.82

Up to 18% savings on running cost

Sensible Heat Capacity increases 20-40% with dedicated system combination.

*EER = (SHC/Corrected PI)

2-Step solution for system selection

High reliability for infrastructure cooling

UNIQUE

Select your infrastructure cooling system in 2 steps

No humidity generation in room (eg: Server room)

IT room requires 22°C inside. It will have 7kW of sensible cooling demand, and no latent cooling demand (no humidity generation) throughout the year.

Ceiling suspended indoor unit is the customer's preference for the server room.

- Indoor temperature = 22°CDB
- Sensible cooling demand (SHC) = 7 kW
- Latent cooling demand (LC) = 0 kW*
- Total cooling demand (TC) = SHC + LC = 7 kW
- Outdoor temperature operating range = -20°C ~ +40°C
- Most stringent outdoor unit capacity condition = -20°C

SOLUTION

Boosted capacity indoor combination with 10kW outdoor system.

- RZAG100 + FHA140
- Total capacity = 7.48 kW
- Sensible capacity = 7.48 kW
- Power input = 0.42 x 1.96 = 0.82 kW

* If there is no latent cooling demand, look for conditions where TC = SHC, since no more dehumidification will occur and thus the indoor environment will stabilize. When TC > SHC and there is no humidity generation, the indoor humidity will gradually decrease.

STEP 1

Determine requested indoor conditions and required cooling demand (Sensible and Total capacity)

STEP 2

Select the system combination from the given table, where the system's sensible and total capacity meets the cooling demand at the requested indoor and outdoor temperatures.

Some humidity source in room (eg: Laboratory)

Lab requires 22°C inside. It will have 9 kW of sensible cooling demand, and some humidity generation in the room (est. indoor humidity level 42%).

Wall mounted indoor unit is the customer's preference for the laboratory.

- Indoor temperature = 22°CDB
- Indoor Relative Humidity (RH%) = 42%**
- Sensible cooling demand (SHC) = 9 kW
- Latent cooling demand (LC) = 0.9 kW
- Total cooling demand (TC) = SHC + LC = 9.9 kW
- Outdoor temperature operating range = -20°C ~ +40°C
- Most stringent outdoor unit capacity condition = -20°C

SOLUTION


Boosted capacity indoor combination with 12.5kW outdoor system.

- RZAG125 + FAA71x2
- Total capacity = 10.39 kW
- Sensible capacity = 9.34 kW
- Power input = 0.46 x 2.65 = 1.22 kW

** System capacity at 42%RH (14,2°CWB) can be found by interpolation between 13°CWB (35%) and 15°CWB (48%).

Combination table for boosted capacity indoor systems

Infrastructure cooling combination table



capacity class	FTXM-N				FAA-A				FHA-A(9)				FBA-A(9)				FDXM-F9				FUA-A				FNA-A9				FVA-A				FFA-A9				FCAHG-H				FCAG-B								
	35	50	60	71	71	100	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140								
RZAG35A	P						P								P									P																									
RZAG50A		P						P								P									P																								
RZAG60A			P						P								P																																
RZAG71							P	3	2			P				3	2			P																													
RZAG100							2	4	3		2					P	4	3		2			P	4	3		2																						
RZAG125							2	4	3		2					P	4	3		2			P	4	3		2																						
RZAG140							2	4	3		2					P	4	3		2			P	4	3		2																						

P = Pair, 2 = Twin, 3 = Triple, 4 = Double twin; For more information on infrastructure cooling options refer to infrastructure cooling catalogue.

Possible combinations: P = Pair 2 = Twin 3 = Triple 4 = Double Twin
Notes: For R-410A combinations please refer to the outdoor unit pages.

Boosted capacity system combination tables

Boosted capacity indoor unit with 5kW outdoor system

RZAG50A / FTXM60N

Indoor temperature		Outdoor temperature [°C DB]																																							
		-20			-15			-10			-5			0			5			10			15			20			25			30			35			40			
RH[%]	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C					
41,8	11	18	3,27	3,27	0,44	3,27	3,27	0,47	3,27	3,27	0,51	3,27	3,27	0,56	3,27	3,27	0,62	3,27	3,27	0,68	3,27	3,27	0,75	3,27	3,27	0,85	3,27	3,27	0,94	3,27	3,27	1,03	3,27	3,27	1,13	3,27	3,27	1,22	3,27	3,27	1,31
57	13	18	4,54	3,33	0,46	4,54	3,33	0,50	4,54	3,33	0,55	4,54	3,33	0,60	4,54	3,33	0,65	4,54	3,33	0,71	4,54	3,33	0,76	4,54	3,33	0,86	4,54	3,33	0,95	4,54	3,33	1,04	4,54	3,33	1,13	4,31	3,21	1,22	4,08	3,10	1,32
31,4	11	20	3,26	3,26	0,44	3,26	3,26	0,47	3,26	3,26	0,51	3,26	3,26	0,56	3,26	3,26	0,62	3,26	3,26	0,68	3,26	3,26	0,75	3,26	3,26	0,85	3,26	3,26	0,94	3,26	3,26	1,03	3,26	3,26	1,13	3,26	3,26	1,22	3,26	3,26	1,31
44,9	13	20	4,52	3,84	0,46	4,52	3,84	0,50	4,52	3,84	0,55	4,52	3,84	0,60	4,52	3,84	0,65	4,52	3,84	0,71	4,52	3,84	0,76	4,52	3,84	0,86	4,52	3,84	0,95	4,52	3,84	1,04	4,52	3,84	1,13	4,31	3,73	1,22	4,08	3,61	1,32
52	14	20	5,12	3,80	0,47	5,12	3,80	0,52	5,12	3,80	0,56	5,12	3,80	0,61	5,12	3,80	0,66	5,12	3,80	0,72	5,12	3,80	0,77	5,12	3,80	0,86	5,12	3,80	0,95	4,89	3,68	1,04	4,66	3,57	1,13	4,42	3,45	1,23	4,19	3,34	1,32
22,9	11	22	3,25	3,25	0,44	3,25	3,25	0,47	3,25	3,25	0,51	3,25	3,25	0,56	3,25	3,25	0,62	3,25	3,25	0,68	3,25	3,25	0,75	3,25	3,25	0,85	3,25	3,25	0,94	3,25	3,25	1,03	3,25	3,25	1,13	3,25	3,25	1,22	3,25	3,25	1,31
34,8	13	22	4,51	4,34	0,46	4,51	4,34	0,50	4,51	4,34	0,55	4,51	4,34	0,60	4,51	4,34	0,65	4,51	4,34	0,71	4,51	4,34	0,76	4,51	4,34	0,86	4,51	4,34	0,95	4,51	4,34	1,04	4,51	4,34	1,13	4,31	4,24	1,22	4,08	4,08	1,32
47,6	15	22	5,24	4,02	0,48	5,24	4,02	0,53	5,24	4,02	0,58	5,24	4,02	0,63	5,24	4,02	0,68	5,24	4,02	0,72	5,24	4,02	0,77	5,24	4,02	0,86	5,24	4,02	0,95	5,00	3,91	1,05	4,77	3,80	1,14	4,54	3,69	1,23	4,31	3,58	1,32
54,3	16	22	5,35	3,73	0,63	5,35	3,73	0,68	5,35	3,73	0,73	5,35	3,73	0,77	5,35	3,73	0,77	5,35	3,73	0,77	5,35	3,73	0,77	5,35	3,73	0,87	5,35	3,73	0,96	5,12	3,62	1,05	4,89	3,51	1,14	4,65	3,41	1,23	4,42	3,30	1,32
21,2	12	24	3,86	3,86	0,45	3,86	3,86	0,49	3,86	3,86	0,53	3,86	3,86	0,58	3,86	3,86	0,64	3,86	3,86	0,70	3,86	3,86	0,76	3,86	3,86	0,85	3,86	3,86	0,95	3,86	3,86	1,04	3,86	3,86	1,13	3,86	3,86	1,22	3,86	3,86	1,31
32,1	14	24	5,12	4,83	0,47	5,12	4,83	0,51	5,12	4,83	0,56	5,12	4,83	0,61	5,12	4,83	0,66	5,12	4,83	0,72	5,12	4,83	0,77	5,12	4,83	0,86	5,12	4,83	0,95	4,89	4,71	1,04	4,66	4,60	1,13	4,42	4,42	1,23	4,19	4,19	1,32
43,8	16	24	5,35	4,25	0,63	5,35	4,25	0,68	5,35	4,25	0,73	5,35	4,25	0,77	5,35	4,25	0,77	5,35	4,25	0,77	5,35	4,25	0,77	5,35	4,25	0,87	5,35	4,25	0,96	5,12	4,14	1,05	4,89	4,03	1,14	4,65	3,92	1,23	4,42	3,82	1,32
50	17	24	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,78	5,47	3,95	0,87	5,47	3,95	0,96	5,24	3,85	1,05	5,00	3,74	1,14	4,77	3,64	1,23	4,54	3,54	1,33
21,5	14	27	5,12	5,12	0,47	5,12	5,12	0,51	5,12	5,12	0,56	5,12	5,12	0,61	5,12	5,12	0,66	5,12	5,12	0,72	5,12	5,12	0,77	5,12	5,12	0,86	5,12	5,12	0,95	4,89	4,89	1,04	4,66	4,66	1,13	4,42	4,42	1,23	4,19	4,19	1,32
26,3	15	27	5,24	5,24	0,48	5,24	5,24	0,53	5,24	5,24	0,58	5,24	5,24	0,63	5,24	5,24	0,68	5,24	5,24	0,72	5,24	5,24	0,77	5,24	5,24	0,86	5,24	5,24	0,95	5,00	5,00	1,05	4,77	4,77	1,14	4,54	4,54	1,23	4,31	4,31	1,32
31,3	16	27	5,35	5,02	0,63	5,35	5,02	0,68	5,35	5,02	0,72	5,35	5,02	0,77	5,35	5,02	0,77	5,35	5,02	0,77	5,35	5,02	0,77	5,35	5,02	0,87	5,35	5,02	0,96	5,12	4,91	1,05	4,89	4,80	1,14	4,65	4,65	1,23	4,42	4,42	1,32

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RZAG50A / FHA60A9

Indoor		Outdoor temperature [°C DB]																																										
		-20			-15			-10			-5			0			5			10			15			20			25			30			35			40						
RH[%]	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C					
42	11	18	4,03	4,03	0,32	4,03	4,03	0,35	4,03	4,03	0,39	4,03	4,03	0,43	4,03	4,03	0,47	4,03	4,03	0,51	4,03	4,03	0,56	4,03	4,03	0,61	4,03	4,03	0,71	4,03	4,03	0,82	4,03	4,03	0,93	4,03	4,03	1,04	4,03	4,03	1,15	3,85	3,85	1,25
57	13	18	5,01	3,81	0,40	5,01	3,81	0,44	5,01	3,81	0,49	5,01	3,81	0,53	5,01	3,81	0,58	5,01	3,81	0,63	5,01	3,81	0,68	5,01	3,81	0,73	5,01	3,81	0,82	5,01	3,81	0,90	4,77	3,69	0,99	4,54	3,58	1,08	4,31	3,47	1,16	4,08	3,36	1,25
31	11	20	4,02	4,02	0,32	4,02	4,02	0,35	4,02	4,02	0,39	4,02	4,02	0,43	4,02	4,02	0,47	4,02	4,02	0,51	4,02	4,02	0,56	4,02	4,02	0,61	4,02	4,02	0,71	4,02	4,02	0,82	4,02	4,02	0,93	4,02	4,02	1,04	4,02	4,02	1,15	3,85	3,85	1,25
45	13	20	5,01	4,44	0,40	5,01	4,44	0,44	5,01	4,44	0,49	5,01	4,44	0,53	5,01	4,44	0,58	5,01	4,44	0,63	5,01	4,44	0,68	5,01	4,44	0,73	5,01	4,44	0,82	5,01	4,44	0,90	4,77	4,33	0,99	4,54	4,21	1,08	4,31	4,10	1,16	4,08	3,99	1,25
52	14	20	5,12	4,10	0,50	5,12	4,10	0,55	5,12	4,10	0,60	5,12	4,10	0,64	5,12	4,10	0,69	5,12	4,10	0,73	5,12	4,10	0,78	5,12	4,10	0,82	5,12	4,10	0,91	4,89	3,99	0,99	4,66	3,88	1,08	4,42	3,77	1,17	4,19	3,66	1,25			
23	11	22	4,01	4,01	0,32	4,01	4,01	0,35	4,01	4,01	0,39	4,01	4,01	0,43	4,01	4,01	0,47	4,01	4,01	0,51	4,01	4,01	0,56	4,01	4,01	0,61	4,01	4,01	0,71	4,01	4,01	0,82	4,01	4,01	0,93	4,01	4,01	1,04	4,01	4,01	1,15	3,85	3,85	1,25
35	13	22	5,01	5,01	0,40	5,01	5,01	0,44	5,01	5,01	0,48	5,01	5,01	0,53	5,01	5,01	0,58	5,01	5,01	0,63	5,01	5,01	0,68	5,01	5,01	0,73	5,01	5,01	0,82	5,01	5,01	0,90	4,77	4,77	0,99	4,54	4,54	1,08	4,31	4,31	1,16	4,08	4,08	1,25
48	15	22	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,65	5,24	4,38	0,73	5,24	4,38	0,82	5,24	4,38	0,91	5,00	4,27	1,00	4,77	4,17	1,08	4,54	4,06	1,17	4,31	3,96	1,26
54	16	22	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,74	5,35	4,03	0,82	5,35	4,03	0,91	5,12	3,92	1,00	4,89	3,82	1,08	4,65	3,72	1,17	4,42	3,62	1,26			
21	12	24	4,76	4,76	0,36	4,76	4,76	0,40	4,76	4,76	0,44	4,76	4,76	0,48	4,76	4,76	0,52	4,76	4,76	0,57	4,76	4,76	0,62	4,76	4,76	0,67	4,76	4,																

Boosted capacity indoor unit with 6kW outdoor system

RZAG60A / FTXM71N

Indoor			Outdoor temperature [°C DB]																																						
RH[%]	°C	°C	-20		-15		-10		-5		0		5		10		15		20		25		30		35		40														
			TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI									
41,8	11	18	3,91	3,91	0,46	3,91	3,91	0,50	3,91	3,91	0,55	3,91	3,91	0,60	3,91	3,91	0,65	3,91	3,91	0,71	3,91	3,91	0,78	3,91	3,91	0,92	3,91	3,91	1,07	3,91	3,91	1,22	3,91	3,91	1,39	3,91	3,91	1,56	3,91	3,91	1,72
57	13	18	5,43	3,98	0,57	5,43	3,98	0,62	5,43	3,98	0,68	5,43	3,98	0,74	5,43	3,98	0,80	5,43	3,98	0,87	5,43	3,98	0,94	5,43	3,98	1,09	5,43	3,98	1,25	5,43	3,98	1,40	5,43	3,98	1,56	5,17	3,85	1,69	4,89	3,71	1,81
31,4	11	20	3,90	3,90	0,46	3,90	3,90	0,50	3,90	3,90	0,55	3,90	3,90	0,60	3,90	3,90	0,65	3,90	3,90	0,71	3,90	3,90	0,78	3,90	3,90	0,92	3,90	3,90	1,07	3,90	3,90	1,22	3,90	3,90	1,39	3,90	3,90	1,55	3,90	3,90	1,72
44,9	13	20	5,41	4,59	0,57	5,41	4,59	0,62	5,41	4,59	0,68	5,41	4,59	0,74	5,41	4,59	0,80	5,41	4,59	0,87	5,41	4,59	0,94	5,41	4,59	1,09	5,41	4,59	1,24	5,41	4,59	1,40	5,41	4,59	1,56	5,17	4,47	1,69	4,89	4,33	1,81
52	14	20	6,15	4,55	0,62	6,15	4,55	0,68	6,15	4,55	0,74	6,15	4,55	0,80	6,15	4,55	0,87	6,15	4,55	0,94	6,15	4,55	1,01	6,15	4,55	1,16	6,15	4,55	1,31	5,87	4,41	1,44	5,59	4,28	1,56	5,31	4,14	1,69	5,03	4,00	1,82
22,9	11	22	3,89	3,89	0,46	3,89	3,89	0,50	3,89	3,89	0,55	3,89	3,89	0,59	3,89	3,89	0,65	3,89	3,89	0,71	3,89	3,89	0,77	3,89	3,89	0,91	3,89	3,89	1,06	3,89	3,89	1,22	3,89	3,89	1,39	3,89	3,89	1,55	3,89	3,89	1,72
34,8	13	22	5,40	5,20	0,57	5,40	5,20	0,62	5,40	5,20	0,68	5,40	5,20	0,74	5,40	5,20	0,80	5,40	5,20	0,87	5,40	5,20	0,94	5,40	5,20	1,09	5,40	5,20	1,24	5,40	5,20	1,40	5,40	5,20	1,56	5,17	5,08	1,69	4,89	4,89	1,81
47,6	15	22	6,29	4,82	0,66	6,29	4,82	0,72	6,29	4,82	0,78	6,29	4,82	0,85	6,29	4,82	0,92	6,29	4,82	1,00	6,29	4,82	1,06	6,29	4,82	1,19	6,29	4,82	1,32	6,01	4,69	1,44	5,73	4,55	1,57	5,45	4,42	1,69	5,17	4,29	1,82
54,3	16	22	6,42	4,47	0,86	6,42	4,47	0,93	6,42	4,47	1,00	6,42	4,47	1,07	6,42	4,47	1,14	6,42	4,47	1,21	6,42	4,47	1,28	6,42	4,47	1,41	6,42	4,47	1,54	6,14	4,34	1,45	5,86	4,21	1,57	5,59	4,08	1,70	5,31	3,96	1,83
21,2	12	24	4,62	4,62	0,52	4,62	4,62	0,56	4,62	4,62	0,61	4,62	4,62	0,67	4,62	4,62	0,73	4,62	4,62	0,79	4,62	4,62	0,86	4,62	4,62	1,00	4,62	4,62	1,16	4,62	4,62	1,32	4,62	4,62	1,48	4,62	4,62	1,64	4,62	4,62	1,80
32,1	14	24	6,15	5,79	0,62	6,15	5,79	0,68	6,15	5,79	0,73	6,15	5,79	0,80	6,15	5,79	0,87	6,15	5,79	0,94	6,15	5,79	1,01	6,15	5,79	1,16	6,15	5,79	1,31	5,87	5,64	1,44	5,59	5,51	1,56	5,31	5,31	1,69	5,03	5,03	1,82
43,8	16	24	6,42	5,09	0,86	6,42	5,09	0,93	6,42	5,09	1,00	6,42	5,09	1,07	6,42	5,09	1,14	6,42	5,09	1,21	6,42	5,09	1,28	6,42	5,09	1,41	6,42	5,09	1,54	6,14	4,96	1,45	5,86	4,83	1,57	5,59	4,70	1,70	5,31	4,57	1,83
50	17	24	6,56	4,74	1,01	6,56	4,74	1,07	6,56	4,74	1,14	6,56	4,74	1,21	6,56	4,74	1,28	6,56	4,74	1,35	6,56	4,74	1,42	6,56	4,74	1,59	6,56	4,74	1,74	6,29	4,61	1,45	6,00	4,48	1,58	5,72	4,36	1,70	5,44	4,24	1,83
21,5	14	27	6,15	6,15	0,62	6,15	6,15	0,67	6,15	6,15	0,73	6,15	6,15	0,80	6,15	6,15	0,86	6,15	6,15	0,93	6,15	6,15	1,01	6,15	6,15	1,16	6,15	6,15	1,31	5,87	5,87	1,44	5,59	5,59	1,56	5,31	5,31	1,69	5,03	5,03	1,82
26,3	15	27	6,29	6,29	0,66	6,29	6,29	0,72	6,29	6,29	0,78	6,29	6,29	0,85	6,29	6,29	0,92	6,29	6,29	0,99	6,29	6,29	1,06	6,29	6,29	1,21	6,29	6,29	1,36	6,01	6,01	1,47	5,73	5,73	1,63	5,45	5,45	1,69	5,17	5,17	1,82
31,3	16	27	6,42	6,01	0,86	6,42	6,01	0,93	6,42	6,01	1,00	6,42	6,01	1,07	6,42	6,01	1,14	6,42	6,01	1,21	6,42	6,01	1,28	6,42	6,01	1,41	6,42	6,01	1,54	6,14	5,88	1,45	5,86	5,75	1,57	5,59	5,59	1,70	5,31	5,31	1,83

3D122109

RZAG60A / FHA71A9

Indoor			Outdoor temperature [°C DB]																																						
RH[%]	°C	°C	-20		-15		-10		-5		0		5		10		15		20		25		30		35		40														
			TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI									
42	11	18	4,61	4,61	0,41	4,61	4,61	0,45	4,61	4,61	0,50	4,61	4,61	0,55	4,61	4,61	0,61	4,61	4,61	0,67	4,61	4,61	0,80	4,61	4,61	0,93	4,61	4,61	1,05	4,61	4,61	1,15	4,61	4,61	1,25	4,61	4,61	1,35	4,61	4,61	1,46
57	13	18	6,01	4,50	0,47	6,01	4,50	0,51	6,01	4,50	0,57	6,01	4,50	0,62	6,01	4,50	0,68	6,01	4,50	0,74	6,01	4,50	0,85	6,01	4,50	0,95	6,01	4,50	1,05	5,73	4,36	1,16	5,45	4,22	1,26	5,17	4,08	1,36	4,89	3,95	1,46
31	11	20	4,59	4,59	0,41	4,59	4,59	0,45	4,59	4,59	0,50	4,59	4,59	0,55	4,59	4,59	0,61	4,59	4,59	0,67	4,59	4,59	0,80	4,59	4,59	0,95	4,59	4,59	1,05	4,59	4,59	1,15	4,59	4,59	1,25	4,59	4,59	1,35	4,59	4,59	1,46
45	13	20	6,01	5,22	0,47	6,01	5,22	0,51	6,01	5,22	0,57	6,01	5,22	0,62	6,01	5,22	0,68	6,01	5,22	0,74	6,01	5,22	0,85	6,01	5,22	0,95	6,01	5,22	1,05	5,73	5,08	1,16	5,45	4,94	1,26	5,17	4,81	1,36	4,89	4,67	1,46
52	14	20	6,15	4,82	0,54	6,15	4,82	0,59	6,15	4,82	0,64	6,15	4,82	0,70	6,15	4,82	0,75	6,15	4,82	0,81	6,15	4,82	0,88	6,15	4,82	0,96	6,15	4,82	1,06	5,87	4,69	1,16	5,59	4,56	1,26	5,31	4,42	1,36	5,03	4,29	1,47
23	11	22	4,58	4,58	0,41	4,58	4,58	0,45	4,58	4,58	0,50	4,58	4,58	0,55	4,58	4,58	0,61	4,58	4,58	0,67	4,58	4,58	0,80	4,58	4,58	0,93	4,58	4,58	1,05	4,58	4,58	1,15	4,58	4,58	1,25	4,58	4,58	1,35	4,58	4,58	1,46
35	13	22	6,01	5,94	0,47	6,01	5,94	0,51	6,01	5,94	0,57	6,01	5,94	0,62	6,01	5,94	0,68	6,01	5,94	0,74	6,01	5,94	0,85	6,01	5,94	0,95	6,01	5,94	1,05	5,73	5,73	1,16	5,45	5,45	1,26	5,17	5,17	1,36	4,89	4,89	1,46
48	15	22	6,29	5,15	0,70	6,29	5,15	0,76	6,29	5,15	0,76	6,29	5,15	0,76	6,29	5,15	0,76	6,29	5,15	0,76	6,29	5,15	0,86	6,29	5,15	0,96	6,29	5,15	1,06	6,01	5,02	1,16	5,73	4,89	1,26	5,45	4,76	1,37	5,17	4,63	1,47
54	16	22	6,42	4,74	0,86	6,42	4,74	0,86	6,42	4,74	0,86	6,42	4,74	0,86	6,42	4,74	0,86	6,42	4,74	0,86	6,42	4,74	0,96	6,42	4,74	1,06	6,14	4,62	1,17	5,86	4,49	1,27	5,59	4,37	1,37	5,31	4,25	1,47			
21	12	24	5,44	5,44	0,44	5,44	5,44	0,48	5,44	5,44	0,53	5,44	5,44	0,59	5,44	5,44	0,64	5,44	5,44	0,70	5,44	5,44	0,83	5,44	5,44	1,05	5,44	5,44	1,15	5,31	5,31	1,26	5,03	5,03	1,36	4,75	4,75	1,46			
32	14	24	6,15	6,15	0,54	6,15	6,15	0,59	6,15	6,15	0,64	6,15	6,15	0,70	6,15	6,15	0,75	6,15	6,15	0,81	6,15	6,15	0,85	6,15	6,15	0,96	6,15	6,15	1,06	5,87	5,87	1,16	5,59	5,59	1,26	5,31	5,31	1,36	5,03	5,03	1,47
44	16	24	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,86	6,42	5,47	0,96	6,42	5,47	1,06	6,14	5,34	1,17	5,86	5,22	1,27	5,59	5,09	1,37	5,31	4,97	1,47
50	17	24	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,86	6,56	5,06	0,97	6,56	5,06	1,07	6,28	4,93	1,17	6,00	4,81	1,27	5,72	4,70	1,37	5,44	4,58	1,47
22	14	27	6,15	6,15	0,48	6,15	6,15	0,54	6,15	6,15	0,59	6,15	6,15	0,65	6,15	6,15	0,70	6,15	6																						

Boosted capacity indoor unit with 12kW outdoor system

RZAG125NV1 / RZAG125NY1

Indoor			Outdoor temperature [°C DB]																																												
			-20			-15			-10			-5			0			5			10			15			20			25			30			35			40								
			TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI						
RH[%]	°CWB	°CDB	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-			
41.8	11	18	7.49	7.49	0.32	7.49	7.49	0.33	7.49	7.49	0.34	7.49	7.49	0.35	7.49	7.49	0.36	7.49	7.49	0.37	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38	7.49	7.49	0.38

PAIR	FCAHG140H	FCAG140B	FVA140A	FHA140A	FBA140A	
Cooling	3.09	3.07	3.17	3.05	2.99	
TWIN	FCAHG71Hx2	FCAG71Bx2	FHA71Ax2	FUA71Ax2	FAA71Ax2	FBA71Ax2
Cooling	2.57	2.79	2.68	2.69	2.88	2.64

TRIPLE	FCAG50Bx3	FHA50Ax3	FFA50Ax3	FDXM50Fx3	FBA50Ax3
Cooling	2.57	2.79	2.97	2.36	2.74
DOUBLE TWIN	FCAG35Bx4	FHA35Ax4	FFA35Ax4	FDXM35Fx4	FBA35Ax4
Cooling	2.51	2.45	2.71	2.55	2.96

3D125186

Boosted capacity indoor unit with 14kW outdoor system

RZAG140NV1 / RZAG140NY1

Indoor			Outdoor temperature [°C DB]																																												
			-20			-15			-10			-5			0			5			10			15			20			25			30			35			40								
			TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI	TC	SHC	CPI						
RH[%]	°CWB	°CDB	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-	kW	kW	-
41.8	11	18	8.24	8.24	0.31	8.24	8.24	0.32	8.24	8.24	0.33	8.24	8.24	0.34	8.24	8.24	0.35	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37	8.24	8.24	0.37

PAIR	FCAHG140H	FCAG140B	FVA140A	FHA140A	FBA140A	
Cooling	3.64	4.29	4.42	4.31	4.69	
TWIN	FCAHG71Hx2	FCAG71Bx2	FHA71Ax2	FUA71Ax2	FAA71Ax2	FBA71Ax2
Cooling	2.89	3.15	3.01	3.02	3.27	2.97

TRIPLE	FCAG50Bx3	FHA50Ax3	FFA50Ax3	FDXM50Fx3	FBA50Ax3
Cooling	2.88	3.14	3.37	2.65	3.06
DOUBLE TWIN	FCAG35Bx4	FHA35Ax4	FFA35Ax4	FDXM35Fx4	FBA35Ax4
Cooling	3.08	2.73	3.04	2.87	3.32

3D125187

Notes

- The ratings shown are net capacities which include a deduction for indoor fan motor heat.
- The capacities are based on the following conditions:
 - Outdoor air: 85% RH
 - Corresponding refrigerant piping length: 5.0 m Cooling
 - Level difference: 0m
- For -EDP- applications, it is recommended to use outdoor unit setting -2-57-2.
- CPI- is a percentage value compared to the rated value which is 1.00.
- The error rate for this value is less than 5% and depends on the indoor unit type.
- The rated power input (PI) for each model is mentioned in the table below.

Symbols

- TC: Maximum total cooling capacity [kW]
- SHC: Sensible heat capacity [kW]
- CPI: Coefficient of the power input
- PI: Power input [kW] Compressor + indoor and outdoor fan motors
- RH: Relative humidity [%]



For all capacity tables refer to the databook:



RZAG-NV1



RZAG-NY1

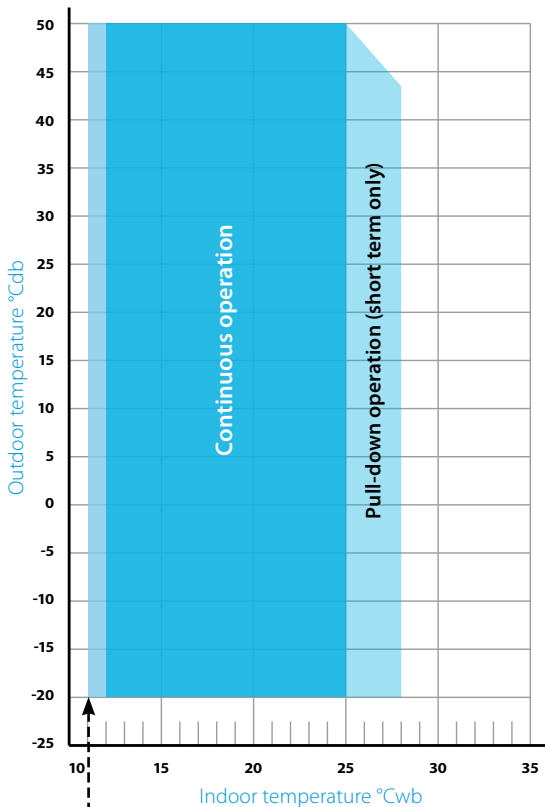
Efficient cooling



Wide operating range

Because infrastructure cooling systems must perform continuous cooling operations and may be required to run in demanding outdoor conditions, a flexible operating temperature map is critical. Daikin Sky Air infrastructure cooling systems offer reliable performance during extreme conditions.

- ✓ Outdoor cooling operation down to -20°C Ta
- ✓ Continuous cooling operation in outdoor temperatures as high as 52°C
- ✓ Extended indoor operation range from 12°C to 11°C
Wet Bulb allows the indoor unit to operate at lower humidity



11 Indoor Operation range extended down to 11°C WB

Cooling operation

Infrastructure cooling applications have minimal relative humidity, which results in a low indoor Wet Bulb temperature. The units may operate close to, or just outside, their official operating range. Sky Air Seasonal Smart can be set to widen the indoor cooling operation range down to 11°C Wet Bulb temperature.

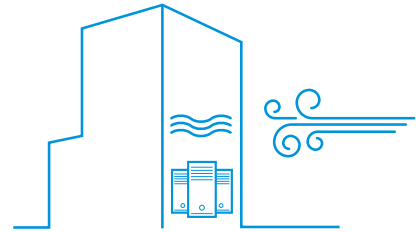
Typical IT or infrastructure room

Set point: 20°C
Humidity: 30% RH
Indoor Wet bulb temperature: 11°CWB

By setting the controller from factory default 16 (26) - 2 - 01 to infrastructure cooling 16 (26) - 2 - 03, the indoor operation range increases from 12°C to 11°C Wet Bulb.

Free cooling

Lower energy consumption



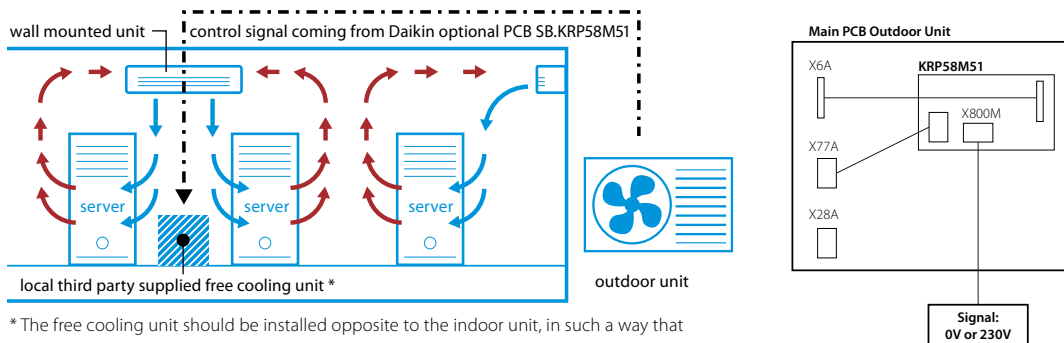
Ensuring uptime for infrastructure cooling applications comes at the cost of higher energy consumption than in comfort cooling applications. Daikin Sky Air infrastructure cooling systems offer you a leading solution for year-round efficiency, while decreasing your running costs.

The energy savings potential of operating in free cooling mode in certain climates is an attractive proposition for continuous cooling environments.

Operating in free cooling mode saves energy by using outdoor air during colder months, which allows refrigerant-based cooling components such as compressors to be shut off or to operate at a reduced capacity.

Daikin Sky Air RZAG-M series provides a control signal that is intelligently based on:
 › the indoor set temperature
 › the actual indoor temperature
 › the outdoor temperature

Typical Server room installation with a free cooling unit



* The free cooling unit should be installed opposite to the indoor unit, in such a way that there is no recirculation of cold air blowing from the free cooling unit.

With the free cooling 230 V signal supplied through optional control board SB.KRP58M51 **available only for RZAG-M series outdoor systems**, you can control a field supplied free cooling unit.

It is important to make setting 2-53-02 in case of the use of free cooling. This to guarantee that the free cooling will start up before the outdoor unit.

Energy efficiency benefits from free cooling

Estimated Annual Savings Potential for a typical small IT room operating 24/7/365

Boosted capacity indoor unit: FHA100, outdoor unit: RZAG

- › Cooling load: 6.8 kW
 - › RH indoor: 30%
 - › Set point: 20°C
 - › Free cooling if $\Delta T_a > 5^\circ\text{C}$
- ΔT_a = difference between indoor and outdoor temperature

AIR FLOW (M ³ /H)	ESTIMATED ANNUAL SAVINGS (EURO)				
	United Kingdom London	Germany Berlin	Poland Warsaw	Austria Vienna	Czech Republic Prague
500	212	275	158	142	185
1000	376	458	267	256	318
1500	436	516	307	313	370
2000	464	550	325	342	392

The savings depend greatly on climate, (ΔT_a), air flow volume and local electricity prices

Flexible control

Flexible and reliable operation of the IT, server or data support infrastructure requires a scalable and redundant cooling infrastructure. Operators of infrastructure cooling environments also need easy means of controlling and pre-programming the cooling systems. Daikin Sky Air solution for infrastructure cooling offers control choices to address the demanding operational needs.

Standard integrated duty rotation and standby control

Standard control solution for most installations

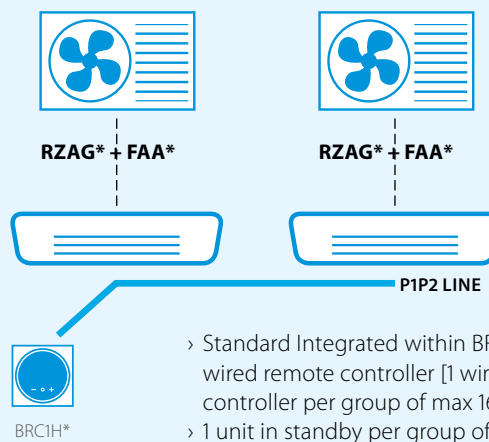
1. Add **redundancy** for critical IT applications
2. Increased **lifetime** of the system by altering operating units
3. **Back-up** operation: If one unit fails, the other unit will automatically start.

› Duty rotation: After a certain period* of time, the operating unit will go in standby and the standby unit will take over.

* **Rotation interval can be set from 6h, 12h, 24h, 72h, 96h, weekly**

- › Possibility to lock on/off and lock the mode button on the Remote Controller
- › Possibility to limit the setpoint range

Integrated Duty/Standby control



Madoka Assistant



BRC1H*

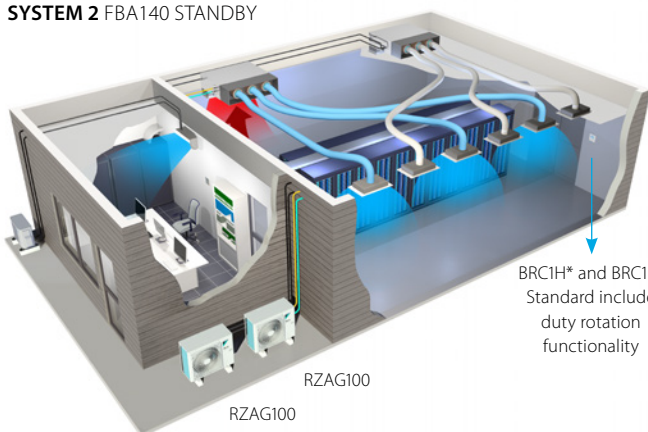
Typical infrastructure cooling units	Modelname
Wired remote control	BRC1H* or BRC1E*
Concealed ceiling system	FBA*
Wall mounted system	FAA*
Ceiling suspended system	FHA*



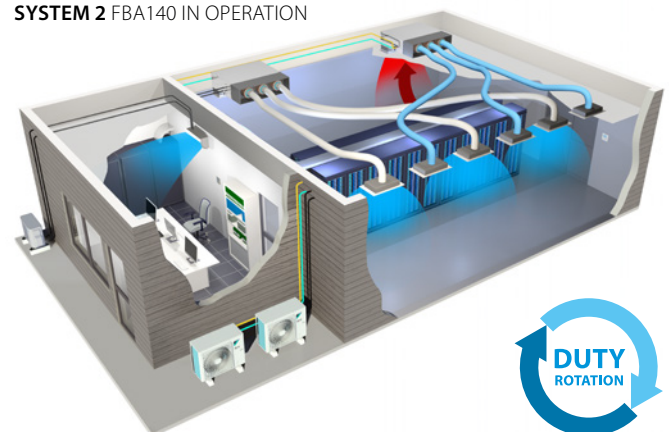
Duty rotation available on all Sky Air indoor units. Refer to combination table for detailed information on page 6.

Application Example

SYSTEM 1 FBA140 IN OPERATION
SYSTEM 2 FBA140 STANDBY



SYSTEM 1 FBA140 STANDBY
SYSTEM 2 FBA140 IN OPERATION



BRC1H* and BRC1E* Standard include duty rotation functionality

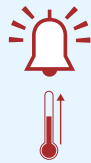


Maximum reliability and flexibility for continuous operation

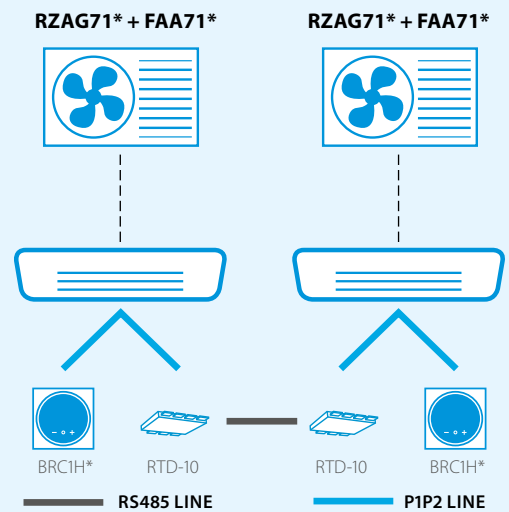
Advanced and scalable control

Modbus gateway RTD-10 option

- > **Automatic control** of indoor temperature
- > **Guaranteed cooling operation mode**
- > **Backup operation:**
 - > If one unit fails, the other unit will automatically take over
 - > When the temperature overshoots the standby unit will start operating
- > **Duty rotation:** After a certain period of time, the operating unit will go into standby mode and the standby unit will take over
- > **Rotation interval** can be set for 1 day, 1 week, 2 weeks or 4 weeks
- > **Remote alarm signal**



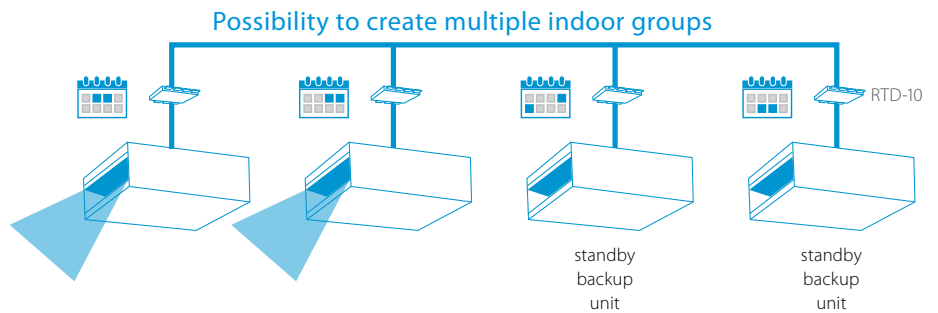
Wiring scheme



Example: 2 operating units, 2 standby units

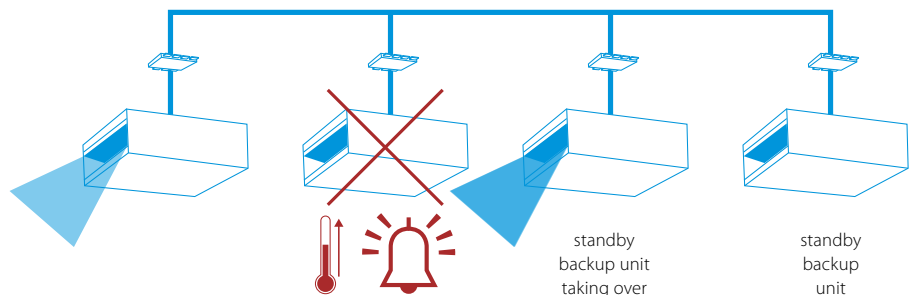
Dedicated duty / standby control

- > RTD-10 [1 gateway for 1 indoor unit (group)]
- > Up to 8 RTD-10 units can be combined in RS485 network
- > 1 or 2 standby units per group



Backup operation

The failure of a unit initiates a safety procedure where the standby backup unit takes over automatically and a repair alarm is sent.





Dedicated field settings

Adapted to the specific needs of infrastructure cooling

Overview of all settings for RZAG-N* series

	Function	Description	Setting	Where	Note
Field settings	Infrastructure Cooling Setting (EDP)	Low Humidity application	2-5-2	Outdoor unit - PCB setting	Continuous cooling operation for low humidity applications
	EDP Setting + Avoid unit OFF time	Slow Start + Increased Hysteresis	16(26)-7-02	Indoor Unit - Remote Controller	
	Maximize airflow	Set airflow high + ceiling soiling prevention	13(23)-0-03	Indoor Unit - Remote Controller	All indoor units except FAA
	Free cooling	To set optimal unit start in free cooling mode	2-58-2	Outdoor unit - PCB setting	
NEW	Quick commissioning setting	Combined setting of 2-5-2 + 16(26)-7-02 + 2-58-2	2-57-2	Outdoor unit - PCB setting	

	Function	Option	Note
Options	Backup operation, Duty Rotation, Additional unit comes in to deliver capacity, Visual Alarm Signal, I/O BMS connection - Forced On/Off operation + Alarm Monitoring	RTD-10	High end solution up to 8 indoors (1 per indoor unit)
	Backup operation, Duty Rotation, I/O BMS connection - Forced On/Off operation, Sequential start control, Minimum Guaranteed units for Operation	DTA113B51	Basic solution up to 4 indoors (1 per group of 4 indoors)
	Free cooling	SB.KRP58M52	
	Above-mentioned+ mini-BMS connection and energy management	DCM601A51	iTM solution

Continuous cooling operation

Avoid downtimes with specific system settings:

In low humidity environments indoor unit freeze-up is less likely. The setting 2-5-2 on **RZAG-N** series allows you to boost the indoor capacity and enables quick restart conditions in case of freeze-up prevention.

For **RZAG-A** series this setting is automated and is activated under -10°C outside temperature. This enables almost continuous heating and restart in case of freeze-up prevention.

Daikin recommends to enable **2-57-2** for infrastructure cooling applications

Built-in settings for improved operational reliability

When using standard AC systems for infrastructure cooling, frequent start / stop cycles of the compressor can occur due to:

1. incorrect selection / sizing of equipment

- The typical solution:
- › oversizing the air conditioning equipment to allow flexibility in server room occupancy
 - › oversizing by building in some spare, 'safety' capacity
 - › using rules of thumb as calculation method

2. installation/application related difficulties

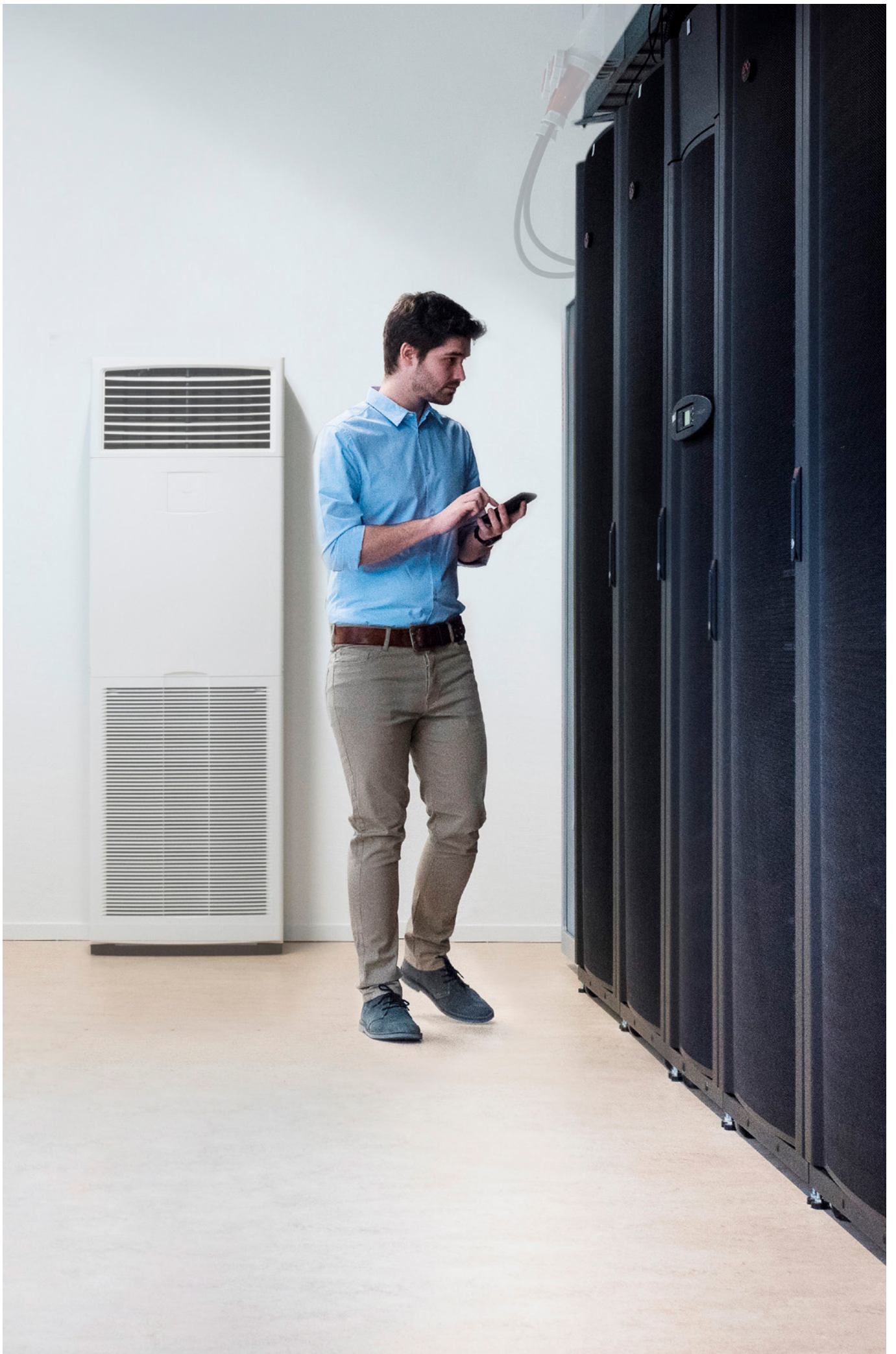
- › restricted air circulation
- › blockage of air distribution from top blow server racks

Compressor and thermostat control are therefore optimized for infrastructure cooling

This setting available on RZAG-N series allows the outdoor system to gradually start. This prevents the outdoor system from going into thermo-off while still in start-up mode. This setting limits frequent on/off operation. By lowering the frequency of the compressor (and subsequently the capacity), the system modulates and avoids early thermo-off 16(26)-7-02 (setting).

ON/OFF differential prevents the output from making fast, continuous switches. Using the 16-7-02 setting activates a larger thermo on/off hysteresis to **enhance continuous operation.**

- 16 (26)-7-01: DEFAULT (Comfort cooling)
 - 16 (26)-7-02: enhanced slow start + increased hysteresis
- This setting must always be combined with the EDP setting 2-5-2.



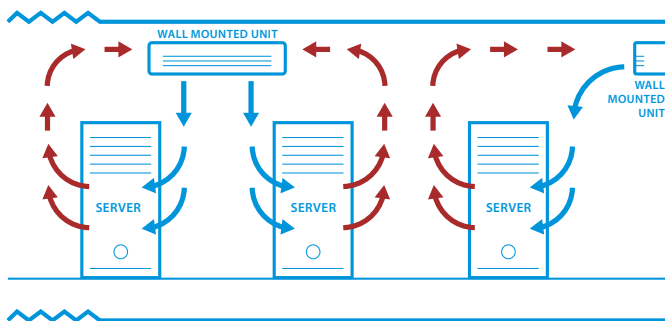
Best practices for planning and design

how to set-up cooling systems in server rooms

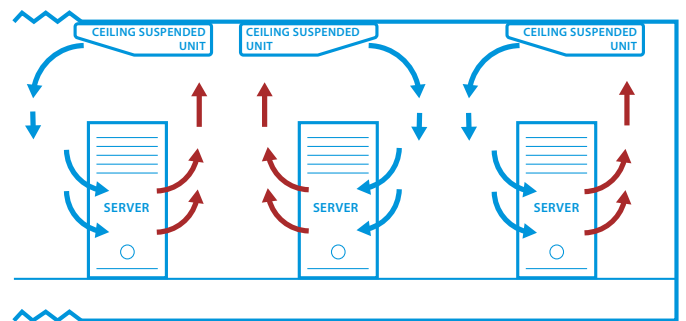
Flat floor or double floor not used for air distribution

Hot-isle / Cold-isle principles must be closely adhered to and the server orientation monitored.

With wall mounted units

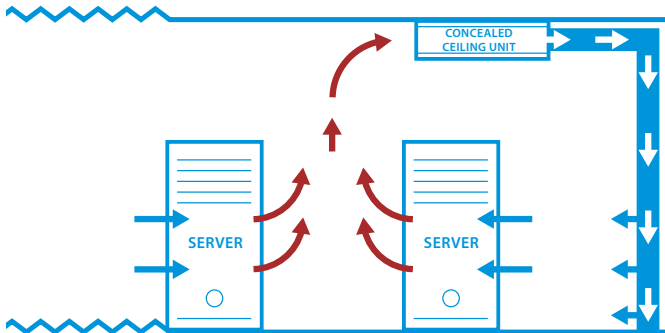


With ceiling suspended units



Install the ceiling suspended units in the opposite direction of the rack orientation

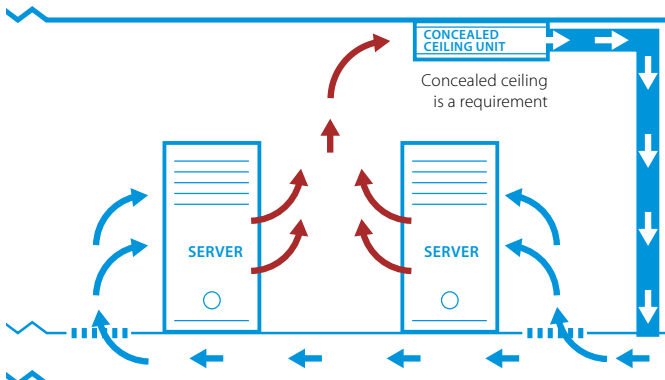
With concealed ceiling units



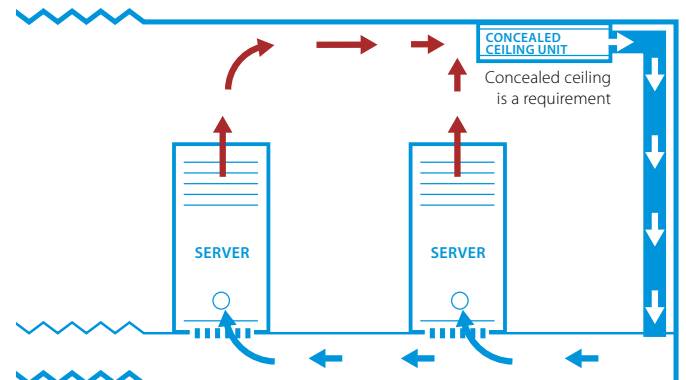
Use concealed ceiling units to distribute cold air where needed (down and to the suction side of the servers).

Flat floor or double floor used for air distribution

Hot-isle / Cold-isle set-up



Throughflow racks



Best match for double floor server rooms with concealed ceiling units

Best practice for cassette units

how to apply cassette type cooling systems in laboratories and other technical facilities

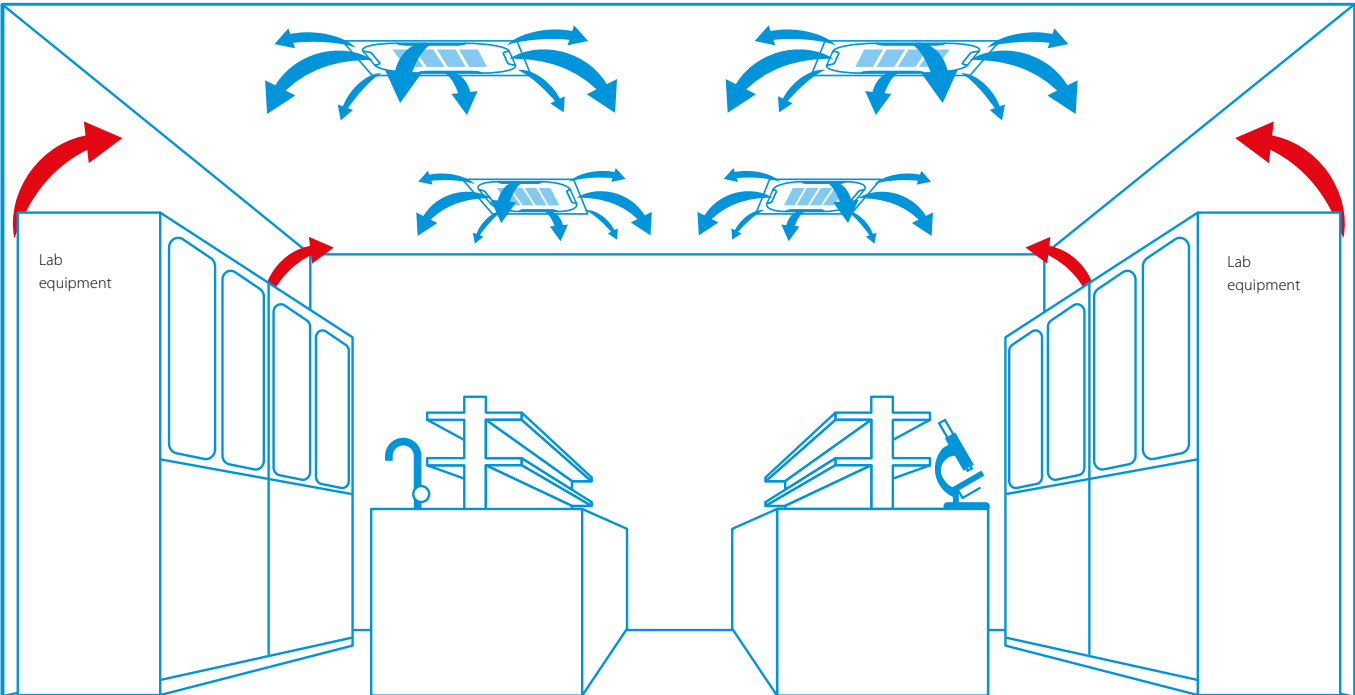
Flat floor or double floor not used for air distribution

Cassette type systems should only be used for specific room configurations where central ceiling installation is most suited for hot aisle/ cold aisle arrangements.

In a laboratory environment for example, when the cassette system is placed centrally on the ceiling and above the aisles, it will allow maximum uniform air distribution around the room.

It is not recommended to install cassette units right above a server or machine.

With cassette units



Sky Air Alpha-series

Industry leading technology in the most compact casing ever

NEW Unique, low-height single fan range

NEW Compact dimensions allow almost unnoticeable installation

NEW Market-leading serviceability and handling

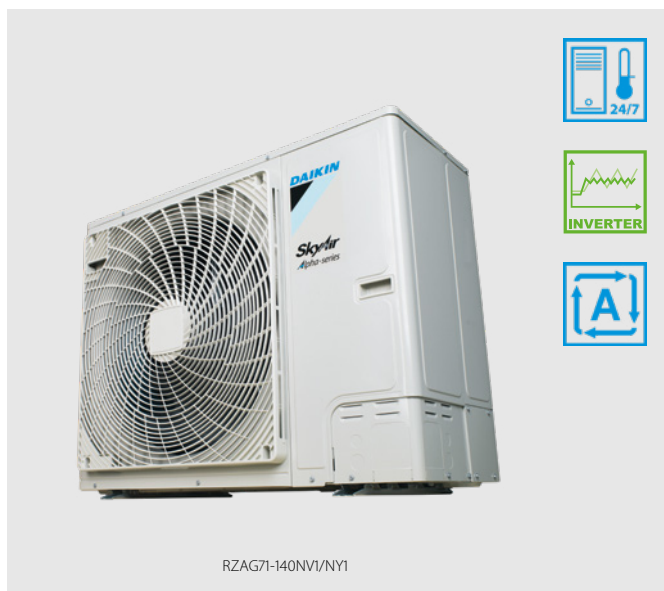
- > The perfect balance in efficiency and comfort thanks to Variable Refrigerant Temperature: top seasonal efficiency throughout most of the year and quick reaction speed on the hottest days
- > Suits high sensible, infrastructure cooling applications
- > Replace existing systems with R-32 technology without needing to replace the piping



- > Guarantees operation in both heating and cooling mode down to -20°C
- > Refrigerant cooled PCB guarantees reliable cooling, as it is not influenced by ambient temperature.
- > Maximum piping length up to 85m (50m for RZAG-A)
- > Outdoor units for pair, twin, triple, double twin application

R-32

SkyAir Alpha-series
BLUEEVOLUTION



Infrastructure cooling combination table



capacity class	FTXM-N				FAA-A				FHA-A(9)				FBA-A(9)				FDXM-F9				FUA-A				FNA-A9				FVA-A				FFA-A9				FCAHG-H				FCAG-B									
	35	50	60	71	71	100	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140	35	50	60	71	100	125	140		
RZAG35A	P							P						P								P						P																						
RZAG50A		P						P						P								P						P																						
RZAG60A			P					P						P								P						P																						
RZAG71NV1				P	3	2			P				3	2					P				3	2				P																						
RZAG100NV1					2		4	3			2			P	4	3			2			P	4	3			2			2			P	4	3			2			P	4	3			2				P
RZAG125NV1					2		4	3			2			P	4	3			2			P	4	3			2			2			P	4	3			2			P	4	3			2				P
RZAG140NV1					2		4	3			2			P	4	3			2			P	4	3			2			2			P	4	3			2			P	4	3			2				P

P = Pair, 2 = Twin, 3 = Triple, 4 = Double twin; For more information on infrastructure cooling options refer to infrastructure cooling catalogue.

More details and final information can be found on my.daikin.eu



RZAG-A



RZAG-NV1



RZAG-NY1

Outdoor unit	Unit	HeightxWidthxDpth	mm	RZAG		35A	50A	60A	71NV1	100NV1	125NV1	140NV1	71NY1	100NY1	125NY1	140NY1				
				734x870x373			870x1,100x460													
Dimensions	Unit	HeightxWidthxDpth	mm	734x870x373																
Weight	Unit		kg	52																
Sound power level	Cooling		dBA	62	63	64	64	66	69	70	64	66	69	70						
	Heating		dBA	62	63	64	64	66	69	70	64	66	69	70						
Sound pressure level	Cooling	Nom.	dBA	48	49	50	46	47	49	50	46	47	49	50						
	Heating	Nom.	dBA	48	49	50	48	50	52	48	50	52	48	50						
Operation range	Cooling	Ambient	Min.~Max. °CDB	-20 / +52					-20~52											
	Heating	Ambient	Min.~Max. °CWB	-20 / +24					-20~18.0											
Refrigerant	Type/GWP			R32 / 675																
	Charge		kg/TCO2Eq	1.55/1.05		3.20/2.16		3.20/2.16		3.70/2.50		3.70/2.50		3.20/2.16		3.20/2.16		3.70/2.50		3.70/2.50
Piping connections	Liquid/Gas	OD	mm	6.35/9.52		6.35/12.7		9.52/15.9												
	Piping length	OU - IU	Max.	50			55	85			55	85								
		System	Equivalent	50			75		100			75		100						
		Chargeless	30			40														
		Additional refrigerant charge	kg/m	See installation manual																
Power supply	Level difference	IU - OU	Max.	30					30.0											
	Phase/Frequency/Voltage		Hz/V	Single / 50 / 230					1~/50/220-240				3~/50/380-415							
Current - 50Hz	Maximum fuse amps (MFA)	A	16	16	20	20	32			16										

FTXM-N

Wall mounted unit

For rooms lacking false ceilings or free floor space

- › Suitable for air circulation for infrastructure cooling rooms (air suction is located at the top, where the hot air tends to be)
- › No floor occupancy
- › Maintenance operations are easily controlled from the front of the unit.



FTXM-N

perfera

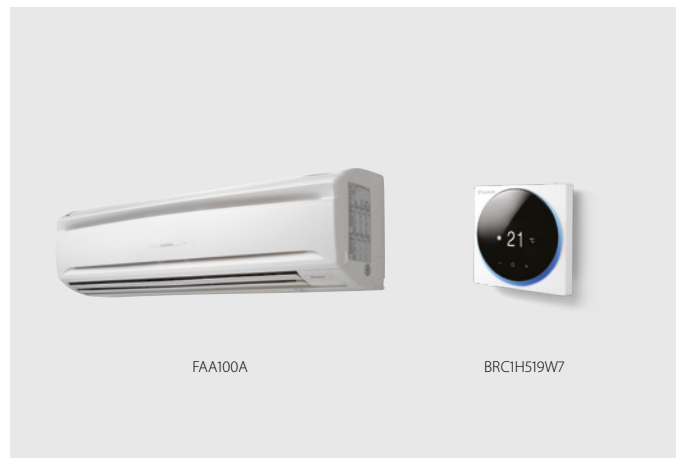
Indoor unit		FTXM		50N	60N	71N
Dimensions	Unit	HeightxWidthxDepth	mm	300x1,040x295		
Weight	Unit		kg	14.5		
Air filter	Type			Removable / washable		
Fan - Air flow rate	Cooling	High/Low/Silent operation	m ³ /min	16.1/11.6/8.1	17.1/12.0/9.1	17.6/12.5/10.1
	Heating	High/Low/Silent operation	m ³ /min	17.1/12.2/10.7	17.7/12.6/11.2	18.4/13.0/11.9
Sound power level	Cooling		dB(A)	58	60	
Sound pressure level	Cooling	High/Low/Silent operation	dB(A)	44/36/27	46/37/30	47/38/32
	Heating	High/Low/Silent operation	dB(A)	43/34/31	45/36/33	46/37/34
Control systems	Infrared remote control			ARC466A33		
	Wired remote control			BRC073A1		
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50 / 220-240		

FAA-A

Wall mounted unit

For rooms with no false ceilings nor free floor space

- › Suitable for air circulation for infrastructure cooling rooms (air suction is located at the top, where the hot air tends to be)
- › Long throw of air for optimal coverage
- › No floor occupancy
- › Air is equally distributed upwards and downwards due to 5 different discharge angles that are programmable via remote control
- › Maintenance operations are easily controlled from the front of the unit.



FAA100A

BRC1H519W7

Indoor unit		FAA		71A	100A
Dimensions	Unit	HeightxWidthxDepth	mm	290x1,050x238	340x1,200x240
Weight	Unit		kg	13.0	17.0
Fan - Air flow rate	Cooling	High/Low	m ³ /min	18.0/14.0	26.0/19.0
	Heating	High/Low	m ³ /min	18.0/14.0	26.0/19.0
Sound power level	Cooling		dB(A)	61	65
	Heating		dB(A)	61	65
Sound pressure level	Cooling	High/Low	dB(A)	45/40	49/41
	Heating	High/Low	dB(A)	45/40	49/41
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50 / 220-240	

FHA-A(9)

Ceiling suspended unit

For wide rooms with no false ceilings nor free floor space

- › Perfect air distribution for wide rooms due to the Coanda effect: up to 100° discharge angle
- › Rooms with ceilings up to 3.8m can be cooled easily and without capacity loss
- › No floor occupancy
- › Can be mounted in corners and narrow spaces, because it only requires 30mm of lateral service space



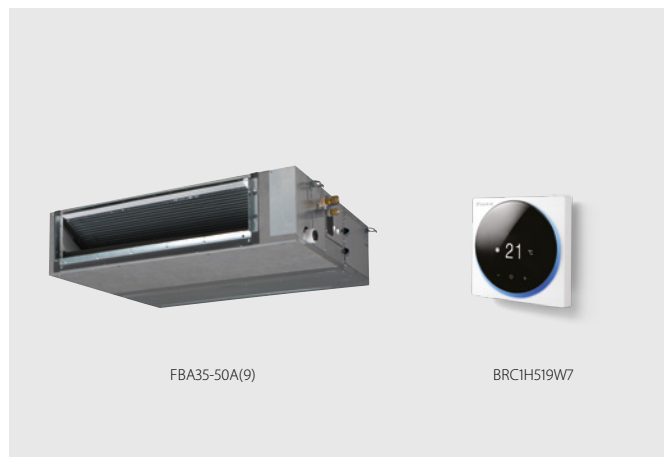
Indoor unit				FHA	35A9	50A9	60A9	71A9	100A	140A
Dimensions	Unit	HeightxWidthxDepth	mm		235x960x690		235x1,270x690		235x1,590x690	
Weight	Unit		kg		24	25	31	32	38.0	
Air filter	Type				Resin net					
Fan - Air flow rate	Cooling	High/Low	m ³ /min		14.0/10.0	15.0/10.0	19.5/11.5	20.5/14.0	28.0/20.0	34.0/24.0
	Heating	High/Low	m ³ /min		14.0/10.0	15.0/10.0	19.5/11.5	20.5/14.0	28.0/20.0	34.0/24.0
Sound power level	Cooling		dBA		53.0	54.0	55.0	55.0	60	64
	Heating	High/Low	dBA		36.0/31.0	37.0/32.0	37.0/33.0	38.0/34.0	42/34	37.0/32.0
Sound pressure level	Heating	High/Nom.	dBA		36.0/31.0	37.0/35.0	38.0/36.0	38.0/36.0	42/38	37.0/35.0
	Control systems	Infrared remote control			BRC7GA53 / BRC7GA56					
	Wired remote control				BRC1E53* / BRC1H519*					
Power supply	Phase / Frequency / Voltage		Hz / V		1~ / 50 / 220-240					

FBA-A(9)

Concealed ceiling unit with medium ESP

Slimmest yet most powerful medium static pressure unit on the market

- › Top efficiency in market
- › Compact unit can easily be mounted in a ceiling of only 285mm, leaving only suction and discharge grilles visible
- › Sound levels lower than 29 dBA
- › Medium external static pressure up to 150Pa allows the use of flexible ducts with varying lengths
- › Flexible installation, the air suction direction can be altered from rear to bottom suction
- › Standard built-in drain pump increases flexibility and installation speed
- › No floor occupancy



Indoor unit				FBA	35A9	50A9	60A9	71A9	100A	140A
Dimensions	Unit	HeightxWidthxDepth	mm		245x700x800		245x1,000x800		245x1,400x800	
Weight	Unit		kg		28.0		35.0		46.0	
Air filter	Type				Resin net					
Fan - Air flow rate	Cooling	High/Low	m ³ /min		15.0/10.5		18.0/12.5		29.0/23.0	34.0/23.5
	Heating	High/Low	m ³ /min		15.0/10.5		18.0/12.5		29.0/23.0	34.0/23.5
Fan - External static pressure	High/Nom./Maximum available/High		Pa		150/30/-				150/40/-	150/50/-
Sound power level	Cooling		dBA		60.0		56.0		58.0	62.0
	Heating	High/Low	dBA		35.0/29.0		30.0/25.0		34.0/30.0	37.0/32.0
Sound pressure level	Heating	High/Low	dBA		37.0/29.0		31.0/25.0		36.0/30.0	38.0/32.0
	Control systems	Infrared remote control			BRC4C65 / BRC4C66					
	Wired remote control				BRC1E53* / BRC1H519*					
Power supply	Phase / Frequency / Voltage		Hz / V		1~ / 50/60 / 220-240/220					

FDXM-F9

Concealed ceiling unit

Compact concealed ceiling unit, with a height of only 200mm

- › Compact dimensions, can easily be mounted in a ceiling void of only 240mm
- › Medium external static pressure up to 40Pa facilitates unit use with flexible ducts of varying lengths
- › Standard built-in drain pump increases flexibility and installation speed
- › No floor occupancy



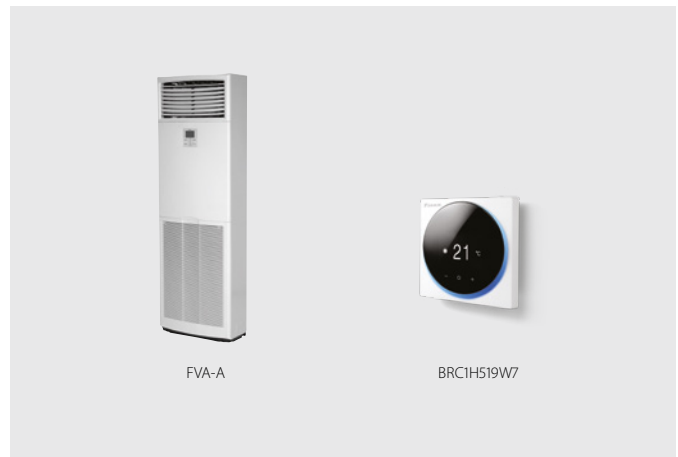
Indoor unit				FDXM	35F9	50F9	60F9
Dimensions	Unit	HeightxWidthxDepth	mm	200x750x620	200x1,150x620		
Weight	Unit		kg	21	28		
Air filter	Type			Removable / washable			
Fan - Air flow rate	Cooling	High/Low	m ³ /min	8.7/7.3	15.8/13.3	16.0/13.5	
	Heating	High/Low	m ³ /min	8.7/7.3	15.8/13.3	16.0/13.5	
Fan - External static pressure	Nom./Maximum available/High		Pa	30/-	40/-		
Sound power level	Cooling		dBA	53.0	55.0	56.0	
Sound pressure level	Cooling	High/Low	dBA	35.0/27.0	38.0/30.0		
	Heating	High/Low	dBA	35.0/27.0	38.0/30.0		
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50 / 220-240			

FVA-A

Floor standing unit

For commercial spaces with high ceilings

- › Ideal solution for commercial spaces without or with narrow false ceilings
- › Easy installation in new and refurbishment projects
- › Very efficient for use in rooms with high ceilings
- › Decreases temperature variation with an automatic fan speed selection and freely selectable 3-step fan speed
- › Selectable horizontal out blow better suits the layout of your room
- › Reduced energy consumption due to specially developed DC fan motor



Indoor unit				FVA	100A	140A
Dimensions	Unit	HeightxWidthxDepth	mm		1,850x600x350	
Weight	Unit		kg		50	
Air filter	Type			Resin net		
Fan - Air flow rate	Cooling	High/Low	m ³ /min	28/22	30/26	
	Heating	High/Low	m ³ /min	28/22	30/26	
Sound power level	Cooling		dBA	62	65	
Sound pressure level	Cooling	High/Low	dBA	50/44	53/48	
	Heating	High/Nom.	dBA	50/47	53/51	
Control systems	Wired remote control			NRC1E53* / BRC1H519*		
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50/60 / 220-240/220		

FUA-A

4-way blow ceiling suspended unit

Unique Daikin unit for high rooms with no false ceilings nor free floor space

- › Rooms with ceilings up to 3.5m can be cooled easily without capacity loss
- › Can be installed in both new and refurbishment projects
- › Flexibility to suit every room layout without changing the location of the unit. The wired remote controller allows you to control and close each flap individually.
- › Reduced energy consumption as a result of the specially developed small tube heat exchanger, DC fan motor and drain pump
- › 5 different discharge angles between 0 and 60° can be programmed via remote control
- › Standard drain pump with 500mm lift increases flexibility and installation speed



Indoor unit				FUA	71A	100A
Dimensions	Unit	HeightxWidthxDepth	mm		198x950x950	
Weight	Unit		kg	25.0		26.0
Air filter	Type			Resin net		
Fan - Air flow rate	Cooling	High/Low	m ³ /min	23.0/16.0		31.0/20.0
	Heating	High/Low	m ³ /min	23.0/16.0		31.0/20.0
Sound power level	Cooling		dBA	59		64
	Heating		dBA	59		64
Sound pressure level	Cooling	High/Low	dBA	41/35		46/39
	Heating	High/Low	dBA	41/35		46/39
Power supply	Phase / Frequency / Voltage		Hz / V	/ - / -		

FFA-A9

Fully flat cassette

Unique design in the market that integrates fully flat into the ceiling

- › Fully flat integration in standard architectural ceiling tiles
- › Remarkable blend of iconic design and engineering excellence with an elegant finish in white or a combination of silver and white
- › Less energy consumption as a result of the specially developed small tube heat exchanger, DC fan motor and drain pump
- › Fresh air intake integrated in the same system reduces installation costs because additional ventilation is not required
- › Standard drain pump with 850mm lift increases flexibility and installation speed
- › No adapter needed for DIII-connection; link your unit into the wider building management system



Indoor unit				FFA	35A9	50A9	60A9
Dimensions	Unit	HeightxWidthxDepth	mm			260x575x575	
Weight	Unit		kg	16.0		17.5	
Decoration panel	Model			BYFQ60C2W1W / BYFQ60C2W1S / BYFQ60B3W1			
	Colour			White (N9.5) / SILVER / White (RAL9010)			
	Dimensions	HeightxWidthxDepth	mm	46x620x620 / 55x700x700			
	Weight		kg	2.8 / 2.7			
Air filter	Type			Resin net			
Fan - Air flow rate	Cooling	High/Low	m ³ /min	10.0/6.5	12.7/8.6	14.5/9.5	
	Heating	High/Low	m ³ /min	10.0/6.5	12.7/8.6	14.5/9.5	
Sound power level	Cooling		dBA	51.0	56.0	60.0	
Sound pressure level	Cooling	High/Low	dBA	34.0/25.0	39.0/27.0	43.0/32.0	
	Heating	High/Low	dBA	34.0/25.0	39.0/27.0	43.0/32.0	
Control systems	Infrared remote control			BRC7EB530W (standard panel) / BRC7F530W (white panel) / BRC7F530S (grey panel)			
	Wired remote control			BRC1E53* / BRC1H519*			
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50 / 220-240			

FCAG-B

Round flow cassette

360° air discharge for optimum efficiency and comfort

- › 360° air discharge ensures uniform air flow and temperature distribution
- › Automatic filter cleaning yields higher efficiency and lower maintenance costs. Dust can easily be removed with a vacuum cleaner, without opening the unit
- › Flexibility to suit every room layout without changing the location of the unit. The wired remote controller allows you to control and close each flap individually.



Cassette units should only be used for specific room configurations where central installation is most suited for hot aisle/ cold aisle arrangements.

See page 19 for more information

Indoor unit				FCAG	35B	50B	60B	71B	100B	140B
Dimensions	Unit	HeightxWidthxDepth	mm		204x840x840				246x840x840	
Weight	Unit		kg	18	19			21	23	
Decoration panel	Model			BYCQ140E - white with grey louvers / BYCQ140EW - full white / BYCQ140EB - black						
	Dimensions	HeightxWidthxDepth	mm	50x950x950						
	Weight		kg	5.4						
Decoration panel 2	Model			BYCQ140EGF - white / BYCQ140EGFB - black						
	Dimensions	HeightxWidthxDepth	mm	130x950x950						
	Weight		kg	10.3						
Decoration panel 3	Model			BYCQ140EP - white / BYCQ140EPB - black						
	Dimensions	HeightxWidthxDepth	mm	50x950x950						
	Weight		kg	5.4						
Air filter	Type			Resin net						
Fan - Air flow rate	Cooling	High/Low	m ³ /min	12.9/8.8	14.6/9.4	8.7/11.2	15.1/10.8	22.7/13.0	27.2/13.1	
	Heating	High/Low	m ³ /min	14.1/9.4	14.6/9.4	8.7/11.2	15.1/10.8	23.0/13.2	27.0/13.0	
Sound power level	Cooling		dBA	49.0			51.0	54.0		
	Heating		dBA	49.0			51.0	54.0		
Sound pressure level	Cooling	High/Low	dBA	31.0/27.0		28/35	35.0/28.0	37.0/29.0		41.0/29.0
	Heating	High/Low	dBA	31.0/27.0		28/35	33.0/28.0	37.0/29.0		41.0/29.0
Control systems	Infrared remote control			BRC7FA532F / BRC7FB532F / BRC7FA532FB / BRC7FB532FB						
	Wired remote control			BRC1E53* / BRC1H519*						
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50/60 / 220-240/220						

FCAHG-H

High COP, round flow cassette

360° air discharge for optimum efficiency and comfort

- › High efficiency cassette provides top performance, great savings in energy consumption
- › 360° air discharge ensures uniform air flow and temperature distribution
- › Automatic filter cleaning yields higher efficiency and lower maintenance costs. Dust can easily be removed with a vacuum cleaner, without opening the unit
- › Flexibility to suit every room layout without changing the location of the unit. The wired remote controller allows you to control and close each flap individually.



Cassette units should only be used for specific room configurations where central installation is most suited for hot aisle/ cold aisle arrangements.

See page 19 for more information

Indoor unit				FCAHG	71H	140H	100H
Dimensions	Unit	HeightxWidthxDepth	mm		288x840x840		
Weight	Unit		kg		25.0		
Decoration panel	Model			BYCQ140E - white with grey louvers / BYCQ140EW - full white / BYCQ140EB - black			
	Dimensions	HeightxWidthxDepth	mm	50x950x950			
	Weight		kg	5.4			
Decoration panel 2	Model			BYCQ140EGF - white / BYCQ140EGFB - black			
	Dimensions	HeightxWidthxDepth	mm	130x950x950			
	Weight		kg	10.3			
Decoration panel 3	Model			BYCQ140EP - white / BYCQ140EPB - black			
	Dimensions	HeightxWidthxDepth	mm	50x950x950			
	Weight		kg	5.4			
Air filter	Type			Resin net			
Fan - Air flow rate	Cooling	High/Low	m ³ /min	23.6/13.7	34.4/21.2	32.2/19.1	
	Heating	High/Low	m ³ /min	23.6/13.7	32.1/19.7	30.8/18.3	
Sound power level	Cooling		dBA	53.0			61.0
	Heating		dBA	53.0			61.0
Sound pressure level	Cooling	High/Low	dBA	36.0/29.0		45.0/37.0	44.0/33.0
	Heating	High/Low	dBA	36.0/29.0		45.0/37.0	44.0/33.0
Control systems	Infrared remote control			BRC7FA532F / BRC7FB532F / BRC7FA532FB / BRC7FB532FB			
	Wired remote control			BRC1E53* / BRC1H519*			
Power supply	Phase / Frequency / Voltage		Hz / V	1~ / 50/60 / 220-240/220			



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- › Efficient cooling with widest indoor system range and free cooling option
- › 2-step solution for system selection
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