

Bringing nature's balance indoors



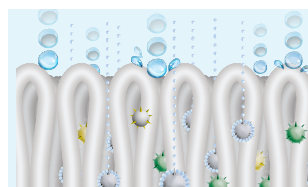
nanoe™ X, technology with the benefits of hydroxyl radicals.

Abundant in nature, hydroxyl radicals (also known as OH radicals) have the capacity to inhibit pollutants, viruses, and bacteria to clean and deodorise. nanoe™ X technology can bring these incredible benefits indoors so that hard surfaces, soft furnishings, and the indoor environment can be a cleaner and more pleasant place to be, whether at home, work, or visiting hotels, shops and restaurants etc.



What is unique about nanoe™ X?

Effective on fabrics and surfaces.



1 | At one billionth of a metre, nanoe™ X is much smaller than steam and can deeply penetrate cloth fabrics to deodorise.

Longer lifespan.



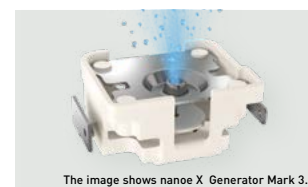
2 | Contained in tiny water particles, nanoe™ X has a long lifespan, which is about 600 seconds, to spread easily around the room.

Huge quantity.



3 | nanoe X Generator Mark 3 produces 48 trillion hydroxyl radicals per second. Greater amounts of hydroxyl radicals contained in nanoe™ X lead to higher performance on inhibition of pollutants.

Maintenance-free.



4 | No service and maintenance required. nanoe™ X is a filter free solution that does not require maintenance, as its atomisation electrode is enveloped with water during its generation process and it is made with Titanium.

7 effects of nanoe™ X – Panasonic unique technology

Deodorises



Odours

Capacity to inhibit 5 types of pollutants



Bacteria and viruses



Mould



Allergens



Pollen



Hazardous substances



Skin and hair

*Refer to <https://aircon.panasonic.eu> for more details and validation data.

First nanoe™ device was developed by Panasonic in 2003

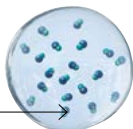
Generator: nanoe™

2003

480 billion hydroxyl radicals/sec

Ion particle structure

Hydroxyl radicals

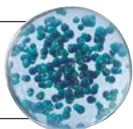


Generator: nanoe™ X

Mark 1 - 2016

4,8 trillion hydroxyl radicals/sec

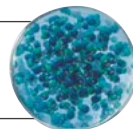
10x times



Mark 2 - 2019

9,6 trillion hydroxyl radicals/sec

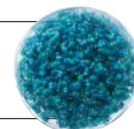
20x times



Mark 3 - 2022

48 trillion hydroxyl radicals/sec

100x times



nanoe™ X has evolved again - the nanoe X Generator Mark 3.

The latest of the continuously evolving nanoe™ X technology, it has the largest amount of hydroxyl radical in the history of nanoe™ which generates 48 trillion hydroxyl radical per second, 100 times the hydroxyl radical contained in traditional nanoe™. The increased number of hydroxyl radical, which are the key to nanoe™ cleaning power, means you can expect an even higher level of performance.



nanoe™ X is an internationally-validated technology. Official test reports are available.

Meets the requirements of VDI 6022 and HACCP

Certified under VDI 6022, meeting one of the strictest hygiene requirements on the market for HVAC systems, and aligned with HACCP-based food-safety practices.



VDI 6022 – Part 5 ¹⁾ Certification.

Avoidance of allergenic exposure.
Inhibits a wide range of harmful bacteria, viruses, mould, pollen and allergens.



VDI 6022 – Part 1 ¹⁾ & 1.1 ²⁾ Certification.

Ventilation and indoor-air quality.
Panasonic nanoe™ X technology improving indoor air quality.



HACCP Food Safety Certified ³⁾ – Europe's first HVAC manufacturer.

1) Certification mark only valid for nanoe X Generator Mark 3. 2) Certification mark only valid for nanoe X Generator Mark 2 and Mark 3. 3) Applicable to PACi NX and ECOi indoor units equipped with nanoe X Generator Mark 3.

Higher concentration, even in large spaces

Greater effectiveness even in large spaces of more than 100 m².

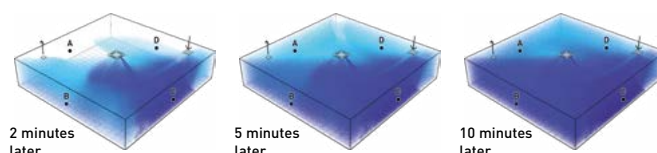
Conditions of the simulation: Inspection / model: 4 way cassette / room size: 112 m² / room height: 2,4 m / position of IDU: centre of space / ventilation: 3 times/hour.

nanoe™ concentration level:



nanoe™ X diffuse into the space in a short time to quickly reach the effective concentration level.

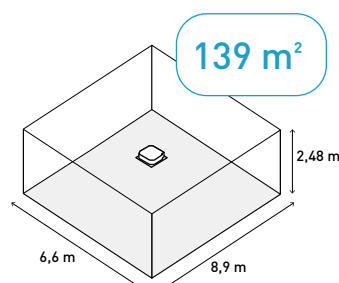
Simulation with nanoe X Generator Mark 3 in a room size of 112 m²



Effectiveness in large space with Generator Mark 3

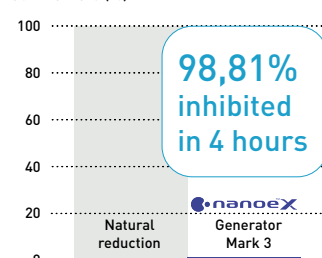
Inhibits virus: An air conditioner equipped with nanoe X Generator Mark 3 inhibits activity of adhered virus (Bacteriophage) by 98,81% in 4 hours ¹⁾.

Test ambient.

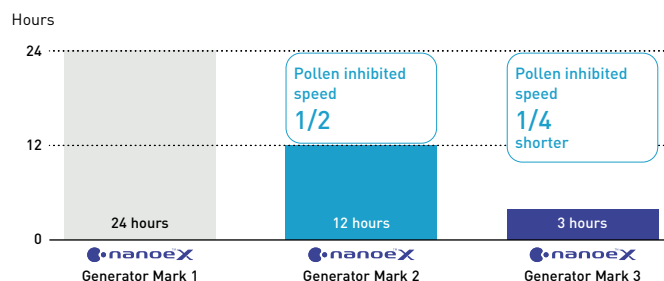


Test result (bacteriophage).

Survival rate [%]



Comparison of time required to inhibit 99% of cedar pollen ³⁾.



1) Testing organisation: SGS Inc / Test subject: Adhered Bacteriophage / Test volume: Approx. 139 m² large space (6,6 x 8,9 x 2,48 m). Test result: Inhibited 98,81% in 4 hours. Test report no.: SHES210901902583. 2) Effect after 3 hours in a test space of approx. 24 m². The figures are not the results of testing in an actual operating space. 3) nanoe X Generator Mark 1: [Testing organisation] Panasonic Product Analysis Center [Test method] ELISA method of measuring allergens adhering to fabric in a test room (approx. 24 m²) [Method of inhibition] Release of nanoe™ [Target] Adhered allergen (cedar pollen) [Test Result] Inhibition of 99% or more in 24 hours (4AA33-151001-F01). nanoe X Generator Mark 2: [Testing organisation] Panasonic Product Analysis Center, [Test method] ELISA method of measuring allergens adhering to fabric in a test room (approx. 24 m²) [Method of inhibition] Release of nanoe™ [Target] Adhered allergen (cedar pollen) [Test Result] Inhibition of 99% or more in 12 hours confirmed (L19YA009). nanoe X Generator Mark 3: [Testing organisation] Panasonic Product Analysis Center [Test method] ELISA method of measuring allergens adhering to fabric in a test room (approx. 24 m²) [Method of inhibition] Release of nanoe™ [Target] Adhered allergen (cedar pollen) [Test Result] Inhibition of 99% or more in 3 hours (H21YA017-1).

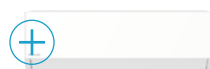
Panasonic Heating & Cooling Solutions is incorporating nanoe™ technology in a wide range of equipment



U2 type 4 way 90x90 cassette.
Built-in nanoe X Generator Mark 3.



Y3 type 4 way 60x60 cassette.
Built-in nanoe X Generator Mark 3.



K3 type wall-mounted.
Built-in nanoe X Generator Mark 3.



F3 type adaptive duct.
Built-in nanoe X Generator Mark 3.



M2 type hide-away.
Built-in nanoe X Generator Mark 3.



G1 type floor console.
Built-in nanoe X Generator Mark 1.



P2 type floor-standing.
Built-in nanoe X Generator Mark 3.



R2 type concealed floor-standing
Built-in nanoe X Generator Mark 3.



Ceiling mounted air-e nanoe X Generator.
Built-in nanoe X Generator Mark 1.

BION air pollutant filter (optional)

Collaborating with BION, experts in filtration equipment, a new molecular filtration is available to improve indoor air quality.





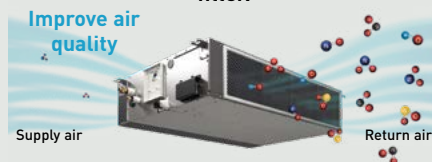
The efficiency of nitrogen dioxide (NO₂) removal can reach 99,5%*

*Measured by ASTM6646 international standards. Efficiency reaches 99,5% within 4,8 seconds of contact time with the media bed (FAM filter). **The performance varies depending on the room size, environment and usage and it may take several hours to reach the full effect. BION air pollutant filter is not medical device, local regulations on building design must be followed. Test results conducted under controlled laboratory conditions. Performance of BION air pollutant filter might differ in real life environment.

BION air pollutant filter traps and reduces certain types of harmful pollutant gases, listed below

- Nitrogen oxides (NO_x)
- Ozone (O₃)
- Sulfur dioxide (SO₂)
- Formaldehyde (HCHO)
- Volatile organic compounds (VOCs)

Adaptive ducted unit with BION air pollutant filter.



Adaptive ducted unit without BION air pollutant filter.



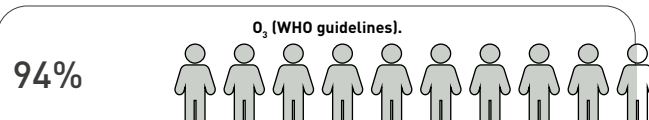
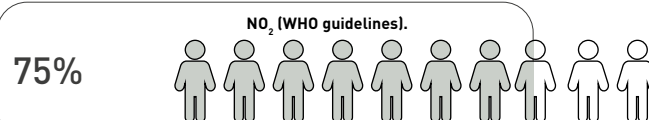
The BION air pollutant filter is an ideal solution for improving indoor air quality in urban areas.

Air pollution in urban areas in Europe

It is reported that in 2021, a significant portion of the Europe's urban population has been exposed to high levels of key air pollutants*.

- 75% of the urban population was exposed to NO₂ concentrations above 10 µg/m³
- 94% were exposed to concentrations of O₃ above 60 µg/m³

*The "Europe's Air Quality Status 2023" report (EEA, 2023) assesses levels of air pollutants measured in ambient air across Europe (> 2000 locations) for the years 2021 and 2022. It compares them against both EU standards as set out in the Ambient Air Quality Directives and the 2021 WHO Air Quality Guidelines.



Share of the Europe's urban population exposed to air pollutant concentrations above EU standards and WHO guidelines in 2021, as referenced in the EEA 2023.

Why outdoor air pollution matters to IAQ?

Poor indoor air quality is associated with outdoor air pollutants such as car exhaust and factory fumes, and the two are closely linked. A significant portion of human exposure to air pollution occurs when they are indoors.



Different objectives, different IAQ solutions

In today's world, we are concerned about wellbeing and the air we breathe. And technology exists to ensure improved indoor air quality. With the introduction of the BION air pollutant filter, Panasonic offers IAQ solutions optimized for various target objectives.

IAQ Solution	nanoe™ X	BION air pollutant filter
Objectives	Inhibit particles such as pollutants, certain types of viruses, and bacteria to clean and deodorise	Inhibit gases such as nitrogen oxides (NO _x), ozone (O ₃), sulfur dioxide (SO ₂), formaldehyde (HCHO) and volatile organic compounds (VOCs)
Technology	Hydroxyl radicals contained in water	Molecular filtration
Filtering mechanism	Physical capture of particles	Adsorption and absorption
Availability	Built into all air-to-air indoor units as a standard	Optional accessory for the adaptive ducted unit (PF3/MF3)

BION air pollutant filter*	PAW-APF800F	PAW-APF1000F	PAW-APF1400F
Compatible adaptive ducted unit	MF3 15, 22, 28, 36, 45 and 56	MF3 60 and 73	MF3 90, 112, 140 and 160

*The filter cartridge and filter casing are included in the package.

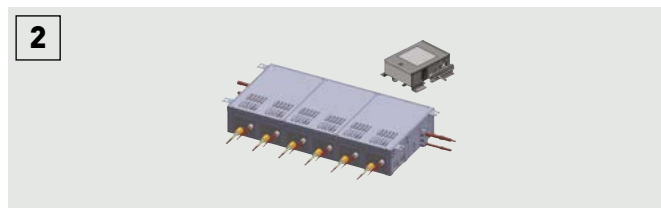
Solutions for Restaurants

Full heating, cooling and DHW solutions for Restaurants.



1 Electric VRF. ECOi EX and Mini ECOi.

ECOi electrical VRF is specifically designed for the most demanding restaurants. High-efficiency system. Extended operating range to provide heating at outdoor temperature as low as -25 °C (2-Pipe ECOi EX). Suitable for refurbishment projects.



2 3-Pipe control box kit.

Heat Recovery box to connect multiple indoor units with just one box, 4, 6 and up to 8 indoor units or groups. This is good advantage in the restaurants, where space for connecting several boxes is limited.



3 Aquarea T-CAP.

Ideal for heating, cooling and for production of big quantities of hot water at 75 °C, Aquarea have a extremely quick return on investment and a low CO₂ footprint.



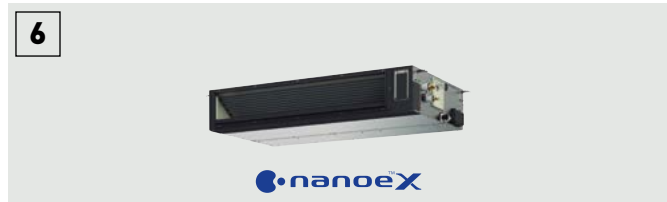
4 Water heat exchanger for ECOi.

Efficient hot water production supported by a high-performance class A water pump.



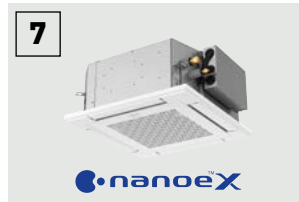
5 AHU connection kit for efficient ventilation.

The AHU connection kit is specially designed to improve the efficiency of the pre-heating or pre-cooling ventilation process.



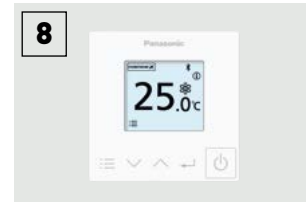
6 Adaptive ducted with nanoe™ X.

Super silent units deliver the ideal air supply. Units available from 1,5 kW providing precise temperature control even in small rooms. 2 installation possibilities (horizontal / vertical) with high ESP 150 Pa allows for flexible installation. nanoe™ X is built-in as standard.



7 Mini Cassette.

The Y3 type 4 way 60x60 cassette unit has modern and stylish panel design which matches with any type of the building design.



8 Control your way.

Wide variety of controls, from simple user control to full system control via remote access functionality. Touch panel and consumption control.



9 Air curtain with DX coil.

Designed for smooth operation and efficient performance.



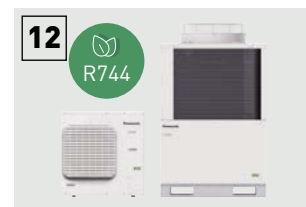
10 Protocol friendly.

Great flexibility for integration into your KNX / Modbus / LonWorks / BACnet projects allows fully bi-directional monitoring and control of all the functioning parameters. Range of solutions to control locally or remotely the full system in bi-directional mode.



11 Commercial Smart Edge.

Manage the entire Panasonic HVAC portfolio across multi-site installations from a single platform, remotely, 24/7.

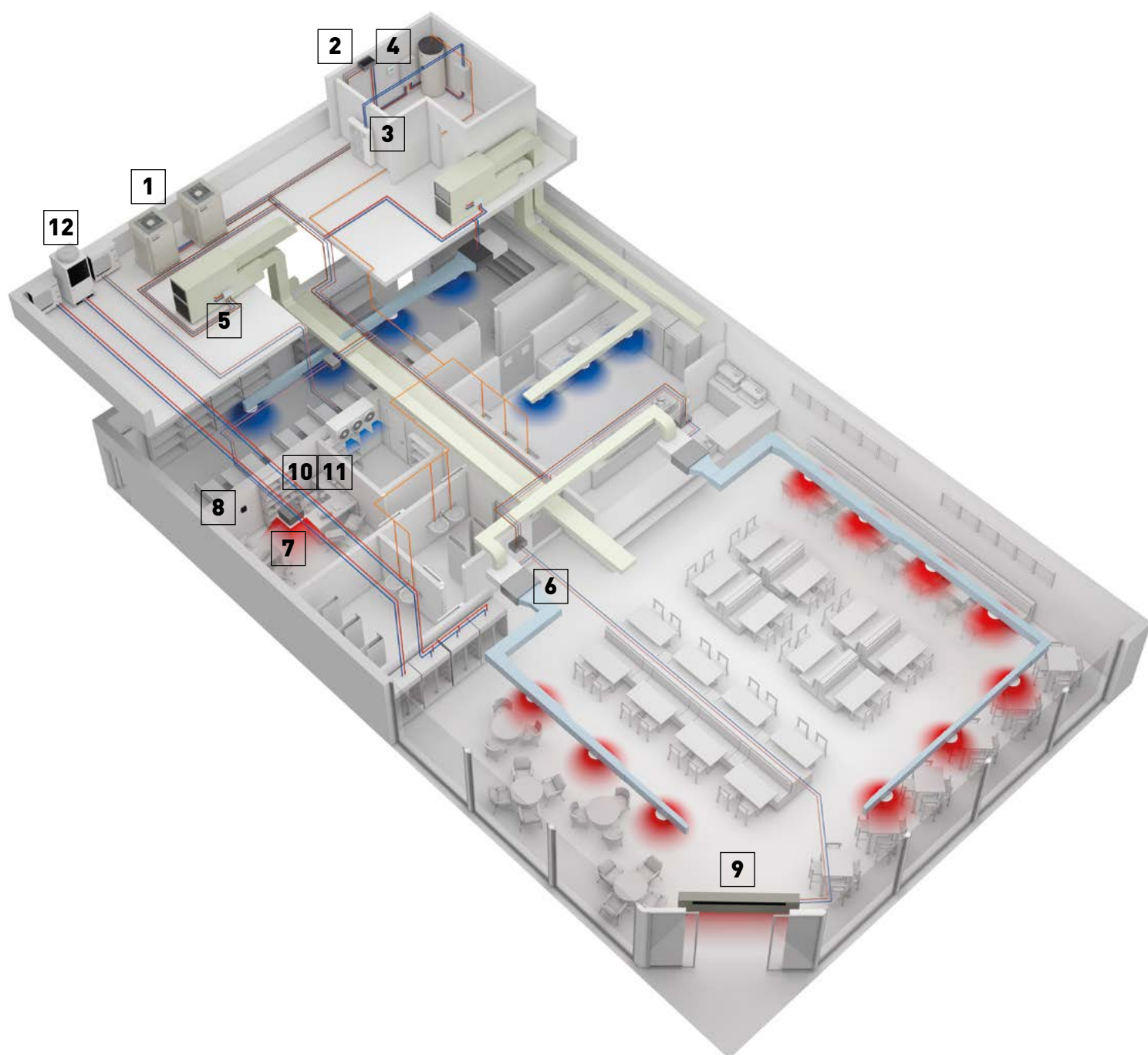


12 Condensing unit with natural refrigerant.

Panasonic CO₂ unit is the natural choice for showcases and cold rooms in restaurants. Always fresh foods from a future-proof refrigeration technology, without any contamination risk.

Highly efficient at part load conditions.

Panasonic has solutions for optimising the installation of cooling, heating and DHW production in restaurants. While the kitchen needs cooling, heating is needed for DHW and also for heating the public area, with the advantage of 100% fresh air that removes odours. Combining all these needs smartly with Panasonic technology results in a simple and flexible system adaptable to any restaurant requests, with lower utility bills.



Your entire hotel with superior comfort, control and savings too



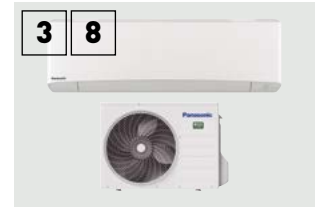
Electric VRF. ECOi EX.

ECOi electrical VRF is specifically designed for the most demanding hotels. High-efficiency system. Extended operating range to provide heating at outdoor temperature as low as -25 °C (2-Pipe ECOi EX). Suitable for refurbishment projects.



Hydronic units.

Providing efficient hot and cold water.



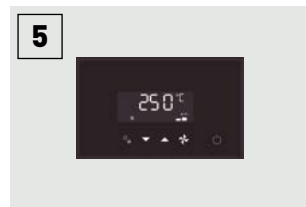
YKEA unit for server room.

Steady cooling, nonstop, even at -25 °C and still with high-efficiency. Ready for continuous operation and easy to connect 2 systems to automatically alternate and ensure server rooms are kept cool.



AHU connection kit for efficient ventilation.

The AHU connection kit is specially designed to improve the efficiency of the pre-heating or pre-cooling ventilation process.



Control your way.

Wide variety of controls, from simple user control to full system control via remote access functionality. Touch panel, web server, consumption control, smartphone control... everything is possible.



Wide range of indoor units.

All units provided with supply air temperature sensor and low operation sound level to guarantee maximum guest comfort. Units equipped with nanoe™ X (available in specific models) provide better air quality in public spaces in the hotel.



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Protocol friendly.

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Air curtain with DX coil.

Designed for smooth operation and efficient performance.



Condensing unit with natural refrigerant.

Panasonic CO₂ unit is the natural choice for an energy saving and climate-friendly solution.

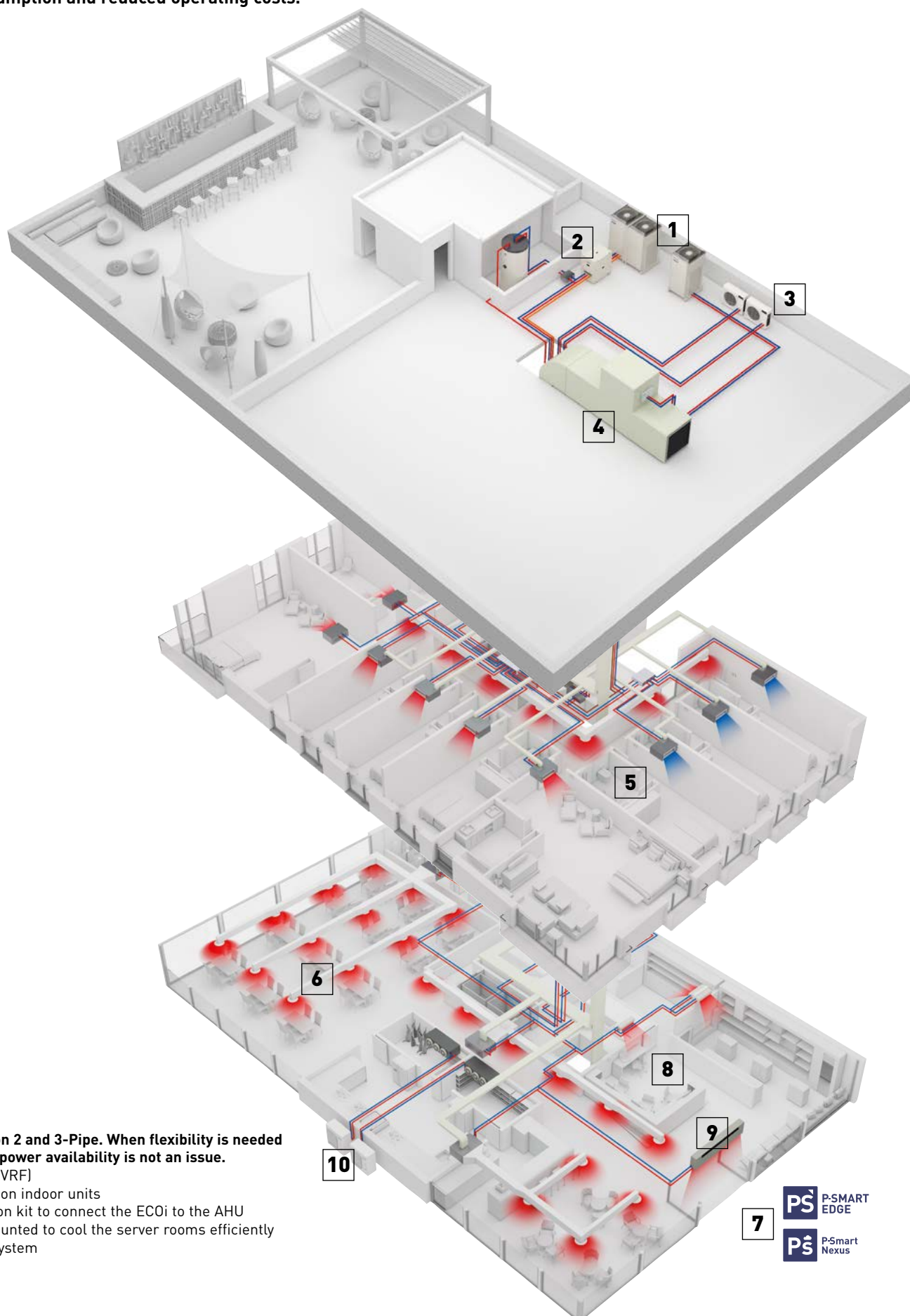


PACi NX Elite Series for cooling rooms.

High quality and efficient solution for high temperature refrigeration down to 8 °C.

Panasonic offers one of the widest ranges in HVAC&R and DHW solutions on the market, enabling us to provide the most suitable system for any application, 24 hours a day, 365 days a year.

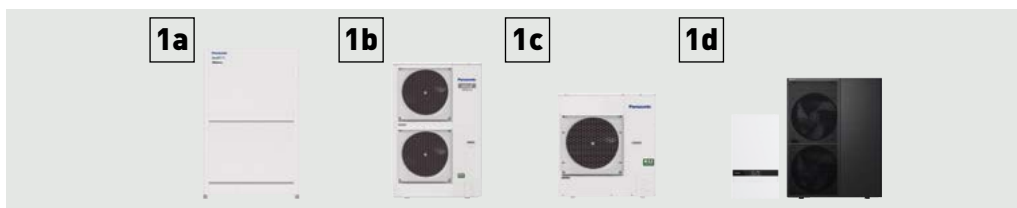
Our solutions ensure not only higher customer satisfaction but also lower energy consumption and reduced operating costs.



Electric solution 2 and 3-Pipe. When flexibility is needed and electricity power availability is not an issue.

- ECOi (electric VRF)
- Direct expansion indoor units
- AHU connection kit to connect the ECOi to the AHU
- YKEA wall-mounted to cool the server rooms efficiently
- Pump Down system

Innovative solutions for retail



Multi energy solutions.

The Multi energy solution from Panasonic provides the best choice in energy saving and on the flexibility of the installation. Panasonic solutions can be connected to direct expansion systems, water chiller installations and ventilation systems as air handling units.

1a: VRF. ECOi

1b: VRF. Mini ECOi

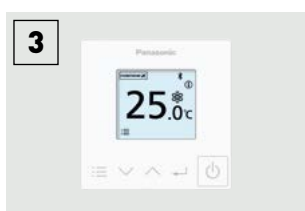
1c: 1x1. PACi NX

1d: A2W. Aquarea



YKEA unit for server room.

Steady cooling, nonstop, even at -25 °C and still with high-efficiency. Ready for continuous operation and easy to connect 2 systems to automatically alternate and ensure server rooms are kept cool.



Control your way.

Wide variety of controls, from simple user control to full system control via remote access functionality. Touch panel and consumption control.



Econavi sensor.

The Econavi sensor detects presence in the room, and quietly adapts the PACi or VRF air conditioning system in order to improve comfort and energy savings.



Wide range of indoor units.

All units provided with supply air temperature sensor and low operation sound level to guarantee maximum guest comfort. Units equipped with nanoe™ X (available in specific models) provide better air quality in public spaces in the hotel.



Hide-away, for power and efficiency.

Super silent units from 1,0 kW offer precise temperature control for small rooms. M2 type ultra-slim ducted units, only 200 mm high, fit in height-restricted spaces.



Air curtain with DX coil.

Designed for smooth operation and efficient performance.



Commercial Smart Edge.

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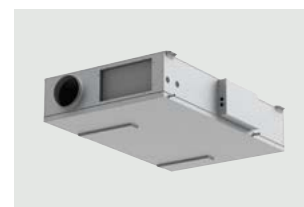
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Great flexibility for integration into your KNX / Modbus / LonWorks / BACnet projects allows fully bi-directional monitoring and control of all the functioning parameters. Range of solutions to control locally or remotely the full system in bi-directional mode.



AHU connection kit for efficient ventilation.

The AHU connection kit is specially designed to improve the efficiency of the pre-heating or pre-cooling process of the ventilation.



Energy Recovery unit for high efficiency of the system.

Panasonic Energy Recovery Ventilators can reduce the outside air load because they efficiently recover the heat lost by ventilation during the heat recovery process.

Heating and cooling solutions for retail applications.

Panasonic has developed solutions for retail and office applications where return on investment is a key factor! The comfort inside the shop is key for a good customer experience.

From local control or Panasonic's cloud control system, a detailed status of the heating and cooling system can be displayed, analysed and optimised in order to improve the efficiency, reduce the running time and increase the life time of the units.

8 reason why Panasonic is the best solution for your retail:

- Complete solution
- Flexibility and adaptability
- Go green retail: low CO₂ emissions
- Comfort - high customer satisfaction
- Future expansion
- Panasonic offers efficient systems meeting expectations over the life-span of the project
- High quality of service with Panasonic pro-partner installation team
- The system maintains operation by bypassing up to 25% of units during power failure

