Panasonic

ACG2013

Panasonic

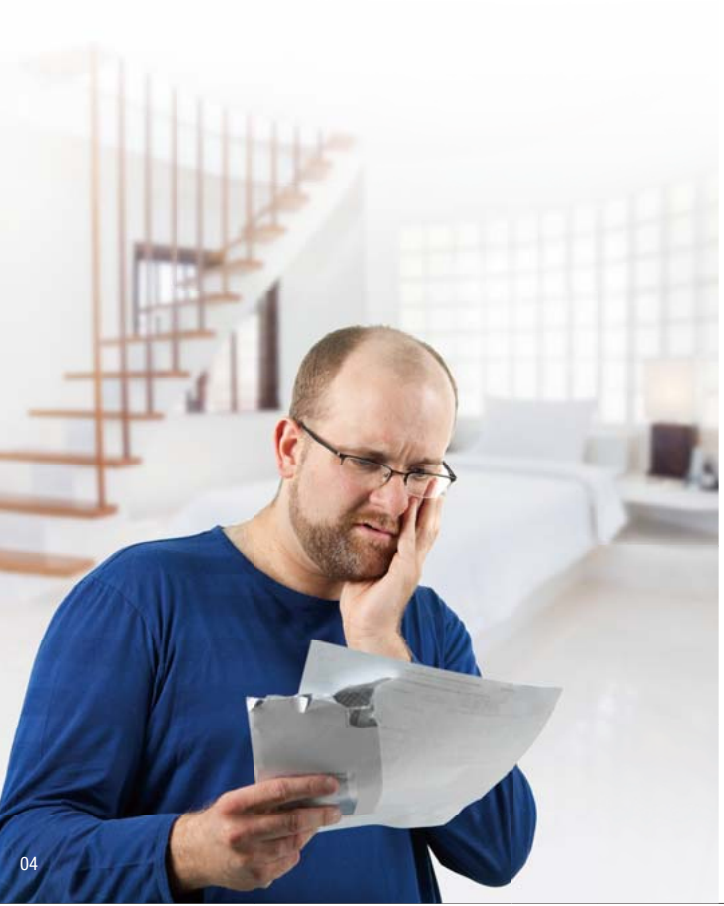
Room Air Conditioner
Sales Talk Guide

CONTENTS

I

Three Panasonic Advantages

Can't the electric bill be lowered?



We're wasting money by cooling too much when we're not even moving, or cooling the room when nobody's in it. It would be great to use the air conditioner efficiently so we could be comfortable and also save energy.

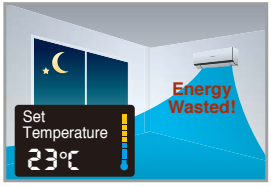
Do you know that you're wasting energy when ...

- Cooling areas where there aren't any people?

- Cooling at high power when nobody's moving?

- Cooling when nobody's in the room?

- Cooling at high power even at night?



Checkpoint!

When choosing an air conditioner, look for a smart one that will keep you comfortable and also cut down on wasted energy.

What's ECONAVI?

High-precision sensor technology allows efficient, automatic operation to match the room conditions. This keeps everyone comfortable while saving energy.

up to **38%** Energy Savings

For an Inverter Model with Temperature Wave

There's no need to endure discomfort to save energy. ECONAVI reduce wasted energy all by itself, and comfortably. For example, when cooling, it saves* up to 38% of the energy of an inverter model.

What does ECONAVI detect?

It detects sunlight intensity and the activity of people in the room, and comprehensively judges the conditions to optimise operation.

* For more information about Sunlight Detection/Human Activity Detection, see the note.

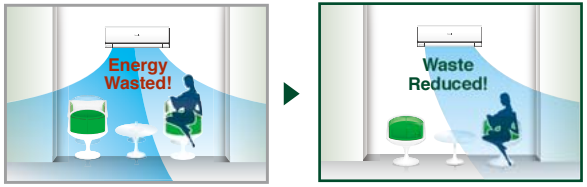
For illustration purposes only. This image is not intended to show results based on test conditions or to show the effects in actual usage.

Note:
Comparison of 1.5HP Inverter model between ECONAVI with (Dual Human Activity Sensor, Sunlight Sensor, and Temperature Wave) ON and ECONAVI OFF (Cooling) ECONAVI ON, Outside temperature: 35ºC/24ºC Remote setting temperature: 23ºC with Fan Speed (High) Vertical Airflow direction: Auto, Horizontal Airflow direction: ECONAVI Mode Setting temperature goes up 2ºC in total, 1ºC controlled by ECONAVI activity level detection and another 1ºC controlled by ECONAVI light intensity detection. Temperature Wave is ON, electric heater (300W; simulating the heat of human and TV etc) ECONAVI OFF, Outside temperature: 35ºC/24ºC Remote setting temperature: 23ºC with Fan Speed (High) Vertical Airflow direction: Auto, Horizontal Airflow direction: Front Total power consumption amount are measured for 2 hours in stable condition. At Panasonic Amenity Room (size:16.6m²) This is the maximum energy savings value, and the effect differs according to conditions in installation and usage.

Can you tell me how the ECONAVI work in more detail?

Human Activity Sensor

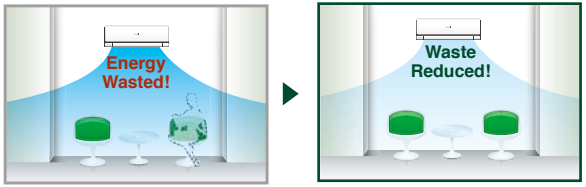
To reduce wasted cooling in areas where there aren't any people...



ECONAVI sends cool air only to areas where people are.

Human Activity Sensor

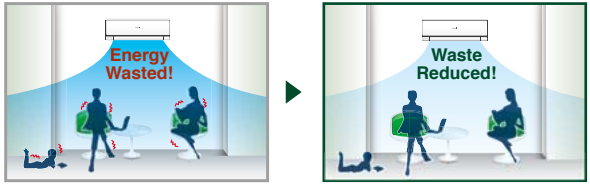
To reduce wasted cooling when nobody's in the room...



ECONAVI switches from high operation to reduce cooling.

Human Activity Sensor

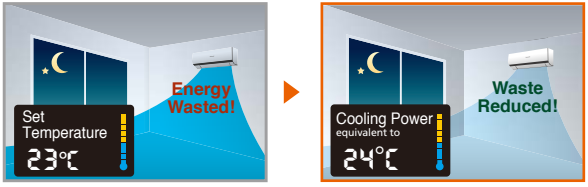
To reduce wasted cooling when people are relaxing.



ECONAVI switches from high to mild cooling.

Sunlight Sensor

To reduce wasted high-power cooling at night or under cloudy conditions ...



ECONAVI raises the set temperature and cools without making it cold.

Sales Talks

For people concerned with saving energy

It saves energy with a single touch as it operates, so you don't have to constantly think about saving energy yourself.

For families with children or elderly family members

It saves energy with a single touch to constantly keep the room comfortable for every member of the family.

For people concerned with the initial cost

It saves energy, so in the long run it ends up being more economical.

Helpful Advice

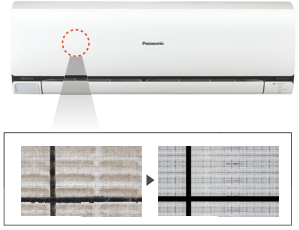
Ways to Save Even More Energy

Keep the area around the outdoor unit neat & clean

When objects are placed near the outdoor unit, they may block the exhaust port and lower the heat dissipating efficiency. Avoid placing objects in this area to prevent excessive power consumption.

Clean the filter often

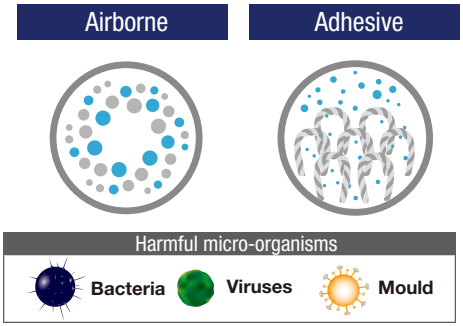
If you clean the air conditioner filter once every two weeks, it helps the air to flow more smoothly and enables more efficient operation.



Cleaning the filter improves cooling efficiency.

Where are those virus and bacteria?

Colds and influenza are transmitted not only by droplet infection, but by touching curtains and furniture that have viruses adhering to them. so it' s important to take contermeasures against them.



Checkpoint!

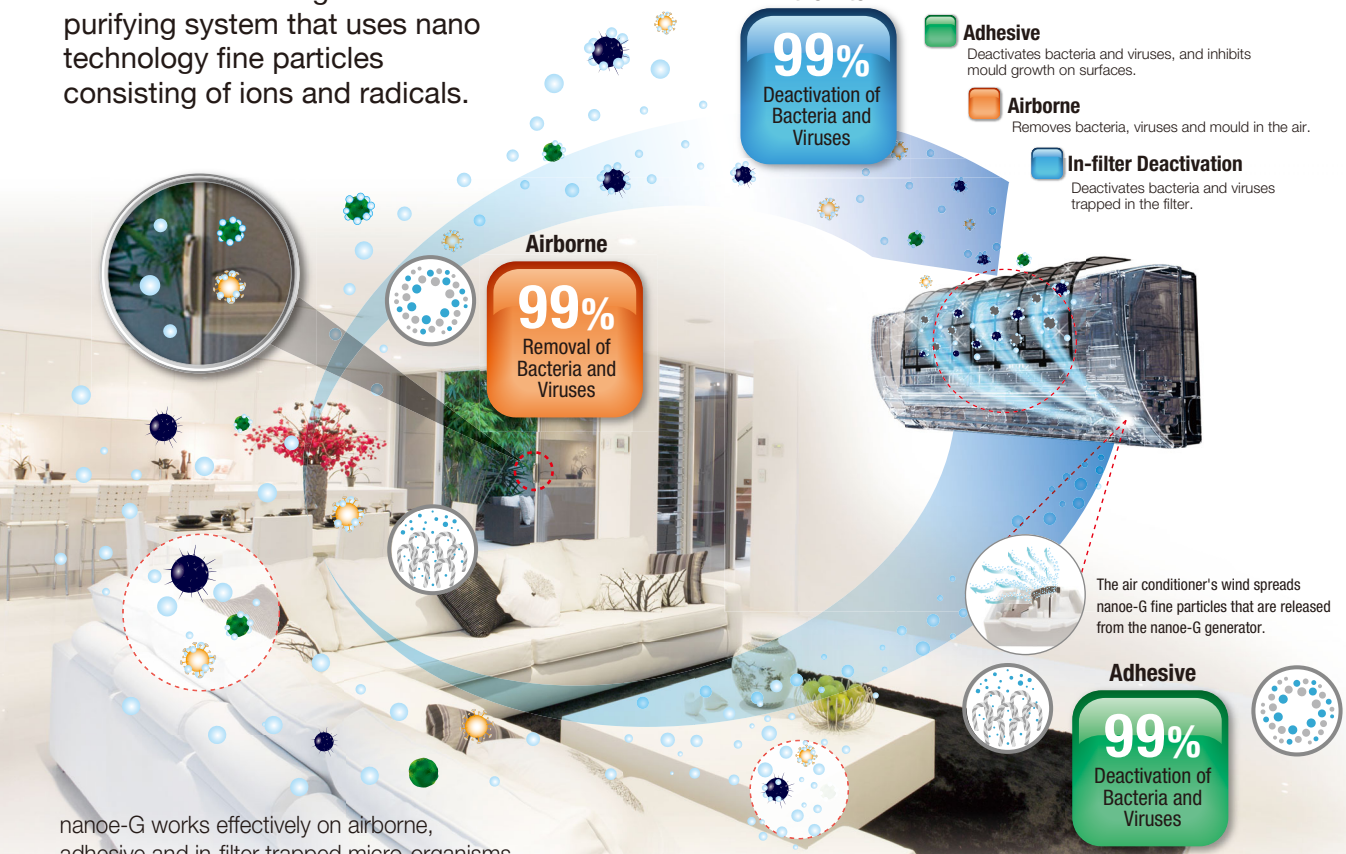
When selecting an air purifying function, make sure it has the following three capabilities.

- **Deactivates adhesive micro-organisms**
- **Removes airborne micro-organisms**
- **Deactivates micro-organisms in the filter**

For illustration purposes only. This image is not intended to show results based on test conditions or to show the effects in actual usage.

What's nanoe-G?

It's Panasonic's original air purifying system that uses nano technology fine particles consisting of ions and radicals.



nanoe-G works effectively on airborne, adhesive and in-filter trapped micro-organisms such as bacteria and viruses thus providing a cleaner living environment.

How does nanoe-G work?

3 trillion* nanoe-G fine particles released from the generator.

Adhesive
Deactivates bacteria and viruses, and inhibits mould growth on surfaces.

Airborne
Removes bacteria, viruses and mould in the air.

In-filter Deactivation
Deactivates bacteria and viruses trapped in the filter.

*3 trillion is the simulated number of nanoe-G fine particles under the mentioned conditions. Actual measured nanoe-G fine particles at the centre of the room (13 m^2): 100 k/cc is the calculated number of nanoe-G fine particles in the entire room assuming they are evenly distributed.

For illustration purposes only. This image is not intended to show results based on test conditions or to show the effects in actual usage.

When does the in-filter deactivation work?

It automatically operates when the air conditioner is turned off. This means that there are no worries of bacteria and viruses breeding on the filter itself, and you don't have to worry about troublesome operation.

Step 1

Power Off

The air-conditioner first has to be turned off.

Step 2

Fan Operation

The fan operation will run automatically for 30 minutes with the louver slightly open to ensure the internal components are dry and reduce the moisture from condensation.

Step 3

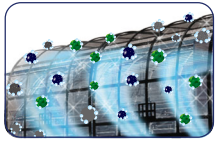
nanoe-G Operation

The air conditioner's wind spreads nanoe-G particles that are released from the nanoe-G generator.

Step 4

Deactivation Effect

Nanoe-G deactivates bacteria and viruses that are trapped in the filter within 2 hours.



*Depending on the air conditioner's accumulated operation time, nanoe-G In-filter Deactivation may be activated only once a day.

Have the deactivation effects of nanoe-G been proven?

Several prominent research institutes have conducted laboratory tests that confirm excellent effects, such as “99% deactivation of adhesive bacteria and viruses” and “99% removal of airborne bacteria and viruses.”

■ Effectiveness of nanoe-G

	1. ADHESIVE	2. AIRBORNE	3. IN-FILTER DEACTIVATION
Bacteria	99%*1 Deactivation	99%*2 Removal	99%*3 Deactivation
Viruses	99%*1 Deactivation	99%*2 Removal	99%*3 Deactivation
Mould	Growth Inhibition	99%*2 Removal	—

Note:

*1: Adhesive Deactivation was certified by Japan Food Research Laboratories
- Test Report number : 11047933001-02
  Bacteria : Staphylococus aureus (NBRC 12732)
- Test Report number : 11073649001-02
  Virus : Bacteriophage (Phi X 174 NBRC 103405)
- Test Report number : 11047937001-02
  Mould : Cladosporium cladosporioides (NBRC 6348)

*2: Airborne Removal was certified by Kitasato Research Center for Environmental Science
- KRCES-Bio. Test Report no. : 23_0182
  Bacteria : Staphylococcus aureus (NBRC 12732)
- KRCES-Env. Test Report no. : 22_0008
  Virus : Escherichia coli phage (øX-174 ATCC 13706-B1)
  : Influenza (H1N1) 2009 virus
- KRCES-Env. Test Report no. : 23_0140
  Mould : Penicillium pinophilum (NBRC 6345)

*3: In-Filter Deactivation was certified by Japan Food Research Laboratories
- Test Report number : 12037932001
  Bacteria : Staphylococus aureus (NBRC 12732)
- Test Report number : 12014705001
  Virus : Escherichia coli phage (**φX**-174 ATCC 13706-B1)

All results are based on specific testing conditions.
All tests are not demonstrated under actual usage situation.

Sales Talks

For homes with small children*

It removes things like the mould and bacteria that cause allergies in children.

For the person who does house chores*

Many types of micro-organisms are caused by contagion from bacteria and viruses that adhere to surfaces. Unlike other air purifying functions, nanoe-G is also effective against adhesive bacteria and viruses.

For the person who has just come back home*

Bacteria and viruses adhering to clothing are deactivated by simply hanging the clothing up when returning home.

For people who don't like complicated functions

You don't need to do any special operation. bacteria and viruses are deactivated while you simply use the air conditioner in the ordinary way.

*These effects are the results of tests and evaluations under certain test conditions. They may vary in actual usage. For test details, please see page 17.

Helpful Information

Nanoe-G is essential for people who are concerned about their physical condition.

■ It uses no chemical

Nanoe-G consists of components of the air, not chemicals, so it can be used without any worries by people who are sensitive to chemicals, and in children's rooms.

■ Also effective against adhesive bacteria and viruses

Colds and other contagious diseases are often caught by directly breathing in airborne droplets that are spread by an infected person's sneezing or coughing. However, they can also be caught by touching furniture, curtains, or other items on which the droplets have adhered, and then bringing the hand into contact with mucous membranes such as the eyes, nose, or throat. It's important to choose an air purifying function that is effective against adhesive bacteria and viruses.

Can't the air conditioner cool quickly and then keep it comfortable?

The level of precision in adjusting the air conditioner's temperature has a major effect on both comfort and the electric bill.

Have you experienced this kind of discomfort?

- It'll take too long to reach a comfortable temperature, which is frustrating.

- It's always too hot or too cold. Never just right.

- I'd like to cool the room for my pet when I go out, but I suppose that'll raise the electric bill too much.

Checkpoint!

When choosing an air conditioner, choose an efficient one that isn't wasteful.

What's an inverter?

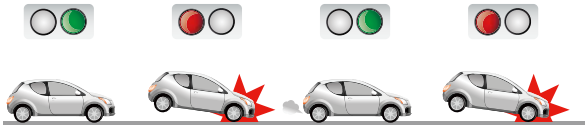
An inverter is a control circuit that varies electric frequency. In an air conditioner, the inverter controls the electric power linearly according to room conditions in order to achieve comfortable, energy-saving operation.

How it works

The principle is much like driving a car. It is more comfortable to drive a car when there is no need to repeat start-and-stop operations.

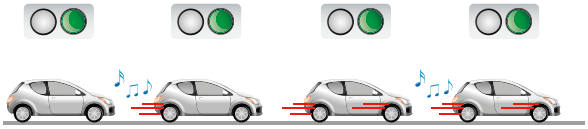
Non-Inverter

Excess consumption of fuel due to frequent restarting of motor.



Inverter

Efficient management of energy by keeping motor running at varying speeds.



In the case of an automobile, for example, which driving condition gives you better fuel efficiency? Driving on an ordinary road that has many traffic signals and requires you to stop frequently, or driving on an expressway on which you can cruise without stopping? Needless to say, the expressway will result in better fuel efficiency. Using an inverter provides the same effect in air conditioners. When an air conditioner starts up, the inverter sets it in full-power operation to quickly bring the room temperature to the set temperature. Once the set temperature is reached, the inverter maintains efficient operation to minimize the change in the room temperature. This prevents wasteful consumption of electricity and keeps the room temperature at a comfortable level.

Useful Information

Quiet, gentle-to-the-body cooling operation

Mild Dry Cooling

This mode maintains the humidity level in the room at about 10% higher than when the conventional cooling mode is used. By minimizing the drying of the skin, throat and other mucous membranes, it prevents overcooling and provides comfortable sleep.

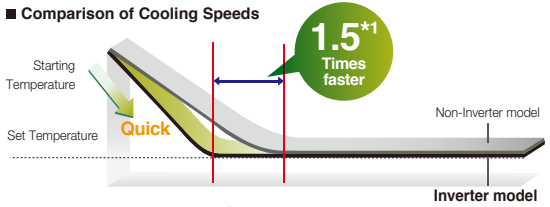
Comparison between models with and without an inverter

1. Startup

1.5 times faster to reach the set temperature	Vs.	Slow to reach the set temperature

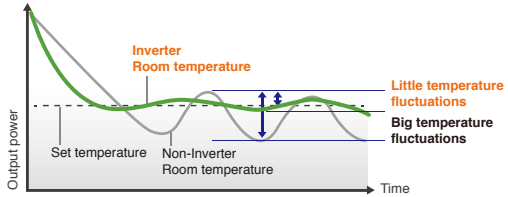
*1 1.5HP Inverter vs. non-Inverter. Outside room temperature: 35°C; setting temperature: 25°C

■ **Comparison of Cooling Speeds**



2. In normal operation

Maintenance of stable and comfortable room temperature	Vs.	Large room temperature fluctuations that lower comfort

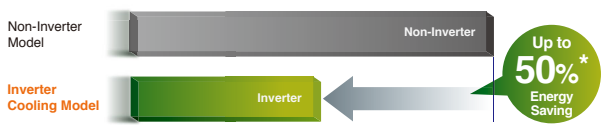


3. Energy-saving performance

Energy saving of up to 50% as compared to non-inverter models	Vs.	Repeated ON/OFF resulting in wasteful consumption of electricity

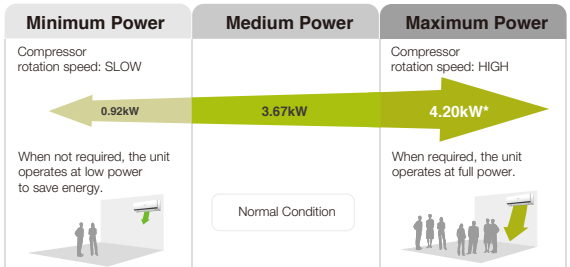
*Comparison of 1.5HP Inverter model and 1.5HP Non-Inverter model (Cooling)
Outside temperature: 35ºC/24ºC

■ **Electricity Consumption Comparison**



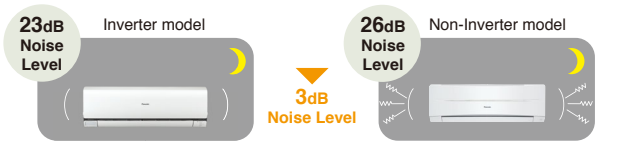
What other benefits does the inverter provide besides energy saving?

The output range is wide, and precise temperature control is possible.



Graph shows the 1.5HP Inverter model's wide power output range during cooling.
* CS-S13PKH

The inverter air conditioner eliminates discomfort, such as a poor cooling effect resulting from many people in the room and overcooling when there are a small number of people in the room.
The inverter air conditioner is quiet in operation so it does not disturb sleep.



* CS-S10PKH: In the Quiet mode during cooling operation with low fan speed.

* CS-PC9MKH: In the Quiet Mode during cooling operation with low fan speed.

Up to 50% Energy Savings
*Comparison of 1.5HP Inverter model and 1.5HP Non-Inverter model (Cooling)
Outside temperature: 35ºC/24ºC
Remote setting temperature: 25ºC with Fan speed (High)
Vertical Airflow direction: Auto, Horizontal Airflow direction: Front
Total power consumption amount are measured for 8 hours from starting.
At Panasonic Amenity Room (size:16.6m²)
This is the maximum energy savings value, and the effect differs according to conditions in installation and usage.

Sales Talks

For a large room

Low electricity bill. No overcooling or overheating that results in wasteful use of electricity.

For a room where people come and go

Minimum temperature fluctuations even if people frequently enter and leave the room.

For people who don't want to wait

Quick startup means no waiting time for the room temperature reach a comfortable level.

II

Which room will the customer install into?

For the living room, where family and friends gather

Energy-saving multi-function models are recommended.

Three recommendation points

Point 01 INVERTER

The cooling capacity is the key to lowering the electric bill.

High-power operation quickly cools or heats the room and provides better overall economy.

Point 02 nanoe-G

nanoe-G is the key to keeping the room clean.

It removes airborne bacteria and viruses to clean the air and keep the room comfortable.

*These effects are the results of tests and evaluations under certain test conditions. They may vary in actual usage. For test details, please see page 17.

Point 03 ECONAVI

Auto airflow is the key to making the room more comfortable

ECONAVI's human activity sensor finds out where people are and automatically controls the airflow direction.

For the bedroom, where relaxing time is spent

Quiet models that provide high-quality sleep are recommended.

Three recommendation points

Point 01

INVERTER

Quiet operation is the key to peaceful sleeping.

Inverter models are quiet and energy saving.

Point 02

ECONAVI

ECONAVI is the key to relaxing sleep.

The room is not overly cooled at sleeping time.

Point 03

nanoe-G

nanoe-G is the key to keeping the room clean.

It removes airborne bacteria, and deactivates bacteria and viruses adhering to linen.

*These effects are the results of tests and evaluations under certain test conditions. They may vary in actual usage. For test details, please see page 17.

For multipurpose private rooms used for work and entertainment

The advanced ECONAVI, nanoe-G and inverter features keep the room comfortable and clean.

Three recommendation points

Point 01

INVERTER

The inverter keeps the room quiet.

Inverter models are so quiet they do not disturb your work or study.

Point 02

nanoe-G

nanoe-G keeps the room environment cleam.

Nanoe-G removes bacteria and viruses that are floating in the air, and deactivates micro-organisms that adhere to places like doorknobs and furniture. It also keeps the room air clean by deactivating bacteria and viruses that are trapped in the air conditioner's filter.

*These effects are the results of tests and evaluations under certain test conditions. They may vary in actual usage. For test details, please see page 17.

Point 03

ECONAVI

ECONAVI prevents wasteful operation.

Operating power is automatically lowered when nobody is in the room.

How to determine the appropriate air conditioner capacity to match the room

The output range is wide, and precise temperature control is possible.

First, check the following:

- **Room size** (volume)
- **Room shape** (oblong, wide, two connected rooms)
- **Room conditions** (entry of sunlight, equipment used)

In addition to the room size, the amount of sunlight that enters the room, the presence/absence of windows, and other factors must be taken into consideration when determining the appropriate capacity.

Air Conditioner Capacity Quick Reference Chart

HP	m^2
0.5 HP	
1 HP	
1.5 HP	
1.75 HP	
2 HP	
2.5 HP	

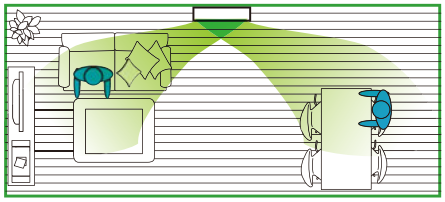
- The above quick reference chart should be used only as a guide.
- The required capacity also varies depending on the room environment and structure.

Conditions that make it better to recommend models with a capacity rating of one class above.

Wide room

In cooling and heating

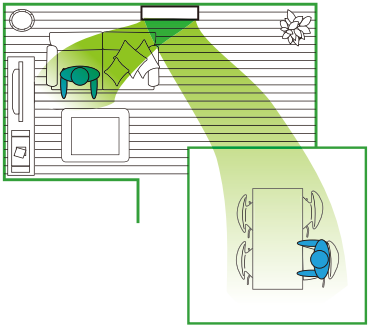
The key point is to select a model that can send air over a wide area, such as a model with individually operating right and left louver blades.



Two connected rooms

In cooling and heating

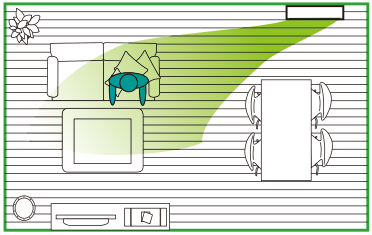
A model with a higher capacity can provide comfort in both rooms.



Room with a side wall (corner wall)

In cooling and heating

Some models are equipped with a sensor to detect walls and direct air toward people, and some models can be set to constantly send air toward the center of the room.

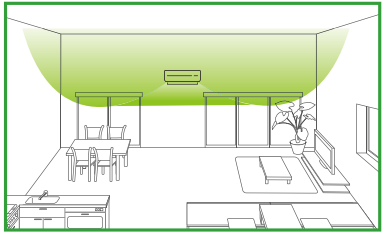


Room with a high ceiling

In cooling and heating

The air conditioner capacity is selected based on the room volume. In the case of a room with a high ceiling, warm air rises so a higher-capacity model is required.

* Recommend a model that warms the leg area first in heating operation.

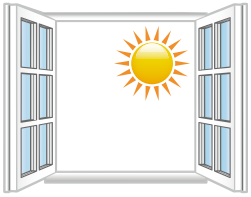


For what kind of room/house structure should higher-capacity models be recommended?

Sunlight receiving condition

Rooms facing south, or with entry of late afternoon sunlight into the room

Require higher cooling power.



Rooms facing north, or with sunlight blocked by buildings

Require higher heating power.

Top floor of multi-unit residential building

There is a tendency for the temperature to remain high due to the proximity to the roof

Requires higher cooling power.

"Bottom floor" for India only
There is a tendency for heat to remain due to the proximity to the ground

Room with large windows

Since large windows dissipate heat quickly, higher capacity is required.

Requires higher cooling power.

Room with large TV and PCs

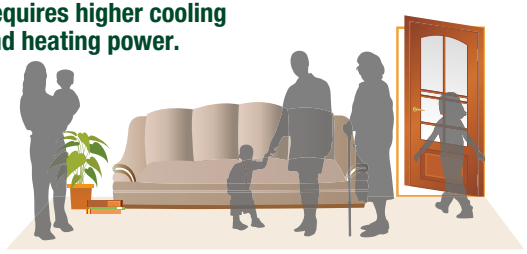
Heat generated by electric products

Requires higher cooling power.

Room where people enter and leave frequently

Temperature fluctuations caused by repeated opening and closing of the door

Requires higher cooling and heating power.



Approach for customers who are reluctant to select higher-capacity models

The way how they think...

- They think small-capacity air conditioners keep electricity bills low.
- They think small-capacity air conditioners are sufficient because they want to avoid overcooling.
- They think small-capacity air conditioners will make the room sufficiently cool, given enough time.
- They prefer models with lower price tags.
- They think the inverter and ECONAVI are luxury features.

Customers tend to select air conditioners based on the room size, but the room size should be considered only as a guide.

Explain to customers that in many cases, a model with a capacity rating of one class above provides enhanced comfort, operates more efficiently and saves energy.

Customers are likely to select models with minimum required capacity (barely enough for the room).

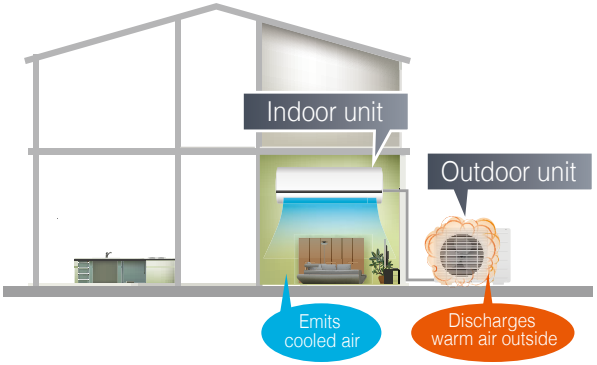
III

Basic
Air Conditioner
Knowledge

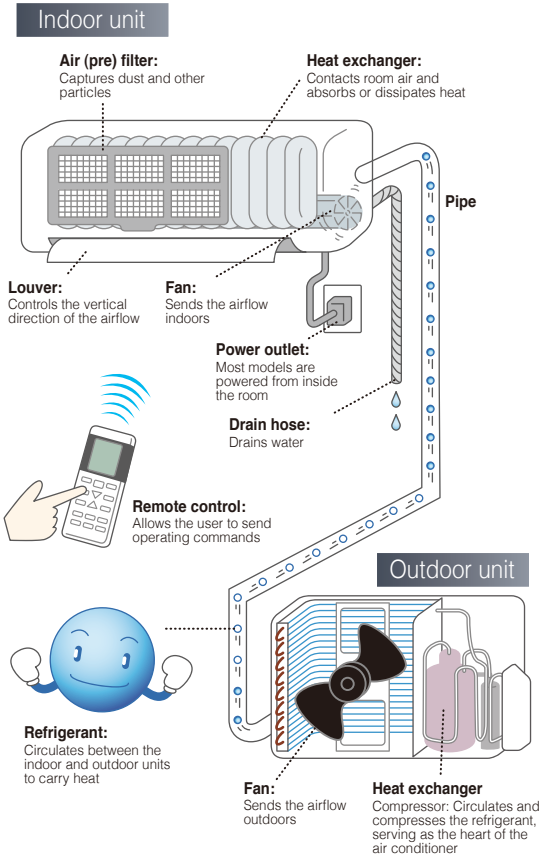
Q How does an air conditioner cool the room?

A It cools the room air by exchanging heat between the indoor and outdoor units.

The indoor and outdoor units of an air conditioner are connected by a pipe that contains a refrigerant. The refrigerant exchanges heat by changing to a gas or liquid depending on the temperature. When cooling, it lowers the room temperature by carrying the heat from the room air outside.



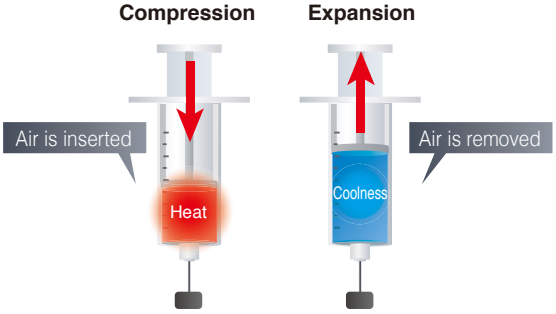
Basic Sturucture of Air Conditioner (Split-type)



Q How is heat transferred from one place to another?

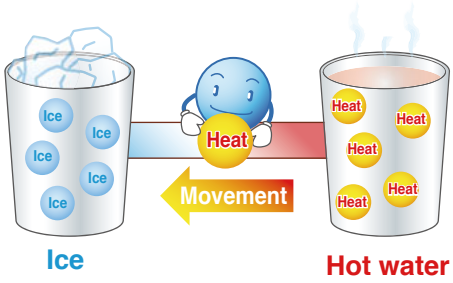
A It cools the room air by exchanging heat between the indoor and outdoor units.

When a gas is compressed, its temperature rises. When it is expanded, its temperature drops. The refrigerant that has carried heat from the indoor unit to the outdoor unit is pressurised to make it warmer than the outside air. Because heat naturally moves from a warm place to a cool place, it moves outdoors and releases its heat.



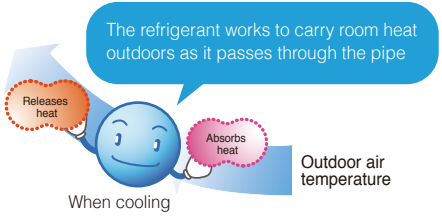
How does heat move?

Heat naturally moves from a warm place to a cool place.



The refrigerant is the "heat carrier."

The boiling point (evaporation temperature) of the refrigerant used in an air conditioner is extremely low. It is minus 51.4 degrees for the new HFC (R410A) refrigerant presently being used. This maintains the characteristic of capturing heat from the outside air even when it is cold outdoors.



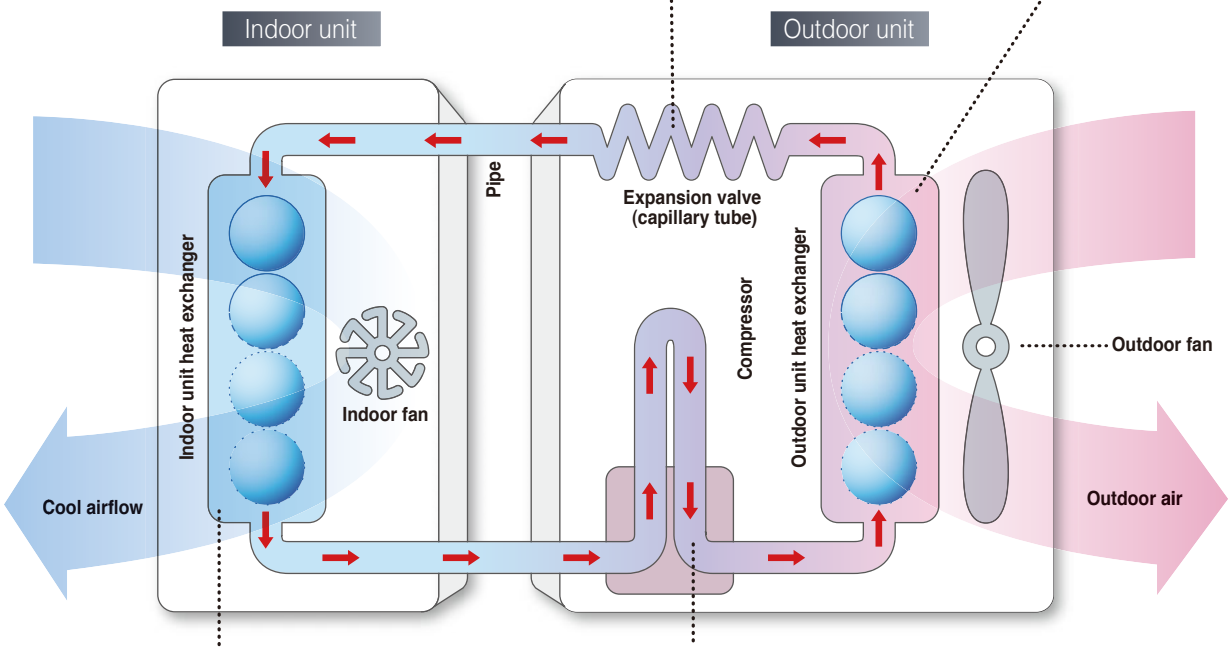
More detail!

How the Heat Transfers Between Indoor and Outdoor Units

When cooling

2 By passing through the long narrow pipe, the refrigerant becomes low in temperature and low in pressure.

1 The high-temperature refrigerant releases heat. This changes it into a high-pressure liquid.



3 The refrigerant captures heat from the surrounding air and changes into a gas.

4 The refrigerant is compressed and again becomes a high-pressure gas. Its heat also rises.

The System of Model Numbers For Spllt Models

❶ Model Type
CS : Split Type(Indoor Unit)
CU : Split Type (Outdoor Unit)
CW : Window Type
CZ : Accessories

❷ Connection Configuration
<Indoor Unit>
W:Multi Split
<Outdoor Unit>
n: (n) Rooms Multi

❸ Function
S : Cooling On(Inverter Deluxe)
C : Cooling Only
PC :Cooling Only (Standard)

❹ Capacity
Value = Capacity (Btu/h) x 1/1000,
e.g. 9,000 Btu/h x 1/1000=9

❺ Type
K : Wall-Mountable Type
T : Floor or Ceiling
Dual Mountdble Type
F : Floor standing Type

CS	—		C	9	P	K	Z	W
❶			❸	❹		❺		❷
CU	—	2	C	18	K	K	H	
❶		❷	❸	❹		❺		

Rating Conditions

	Cooling
Inside air temperature	27ºC DB(19ºC WB)
Outside air temperature	35ºC DB(24ºC WB)

IV

Glossary

Air purging

When work has been done on the air conditioner, some air and moisture remains inside the piping and in the interior of the indoor unit. The step of removing this air and moisture is called air purging.

Chlorofluorocarbon gas (refrigerant)

This is the gas that flows inside the air conditioner and through the pipes, changing back and forth from a gas to a liquid to cool the room.

Compressor

This is the heart of the air conditioner. It compresses the chlorofluorocarbon refrigerant to change it from a gas to a liquid.

Drain hose

This hose is used to discharge the water that collects in the drain pan.

Drain pan

When the heat exchanger in the indoor unit cools down, water drops adhere to it and run off. The drain pan serves to catch this water.

Capitally tube expansion valve

This valve changes the refrigerant from a high-temperature, high-pressure liquid into a low-temperature, low-pressure liquid for easier evaporation.

Flaring

The ends of the copper pipes that connect to the pipes of the indoor or outdoor unit are widened, similar to the shape of a bugle, to make the connection airtight and prevent gas leaks.

Four-way valve

In order to achieve cooling in the summer and heating in the winter, the gas flow is changed in summer and winter. The component that changes the gas flow is call a four-way valve. Air conditioners that are used only for cooling are not equipped with this valve.

Heat exchanger (indoor)

This is the set of aluminium fins that can be seen under the air filter of the indoor unit. The chlorofluorocarbon gas evaporates inside this unit to cool the aluminium fins.

Heat exchanger (outdoor)

This is a set of aluminium fins in the outdoor unit. Chlorofluorocarbon refrigerant that has been compressed by the compressor to become a high-temperature gas is passed through here, and cooled by the outdoor unit fan.

Height difference

This refers to the difference in height between the indoor and outdoor units when installed.

Installation Panel

This panel is used to fix the indoor unit of the air conditioner to the wall.

Inverter

Because the capacity of a conventional (fixed speed) air conditioner is constant, it controls the room temperature by simply turning itself on and off. The inverter is capable of changing the capacity in response to the load, i.e., the temperature, so it is able to start up fast and control the temperature more finely.

Liquid pipe, gas pipe

Pipes come as a set: large-diameter and small-diameter. When cooling, the chlorofluorocarbon refrigerant flowing through the small-diameter pipe becomes a liquid, so this pipe is called a liquid pipe (high pressure). The refrigerant that has evaporated indoors to become a gas flows through the large-diameter pipe, so this pipe is called a gas pipe (low pressure).

Open piping

This is a common installation method where a hole for the pipes is made directly in an outside wall, and the pipe is exposed. Materials such as tape and decorative covers are also available to improve the appearance and prevent pipe deterioration.

Outdoor fan

As the chlorofluorocarbon gas that has been heated by the compressor flows through the heat exchanger, the outdoor fan sends outdoor air to release the heat.

Pipe length

This is the distance between the installed indoor and outdoor units. The longer the distance, the more freedom there is for positioning the outdoor unit.

Piping

This is copper piping for connecting the indoor and outdoor units. Chlorofluorocarbon gas flows through the pipes when the air conditioner is operating. Insulation is used to protect them from condensation during cooling.

Pump down

This is an operating method used when removing the air conditioner. It recovers chlorofluorocarbon gas from the indoor unit and pipes, and stores it in the outdoor unit.

R410A

This is a type of chlorofluorocarbon gas that manufacturers have begun using instead of R-22. It doesn't deplete the ozone layer, but it is a special refrigerant oil with high moisture absorbency. It generates impurities when mixed with moisture or other oils, so the removal of impurities from inside the pipes is more important than with conventional refrigerants. It also operates at a higher pressure, and is a mixture of two gases: R32 and R125.

Sleeve

This is a plastic tube that is inserted into a hole in the wall for pipes to pass through. It prevents the air inside the wall from flowing to the back surface of the air conditioner.

Vacuum pump

This pump is used to remove the air and moisture inside the pipes when conducting air purging.

Memo