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HITACHI TECHNOLOGY

Digital Media & Consumer Products

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Triple-power Induction Cooktop with Double All-metal Compatibility for Ease-of-use in Kitchens

Household induction cooktops are becoming more widespread because of their ease-of-use and safety. Drawing on its diverse technical capabilities, Hitachi has developed the double all-metal compatible triple-power induction cooktops. The new models use a newly developed circuit design and cooling mechanism as well as the optical and four temperature sensors feature for a safer and more convenient kitchen.

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Ultimate Induction Cooktop for All Types of Cookware

The demand for induction cooktops (induction hobs) has grown as all-electric houses have become more common. This is likely due to the advantages of induction cooking being well received by users. These include high heat output, flameless cooking which makes induction cookers safer than gas, and the convenience of being able to wipe away spills easily should a pot boil over. A disadvantage, however, is many induction cooktops can only be used with iron and stainless steel but with copper or aluminum, meaning the types of compatible cookware are limited.

Now, the newly developed triple-power induction cooktop with double all-metal compatibility has overcome this problem, presenting itself as the ultimate induction cooktop for all types of cookware. The flagship model has all-metal induction elements on the left and right heaters and a standard induction element in the center. Other major features of this series include less smoke generation than previous models, a silent design for a quiet kitchen, more fine-grained temperature and heat control, and functions for keeping food tasty.

Diverse Technologies Combined to Achieve Smaller Circuit Board and New Functions

We called upon our diverse skills to develop the triple-power induction cooktop with double all-metal compatibility. Because induction cooktops must satisfy standard specifications, the various components including the power supply circuit board, induction cooker circuit board, and cooling system must be housed within the limited space available. To this end, Hitachi Research Laboratory developed a proprietary high-efficiency hybrid power circuit called the "BBFB (buck boost full bridge)" to reduce heat generation by components while also achieving the required heating with less current. As a result, the size of the induction cooker circuit board was reduced to about one third that of the first generation model.

The cooling system developed by the Mechanical Engineering Research Laboratory combines an "S-curve turbo fan" designed using analysis-based techniques with "multi-hole jet cooling" to achieve highly efficient cooling with a noise level of only around 48 dB even for aluminum and copper cookware. The new cooktop was produced by integrating these together in a high-density configuration. In other words, the new cooktop was made possible by bringing together a range of technologies we have.

A new function incorporated into the cooktops is the industry-first optical and four temperature sensors feature whereby a sensitive new thermopile optical (infrared) sensor is added to the four existing temperature sensors. In addition to making the heating up time shorter, this feature provides a "suitable temperature sign" for gourmet cooking that can be used to maintain pot temperature in recipes where heat control is difficult. Instead of trusting to experience to keep the heat just right, the cook can achieve excellent results by leaving everything under the control of the cooktop.

Environmental Awareness Combined with Safety and Ease-of-use

Our plans for the future include further miniaturization of internal components to make room for new features while maintaining our emphasis on silent design. Our induction cooktops work by heating the cookware only without making the top plate hot. We call this "pure induction heating" and one of our aims is to improve the safety inherent in induction cooking even further. Other measures include the use of lead-free soldering for electronic circuit boards and electroplated steel sheets and screws that do not contain hexavalent chromium.

The pursuit of ease-of-use and safety combined with consideration for the environment will remain the themes behind our product manufacturing.

Portal Site for Network Television

Hitachi has developed a portal site for controlling its Internet-ready televisions and accessing on-line services. The system provides a GUI (graphical user interface) optimized for navigating the viewer using the television remote control.

[Outline]

The initial screen appears when a user presses the "Net" button on their remote control. The top screen shows a calendar on the left and a service menu on the right.

The calendar is overlaid with the weather forecast for the coming week. Because the calendar and weather forecast are things that everyone needs often in their daily lives, it is hoped that making this information available will encourage users to access the portal site daily.

The service menus on the right list services provided by the portal site and other companies that are linked to the portal site. Both menus are assigned to channel buttons on the remote control and users can select a service in the same way as selecting a television channel.

[Major services] (As of March, 2009)

(1) acTVila*

This service provides information and powerful high-definition video via broadband.

acTVila's video menu allows users to download videos to the HDD (hard disk drive). Users can also copy videos to a removable HDD unit called the iVDR-S (information versatile disk for removable usage–secure).

(2) DoTV*

This service lets users use their television to browse information useful for daily life such as news and weather, and also includes simple and convenient online shopping and Internet search services.

(3) Video mail

This service enables users to send movies or pictures from networked PCs (personal computers) or mobile phones to Hitachi Internet-ready televisions. Once sent to the televisions, the movies and pictures can be viewed easily.

[Video mail overview]

The following section describes a newly developed video mail service provided on the portal site that is unique to Hitachi. The video mail service allows its users to upload video movie files or digital photographs from a PC to the server and distributes these to a designated television. The main scenario envisaged for the service during development was to provide a way of sending video captured on a video camera to family members living elsewhere so they could view it on their own television.

The video mail service has the following features.

(a) Distribution to a designated television set
(b) Distribution of high-definition video
(c) Simple user interface
(d) Allowance for security

Through these features, video mail aims to provide a simple, safe, and secure service that is representative of the Hitachi approach.

(4) Hitachi product offers

This provides introductory information about Hitachi home appliances.

The offer information includes details of current AV (audio-visual) products and mobile phones.

(Hitachi Consumer Electronics Co., Ltd.)

* See "Trademarks" on page 87.

Portal site top screen

FPD Lineup with Hitachi Advanced Technology

(1) UT series of high-definition LCD (liquid crystal display) TVs (televisions) with flexible installation
The new series of FPD (flat panel display) TVs (8 models*1) went on sale in Japan in May 2009. The new series offers flexible installation options including mounting on a TV cart or wall-mounting in a way that creates a sense of unity between the wall and TV, something difficult with conventional large-screen TVs. This is possible by the wide range of options (sold separately) for these lightweight FPD TVs.
(2) High-definition LCD and plasma TVs
The specially-designed high-quality/high-definition LCD TVs and high-resolution PDP (plasma display panel) TVs*2 went on sale in Japan in April and May 2009 respectively. The high image quality of the LCD screens provides excellent viewing from any angle.
[Key features]
(1) All models in the new series feature an internal 250-Gbyte HDD (hard disk drive) recorder with Hitachi's original XCodeHD*3 technology for long-duration high-definition video recording (8 times longer than conventional recording length). The TVs also incorporate an iVDR slot for plugging in an iVDR-S*4 (information versatile disk for removable usage–secure) removable HDD (sold separately). This extends the available recording time, and because the removable HDD can be plugged in as required, a family can share a number of iVDR-S units.
(2) All models offer the acTVila video-full and IP (Internet protocol) video download services along with DLNA (digital living network alliance) support for building a home networking environment.
(3) All models in the series have the intelligent automatic high-definition feature. This feature automatically detects the brightness and lighting color in the room and optimizes the display definition taking the scene and program category into account. This optimization of the image quality also acts to reduce unnecessary power consumption.
(Hitachi Consumer Electronics Co., Ltd.)

*1 UT800 series; 8 models [UT47XP800 (B/W), UT42XP800 (B/W), UT37XP800 (B/W), and UT32XP800 (B/W)], B: crystal black, W: white musk
*2 LCD TV 03 series; 3 models [L42XP03, L37XP03, and L32WP03], plasma TV 03 series; 4 models [P50XP03, P46XP03, P42XP03, and P42HP03]
*3 XCodeHD is an HD transcode/translate technology developed by ViXS Systems Inc.
*4 See "Trademarks" on page 87.

FPD lineup

Hitachi's Brightest Projector "CP-X10000"

The CP-X10000 was released in November 2008. The new model has the highest brightness of any model in the Hitachi range.
(1) The CP-X10000 produces 7500 lm from a low-wattage 350-W lamp, making it 18% more efficient than the current CP-X809 model (rated at 5,000 lm).
(2) The projector uses a three-LCD (liquid crystal display) panel system and digital processing of the video signal uses 10-bit resolution from input to output, allowing smooth and natural gradations with 1,024 shades of each color (red, green, and blue). Picture quality is further enhanced by an on-board high performance chip and a high contrast of 2,500:1* is achieved using an iris.
(3) The projector can be adapted to suit the space available with six optional lenses able to support projection onto a 100-inch screen from any distance between 1.0 and 18.8 m. In a spacious area such as an auditorium or convention hall, the projector is capable of projecting image sizes up to 700 inches (about 17.8 m).
(4) Lens shift technology allows the image projection area to be moved over a wide range and the CP-X10000 can cover a total range of 2.7 screen areas vertically and 2.2 screen areas horizontally. This wider projection area coverage means that you can place a projector on the second floor to prevent audience shadows from the first floor blocking the screen. In auditoriums and convention halls with stationary screens, this gives the user the freedom to locate the projector wherever is most convenient.
(5) The projector has a lens memory function that can store up to three lens shift settings. When the projector is used at a location for which a lens shift setting has previously been stored in memory, this previous setting can simply be called up, saving the user from having to adjust the position again. This is done by selecting the stored setting from the OSD (on-screen display) menu screen where the settings are labeled LOAD 1, 2, and 3.
(6) Network functions allow management and control of multiple projectors. The projector can be used to control, diagnose and manage a single projector or group of projectors. Similarly, the MY IMAGE function can transfer images over a LAN (local area network) to individual or multiple projectors. This function stores the images in the projector's memory from which they can be displayed when required. The MY IMAGE function can be invoked locally using the projector's remote control or remotely over the LAN. E-mail notification is sent for routine maintenance and error conditions to registered e-mail addresses. A scheduling function is available to schedule routine and one-off projector events, including power on, power off, MY IMAGE display, and other settings.
(Hitachi Consumer Electronics Co., Ltd.)

* When using the standard SD-804 lens.

CP-X10000 projector

Vacuum Compartment Refrigerator for Keeping Food Nutritious and Fresh

Hitachi Appliances, Inc. has released the vacuum compartment refrigerator. The new refrigerator is part of the vacuum compartment range on sale since 2007 and incorporates an antioxidant vitamin delivery feature in the vacuum compartment to help preserve food for maintaining its nutritional value longer.

[Key features]

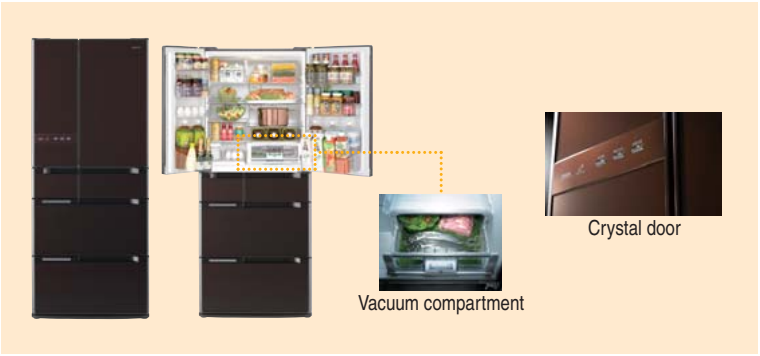
(1) The ability of the refrigerator's vacuum compartment to preserve food has proved very popular and has been further enhanced in the new model. Maintaining a vacuum inside the compartment and injecting antioxidant vitamins from a newly-developed vitamin cassette dramatically inhibits oxidation of the stored food and keep its nutritious value.

(2) An 18% reduction in power consumption compared to conventional models has been achieved by the adoption of the flexible vacuum insulator which can be three-dimensionally formed with deep bends and provides good thermal insulation.

(3) The refrigerators feature a crystal door that uses tempered glass for the outer surface of the door to help blend in with the room decor. The door uses tempered glass that is resistant to scratches and dents to protect the gloss finish and make it last longer.

(4) A new mechanism, storage with easy access and full of ideas, is used to ensure that every corner of the large interior of the refrigerator can be put to use. Other mechanisms that improve usability and storage space utilization include retractable shelf which allows the top shelf to be lowered for ease-of-access and drawer-type pull-out shelf that gives easy access even to food at the back of the shelf.

(Hitachi Appliances, Inc.)



Vacuum compartment refrigerator for keeping food nutritious and fresh

Drum-type Washer/Dryer Achieving High Performance and Finish with Unique Technology

A drum-type washer/dryer uses a drying method, heat recycling dry, to make maximum use of the available heat energy.

[Key features]

(1) A newly developed power saving technology has been employed to make the most of the available heat energy by reusing waste heat generated during operation. The heat from the drive motor is used to increase the drum temperature and warm the clothes. Air that accumulates at the top of the washer/dryer is heated by the waste heat from the motor and heater and then is drawn into the drum to be reused when drying the clothes. This reduces power consumption by about 80%*1.

(2) The models with big 61-cm-diameter drums can take a larger laundry load than any other washer/dryer on the market (10 kg*2) and the air dries clothes and smoothes wrinkles by blowing in air at 360 km/h. For loads up to 3 kg, the air iron can produce clothes that are ready to wear without any further ironing.

(3) The washer/dryers are more water-efficient than any similar products on the market*3. This is achieved through a water-saving technology that recirculates the detergent liquid, a shower (sprinkler) function that gets the liquid to penetrate into the clothes, and an efficient washing method with a powerful action that beats the clothes clean by deeply dropping them inside the wide drum.

(4) The superior energy-efficiency of the washer/dryer has been recognized by their being awarded the 2008 "Minister's Prize, the Ministry of Economy, Trade and Industry in Energy Conservation Grand Prize."

(Hitachi Appliances, Inc.)

*1 NW-D8AX, 2001 model, 2 times running (4.5 kg + 1.5 kg), compared to the standard course.

*2 As of October 12, 2008, for home washer/dryers.

*3 As of October 12, 2008, for home washer/dryers (a class with a 9-kg washing load and 6-kg drying load). Standard water use is 74 L for a 9-kg washing load. Standard water use is about 58 L for a 6-kg washing and drying load. BD-V2100.

Drum-type washer/dryer

Hitachi Eco Cute Premium Type

Hitachi Appliances, Inc. has released a premium model in its Eco Cute range of boilers. The new boiler can supply powerful hot water to two locations without losing water pressure at once (bath and shower, for example), uses Hitachi's unique direct water pressure technology to supply hot water, and has top-class energy-efficiency at boiler on the Japanese market*1.

[Key features]

(1) The new model is the first heat pump or hot water storage system to adopt Hitachi's unique high-performance vacuum insulator*1 which makes significant savings on energy use by minimizing heat loss.

(2) Hitachi has improved heat pump performance to achieve greater efficiency during the winter*2 when hot water use tends to be greater.

(3) The APF (annual performance factor of hot water supply*3) ratings for the boilers are 3.6 for the 370 L model and 3.5 for the 460 L. This means that the boilers have better energy-efficiency than previous model*4 on the market and represents CO_2 emissions savings*5 of about 14%*6 and 11%*7 respectively.

(Hitachi Appliances, Inc.)

*1 As of June 1st, 2009, for home heat pump boilers.

*2 Operating conditions: 7°C/6°C external temperature (dry-bulb temperature/wet-bulb temperature), 9°C water temperature, and 65°C boiling temperature.

*3 The APF represents the performance of a hot water supply in terms of the annual heat quantity per unit power consumption under constant conditions which are based on consideration of actual consumer use. The APF standard is based on the JRA4050: 2007R regulation of the Japan Refrigeration and Air Conditioning Industry Association.

*4 Hitachi's previous BHP-FS37ED and BHP-FS46ED models (on sale from 2007)

*5 As estimated by Hitachi using a CO_2 conversion rate (for fiscal year 2006) of 0.410 kg-CO_2/kWh (source: "Environmental Action Plan by the Japanese Electric Utility Industry 2007" published by The Federation of Electric Power Companies of Japan).

*6 BHP-FS37ED (on sale from 2007): about 627 kg, BHP-FSV37FD (on sale from 2008): about 541 kg

*7 BHP-FS46ED (on sale from 2007): about 627 kg, BHP-FSV46FD (on sale from 2008): about 556 kg

Hitachi Eco Cute premium type heat pump unit and thin tank

Premium Clean Series of Vacuum Cleaners with Very Clean Exhaust and Low Operating Noise

Hitachi Appliances, Inc. has developed a series of vacuum cleaners that utilize advanced dust capture technologies to capture 99.999%*1 of dust, giving them one of the cleanest exhausts of any vacuum cleaner on the market. The most important of these technologies is the plasma ULPA (ultra low penetration air) construction technique developed by Hitachi which can operate using either a paper bag filter or cyclonic separation. The vacuum cleaners also feature a newly-developed proprietary low-noise design that gives them a low operating noise of only 49 dB.

In addition to audio prompts, compact storage, and convenient attachments, the cyclonic separation model uses a new cyclonic separation method which ensures that the vacuum cleaner can perform its intended function and maintain strong suction right up until it needs to be emptied of dust.

Another feature is the automatically controlled head which reduces power consumption by up to 75%*2.

(Hitachi Appliances, Inc.)

Paper bag type vacuum cleaner (left) and cyclonic vacuum cleaner (right)

*1 Testing agency: Sumika Chemical Analysis Service, Ltd., Test item: particle measurement, Test method: measurement of dust level for particles larger than 0.3 μm

*2 Comparison of the automatic mode and high power mode. The test used Hitachi's specimen dust and compared power consumption after 6 minutes of vacuuming.

Moisture with Mist, Stainless-clean "SHIROKUMA-KUN" Room Air Conditioner

Hitachi Appliances, Inc. has released a room air conditioner called Moisture with Mist, Stainless-clean "SHIROKUMA-KUN" which combines both compact size and excellent energy-efficiency. The room air conditioner has a stainless-clean feature which improves its internal cleanliness and an ion mist diffuser which sterilizes*1 and deodorizes*2 the room air to help keep users' skin and hair beautiful.

[Key features]

(1) The indoor unit is very compact with a width of only 798 mm and has a very high APF (annual performance factor) that is 6.0. This is equivalent to an annual reduction in CO_2 (carbon dioxide) emissions of 182 kg*3.

(2) Eco-sensor (a monitoring sensor used to improve economy of operation) detects the position of any human activity in the room and can reduce energy consumption for cooling by up to 35%*4 using the "Eco" operation mode that automatically controls the room temperature and a "Following Blower" function that automatically controls the wind direction.

(3) Stainless steel is used for the indoor filters made by sputtering, air ducts, and louvers. Also, a sterilizing and deodorizing coating are applied to the fan and heat exchanger to ensure that all parts of the indoor unit are kept sterile*5.

(4) The ion mist feature sterilizes and deodorizes the room using a deodorant with rapid penetration to help keep the room clean and keep users' skin and hair beautiful.

(Hitachi Appliances, Inc.)

Moisture with mist, stainless-clean "SHIROKUMA-KUN" room air conditioner (RAS-S40Y2)

*1 Sterilization of suspended viruses, sterilization of suspended bacteria, and sterilization of suspended fungi. The level of sterilization is about 99.99%.

*2 Measured based on a standard specified by the Japan Electrical Manufacturers' Association (removal performance of tobacco odor in a 1-m^3 box).

*3 As estimated by Hitachi based on a comparison between a Hitachi RAS-4010JX2 model made 11 years ago and the new RAS-S40Y2 model and using a CO_2 conversion rate (for fiscal year 2006) of 0.410 kg-CO_2/kWh (source: "Environmental Action Plan by the Japanese Electric Utility Industry 2007" published by The Federation of Electric Power Companies of Japan).

*4 Total power consumption per hour during stable operation. Based on the difference between power consumption of 172 Wh when using the "Eco" and "Following Blower" features and 265 Wh when "Eco" mode is not used. These figures are based on Hitachi's original condition.

*5 Tested in accordance with the JIS Z 2801 quantitative test procedure (closed film method). About 99.99% of viruses, bacteria, and fungi are eliminated.

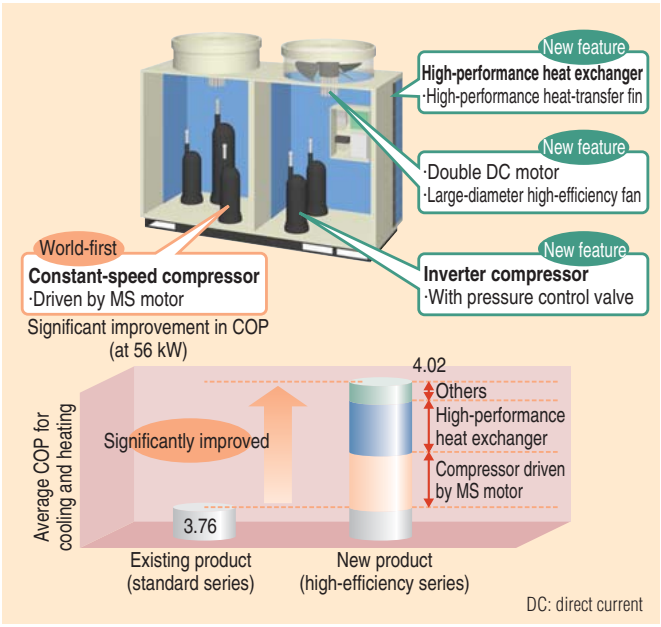
Cooling-heating Switchable Series (High-efficiency Type) of Multi-split Air Conditioning System for Buildings

The cooling-heating switchable series (high-efficiency type) of multi-split air conditioning system for buildings that connect multiple indoor units are available in 21 different models ranging from 22.4 to 135 kW. The series have an industry leading level of energy efficiency with an average COP (coefficient of performance) rating for cooling and heating of 4.0 or more.

Air conditioning systems require a compressor to circulate the refrigerant and the new series features a constant-speed compressor that is the first such system in an air conditioner to be driven by an MS motor (self-starting magnetic synchronous motor) and an inverter compressor with a pressure control valve driven by a high-efficiency inverter. Moreover, by using state-of-the-art technologies, including a heat exchanger with a high-performance heat-transfer fin structure and a fan system with a large-diameter high-efficiency fan, the 56-kW model reduces annual power consumption by approximately 40% compared with models from 15 years ago (as calculated by Hitachi Appliances, Inc.). This corresponds to an annual reduction of approximately 3,000 kg of CO_2 (carbon dioxide) emissions, which is equivalent to the annual absorption by approximately 0.9 ha of forest (as calculated by Hitachi Appliances, Inc.).

The main unit is housed in an integrated enclosure in all models. This requires less installation work because it reduces the number of steps to be carried out when delivering a unit to a site and lightens the workload associated with piping and cabling between outdoor units. The design also allows an active filter to be incorporated in the main unit as an excellent harmonic control measure.

(Hitachi Appliances, Inc.)



Technology for increasing efficiency of variable refrigerant flow systems