

# Press Release

September 6, 2017

Johnson Controls-Hitachi Air Conditioning

Automatic Cleaning of Heat Exchanger through "Frost Wash" to Wash Away Dust and Mold Through Freezing and Rapid Melting Process

Hitachi Room Air Conditioner "Stainless Clean Shirokuma-kun" Premium X Series has launched



RAS-X40H2 Star White (W)



\*The remote control is shown at a relatively larger size in comparison to the indoor unit

In the end of October, Johnson Controls-Hitachi Air Conditioning (CEO: Franz Cerwinka) will release eleven models of the "Stainless Clean Shirokuma-kun" Premium X Series air conditioning system, which are the first-ever units in Japan <sup>(\*)</sup> equipped with "Frost Wash" technology for automatically cleaning the heat exchanger inside the unit by washing away the dirt, mold and grease that adheres to the exchanger, causing odors, by automatically freezing the exchanger and then rapidly melting the frozen layer which is formed.

The new "Frost Wash" technology for automatically cleaning the heat exchanger regularly performs cleaning of the exchanger <sup>(\*)</sup>, which is difficult to clean by hand, throughout the year, ensuring that the inside of the unit remains clean, producing a hygienic breeze. This new mechanism cleans even stubborn grease that could not be washed away using the previous designs, in which the heat exchanger was covered with a coating <sup>(\*)</sup> which was then cleaned using the water condensing inside the unit when cooling or dehumidifying.

In addition, the units also make use of the Kurashi Camera AI technology <sup>(\*)</sup>, which can detect the room environment and the location of people in a room, in order to predict the degree of contamination inside the air conditioning unit and smartly control the cleaning frequency. The unit also executes the automatic cleaning procedure at times when no one is in the room.

The new series of air conditioners will continue to use the "Stainless Clean System" developed exclusively by Hitachi, which makes use of stainless steel in order to achieve anti-bacterial <sup>(\*5)</sup> benefits, while also incorporating a new stainless steel reservoir attached to the wastewater channels that collect the wastewater be used in the "Frost Wash" process as well as other wastewater.

When the unit is used for heating, at the start of operation, it begins by warming the feet of the people in the room, and once the room has warmed up, it switches to a "Wraparound Heating" mode that uses six flaps to guide the airflow from around the people in the room, so they can be warmed without feeling the breeze.

\*This technology does not remove 100% of all dirt, mold and other contamination.

(\*1) Data from a company survey. The models are scheduled for launch at the end of October 2017. "First in Japan" refers to the use of technology for freezing and then cleaning heat exchangers in the indoor units of domestic household air conditioners.

(\*2) Frost Wash may not operate under some environments.

(\*3) The coating is used on the company's previous X Series models launched (2016)

(\*4) AI is an abbreviation of Artificial Intelligence.

(\*5) The system does not disinfect the airflow from the unit.

For further details, see page 6 (\*5).

## ■ Characteristics of the New Product

### Room Air Conditioner "Stainless Clean Shirokuma-kun" Premium X Series

1. Incorporates "Frost Wash" technology for cleaning the heat exchanger through a process of freezing and then rapidly thawing to wash away dust and mold.
2. Uses the "Stainless Clean System" and "Stainless Reservoir" in order to keep the inside of the air conditioner clean and hygienic
3. Includes "Wraparound Heating" technology that prevents room occupants from feeling the breeze

■Models and launch dates

Model	Cooling capacity	Power supply	Suggested retail price	Planned release date	Initial monthly production
RAS-X22H	2.2 kW	Single phase 100V	No suggested retail price	End of October	30,000 units
RAS-X25H	2.5 kW				
RAS-X28H	2.8 kW				
RAS-X36H	3.6 kW				
RAS-X36H2	3.6 kW	Single phase 200V			
RAS-X40H2	4.0 kW				
RAS-X56H2	5.6 kW				
RAS-X63H2	6.3 kW				
RAS-X71H2	7.1 kW				
RAS-X80H2	8.0 kW				
RAS-X90H2	9.0 kW				

■Demand and background of development

According to our user surveys, there were complaints regarding contamination from dirt inside the air conditioning unit, particularly with regard to the heat exchanger, which is difficult to clean by hand. We are also aware that once the dust, grease and other contaminants, which may also cause odors, adhere to the heat exchanger, it compromises the performance of the air conditioner and results in inefficient spending of electricity.

To address these issues, the new air conditioners have been equipped with a "Frost Wash" function, which automatically cleans the heat exchanger by automatically freezing and then rapidly thawing the ice in order to wash away the dust, mold, grease and other contaminants that may adhere to the exchanger and cause smells. In addition, the units also make use of the Kurashi Camera AI technology, which can detect the room environment and the location of people in a room, in order to predict the degree of contamination inside the air conditioning unit and smartly control the cleaning frequency. The unit also executes the automatic cleaning procedure at times when no one is in the room.

■Customer inquiries

Customer Center

TEL: 0120-3121-11(toll free) \*When calling from mobile phones or PHS, call 050-3155-1111  
(toll applies)

Open: 9:00-17:30(Mon.-Sat.), 9:00-17:00 (Sun., public holidays)

\* Excluding year-end and New Year period

■Hitachi Room Air Conditioning system website

<http://kadenfan.hitachi.co.jp/ra/>

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Information in this press release (including information concerning product prices, product specifications, service details, launch dates, contact details, website addresses and other information) is correct at the time of publication. As this information may change without warning, please understand that the information in this release may not apply if the release is referred to at a later date.

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(Attached Documents)

■Details of Hitachi Room Air Conditioning system "Stainless Clean Shirokuma-kun" Premium X series

1. Incorporates "Frost Wash" technology for cleaning the heat exchanger through a process of freezing and then rapidly thawing to wash away dust and mold.

"Frost Wash", a process for automatically cleaning the heat exchanger inside the air conditioning unit (Figure 1), washes away the dust, mold, and grease that may cause odors when adhering to the heat exchanger by automatically freezing and then rapidly thawing the frost\*. This ensures that the inside of the unit remains clean, producing a hygienic breeze. It also helps to reduce the wasteful expenditure on excess electricity that results from the reduced capacity of the air conditioner occurring due to internal blockages and other reasons (\*1). In addition to this technology, these new products also make use of "Kurashi Camera AI" (\*2), a technology for detecting the condition of the room and the location of people, allowing the unit to predict the degree of dirt inside the air conditioning unit on the basis of the room's condition and intelligently control cleaning frequency accordingly. In addition, the unit schedules automatic cleaning when no one is in the room.

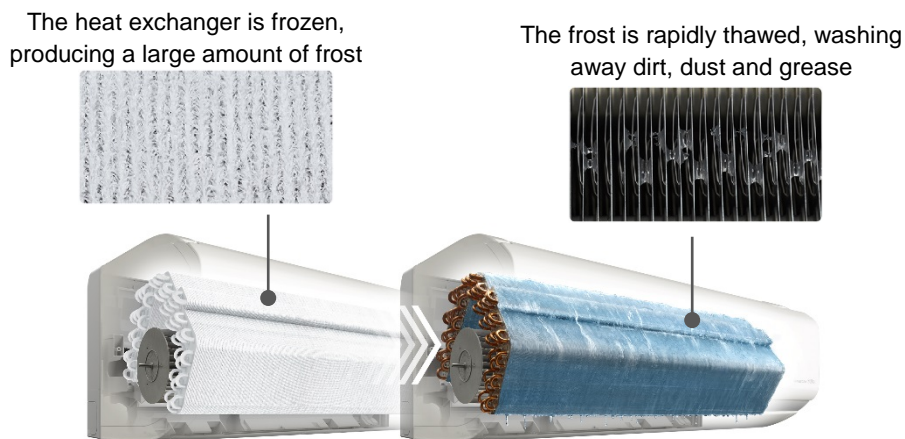


Fig.1 Schematic diagram showing "Frost Wash" (Conceptual diagram)

According to our user surveys, there were complaints regarding contamination from dirt inside the air conditioning unit, particularly with regard to the heat exchanger, which is difficult to clean by hand. We are also aware that once the dust, grease and other contaminants, which may also cause odors, adhere to the heat exchanger, it compromises the performance of the air conditioner and results in inefficient spending of electricity.

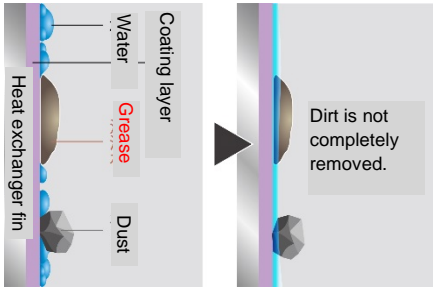


Fig. 2 Schematic diagram showing previous design of heat exchanger fins (Conceptual diagram)

Since 2006, our company has adopted the automatic filter cleaning and the "Stainless Clean System", which uses stainless steel for parts including the filter inside the unit, air passages, and flaps. Previous models have also used a special coating on heat exchanger fins <sup>(^3)</sup> (Figure 2). However, although dirt could be washed off the coated fins using condensed water produced during cooling and dehumidifying operations, it was not possible to wash away stubborn grease. Also, the function was not available throughout the year since heating does not produce water.

In addition, units installed in living rooms and dining rooms that are close to the kitchen, are known for their tendency to accumulate stubborn grease.

In other words, although the automatic filter cleaning was sufficient to remove dirt attached to the air conditioner's filter without much effort, it was insufficient for cleaning dirt attached to the heat exchanger. The "Frost Wash" technology for automatically cleaning heat exchangers incorporated in these new models regularly cleans the heat exchanger by first producing a large amount of frost around the exchanger when the unit is not in operation <sup>(^4)</sup>. This can be done regularly throughout the year. Following the rapid freezing process, the frost is then rapidly thawed, producing water that washes away the dust, mold and grease that may be the cause of odors. (Figure 3). This mechanism ensures that the inside of the air conditioner is kept clean and hygienic, producing refreshing, clean airflow.

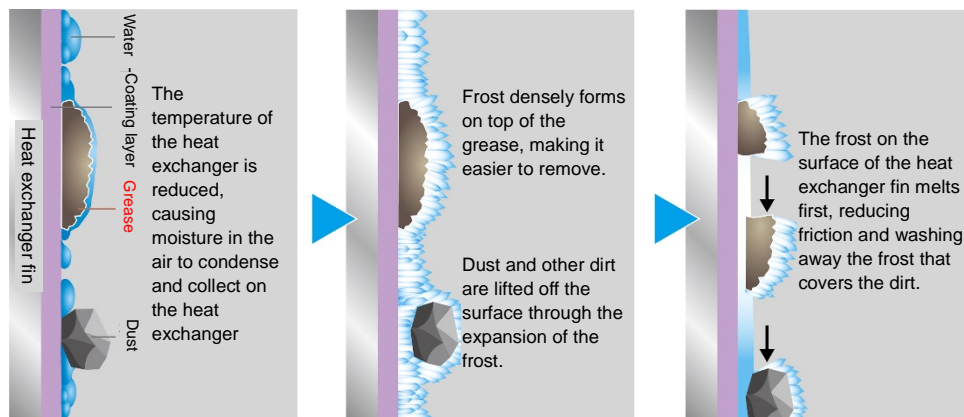


Fig. 3 Schematic diagram showing the "Frost Wash" mechanism (Conceptual diagram)

It also helps to reduce the wasteful expenditure on excess electricity that results from the reduced capacity of the air conditioner occurring due to internal blockages and other reasons. As the "Frost Wash" technology for automatically cleaning the heat exchanger can also be used when the unit is in heating mode, it is able to keep the inside of the air conditioner clean through all seasons.

These units also include Hitachi's proprietary Kurashi Camera AI technology, which is able to detect the situation of the room and apply that information to predict the accumulation of dirt inside the air conditioner, as this varies depending on the type of room and the occupant's lifestyle. The unit can then intelligently control cleaning frequency. When the grease inside the unit is particularly stubborn, the "Frost Wash" is repeated twice, thoroughly remove dirt. The unit also executes the automatic cleaning procedure at times when no one is in the room.

\*This technology does not remove 100% of all dirt, mold and other contamination.

(\*1) RAS-X40H2. This is based on operating conditions defined according to JIS. A comparison of usage over approximately five years showed that when performance with "Frost Wash" is defined as 100%, performance without "Frost Wash" is defined as 102%. This reduction will depend on the environment of the installed unit as well as usage conditions.

(\*2) AI is an abbreviation of Artificial Intelligence.

(\*3) The coating is used on the company's previous X Series models launched (2016)

(\*4) The system does not disinfect the airflow from the unit.

2. Uses the "Stainless Clean System" and "Stainless Reservoir" in order to keep the inside of the air conditioner clean and hygienic

The new products continue to use Hitachi's proprietary "Stainless Clean System", which makes use of stainless steel, a material with anti-bacterial <sup>(\*)5</sup> properties, four parts of the unit including the air passages and the flaps at the airflow outlet, ensuring that the inside of the unit, which is difficult to clean by hand, is kept clean and hygienic (Figure 4). Additionally, these new products also include a "Stainless Steel Reservoir" which has been attached to the wastewater channel in order to collect water that drains from the unit when it is used for cooling as well as the dirty water that has been washed out of the unit following the automatic "Frost Wash" process for cleaning the heat exchanger.

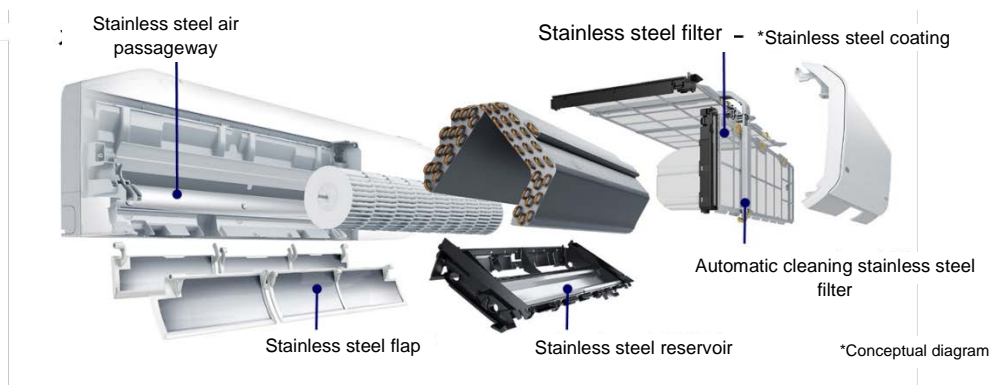


Fig. 4 The Stainless Clean System

(\*)5 the unit does not disinfect the airflow from the air conditioner.

Trial conducted by Boken Quality Evaluation Institute

Trial method: Based on JIS Z 2801 qualitative test (film adhesion method)

Scope: Removal of bacteria touching or collected on air passageways, flaps, fins, reservoir, fans, and heat exchanger.

3. Includes "Wraparound Heating" technology that prevents room occupants from feeling the breeze

The "Wraparound Heating" feature is combined with the AI Airflow technology so that when the unit starts operating in heating mode, the "Kurashi Camera AI" detects the feet of the room's occupants, directing the air flow towards the occupant to begin rapidly heating their feet. Once the room has warmed up, the six flaps (Figure 5) direct the flow to surround and warm the people in the room, heating the room in such a way that they do not feel the breeze from the unit (Figure 6).





Figure 5: The six flaps of the "Stainless Flap 6 "

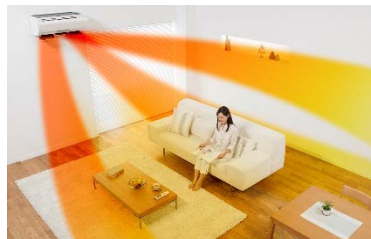


Figure 6: "Wraparound Heating"

\*Conceptual diagram

#### 4. "Considerate Voice" Technology for Confirming Unit Operation

When the "Considerate Voice" button is pressed, users can easily confirm the room temperature and current operational status of the unit through voice announcements <sup>(\*6)</sup>, a convenient way for those who are not yet familiar with the unit, for preventing inappropriate operations, and for checking whether there is a fault in the unit.

(\*6) The amount of information provided by voice confirmation can be set to four levels: "none", "few", "standard", and "frequent".

When the unit is shipped, it is in "standard" mode.

#### Room Air Conditioning system "Stainless Clean Shirokuma-kun" Premium X Series Product Lineup

Model	Cooling capacity	Power supply (Phase-V)	Color of indoor unit	Dimensions (mm) W×H×D
RAS-X22H	2.2	Single phase 100V	Star white(W)	Indoor unit 798×295×374 Outdoor unit 799×629×299
RAS-X25H	2.5			
RAS-X28H	2.8			
RAS-X36H	3.6			
RAS-X36H2	3.6	Single phase 200V		Indoor unit 798×295×374 Outdoor unit 859×709×319
RAS-X40H2	4.0			
RAS-X56H2	5.6			
RAS-X63H2	6.3			
RAS-X71H2	7.1			
RAS-X80H2	8.0			
RAS-X90H2	9.0			