

ExceedHyper Series Ultra-High-Efficiency Packaged Air Conditioner with Brand-new FDT Indoor Unit Applying Industry's First AirFlex Panel



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Mitsubishi Heavy Industries Thermal Systems, Ltd. has developed ultra-high efficiency packaged air conditioners, the ExceedHyper series, using R32 refrigerant, with which the global warming potential (GWP) is reduced to nearly 1/3 that of previous models. The outdoor unit is equipped with the industry's first three-phase pulse amplitude modulation (PAM) inverter and a high-efficiency motor compressor, achieving the highest level of energy-saving capability in the industry. The FDT indoor unit (ceiling-mounted with 4-way air outlets) has undergone a model change and is now equipped with the industry's first draft sensation-free mechanism "AirFlex" panels, making both comfort and energy saving possible at the same time. The product features and specifications are given below.

1. Features

(1) Use of R32 refrigerant

In air conditioners, the typically-used R410A refrigerant has a GWP nearly 2,000 times as high as that of CO₂ and can have a significant impact on global warming. However, the GWP of R32, which is used in the outdoor unit of the ExceedHyper series, is approximately 1/3 that of previous models. The amount used is also reduced by a maximum of 14%. These factors contribute to mitigation of global warming.

(2) High efficiency

The compressor, which is one of the main components of the outdoor unit, is equipped with high-efficiency motors. The outdoor unit also employs the industry's first three-phase PAM control. Thus, both a higher efficiency and a wider operation range have been realized at the same time (**Figure 1**).

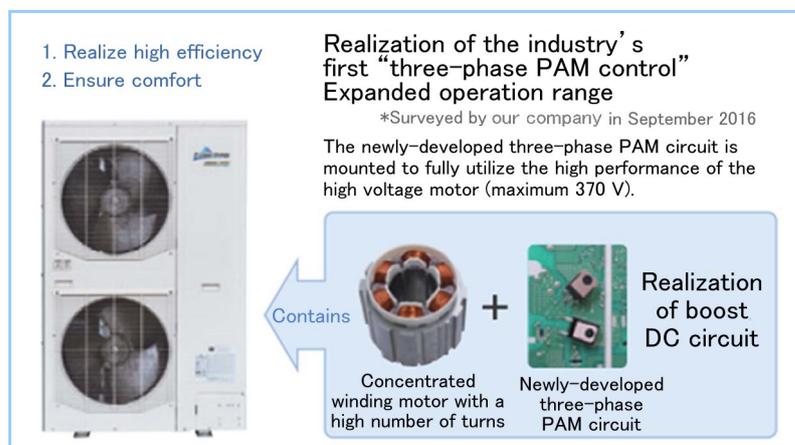


Figure 1 High-efficiency motor and three-phase PAM control

In the FDT indoor unit, the heat exchange performance was improved and the fan input power was lowered by enhancing the aerodynamic performance of the unit (**Figure 2**). The consequent reduction in electricity consumption achieved the industry's top-class annual performance factor (APF) in 2015.

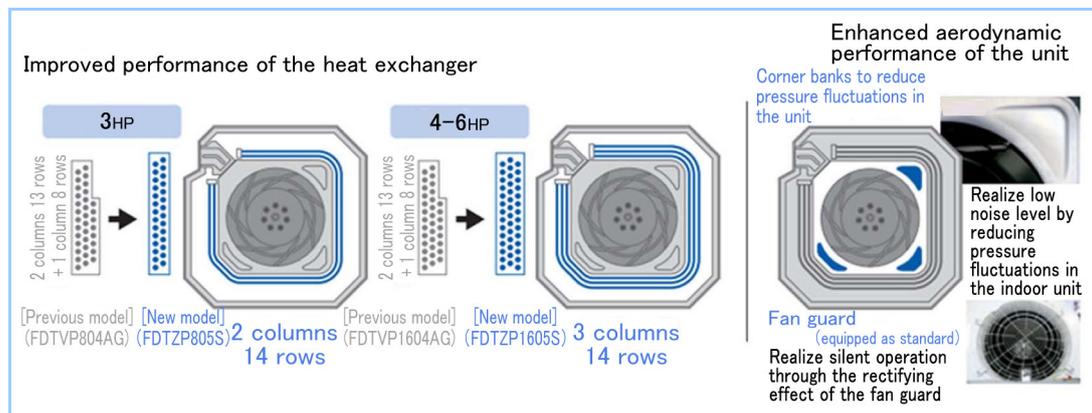


Figure 2 Improved heat exchange performance and enhanced aerodynamic performance of the indoor unit

(3) FDT indoor unit with AirFlex panels

The FDT model is a ceiling-mounted indoor unit with 4-way air outlets, and the panels are equipped with “AirFlex,” the industry’s first draft sensation-free mechanism. Conventionally, to prevent air from direct blowing on occupants, airflow direction adjusting plates are attached at the outlets of air conditioners as an optional on-site service. However, once attached, they are not easily to remove and also spoil the appearance.

The FDT indoor unit, which has undergone a complete model change, has panels with built-in airflow direction adjusting plates to allow the user to open/close them. Therefore, when there is a need to stop direct airflow, AirFlex can be turned on to operate the built-in plates. Contrarily, if the user wants to directly feel the airflow, the built-in plates can be stowed back in the panels and air-conditioning can be conducted by setting each outlet to the user's liking (**Figure 3**).

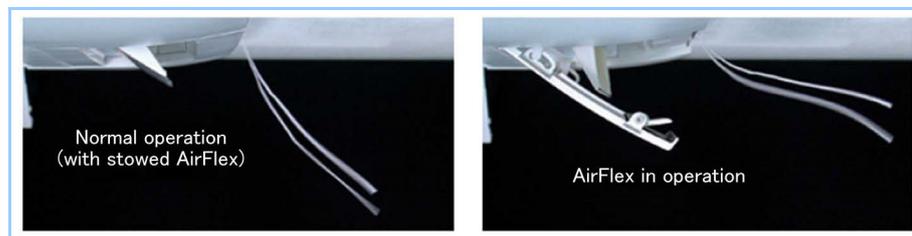


Figure 3 Change of airflow direction using AirFlex

The built-in plates will also be automatically retracted into the panels when turning off the air conditioner. Because of this function and aesthetic considerations in the design, the AirFlex panels received a Good Design Award in 2016. From customers who had installed the FDT indoor unit, we received positive feedback such as “No longer direct airflow coming from the air conditioner,” “There is no more annoying sensation caused by airflow from the air conditioner,” and “No longer feel a draft during cooling.”

(4) Improved ease of installation and serviceability

- Antimicrobials as the standard package and replacement system: Slime (sludgy and sticky liquid) produced in the drain pan can lead to unpleasant odors or failure due to insufficient drainage. As the standard package, our new FDT unit includes enough antimicrobials to last through one season to prevent slime production. There is also a new system that has been introduced to easily replace the antimicrobials in the drain pan (**Figure 4**). This improved maintainability has reduced slime-related problems and the frequency of cleaning the drain pan.
- Addition of a drain pan window and a quick cleaning opening: The Japanese Act on the Maintenance of Sanitation in Buildings prescribes the conduct of inspections of drain pans once a month. In the new FDT unit, a removable window is attached immediately beneath the drain pump (**Figure 5**), thereby making it easy to carry out regular inspections on the drain pan. Since the window can be removed, quick cleaning of the drain pump is possible without removing the drain pan. The maintainability has thus been improved.

There are also other improvements such as the increased size of the pumping head of the drain pump, easier filter attachment/detachment and simplified mechanisms for the positioning and hanging of the indoor unit and panels. In this brand-new FDT indoor unit, therefore, ease of installation and serviceability have been greatly improved based on feedback from end users and installers.

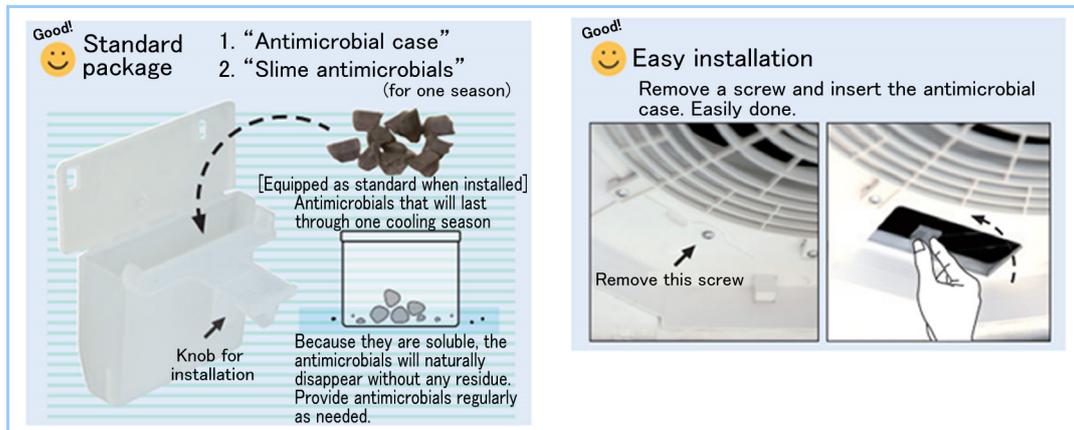


Figure 4 Antimicrobials as standard package and preplacement system

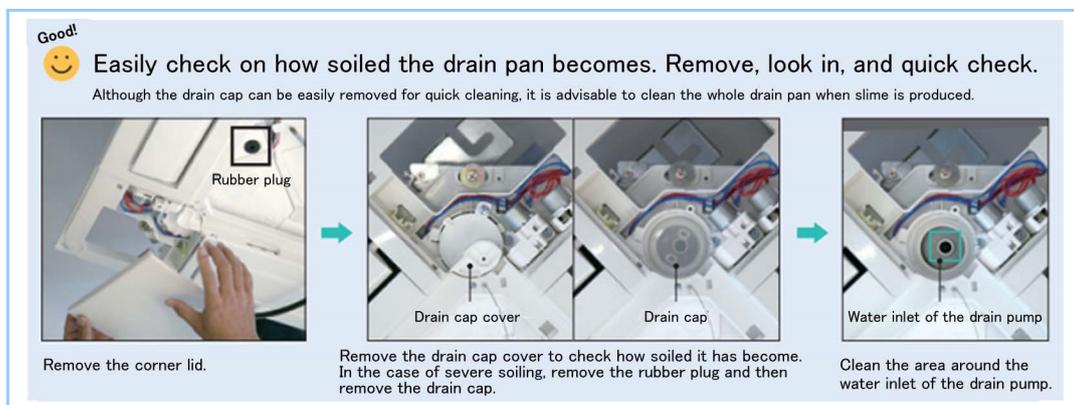


Figure 5 Addition of a drain pan window and a quick cleaning opening

2. Specifications

Table 1 gives the specifications of the ExceedHyper series.

Table 1 Specifications

Set model code		FDTZ805H5S	FDTZ1125H5S	FDTZ1405H5S	FDTZ1605H5S	
		3HP	4HP	5HP	6HP	
Rated cooling capacity	kW	7.1	10.0	12.5	14.0	
Rated heating capacity	kW	8.0	11.2	14.0	16.0	
Heating capacity at low outside temperature	kW	8.4	14.5	15.5	15.5	
Annual performance factor (APF) (2015)		7.0	6.8	6.5	6.2	
Outdoor unit	Dimensions	mm	845×970×370			
	Weight	kg	70			
	Operating noise (sound power level)	dB(A)	Cooling: 65 Heating: 66	Cooling: 66 Heating: 66	Cooling: 67 Heating: 69	Cooling: 68 Heating: 70
	Refrigerant/Charged amount	kg	R32/3.6			
Indoor unit	Dimensions	mm	333×950×950			
	Weight	kg	24.5+6	27+6		
	Operating noise (sound power level)	dB(A)	58	62	62	62

3. Future development

We will also apply the use of low-GWP R32 refrigerant to other ExceedHyper models of small capacities and the HyperInverter series (high-efficiency packaged air conditioners), and eventually use R32 refrigerant in all models of these two series. The FDT indoor unit with AirFlex panels will be introduced to multi-split air conditioners for buildings, as well as air conditioners for overseas markets.