

# JAPAN AIR CONDITIONING, HEATING & REFRIGERATION NEWS

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**Heat Pumps and Key Components**

# JARN

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## World Heat Pumps and Key Components

<p><b>ATW Heat Pumps</b></p>	<p><b>Heat Exchangers</b></p>	<p><b>Controls</b></p>	<p><b>Worldwide ATW Heat Pump Market</b></p> <table border="1"> <caption>Worldwide ATW Heat Pump Market (1,000 units)</caption> <thead> <tr> <th>Year</th> <th>Japan</th> <th>Europe</th> <th>China</th> <th>Others</th> </tr> </thead> <tbody> <tr> <td>2009</td> <td>510.0</td> <td>240.0</td> <td>228.0</td> <td>50.0</td> </tr> <tr> <td>2010</td> <td>548.5</td> <td>206.0</td> <td>450.0</td> <td>45.0</td> </tr> <tr> <td>2011</td> <td>497.0</td> <td>170.0</td> <td>630.0</td> <td>71.0</td> </tr> <tr> <td>2012</td> <td>454.0</td> <td>214.0</td> <td>699.0</td> <td>81.0</td> </tr> <tr> <td>2013</td> <td>442.0</td> <td>221.0</td> <td>880.0</td> <td>85.0</td> </tr> <tr> <td>2014</td> <td>436.0</td> <td>232.0</td> <td>987.0</td> <td>90.0</td> </tr> </tbody> </table> <p>Note: Japan: statistics from JRAIA Other areas besides Japan: JARN estimates</p>	Year	Japan	Europe	China	Others	2009	510.0	240.0	228.0	50.0	2010	548.5	206.0	450.0	45.0	2011	497.0	170.0	630.0	71.0	2012	454.0	214.0	699.0	81.0	2013	442.0	221.0	880.0	85.0	2014	436.0	232.0	987.0	90.0
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### 1. 2014 ATW Market Overview

Heat pumps are recognized around the world as energy-saving technology. Of the various types of heat pump products, air-to-water (ATW) heat pumps, which use air as the heat source, are gaining in popularity.

While the 2014 ATW market faces a number of challenges to growth, including economic slowdowns in emerging markets, delayed economic recovery in the key European market, and falling crude oil prices, the global ATW market reached a scale of 1,745,000 units to post year-on-year growth of 7.2%.

The European market peaked in

2008 at 300,000 units, after which the market contracted substantially but is now maintaining double-digit annual growth.

In China, ATWs have ridden the wave of fast-paced economic expansion, and sales of energy-efficient ATW heat pumps have expanded sharply as replacements for boilers and electric heaters. China is now the world's largest ATW market, followed by Japan and Europe. These three regions are the largest ATW markets in the world and account for the vast majority of demand.

### Europe

According to JARN estimates, 2014 European ATW market scale came to 232,000 units, representing year-on-year growth of 5.0%. France, Germany, and the United Kingdom are the three largest ATW markets in Europe. Heating is the main use in each of these markets, but products for water heating are also showing growth.

In France and other countries around Europe, energy-efficiency regulations have brought about improvements in building insulation, which has resulted in less heat pump heating capacity required to heat new homes. Following this, new homes tend to have smaller-capacity ATWs installed.

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# JATL



## Japan Air Conditioning and Refrigeration Testing Laboratory



### Performance Tests

- JATL conducts the following performance tests based on the corresponding JIS/ ISO standards at the request of an applicant.

As a testing laboratory for air conditioners, JATL was the first in Japan to be certified to ISO/IEC 17025 by JAB\*, an international standard for laboratory accreditation.

\*The Japan Accreditation Board

JATL assures reliability through its expertise and high-tech testing facilities.

### Testing Facilities

- Balanced ambient room-type calorimeter (Cooling 0.2–16kW, Heating 0.2–20kW)
- Tunnel air enthalpy test method (Cooling –10kW, Heating –13kW)
- Room air enthalpy test method (Cooling 2–56kW, Heating 2–67kW)
- Residential heat pump water heaters testing room

### Verification Program

#### ● Calibration of testing facilities

Calibration of testing facilities is conducted by measuring two units of air conditioning and refrigeration equipment with different capacities.

Test conditions are as follows: Standard cooling capacity  
Standard heating capacity  
Low temperature heating capacity

#### ● Verification

If the applicant's test results agree to those of JATL within  $\pm 3\%$ , the applicant's testing facilities are recognized as having adequate capabilities, and the "certificate of verification for testing facilities" is issued to the applicant. The certificate of verification is valid for two years starting from the date of issue, and the range verified is described in the certificate.

### Training Program

#### ● Practical Training and Lecture on Expertise

- ; knowledge and skill of performance test of air conditioners
- ; know how of maintenance check of testing facilities
- ; based on the ISO/IEC17025

At your request, we can set up several training programs.

### Test Request

- Any person can apply to JATL for a test request.

## JATL Japan Air Conditioning and Refrigeration Testing Laboratory

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## Related News

### Carel Management & Control Systems for Residential Heat Pumps

Carel's over 40-year experience in high efficiency management and control systems has been applied to the design of solutions created specifically for residential heat pumps.

Carel solutions for heat pumps are unit control systems with room climate control options, suitable for many different needs thanks to different configurations in terms of hardware size and number of inputs/ outputs (I/Os).

Numerous distinctive features define Carel's solutions in this segment. Firstly, complete control of the operating limits of variable-speed brushless DC (BLDC) compressors, guaranteeing protection, reliability, and maximum efficiency. The control system in fact constantly acquires electrical data and pressure and temperature values that determine the compressor working point. Another fundamental feature is integrated management of the various controlled devices (compressor speed, electronic valve, and condenser) so as keep compressor operation – or bring it back – inside the correct operating limits. These controllers offer both greater compressor protection and reliability and, at the same time, high unit efficiency.

Carel's electronic expansion valves are also essential components, with market-leading performance and extreme reliability.

Finally, Carel does not adapt drivers from other applications, but rather designs them specifically for the compressors used.

Special attention has been paid to the display and human machine interface (HMI) devices: alongside simpler and higher performance versions and room controllers, models have been developed with attractive colour touchscreen displays, and even more advanced solutions with cloud interface and connectivity via smartphone and tablet.

The offering is completed by a wide range of sensors for units and rooms.

The use of drivers for BLDC compressors makes the Carel solutions flexible and allows a vast choice of compressors. The manufacturer of the final unit can in fact decide which compressor to use from the range available.



Carel management and control systems for residential heat pumps

### Frascold Offers New Screw Compressor

The HVAC industry is facing growing pressure to change as momentum builds for use of low global warming potential (GWP) refrigerants and improved product efficiency, reduced energy consumption, and lower carbon footprints. To respond to these changes, Frascold recently extended its range of compact screw compressors with the addition of the CXITV.

Frascold is combining two energy-efficient technologies to substantially reduce energy requirements under part-load operating conditions. Combining integrated variable frequency drive (VFD) together with integrated Automatic Continuous Vi Regulation (ACVR) makes it possible to offer efficiency improvements of more than 20% (patent pending).

The possibility to modify the pressure ratio (Vi) in real time when the boundary conditions change can improve the efficiency of the system across the application envelope. Frascold's technology automatically and continuously optimizes Vi, providing almost double the energy savings of

VFD alone under part-load conditions.

The EU's F-gas Regulation aims to reduce F-gas emissions by two-thirds of today's levels by 2030 and to encourage the use of viable and more climate-friendly alternatives. Frascold's various compressor series compatible with low-GWP refrigerants have been developed thanks to its long-established capabilities in reciprocating compressors with close attention to energy savings and environmental protection. This is now complemented by the newly released CX series of compact screw compressors for applications using HFO and HC refrigerants.



Frascold's CXITV compact screw compressor