Top Interview

Mitsubishi Electric Compressor Business Aims to Expand in U.S. Market

At 2024 AHR held in Chicago, the United States, in January, Mitsubishi Electric displayed scroll and rotary compressors from Siam Compressor Industry (SCI), its group company based in Thailand. Seizing this opportunity, JARN interviewed Kajonsak Suwattanakorn, vice president of SCI, to hear about the company's compressor business strategies.

JARN (J): The rotary compressor market continues to expand, with larger capacity models coming to the forefront. Will there be a bottleneck in demand for scroll compressors? How will you make breakthroughs in the future?

Kajonsak Suwattanakorn (S): Rotary compressors and scroll compressors have different benefits. For example, with rotary compressors, price performance is expected, while with scroll compressors, high system performance and reliability are expected.



Mr. Suwattanakorn explains SCI's compressor business

SCI manufactures both scroll and rotary types of compressors. Regarding rotary compressors, we also have expanded their capacities to larger sizes. Regarding scroll compressors, Mitsubishi Electric has patented oval scroll technology that realizes bigger displacements in the same size body, with a lighter weight, higher efficiency, etc. Backed by this technology, we set scroll compressors as our core premium product and focus more on both their performance improvement and capacity expansion. We think scroll compressors have a variety of opportunities such as in the commercial segment with their larger capacities and also in the heat pump segment. For the commercial segment, we have just begun to deliver a 25-hp large capacity scroll model to the markets, starting with the Chinese variable refrigerant flow (VRF) and European chiller markets. We hope that sales are growing.

J: You said SCI expanded its rotary compressor capacities. We heard that you have developed 100-cc and 130-cc large-capacity rotary compressors with propane (R290) refrigerant. What is the current status of these compressors?

S: These 100 cc and 130 cc rotary compressors with R290 are still in the developmental stage and have not been launched yet. However, we

have finished the development of the same capacity models of R290 scroll compressors and are displaying them here. We have already started to deliver sample products of these scroll compressors to many customers in the European air-to-water (ATW) heat pump market. With these R290 scroll compressors, we are also trying to expand the U.S. market, targeting heat pump products and refrigeration equipment.

For refrigeration, we are displaying here our new R290 horizontal inverter scroll model. Our new model requires less installation space and has low noise and vibration. Its cooling capacity ranges from 0.1 to 2.9 kW (500 to 10,000 BTU/h) for lowtemperature applications, and from 0.5 to 7.6 kW (1,700 to 26,000 BTU/ h) for medium-temperature applications.

J: In the U.S. market, what is the most significant resistance to the expansion of demand for twin-rotary compressors?

S: In the U.S. market, non-inverter scroll compressors have been very popular among system manufacturers and it has been really difficult to expand inverter rotary compressors. However, currently, we see good signs in the context of carbon neutrality policy as the U.S. market aspires to energy-saving and eco-friendly compressors adopting new technologies such as inverter and lower-global warming potential (GWP) refrigerants. In fact, we can see some signals that many customers are trying to use inverter twin-rotary compressors.

J: Several U.S. states, such as New York and California, encourage the use of heat pumps. How are you seizing this opportunity as a leading compressor manufacturer?

S: These moves in the United States are good news for our environment. Heat pumps are a more sustainable heating solution than fossil-fuel heating. They are good news for us too. We have been focusing on the European ATW heat pump market for more than 10 years. With these moves in the United States, we see an opportunity for expanding our heat pump market. In the U.S. market, the majority of heating appliances use traditional technology where system performance is low, and by adopting heat pump technology, this

could increase energy savings at least three-fold. With this benefit, we believe that heat pumps will be a key product enabling the United States to achieve the environmental policy which is in place and will come in the future. That is why we provide product variety to the market from rotary to scroll, with low-GWP synthetic and natural refrigerants.

J: How do you see the refrigerant trends in the U.S. market?

S: I think R454B is now attracting publicity in the U.S. market. However, R454B is not the final refrigerant, because its GWP value is 465, which is projected to not meet the future U.S. regulations on refrigerants. Finally, the U.S market is expected to select natural refrigerants with lower GWP values such as R290 and CO₂. In addition, refrigerant manufacturers are now developing new refrigerants with lower GWP, lower flammability, and higher capacity. We will keep watching these trends.

J: Are you exhibiting any R454B compressors here?

S: Yes, we are displaying both inverter rotary and scroll compressor models with R454B. In addition to ensuring compatibility with low-GWP refrigerants, we have newly incorporated our various technologies such as oil sensor technology into our compressors.

This oil sensor is one example of such technologies which integrate both electronic and digital technologies into scroll compressors. Oil is the most important factor for compressors' reliability as it lubricates all of the moving parts to work without binding or wearing. Checking the amount of oil and maintaining its level and preventing liquid flowback are key means of achieving zero breakdowns.

Liquid flowback issues lead to low oil concentration. From our experience, oil concentration during operation is crucial for system reliability. Even with a sufficient amount of oil, the system could fail if the oil concentration is low. One customers' pain point was that the customers could not know the oil concentration in real time, and once they knew it, it could be too late to address the issue, so that is why we came up with this oil sensor technology which manages both the oil level and concentration.



Kajonsak Suwattanakorn, vice president of SCI

By receiving a signal from our oil sensor, the controller has more time to manage the oil, resulting in better temperature control, performance, and reliability. We believe this technology will be the answer the market is looking for, especially for commercial applications where system breakdown is undesirable. This technology will enable Internet of Things (IoT) capability in the heating, ventilation, air conditioning, and refrigeration (HVAC&R) industry to support system health monitoring and maintenance planning to be scheduled.

J: We noticed that many manufacturers are displaying mini-splits using R32 refrigerant at this expo. How do you see this trend?

S: R32 is also not a final refrigerant. However, to meet customers' needs, we also have R32 models to cover 2,400 to 319,000 BTU/h, such as the new BVK128 inverter scroll compressor that produces the largest stroke volume at 128 cc among compressors of the same size. Equipped with dual-injection technology, it allows an increase in heating capacity and efficiency at low ambient temperatures.

J: Mitsubishi Electric plans to produce rotary compressors in India, a very promising air conditioning and refrigeration market. What functions will SCI and the new Indian factory have in the future?

S: The new factory in India is planned to start operation in 2025, and will manufacture room air conditioners (RACs) and rotary compressors for these RACs. Meanwhile, as I said before, SCI puts a greater focus on scroll compressors. Our scroll compressors are used in a variety of applications in India, such as VRFs and chillers. Moreover, we are trying to expand the Indian refrigeration market with our scroll compressors from current refrigeration equipment for stores to the transport refrigeration segment, which is new to us.



Mitsubishi Electric compressor business staff at 2024 AHR Expo