

Variable Frequency Drives Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

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Report description:

The variable frequency drives market is expected to register a CAGR of 5.0% over the forecast period. The variable frequency drives used to monitor the speed of motors have gained considerable traction due to their power to optimize energy usage in various industries. Apart from energy efficiency, the popularity of VFDs can also be attributed to their capacity to improve motor life and reduce maintenance by allowing distributed use across the life cycle, relieving it from constant use under the same parameters.

Key Highlights

The market is characterized by various government directives focusing on making the industrial sector more energy efficient. The HVAC systems, especially chillers, a key deployer of VFD, are increasingly scrutinized by government bodies for their eco-friendliness. They have been regularized with time to comply with the updated policies.

Rapid industrialization in emerging economies like China, Japan, India, Brazil, and South Korea has boosted innovations and the adoption of efficient industrial equipment. For instance, according to the National Bureau of Statistics of China, in 2021, China's industrial production increased by about 9.6% compared to the previous year. China aims to achieve an automobile output of up to 35 million units by 2025, from 22.3 million units in 2018. With the recent tax incentives and the 'Made in China 2025' initiative, manufacturing units in the country are expected to increase rapidly. This provides several opportunities for the AMH equipment market in the country. ?

Energy efficiency has been of key focus for federal regulators and industry organizations. According to the International Energy Agency, electric motors consume 40% of the energy used in power industries. When these motors are deployed with VFDs in centrifugal load service, their efficiency increases. Due to the technological improvements in power electronics technology, the performance of VFDs is expected to improve, helping conserve energy.

The addition of VFDs in existing motors gives rise to several technical problems, which have created a barrier to adoption among

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numerous players in various industries. After integrating the drive with an existing motor, the speed of the motor shaft reduces, causing decreased cooling from the shaft-driven fan. The rotors in the VFD motors are very sensitive and can get damaged by frequent spinning, which occurs because of aggressive dynamic braking. When the rotors are stopped this way, the thermal expansion of the rotor produces a force that pulls the rotor shaft away from the stator, leading to bearing failure. This usually occurs when the VSD is not adequately cooled.

During the pandemic, the power sector received less traction with the shutting down of offices and the complete halt of activities in the industrial sector. With the reopening of the industries and offices in the post-COVID-19 period, the industry is anticipated to witness increasing demand for energy-efficient devices, creating an ancillary demand for VFDs. The energy and power sector has been exposed to several new regulations post the COVID-19 pandemic, highlighting the need for contingency plans to save energy to move toward a sustainable future. These directives are expected to propel the growth of the market over the forecast period.

Variable Frequency Drives Market Trends

Rapid Industrialization and Increased Use of VFDs Across Major Vertical Industries to Drive the Market

The rise of automation in the manufacturing sector has driven the growth of the market. For instance, according to the International Federation of Robotics, the annual installation of industrial robots increased from 382,000 in 2019 to 384,000 in 2020. According to the IFR forecasts, global adoption is expected to increase significantly, with 518,000 industrial robots operational across factories worldwide by 2024.

A significant trend impacting the market is the focus on smart manufacturing practices. According to the India Brand Equity Foundation (IBEF), the Government of India set an ambitious target of increasing manufacturing output contribution to 25% of the Gross Domestic Product (GDP) by 2025 from 16%. The Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) Udyog Bharat 4.0 initiative aims to enhance awareness about Industry 4.0 within the Indian manufacturing industry and enable stakeholders to address challenges related to automation material handling.

With the global impact of Industry 4.0, IoT, and smart manufacturing practices, the manufacturing industry is moving toward automation. VFDs are a right fit with this evolving trend.

The market is also witnessing an increased focus on process optimization. A VFD reduces downtime in the oil and gas industry because the gas turbines require frequent maintenance, while VFDs and motors require very little maintenance. This enables more production, lowers maintenance expense, and improves productivity, thus encouraging various oil and gas companies to incorporate VFDs.

Focusing on the energy-savings benefits of the VFDs, various governments partnered with manufacturers of VFDs and related products for installation in multiple sectors, which is driving the growth of the market studied. For instance, Danfoss partnered with the Kolkata Metro Rail Corporation (KMRC) and Chennai Metro Rail (CMRL) to offer varied drive solutions.

VFDs are being applied to several new applications. Applications with grid interfaces, like frequency converters and pump storage, employ VFDs. New industries like carbon capture, hydrogen generation, and transportation are also anticipated to rely on VFDs.

Asia-Pacific is Expected to be the Fastest-growing Market

The variable frequency drives market is anticipated to hold a significant share in China, owing to the increasing operations primarily across power generation and the oil and gas industry, along with bold spending toward establishing manufacturing facilities.

China's focus on infrastructural expansion has translated into FDI in numerous manufacturing and industrial sectors. Active backing from the Chinese government has empowered a higher number of value-addition industries, achieving overall industry

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growth, including several Chinese industrial sectors such as wind and solar power, telecommunications, automotive, petrochemical processing, and steel productions, among the top contributors to the progress of its economy. Therefore, these industries have the highest impact on the demand for variable frequency drives. As a result, China continues to be the most profitable market for VFDs.

The Indian VFD industry is entering a growth phase with increasing energy prices, leading to a necessity for energy and operational-efficient motor control systems and drives. End-user awareness of surplus drive benefits, such as enhanced process control performance, minimized maintenance requirements, and improved motor and equipment life, stimulate VFD adoption. The market for residential ACs in Japan is one of the largest worldwide. Furthermore, the ownership of ACs in Japan is high due to expectations of thermal comfort and sociocultural preferences. Renewable energy generation in the country is taking place at a humongous rate. This needs to be integrated into the existing national grid, leading to the introduction of additional electrical infrastructure, which may ultimately drive the variable frequency drives industry.

There has been continuous regulation enforcement by government bodies within the Asia-Pacific countries in terms of energy consumption in the past few years. This may bring good growth opportunities for the variable frequency drives industry in the next 5-7 years.

Variable Frequency Drives Market Competitor Analysis

The variable frequency drives market is highly competitive due to the presence of many small and large players in the market. The market is observing a growing need for energy-efficient equipment, owing to which international players in the market are rapidly increasing their footprints, and local vendors are finding it difficult to compete with the major players in terms of quality, safety, and price. This factor is boosting the competition in the market. Some of the key players are Eaton Corporation, ABB Ltd, and Honeywell International Inc.

April 2022 - ABB introduced the latest compact, fully integrated design medium voltage VFD ACS1000i with an integrated input transformer, input contactor, and auxiliary power supply in response to the space-constrained needs of the water and power industries. The air-cooled ACS 1000i - rated from 315 kW to 1800 kW, voltage classes 3.3, 4.0/4.16, 6.0/6.6 kV - employs a standard drive cabinet with built-in input transformer and input contactor while keeping the compact design of its sister drive, the ACS 1000. The traditional water-cooled ACS 1000 VFD can still be used for higher power levels.

Additional Benefits:

The market estimate (ME) sheet in Excel format
3 months of analyst support

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