

Fully integrated drive maintains compact size

ABB, the world's leading supplier of medium voltage drives launches a drive that integrates an input transformer, input contactor and on-board auxiliary power supply.

The air cooled ACS 1000i – rated from 315 to 1800 kW, in voltages 3.3, 4.0/4.16, 6.0/6.6 kV - uses a drive cubicle in which the input transformer and input contactor are now built-in, while maintaining the compact footprint of its very successful sister drive, the ACS 1000. For higher powers, the traditional ACS 1000 is still available as a water-cooled version.

The ACS 1000i overcomes the need for project management and additional engineering that is needed with external transformers and components, as well as the customer challenges of transformer and main feeder breaker location. Costs are therefore reduced.

But it is not just existing installations that can benefit. New motor applications can also take advantage of the small size of the ACS 1000i along with its elimination of harmonics and voltage reflections that can damage motors and network; simplified installation, easy commissioning and maintenance; and reliability.

Typical applications for the ACS 1000i include conveyors, compressors, crushers, mills, fans, pumps, extruders, mixers and blowers in all major industries, along with test stands and wind tunnels.

Harmonic elimination

The ACS 1000i is equipped with a 24-pulse diode rectifier, which eliminates network harmonics without increasing the drive's complexity. It meets the stringent requirements for current and voltage harmonic distortion as defined by IEEE 519, IEC 61000-2-4 and EN. This eliminates the need for costly harmonics analysis or installation of network filters when installing a new drive.

Voltage reflections and common mode voltages - the result of any inverter topology - cause excessive stress to a standard motor insulation and create harmful bearing currents. Furthermore, the motor is subjected to additional heating caused by the high content of harmonics, which are generated by the inverter switching and supplied to the motor, if no further precautions are taken.



With the ACS 1000i, all these detrimental effects are removed through ABB's patented output sine filter. The result is an excellent current and voltage waveform supplied to the motor. Additionally, long motor cables of 3,000 meters and beyond can be applied without any risk of voltage reflections.

Reliability

A combination of features contributes to one of the most reliable drives ever designed. The ACS 1000i uses an advanced and proven power semiconductor switching device known as IGCT (Integrated Gate Commutated Thyristor). IGCTs combine the best of two traditional semiconductor technologies: the fast switching of the IGBT with the proven reliability of the GTO.

The use of IGCTs results in low parts count, providing an intrinsically less complex, more efficient and reliable drive.

The drive's well-proven three level inverter, without series or parallel connected power semiconductors, is the least complex, most robust and efficient topology in the world of medium voltage AC drives.

The converter design does not require any power fuses, which are known to be unreliable, costly and subject to ageing.

The drive uses advanced, environmentally friendly, oil-filled foil capacitors, designed for a long lifetime, as opposed to electrolytic capacitors, known for their short life.

Also snubber components, such as capacitors and resistors, are not required for the IGCTs, which again reduces the component count and their losses.

Simplified installation, easy commissioning and maintenance

With its three cables in/ three cables out concept and on-board macros, commissioning the ACS 1000i is rapid, thereby minimizing plant downtime.

The three cables in/ three cables out concept means that the customer does not need to worry about engineering and coordinating the installation of different equipment, with long and complex cable runs. Simply cut the motor cable and put an ACS 1000i in between.

An enhanced motor identification routine simplifies the start-up procedure by determining all key motor parameters automatically. Enter the motor nameplate data and the ACS 1000i does the rest.



Every ACS 1000i is tested as a total drive system, including input contactor and input isolation transformer, driving a real motor load before being delivered to the customer. This minimizes technical risks, reduces installation and commissioning times and increases system reliability.

Other cost saving installation benefits include:

- no cabling between transformer and drive
- no separate space indoor / outdoor (oil pit, cable ways) for the transformer
- no control cabling between customer's main feeder breaker and drive for control and protection, as contactor is included

A powerful performing motor control platform

The motor control platform of the ACS 1000i is ABB's award-winning Direct Torque Control (DTC). This provides rapid, accurate and stepless control from zero to full speed. It brings the highest torque and speed performance as well as the lowest losses ever achieved in medium voltage drives.

The control of the drive is immediate and smooth, under all conditions, resulting in a more reliable operation and better product quality.

Control system

ABB offers an open communication strategy, enabling connection to higher-level process controllers. The ACS 1000i can be installed with all major fieldbus adapters for smooth integration, monitoring and controlling of different processes, according to customer requirements.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 105,000 people.

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