Harmonizing drives

The driving force behind ABB's all-compatible drives architecture

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ABB's drive product range extends from low- to medium-voltage AC drives to DC industrial drives. They contribute to increasing the efficiency, reliability and flexibility of industrial processes while at the same time the use of variable-speed drives contribute to significant energy savings. Now ABB has created its first low voltage AC drives portfolio built on the same, all-compatible architecture. In other words low-voltage AC drives use the same control panel, the same parameter menu structure, universal accessories and the same engineering tools. Initially the new architecture is being applied to ABB industrial and standard drives up to 250 kW with plans to extend it to higher powers in the future. The latest ABB industrial drives in the ACS880 series are one of the first to be based on the architecture. They are powerful drives capable of tackling any application and any challenge in any industry.

ABB is the world's largest drives manufacturer. Its variable-speed drives are used to regulate the torque and speed of an electric motor by controlling the power fed to it. This in turn results in: substantial energy savings (compared to constant power loads); optimal process control; a reduced need for maintenance; and functional safety as most drives offer safety features that comply with the requirements of the European Union Machinery Directive 2006/42/EC.

ABB has further enhanced its drives business by creating an all-compatible low-voltage AC drive portfolio that is built on a common architecture. The drives portfolio is specifically designed to simplify operation, optimize energy efficiency and maximize output. The new architecture enables the new ABB drives to control virtually any type of AC motor and interface across all major fieldbus protocols as well as remote monitoring solutions. Compatibility is the key with users enjoying many more convenient functions for easy selection, installation, fast set up and maintenance with integrated safety features. The first drive available for ordering will be the wall-mounted ABB industrial drive.

The benefits of having unified architecture include:

- "Learn it once, use it everywhere" – The same control panel, common engineering tools and parameter menus reduce the time needed to learn and operate the new drives
- Universal accessories provide low-spares cost and easy stocking
- Integrated safety features increase personnel safety and lower installation costs
- Reduced energy use from energy saving features, such as the energy optimizer
- Built-in energy-efficiency information to help analyze and dimension the application. The information is provided by a load profile and energy efficiency calculators, which determine used and saved energy, CO_2 reduction and money saved

The smooth transition from the old to the new generation of drives has resulted in dimensions that are either the same or, in many cases, considerably smaller. This is in part due to the fact that the power

Title picture
ABB's drive product range extends from low-voltage to medium-voltage AC drives to DC industrial drives and is applied across many industries.

1 The new high-contrast, high-resolution control panel

2 Unified control-panel features

- It offers soft keys and an intuitive four-direction navigation to help users quickly locate parameters or functions.
- Information can be displayed in basic formats or in more advanced views, offering visual trend graphs and histograms, bar graphs or numerical data that make it easier and faster to interpret process variations and faults.
- Panel assistants save commissioning time by simplifying the set up of essential parameters for different functions so the user does not need to know all the parameters for the function. For example a fieldbus assistant helps the user set up the drive and fieldbus adapter for communication.
- The menus and messages can be customized to use terminology appropriate to the application so that the drives can be configured using familiar words.
- The panel's text editor lets the user add information and customize text.

3 Built-in safety features help achieve the highest machine safety.

ABB's new all-compatible architecture enables new drives to control virtually any type of AC motor, and interface across all major fieldbus protocols as well as remote monitoring solutions.

density of the new generation of drives has increased significantly to the point that the new ABB industrial drive in particular has a volume that is up to three and a half times smaller than its predecessor! As well as size, many of the best features from the existing drives, such as functional safety and energy-efficiency calculators have successfully made the transition to the new architecture.

A control panel and PC tool with a difference

The new high-resolution control panel ➔ 1 is based on modern interface techniques with features that are outlined in ➔ 2. Importantly, it enables quick drives set up and allows one control panel to control several drives by simply daisy chaining the drives with the help of built-in terminals. The control panel enables parameters to be copied from one drive to another, saving time and providing flexibility especially when several drives need to be configured.

The drive composer PC tool, for all drive types, offers fast start-up, commissioning and monitoring. An entry version provides start-up and maintenance capability while the professional version of the tool provides additional features, such as custom parameter windows, control diagrams of the drive's configuration and safety settings. The control diagrams save users from browsing a long list of parameters and help to set the drive's logic quickly and easily. The PC tool can be connected to drives using a standard USB connection or an Ethernet connection. With one mouse click on the PC tool, all drive information such as parameter lists, faults, back-ups and event lists, are gathered into a file, which can be e-mailed to maintenance personnel or ABB for further analysis. This provides faster fault tracking, shortens downtime and minimizes operational and maintenance costs.

Advanced safety functions

The drives' functional safety complies with the requirements of the European Union Machinery Directive 2006/42/EC. Built-in safety features, such as safe torque-off (STO), which enables emergency stopping and prevents unexpected start-ups and other safety-related functions achieve the highest machine maintenance and operation safety. Integrated safety functions reduce the need for external safety components, which simplifies the configuration and reduces installation space ➔ 3. ABB's industrial drives offer integrated safety options that include safe stop 1 (SS1), safe stop emergency (SSE), safely-limited speed (SLS), safe brake control (SBC) and safe maximum speed (SMS).

Low energy consumption

While drives inherently save energy, details of just how much is used and saved (in kWh and MWh) and the amount of CO_2 reduction are available through

4 The new wall-mounted ABB industrial drives, ACS880-01 series

built-in calculators. The information provided by these calculators helps to fine tune the process to ensure optimum energy use. The energy consumption optimizer control mode ensures maximum torque per ampere and reduces energy drawn from the supply.

Minimal training

Thanks to the "Learn it once, use it everywhere" approach, the time needed for machine builders, system integrators and end users – including maintenance personnel – to optimally configure, operate and maintain the new drives is reduced significantly. This is possible because the drives use the same control panel, the same engineering tools and universal accessories across the drives architecture. In addition all parameters are harmonized (ie, they use the same structure and naming) right across the platform, and as with the different functionalities, the naming used is consistent in all drives.

The ABB industrial drive ACS880-01

Of the new generation of AC drives that will be based on the all-compatible architecture, the first to be launched is the industrial drives ACS880 series. The first drive available in this series will be the wall-mounted single drive[1] ACS880-01 → 4, which is initially available with a power range of 0.55 to 250 kW and voltage range of 380 to 500 V, with plans to extend the voltage range. It is designed for a wide range of applications including extruders, cranes, winches, winders, conveyors, mixers, compressors, pumps and fans, and is targeted at industries, such as marine, mining, cement, oil, gas, metals, chemical, material handling, pulp and paper. The different ACS880 drives versions are built-to-order to satisfy customers' requirements and come with an array of options, such as a wide selection of fieldbuses, EMC filters, resolvers, encoders, du/dt filters, sine filters, chokes and brake resistors, as well as application-specific software.

Through the highly accurate and proven motor control platform, direct torque control (DTC), the ACS880 industrial drives can be used for open- or closed-loop control of almost any type of AC motor, including synchronous and permanent magnet machines, as well as induction servomotors. In order to maximize productivity, the DTC technology has been further enhanced for the new drive families to ensure highly accurate motor control and quick responses to process changes without needing a feedback device. The drives can also control permanent magnet motors without extra software.

The drive offers two enclosure ratings, IP21 and IP55 for dusty and wet environments. Both versions come with varnished boards, which improve durability in harsh environments. In addition, the air inlet temperature is constantly monitored and a warning is issued when critical temperatures are reached.

The new industrial drives support the CoDeSys[2] programming environment, allowing easy integration with ABB's AC500 programmable logic controller (PLC), which is also programmed and configured using the same CoDeSys-based engineering tool. Some control logic can even be transferred from the PLC to the drive. ABB's industrial drives can also interface with most popular fieldbus protocols as well as remote monitoring solutions.

A real driving force

The past 20 years or so has seen some remarkable advances in AC drives technology and ABB has been leading the way. While miniaturization is one of the most striking developments, drives have also become more intelligent, have better communications, and are easier to install and control. ABB continues to remarkably increase the power density of its drives, and to illustrate this point, its new ACS880 industrial drive has a volume that is up to three and a half times smaller than its predecessor.

The creation of a drives portfolio built on the same, all-compatible architecture will bring huge benefits to customers. As well as enabling the control of virtually any time of AC motor, fast commissioning, an even greater reduction in energy consumption and higher productivity mean customers can expect the lowest total cost of ownership for ABB LV AC drives used in industrial, commercial, public sector and residential applications.

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Footnotes

1 Single drives are complete AC drives that can be installed without any additional cabinet or enclosure. They are available as wall-mounted and cabinet-built constructions.
2 CoDeSys, an acronym for Controller Development System, is a development environment for programming controller applications according to the industrial standard IEC 61131-3.