In today’s competitive business environment, important decisions like choosing the right process automation strategy are critical. You must consider a strategy to meet not only your current needs but also, more importantly, your future operations. Advant Automation with MOD 300 software uses industry-leading technology that empowers you and your organization to more effectively improve product quality, increase productivity, minimize costs and enhance safety.

**Industry-Leading Technology**

As an industry leader, the innovative customer-focused Advant process control solutions ABB has introduced over the years have raised standards for the entire industry. ABB is literally reshaping traditional beliefs of manufacturing productivity improvement by developing creative approaches to integrating leading-edge, technology with improved process control capabilities.

The heart of the system is an interoperable object manager that allows the integration of new technology. This ability to meet constantly changing technology standards, combined with powerful and proven software packages, makes Advant an industry leader in open control systems.

### User Empowerment

Technology by itself never translates directly to increased productivity. Correct application of technology is essential. ABB has integrated new technology into Advant in a way that gives all the people in your organization—managers, engineers, operators, and maintenance personnel—the power to do their jobs better.

### Investment Protection

With today’s rapidly changing technology and competitive business climate, your process control needs change more frequently and sometimes unexpectedly. Regardless of what is driving these changes (external market pressures, competition or new technology), it is imperative to maximize and protect your investment and remain competitive.

As Advant and MOD 300 system enhancements have evolved, ABB ensures that the system maintains application compatibility. What's more, ABB makes it easy and affordable for you to move forward, remain competitive and position your manufacturing operations for growth.
The Advant system architecture is designed to meet today’s changing business and technology environment. The heart of the system is an interoperable object management facility. This integrates a variety of relational and object-oriented models and computing platforms. This assures that your automation investment will be able to keep pace with your changing technology needs.

**Object Management**

Advant’s object-oriented architecture is based on the award-winning OMF (Object Management Facility) technology. OMF provides an object model that is both compatible with standard and meets the high-performance and reliability requirements of complex control applications.

**Distributed Communications Network**

Advant nodes are linked together by the DCN, a high-speed, token-passing ring or Ethernet base. The DCN provides secure and reliable real-time communication between the nodes under all process conditions.

The DCN can have single or dual paths, with each path operating independently. Dual DCN media (or network) are simultaneously active and share the communication load. If either path fails, the other DCN automatically handles all traffic. In addition to redundancy, dual DCNs allow new subsystems to be added on-line by connecting new nodes one cable at a time. For applications requiring isolation, longer transmission distances or protection against hazardous areas, a Fiber Optic DCN is available.

Advant has an object-oriented architecture and a global database that resides in every node in the system. Advant is a master-less system using a single, integrated database approach. Engineering effort is therefore simplified, and operator errors due to duplicate references to a single object are avoided. With the Advant object management approach, you do not need to know the location of data or any data access or organization technique to retrieve its value. You can retrieve all database information by simply requesting the object name and attribute you desire.
Advant® with MOD 300 Software
Advant Station 500 Series

The Advant Station 500 Series workstations offer industry-leading performance, built-in networking, and outstanding graphics. ABB adds hardware and software components to adapt the basic platform to today’s demanding real-time industrial requirements of process plant operations.

Advant Station 500 Series workstations perform a wide variety of functions in the system when combined with basic and optional software. Available software packages are AdvaCommand operator interface software, AdvaBuild engineering software, AdvaInform information management software, and Batch 300™ batch control and management software.

Each Advant Station can be optimized for a single function, or multiple functions can be combined onto a single station. Both hardware and software are scalable throughout the entire Advant Station 500 Series.
Additionally, the Real-Time Accelerator extends the capabilities of the workstation. With a powerful processor and on-board memory, the Real-Time Accelerator handles time-critical tasks such as real-time database management and DCN communications. By performing front-end processing, the accelerator lets the workstation processor dedicate its resources to those applications that the user interacts with directly.

Advant Station 500 Series operates with a state-of-the-art man/machine interface. The user interface includes high-resolution monitors, X Window driven displays, and an advanced graphics building package. Workstations can support multiple high-resolution monitors, PC-based X terminals, and keyboard, trackball, mouse and/or touch screen combinations.
Controller Hardware
Advant offers a wide range of control solutions to meet your specific application requirements. The Advant Controller 400 Series utilizes the benefits of MOD 300 control languages and a global database. The controllers reside on the same DCN as the Advant Stations and share data in a seamless manner.

Advant Controller 400 Series provides direct access to many field control and data input devices such as PLCs, analyzers, smart devices, bar code readers, etc.

Personality submodules contain specific protocols. If a new protocol is required, a new module is simply plugged into the controller. With this visionary architecture, technologies such as fieldbus and high-speed fiber-optic can be easily integrated into the system.

The Advant Controller 410 and 460 provide a versatile range of processing power and redundancy schemes to meet your specific application needs.
As technology continues to evolve rapidly, personality modules make Advant Controllers ready for the latest fieldbus technology.

The Advant Controller 460 allows backup security for both hardware and software through redundancy of control processors, I/O, communication and power supplies. If a redundant controller fails, all control software functions transfer to a backup controller.

**Fieldbus Technology**

Fieldbus technology offers process engineers not only a new way to communicate, but a whole new way to control the process. Recognizing manufacturing end-users’ increasing demand for accelerated development of a single, open, interoperable and international fieldbus standard, ABB has positioned itself and its products to meet this demand. As fieldbus technology expands the ease of information collected from the field, ABB will help ensure that plant operators and managers will be able to have tighter control and improved performance over their process.
The modular design of S800 I/O saves installation time and panel space, while reducing down-time and maintenance costs.

Terminal blocks can be replaced without affecting the operation of other blocks.

A switch makes it possible to remove and reinsert modules while the station is in full operation. A hardware key ensures that only modules of the right type can be plugged into each vacant slot.
The Advant system supports a wide variety of I/O options to meet various project requirements. I/O strategies can be selected independent of the choice of control techniques, and any combination of I/O strategy and control language is valid. Selection can be based on minimizing installation costs, per-point costs, or maximizing security.

**Series 800 I/O**
ABB has designed S800 I/O from your process point of view by saving installation time, maintenance costs, and panel space. It also reduces down-time, which in turn increases productivity.

S800 I/O is designed for field performance. Its many features make it reliable, fault tolerant and give it superb auto-diagnostic capabilities, which helps keep your plant up and running. It has built-in protection for data communications with the parent controller, and its handshaking and checksum handling allow it to achieve zero errors.

Its modular design permits step-by-step system expansion. Modules may be removed and reinserted while the rest of the station is in service, preventing disruptive and costly downtime. S800 I/O can also be incrementally expanded while the process remains on-line. S800 I/O can be mounted in many configurations to fit a wide variety of requirements.

**Series 100 I/O**
Series 100 I/O is a local I/O that offers a cost-effective control solution for a wide range of redundant or non-redundant applications. The S100 I/O system consists of I/O modules with 4 to 32 channels, depending on type, which are placed in the I/O subracks. The Advant Controller 410 includes an integral S100 I/O card file. The Advant Controller 460 interfaces to the S100 I/O through an interface module.

**TRIO**
TRIO for the Advant system uses a fieldbus connected to groups of intelligent, highly reliable, field-mounted blocks. They can be individually installed on machines, mounted in junction boxes or grouped in racks and panels.

TRIO can save additional last-minute expenses because many of its process parameters are software-configurable and easily changed.
Control Software

Manufacture of quality products demands sophisticated process control techniques. The Advant system meets these demands through three powerful control packages that provide optimal implementation approaches in the areas of continuous control, discrete device control, high-speed interlock logic control, sequential and batch control, and supervisory control. This provides IEC-1131-like control language flexibility and extensions for more sophisticated control.

CCF
Configurable Control Functions (CCF) software provides comprehensive capabilities from a preprogrammed library of functions. CCF configuration uses a menu-driven, fill-in-the-blank approach and does not require programming. This function block structure is similar to the IEC-1131 function language, and its representation matches the measurement and control functions of process diagrams. CCF is ideal for continuous control, device handling, interlocking and alarm handling. It saves valuable commissioning and start-up time through the Autotune feature available for all PI and PID loops.

TLL
TLL (Taylor Ladder Logic) provides high-speed, industry-standard ladder logic control processing. It is ideal for device interlocking, motor control, and drum programming device sequencing. Plant personnel familiar with IEC-1131 ladder logic can implement and use TLL with little training. And by performing ladder logic functions directly on the Advant system, the need for separate programmable controllers that create additional support and maintenance costs is reduced.

TCL
TCL (Taylor Control Language) is a structured block text, high-level procedural language. The programmable flexibility of TCL is ideally suited for sequential/batch control, complex arithmetic and logic functions, supervisory tasks such as start-ups and shutdowns, and serial interfaces to third-party equipment. The unit relativity feature allows the user to write TCL sequences to be executed on different plant equipment without reprogramming. This decreases the amount of time that engineers must spend on sequence design, programming and debugging.

Building advanced control strategies using CCF, TLL, and TCL provides flexibility for optimal control solutions.
Real-time displays simplify application de-bugging and commissioning.
Efficient plant-wide operations require a system that works with operations personnel to manage process information in a consistent, easy-to-use manner. AdvaCommand display software manages the amount of information that an operator deals with during normal and abnormal operating conditions. It provides information in a standard presentation style, and in a standard access method that can be customized to individual operators. As a result, operator fatigue and errors are reduced. AdvaCommand empowers operators to interact effectively and safely with all process situations, enabling them to spend more time on process improvements.

**Single Window for Plant-Wide Operation**

The Advant system provides a single window that integrates data from a variety of field devices and third-party X Window displays using the same access approach used for all other displays.

Data from a variety of sources, including programmable controllers, information management computers and analyzers, is displayed on the same screen. This universal window to the process makes operations more manageable because operators need only be trained on one control system that supports information from several devices on unified operational displays.

**Ergonomic Windowing Environment**

ABB has applied window technology, third-party display access, and an advanced graphics package in the Advant system to create an ergonomic environment which enhances operator efficiency.

AdvaCommand’s screen layout includes color combinations designed by ergonomic scientists to reduce operator fatigue and increase object recognition.
Advanced Display Access
AdvaCommand software minimizes the number of keystrokes required for operators to control the process through the use of pull-down menus and dialog boxes, providing rapid display navigation.

The Personal Menu is a user-configured feature that lists just the displays typically used by a specific operator. This unique menu eliminates the need to review the entire list of displays, reducing time and possible errors. The Last Page Menu keeps a running list of the last displays the operator has used. If one of these displays is required for further reference, it can be quickly accessed by pointing and clicking.

The easy-to-use collage feature allows the operator to save a collection of display pieces as a separate display under a user specified name. If the operator is concerned with and wants to monitor a specific process area, the operator can simply cut, size, overlap or tile these specific sections of the existing displays on to one display. The operator can save it as a collage display in his personal menu and access it at any time.

Management of Alarms
The Advant system provides prompt visual, and optionally audible, notification of alarms and events. An alarm banner informs operators of the most recent alarm conditions without calling up additional displays.

Detailed alarm information is displayed by selecting this flashing banner. Operators can access an alarm status window without restricting the view of the current display, or can directly fetch the display containing the tag-in alarm.

Advanced On-Line Diagnostics
AdvaCommand software features include a number of system diagnostic displays. A flashing diagnostic icon alerts operators to system problems. Selecting this icon automatically displays the cause and location of the problem.

Comprehensive system status displays let personnel diagnose problems quickly. The I/O cross-reference display facilitates I/O checkout with tag ID, and channel association lets operators and maintenance personnel work as a team. The System Performance Display provides engineers with on-line information about microprocessor loading and memory usage. This information is helpful when developing applications and when planning upgrades or expansions.
User Accountability
The portion of the system an operator can view and control is established by the Environment. An Environment consists of a list of process objects, standard displays and custom graphics that an individual user has authority to access.

Within an Environment, access is controlled by the user’s security classification. Every user name is configured with a security class of Engineer, Supervisor, or Operator. This provides the flexibility to customize authority down to the individual displays that are available to each user. In addition, every user name is password-protected, and all can be automatically logged by the system and printed.

Intuitive Graphics Builder
AdvaCommand graphics are created using the Display Builder. This AdvaBuild software option takes full advantage of high-resolution monitors with an almost infinite choice of colors and windowing technology. Through increased object resolution, realistic colors, and shading, operators are presented with a more accurate representation of the process, resulting in increased recognition of process objects.

Palettes of color, shades, patterns, basic objects, and application-specific objects make graphic building easy. The basic process symbol palette conforms to ISA standards. Drawings can be easily copied and pasted between graphics. The Display Builder lets you zoom in and out for detail work and create dynamic objects. Sixteen levels of conditional logic are supported through IF THEN ELSE statements, thus simplifying an operator’s job by placing more intelligence in the display.
Self-Configuring Displays
The simple association of process objects, groups and areas results in the automatic generation of operation, engineering and diagnostics displays, significantly reducing the amount of engineering time required to configure the system.
Integrating process, production and business management functions is critical to the success of today’s manufacturers. Eliminating the functional boundaries between the front office and the production floor can provide a tremendous business advantage for manufacturers to meet the increased demand for quality, speed and lower cost. AdvaInform opens the system by providing third-party data and application integration methodologies. Utilizing the strengths of AdvaInform, ABB has developed Advant Enterprise Historian, a unique information management solution for increased productivity.

**Advant Enterprise Historian**

Advant Enterprise Historian provides manufacturers with unparalleled access to plant-wide and corporate-wide data from business, production and control systems for better production and business decisions. The unique distributed architecture of this true enterprise-wide historian enables visualization, retrieval and storage of data so that it becomes meaningful and useful information.

This distributed architecture allows historical information to be retrieved from different systems within the plant as well as from other plants, whether they are across the street or across the globe. Historical data from upstream and downstream processes can be viewed from operator stations on the plant floor as well as from desktop PCs, and it integrates information from both ABB systems and other vendors’ systems. At the same time, data access options can be configured to ensure maximum security.

Advant Enterprise Historian’s unique capabilities are facilitated by three primary software services. The display service provides a distributed graphical user interface and Web-based access; the history service provides data collection, storage and archiving. The connectivity service integrates external systems with the control systems for enterprise-wide data access and use.

**Unique Distributed Architecture**

Easy-to-configure Advant Enterprise Historian uses a distributed client/server architecture to take advantage of distributed servers for data collection and display generation. Common software platforms such as Windows 95, Windows NT and UNIX provide client software for display of historical and real-time business information through vehicles such as PCs and X terminals. This makes Advant Enterprise Historian easy to use from all points in the company enterprise, and lets the user put this information into reports and other documents using familiar Microsoft desktop applications.

**Enterprise-Wide Views of Information**

AdvaInform Display provides information throughout the organization for improved decision making. It provides graphical display access to real-time process data, alarm and event messages, historical trend delay, production data logs and more. This information is available on a variety of clients, including native Windows NT.

**Superior Data Access**

Because the data is distributed from the OCS network to the plant network, there is no central server to act as a bottleneck for data access. Process and production information can be accessed over the company Intranet using the AdvaInform Display Web Client and saved in reports stored as HTML or PDF files for Internet access by remotely located personnel. The physical distribution of the information does not hinder the ability to access
and use it; plant systems can reside in other facilities or even other countries, making Advant Enterprise Historian a truly global means to enhance productivity.

**Easy Access with Microsoft Excel Add-Ins**

Advant Enterprise Historian includes AdvanInform Data Direct, a series of Microsoft Excel add-ins for easy access to enterprise data. AdvanInform Data Direct provides this access through standard dialogues to obtain information on process variables, history values and SQL queries, to name a few. This information can then be made into management reports using standard Microsoft desktop applications. AdvanInform Data Direct requires no additional third-party drivers such as ODBC or SQL; this helps to keep the desktop PC configuration simple.

**Better Data Security**

While providing comprehensive and wide-ranging information access, Advant Enterprise Historian also has built-in data security mechanisms that protect the integrity of the data and safeguard its access. Its dual data storage meets safety, regulatory and environmental needs; its auto recovery capability automatically backfills data to prevent data loss. Access to any type of plant data can be opened or restricted as necessary; information can be completely restricted from some users or designated as “view only.”

**Statistical Process Control**

Early detection of system variations is key to producing on-spec product. AdvanInform SPC provides the information that operators need to determine whether process variables are within statistical control or if a systematic error is causing off-spec product, delays or even potential process shutdowns.

SPC alarms alert operators to significant statistical deviations. Standard SPC displays can be viewed on-line and archived for later retrieval. Control chart and histogram displays are configurable and provide such choices as process average (X-Bar) with range, and moving process average with moving range chart. SPC indexes for process capability, kurtosis, and skewness are also supported.

**Comprehensive Reports**

Reports are created in a way that combines powerful SQL query generators, flexible report layouts, graphics and a full range of chart options. Reports can be scheduled for predefined times such as end of shift, day or month, or they can be executed based upon an event such as end of batch or equipment start. Reports can also be executed manually through the report scheduler or operator-selectable screen targets, printed on the system printer and/or automatically archived on hard disk. Reports saved in HTML or PDF format can be viewed on CRTs, transferred to host computers, and kept on track in multiple revisions.

An extremely powerful and unique feature is the ability to perform database queries and produce a useful process snapshot. The query feature can be used to report on loops not in automatic mode, those which are tracking, or those on local set-point.
ABB was one of the first companies in the 1960s to automate batch processes in the pharmaceutical and fine chemical industries. Since then, ABB has pioneered many innovations in batch automation. Because of the wide variety of batch process applications, flexibility is essential in process control and batch management systems. Batch 300 helps batch manufacturing customers meet this need.

**Batch 300**

Batch 300, together with the standard features of the Advant system, offers the degree of flexibility required to meet your demanding batch applications.

Batch 300 is based on the S88.01 standard and NAMUR guidelines. These standards go far beyond traditional batch process control and include Recipe Management, Production Scheduling, and Batch, Unit and History Management.
Batch 300 is broken into the following functional areas:

**Recipe Management**
Recipe Management provides three levels of recipe: site, master, and control. Recipe information includes header, equipment, procedure and formula values. As part of Recipe Management, the most generic site recipe is automatically translated to the master recipe and then to the control recipe.

**Production Schedule**
Production Scheduling (Job Entry) places a job or order into the schedule. The system calculates the number of standard size batches required to fulfill the order. Two methods are provided to determine equipment usage. The “Follow First” method dictates that once a job of batches starts, all batches will use the same equipment. The “Parallel” method lets the system assign equipment as it becomes available and unrelated to the previous batch.

**Batch Management**
Batch Management processes schedules jobs according to start time and availability of plant equipment. Batch IDs are assigned at this level and displays are provided to monitor and edit the job status. Resource Management, as part of Batch Management, utilizes information for controlling equipment availability.

**Unit Management**
Unit Management gives operators and production managers easy access to and control of batch production. Unit Management coordinates the control actions of a set of equipment (unit).

Process Control consists of the fully integrated TCL, CCF and TLL. Together, these three elements provide advanced process control capabilities and interlocking.

**Batch Analysis at Your Desktop**
The tight integration of Batch History Data within Advant allows users to improve batch productivity by gathering Batch ID and event data in a common format. Productivity can be increased by comparing batch-to-batch variables and understanding their effect on yield. Ideal Batch Display allows any key variable of a batch to be saved as an ideal plot. Ideal Plot points can be modified or manually entered. In addition, alarms, events, and operator messages can be viewed at the unit, reactor, or phase level. The inherent design of the batch tools allows all of this data to be viewed by plant production personnel on their office personal computer.
AdvaBuild is a set of engineering tools that enables engineers to work smarter, reduce repetitive engineering tasks, and improve plant-wide documentation. AdvaBuild is a concept which integrates plant engineering capabilities with control system database configuration. AdvaBuild integrates the tools needed for an automation project, including process engineering tools, control system database creation tools, and operator graphics building.

**Simplified Project Structure**
The Structure Builder provides a common project framework. With the Structure Builder, you can create an organized means to build and maintain the object hierarchy for a project by use of a simple tree-structured environment.

**Efficient Database Creation and Documentation**
Engineers can spend a great deal of time at the beginning of a project entering large quantities of new information. The Template Builder is a bulk data-handling tool, where large amounts of data can be entered either through fill-in-the-blank templates or tables. The Template Builder takes full advantage of the relational database. This saves debugging time by searching for unresolved tag references. The Function Chart Builder can then be used to view the loops graphically and make modifications.

The MOD 300 database is a hierarchical tree structure that can be easily navigated from the Structure Builder. The Structure Builder provides the ability to copy, delete, or move whole structures within a single project or among separate projects to share application solutions.

**Source Code Management**
The TCL Builder is an advanced development environment for Taylor Control Language and batch recipes. It provides syntax checks that generate a list of file errors and warnings. Through windowing, an engineer can compare compiled code listings against the source code structure for easier debugging. This enables engineers to debug their programs and correct errors before the code is downloaded to an on-line system. The TCL Builder also provides version-control features which help track changes in source code.
Control logic can be configured and viewed either by template, tables or function chart methods.

Through windowing, an engineer can compare compiled sequencing code for easier debugging.

The Structure Builder provides "top-down" project organization and access to all fields.
A variety of customer-focused services are available locally to provide total system and user support from project inception to start-up and throughout the life of the system.

**Technical Services**
Supplying control systems and advanced supervisory applications demands superior project services and an overall understanding of customer processes. Constant demand for shorter delivery times and fast response to changes means suppliers must improve the total delivery process for all automation needs.

ABB project services provide the capabilities to successfully implement process control systems. Project services incorporate all engineering disciplines needed for a project from inception through equipment start-up and full operation. ABB's professional project services ensure on-time, on-budget, on-specification projects, resulting in complete customer satisfaction.

**Technical Support**
Technical support services ensure proper operation, maintenance and timely repair of your Advant system. Local and regional field engineers are available worldwide to respond immediately to your technical support needs. The 24x365 Support Line is designed to complement local expertise in emergency corrective actions at any time on any day.
**Technical Training**

Performance-based training programs are offered to address your objectives, ranging from training during the pre-installation phase to training throughout the system life cycle. ABB puts our knowledge and years of experience in the process control industry at your disposal. A variety of courses covering basic operator training through advanced process control concepts is available. Plus, ABB training is structured so that you can design a modular, long-term training program for an individual or organization, continually building on knowledge from previous classes until your training objectives are achieved.

ABB's three Global Training Development Centers, supported by major R&D Centers, are augmented by a network of 28 regional training centers in 25 countries. Staffed with certified instructors and with the full support of Global Training Development Centers, these local training centers provide world-class training to meet local market and language needs.

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**Business Alliances**

ONE is ABB’s business alliance program. This program combines the core technologies and open system advantages of ABB automation platforms with selected software, hardware and systems enhancements from alliance member companies. ABB and alliance companies work hand-in-hand to provide enterprise-wide solutions.

These include integrated process, production, and higher level business management systems. Alliance member companies and ABB share a commitment to high-quality standards, technological leadership, open systems and total customer support.

For a list of members, contact your local sales office.

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*ABB extends its enterprise-wide solutions with its ONE alliance partners.*
ABB has been the leader in investment protection and has a long-standing commitment to protecting your automation investment. ABB demonstrates this commitment through incremental evolutionary additions, avoiding radical architectural changes that could jeopardize your investment. Today’s Advant Controllers can run the same applications as previous generation controllers sold as far back as the mid-1980s.

By designing the latest international standards and by committing to open system architectures, ABB makes it easy for you to adapt your Advant system and solutions as needs and technology change. Most recently ABB has developed two new excellent investment protection programs for MOD 300 users that prepare your ABB automation system to migrate to the latest Advant technology as it becomes available. As a result, your system can continually evolve to new levels of control and connectivity.

The Advant StepUp Program
Specifically designed for MOD 300 system users, the Advant StepUp Program allows you to take advantage of the latest performance capabilities for greater computing power and larger memory and disk capacities. This program makes it easy for you to step up from your existing MOD 300 system—Multibus, Turbo Nodes, and Model B Controller Subsystems—to new high-performance Advant workstations and Advant Controllers. And, it provides financial flexibility so you can step up one node at a time. The program also offers companion discounts on software, options, peripherals and services.

The Advant TradeUp Program
The Advant TradeUp Program is another example of how ABB makes it easy and affordable for you to move forward, remain competitive and position your manufacturing operations for growth. This program allows you to trade up your existing Advant Automation with MOD 300 Software workstations toward new high-performance workstations. Best of all, in most cases, trade-up equipment can be installed on-line. Whether you want to replace an entire system or trade up one station at a time, the Advant TradeUp Program offers hardware discounts as trade-in value toward the purchase of new equipment. Any software purchases associated with the TradeUp are available at substantial discounts.

Contact your local ABB sales representative for more information regarding the Advant StepUp and TradeUp Programs.
For additional information, visit us on the Internet at www.abb.com/controlsystems