

# Automated Manufacturing

## Surface Mount Component Line



New surface mount component line.



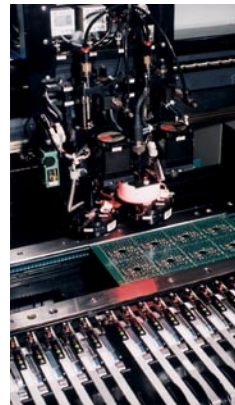
The first pick and place station places chip style surface mount components.



The second station places integrated circuits and microcontrollers.

## Automatic Component Assembly

We use proven technology to manufacture products. The automatic assembly department is constantly expanding. This department has machines to insert: radial components, axial components, integrated circuits, terminals, and surface mount components. Our ability to place a wide variety of surface mount components, utilizing both top side and bottom side technologies, demonstrates our commitment to offer the newest assembly technologies to our customers. Our state of the art automation equipment contributes to higher quality, consistency, and competitive pricing throughout the SSAC brand product line.



Pick and place head with vision system for surface mount components.



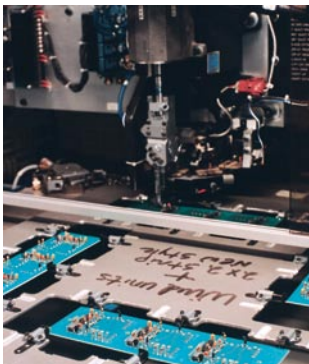
Automatic Insertion machines to insert: radial components, axial components, integrated circuits and terminals.



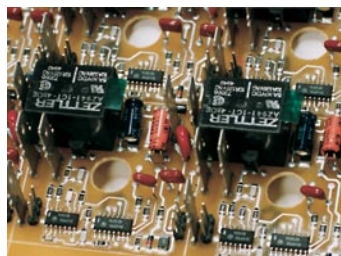
An Axial Sequencer places components in the correct order on a multiple component reel by selecting parts from numerous single part reels.



Computers control the operation of the automatic insertion machines. The operator loads a new program as each new job is started.



This machine inserts conventional radial lead components.



This design uses a combination of surface mount and conventional components.



An operator inspects the automatic application of circuit board masking material.

# Assembly Process



An operator adds components that cannot be automatically inserted.



The CS400 line shows the operator where to insert a through-hole component; then clinches the component into position, ready to be soldered.



A computer controlled line provides consistent quality soldering of single and double sided PC boards.

When all components are inserted in the PC board, the panel proceeds to a computer controlled soldering line. When the soldered boards emerge, they progress to computerized material defect analyzers (MDA) and then to the function testers.

Where and how product is manufactured is determined by the size of the order and type of product. If the order is for 25 to 10,000 plus standard or custom products, manufacturing is handled by our high volume equipment and teams (see photos on this page). If the order is for 1 to 24 pieces of a standard catalog product, it is manufactured in our Express Order Department (see the section on Express Service).



Panels enter the wave soldering line.

## Coating & Encapsulating

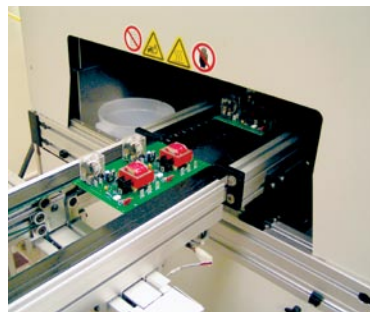
We design in and then build in the quality. Since sensitive electronic components can be adversely affected by harsh industrial environments, our timing modules are encapsulated. Other circuits designed to be installed in an environmentally protective panel or enclosure are coated with a clear conformal coating.



Multiple position testers are used to check the time delay of each timer and timing module. Shown is a pre-encapsulation test.



Sensitive electronics must be protected from harsh industrial environments. An automated spraying line ensures uniform coverage of electronic components with clear conformal coating.



Each timing module and modular control is encapsulated for reliable, continuous operation.

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# ISO9000 Quality Management System

## ISO 9000:2000

Registered



A Quality Control inspector carefully inspects printed circuit boards under a microscope to monitor material and vendor quality.

We understand the important role played by our Quality Management System in making our products dependable, competitive, and responsive to our customers' needs. In order to fully realize our stated Quality Policy, we monitor the quality of the incoming material, the quality of each step of the manufacturing process, and we continue to monitor the performance of units after sale and installation.

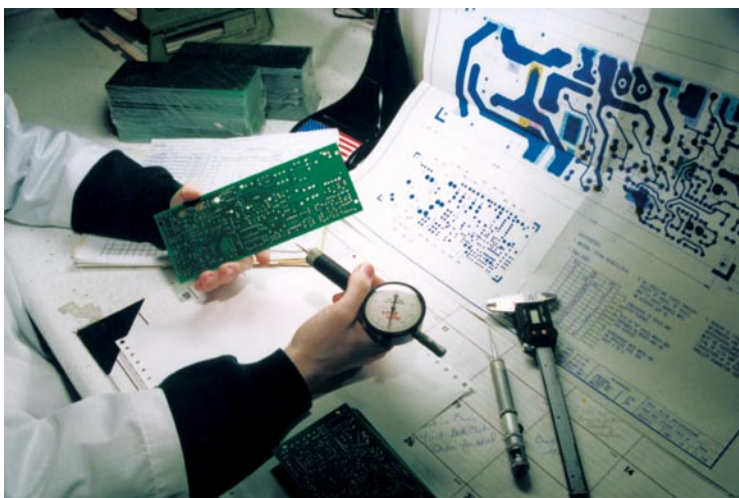
We have invested heavily in our Registered ISO9000 Quality Management System. We did it to ensure that our customers will receive the best products available in every shipment. Our concern for quality extends back to our sources of material and reaches forward to our customers success with our product. We constantly reassess ourselves by critically examining the results of every product we manufacture. Manufacturing data is collected and summarized every week by our QC Department and given to Plant Managers for their review. Their responses initiate monthly discussions both by the QC Department and Management to evaluate ways that will lead to continuous improvement.



A data technician and their supervisor review SPC data on a computer generated chart.

## Statistical Process Control

Statistical Process Control (SPC) is used to contain manufacturing costs and maintain quality. Data is collected from each step of the production process, charted, and then sent to the plant managers each week for review with factory personnel.



Raw material is carefully inspected against engineering specifications for the component. This photo shows a quality inspector checking the dimensions and hole diameters on a shipment of printed circuit boards. After raw material is approved for production, it receives a bar code and is entered into the inventory system.

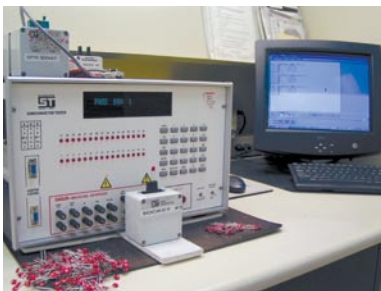
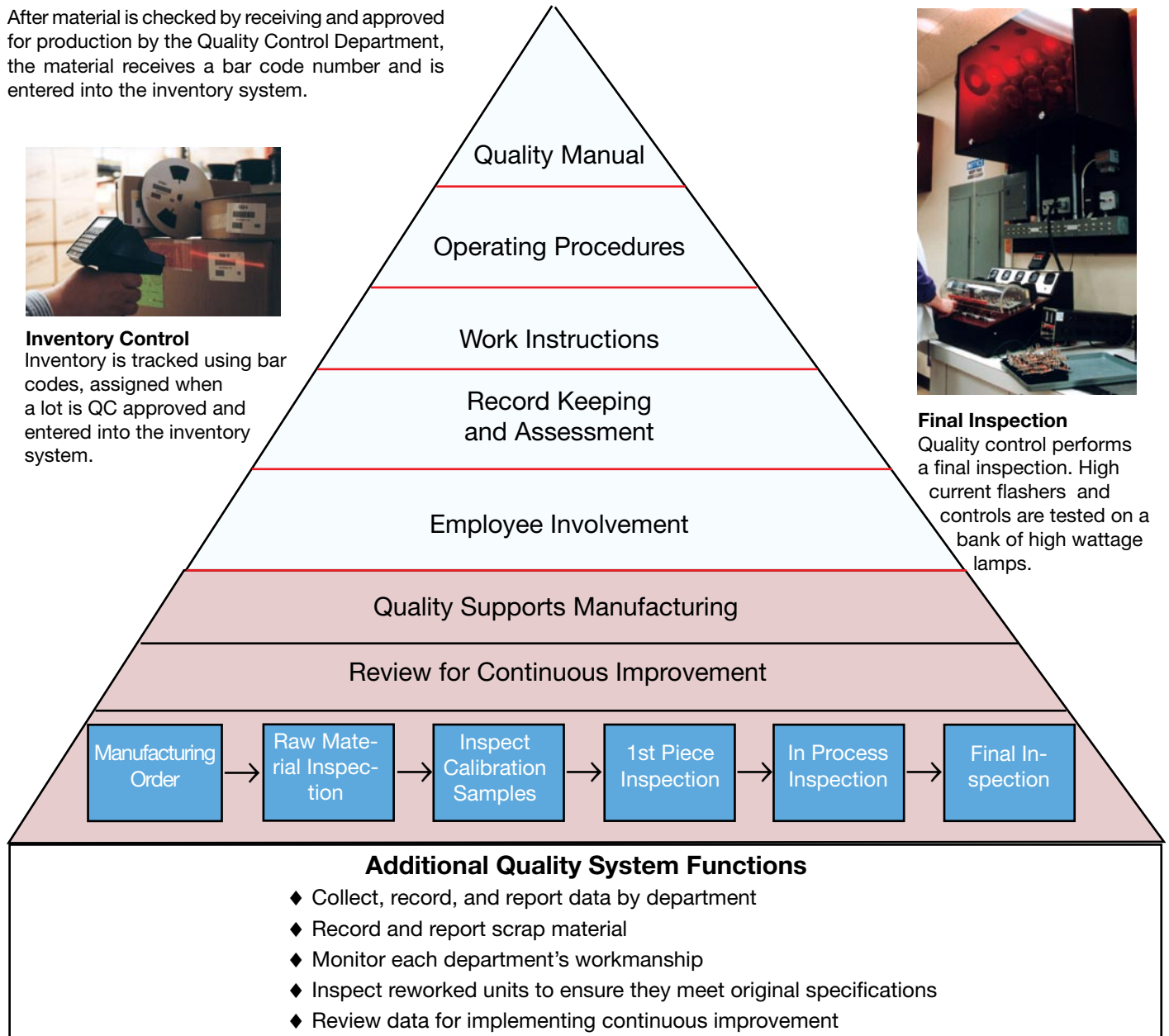
After material is checked by receiving and approved for production by the Quality Control Department, the material receives a bar code number and is entered into the inventory system.



**Inventory Control**  
Inventory is tracked using bar codes, assigned when a lot is QC approved and entered into the inventory system.



**Final Inspection**  
Quality control performs a final inspection. High current flashers and controls are tested on a bank of high wattage lamps.



**Component Testing**  
Electronic components are tested by computer controlled testers.



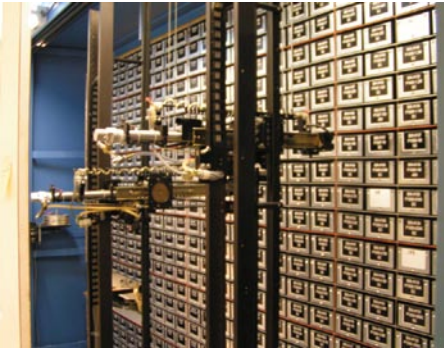
**Inspect Calibration Samples**  
QC inspectors monitor calibration samples to ensure consistent performance from each batch of products.



**High Voltage Testing**  
QC inspectors check isolation voltage to ensure all units meet the high voltage specifications and provide safe, reliable performance in OEM equipment.

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## Express Service



Automated component delivery system supplies components as needed for semi-automatic insertion.



Skilled workers assemble 1-24 piece orders using the same manufacturing methods.



Semi-automatic component placement machines, show operator where to insert each component in the PC board.



Premium Rush Delivery orders are marked for special handling with "Rush" tags.

### Express Order Department

Skilled workers assemble 1-24 pieces of any standard catalog product. Product is assembled on the semi-automated lines utilizing an automated inventory that contains all raw material required. All orders follow the same manufacturing methods. The normal lead time for product produced in an express manner is two weeks or less.

### Premium Rush Delivery

The Express Order Department handles all of our premium rush orders. If your order is for 1-24 pieces of a standard catalog item and you must have it shipped in four to five working days, the Express Order Department can produce it. Rush tags are attached to the processing containers and special attention is given to these orders. There is a nominal per-unit fee for Premium Rush Delivery.



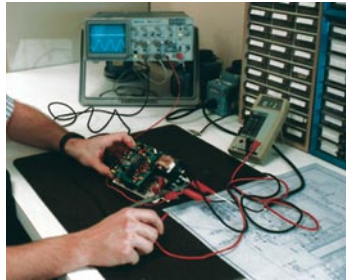
Express Order Department has its own test equipment and trained test technicians.



The Express Department inspects the order, applies labels, boxes, and then sends the order to the shipping department.



Using the latest in CAD software, a design engineer develops a schematic drawing of a new control.



A prototype of the design is built, tested, modified, re-tested, and finally approved by the design engineer.



Individual components are tested to ensure that temperature specifications are not exceeded.



R&D laboratory is staffed with skilled technicians who build prototypes and test new designs.

## Product Research and Development

Our large engineering staff develops new products as well as improves existing products. Using state-of-the-art equipment and supplies, these experienced people design and modify standard products and custom controls. The engineering group regularly tests our standard and custom products in the actual equipment it controls. Each new design is subjected to a battery of tests before it is approved for production.

## New Product Development

The research and development group provides the vehicle for new innovative products that meet today's and tomorrow's equipment requirements. They work closely with the Sales and Marketing Departments looking for new ways to apply emerging technologies to the types of controls we manufacture. Regular concept meetings are held to discuss new customer requirements and new control technologies. Each concept group includes design engineers and sales representatives.

## A Battery of Tests

Each new design has to pass a battery of engineering tests before it can be approved for production. The photos below illustrate our commitment design in the quality. Many designs are also life tested to ensure reliable performance. This multilevel testing program means you can specify our controls with confidence.



CE Master  
EMC Immunity Test  
System



IEEE C62.41 - 1991  
Level A Surge Tester



UL 1991 Showering  
Arc Tester



Electrostatic Discharge  
Tester



EMI & RFI Emission  
Analyzer

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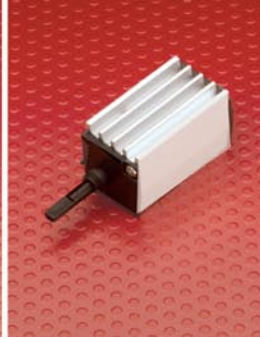
## Custom Product Program General Information



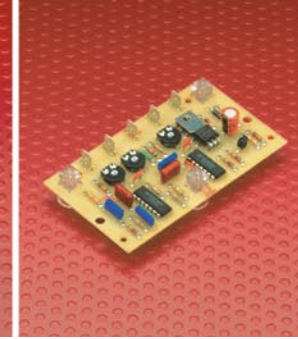
Recycling timer with LEDs and separate adjustments



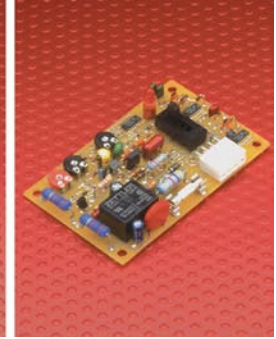
Delay on make timer with end of cycle beeper



Fan speed control in heat sink housing



Recycling timer used in medical equipment



Dual timer with solid state and relay outputs

We are proud of our wide selection of standard products. These controls satisfy most applications. If you cannot find the exact control for your equipment in this catalog, call our technical assistance group. We may have already developed a similar custom control. We have over 4,500 custom project numbers on file and over 30 years experience. The design you require may be a slight modification of an existing design, or a complex development program using microcontroller and multiple inputs and outputs.

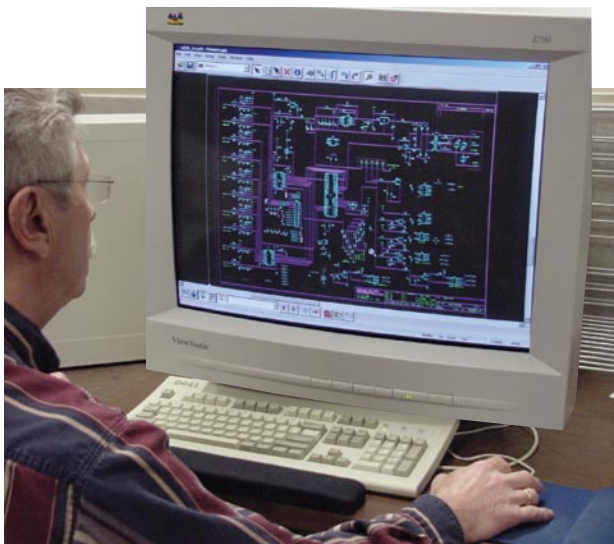
Complex or simple, we provide the required service. The process starts when you contact our technical assistance group or your field sales person. After we receive a description of how your equipment must operate, we will process an estimate for design and production. We can design the control with conventional through hole components or with surface mount technology. There is no separate charge for engineering. Free engineering is part of the service we provide.



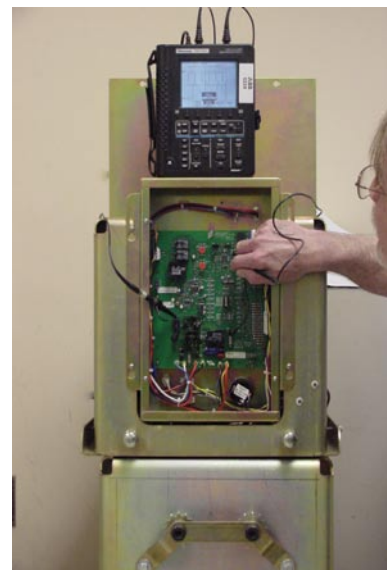
A drafting engineer uses CAD software to design a printed circuit board layout.



Detailed manufacturing instructions are created for all critical processes, and checked against the design prototype.



A design engineer working on a schematic drawing in a CAD workstation.



The design is tested in the customer's equipment to verify proper operation. We encourage customers to ship their equipment to our design laboratories for thorough testing during the design stages.



## Benefits of Selecting Us As Your Custom Controls Supplier

### 1. Design Experience

With more than 4,500 successful designs over the past 30 years, we offer design experience in many areas of solid state equipment control.

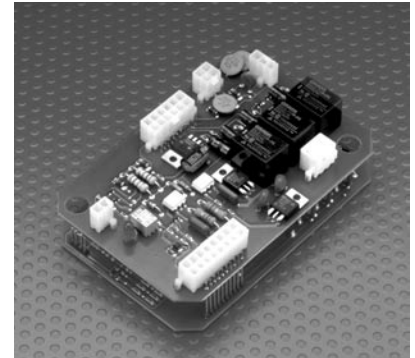
### 2. Lower Project Cost

A. No charges for engineering on most designs when accompanied by a production quantity order. This could easily save you \$20,000 to \$100,000 in engineering costs.

B. Our high volume purchasing of raw materials means a lower component cost, which gives you a competitive advantage.

### 3. Extensive Testing

Our Engineering Department runs a battery of tests on each design before it is approved for production. This means you are unlikely to get surprises when the first units are placed in the field.



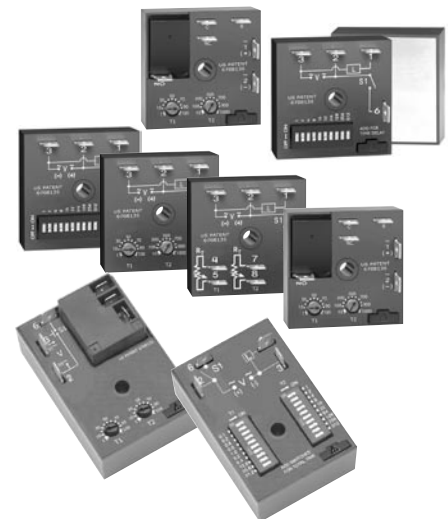
### 4. Agency Approval

Our working knowledge of (UL) Underwriter's Laboratories Incorporated and (CSA) Canadian Standards Association means our designs will pass when your equipment is submitted for approval.

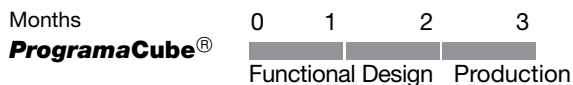
## ProgramaCube®

### A NEW APPROACH FOR CUSTOM DESIGNS

- Factory Programmed to your Requirements
- Reduced Lead Times-Faster Prototypes and Faster Production
- Can Replace Two or More Timers or Counters
- Cost Effective for OEM Equipment
- Single or Dual Timing Functions, Counting or Combinations
- One Adjustment - Accurate Switch, Onboard or External Adjust or Fixed
- Dual Adjustments - Accurate Switch, Onboard or External Adjust or Fixed
- Initiate Terminal for Start, Stop, Counting, or Accumulation
- 12, 24 or 110 VDC; 24, 120 or 230 VAC
- 10 A or 30 A Res. Isolated SPDT Relay Contacts
- 1, 6, 10, or 20A Solid State Output
- Time Delays 0.1 s to 1000 h or Counts to 1023
- Repeat Accuracy to 0.1%
- Encapsulated Circuitry - 10 Year Warranty



### Custom Product Development Time Line



**ProgramaCube®** is a new concept in custom product development. Traditional custom products can take six to ten months to complete. The **ProgramaCube®** concept slashes the development time by inserting custom software into UL, CSA, and CE approved standard control modules. As the above time line shows, this eliminates three of the most time consuming steps in the custom design process. When the functional design is approved, production begins immediately; for this and all future releases. See the **ProgramaCube®** catalog pages for complete specifications. Special time ranges and counter ranges are also available. Custom software designs require a 250 piece order.

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## Approvals for World Markets

ABB's timer and control products are UL recognized or listed and CSA certified. They are tested and approved or certified by many other national and international authorities. Canadian and US standards are similar but considerably differ from the IEC and VDE regulations. ABB low-voltage switching devices are developed and produced in accordance with the applicable regulations of the European EN specifications and VDE standards.



Underwriters Laboratories (UL) and the Canadian Standards Associations (CSA) agreed that either laboratory can test a product to both UL and CSA specifications.



The combined UL signs for the USA and Canada are recognized by the authorities of both countries. Devices with this certificate meet the requirements of both countries.



### UL Listed

The UL Listing Mark on a product indicates that samples of that complete product have been tested by UL to nationally recognized safety standards and found to be free from reasonably foreseeable risk of fire, electric shock, and related hazards.



### UL recognized

UL, Component Recognition Service covers the testing and evaluation of component products that are incomplete or restricted in performance capabilities. These components will later be used in complete end-products or systems listed by UL.



### Canada

Canadian Standards Association (CSA)



### Conformite European (CE)

All devices which comply with the European low voltage directive and which are intended for sale within the European Union must have the CE sign applied. All products in this catalog are CE marked.

The CE sign must not be confused with a certificate of quality issued by the EU. It is solely used to confirm that the respective product complies with the applicable European directive. The CE sign is part of an administrative procedure to guarantee free movement of goods with the European Community.

### ABB SSAC Controls

Low Voltage Directive	93/68/EEC
EMC Directive	89/336/EEC

### ABB's IEC Type Controls

Low Voltage Directive	73/23/EEC
EMC Directive	89/336/EEC
Machinery Directive	98/37/EEC

## Europe

### Russia

In Russia, low-voltage switching devices are subject to certification and have to be provided with a sign.

### Gost standard (GOST-R)



Gost R certification is mandatory for many products. This certification is based on a safety test (IEC standards with Russia-specific deviations) and an EMC test.

### Verband der Elektrotechnik Elektronik Informationstechnik (VDE)



Applicable for technical instruments covered by the German Gerätesicherheitsgesetz (GSG) as well as for single parts and electrical wiring devices.

### Shipping approvals



### Germanischer Lloyd (GL)

For devices installed in ships, an approval issued by independent shipping companies, such as the GL, are required by the maritime insurance companies.

### Australia, New Zealand



### C-Tick Mark

The C-Tick Mark certifies compliance with the Australian EMC requirements. The Mark is also recognized in New Zealand.