



# Machine Control Solutions

Components for Machine Builders:  
Industrial PC | Remote I/O | Ethernet Switch | Drives | Motors



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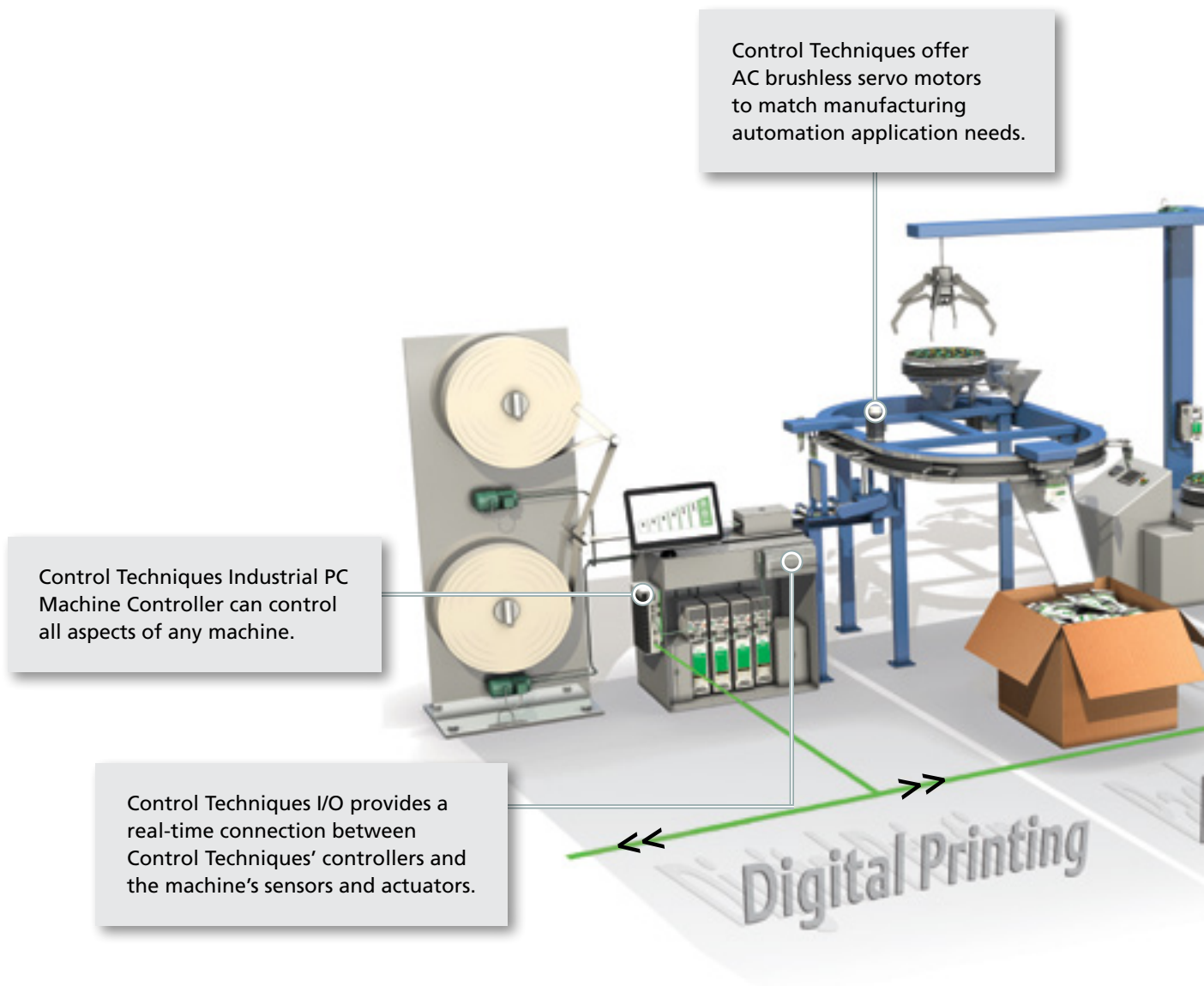
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**CONTROL TECHNIQUES™**

**Nidec**  
All for dreams

# The Control Techniques Machine Control Solution



Control Techniques offer optional drive based controllers to deal with machine section control.

Control Techniques offer integrated PLC in their drive for simple logic control.

Control Techniques offer a range of drives designed specifically for industrial applications.

Control Techniques Ethernet Switch enables you to tailor your network architecture to suit your machine design.

Standard Ethernet can connect all devices and systems in a machine, factory or in the cloud.



←← →→  
Packaging Handling Food Processing

**Control Techniques' products are tailored to work together in order to:**

- Reduce installation and commissioning time
- Improve machine throughput and enhance performance
- Minimize downtime
- Simplify sourcing via a single point of contact

# Industrial PC Machine Controllers: MCz600 & MCz200

Our Industrial PC Machine Controllers are general purpose computers that can manage every aspect of any industrial process, as well as a variety of wider tasks within your factory or business such as big data analysis. Our IPCs run on the Windows operating system, and so are fully compatible with third party software, but have been optimized to work with other Control Techniques' products as a complete solution. The result is increased throughput for all machines.

There is increasing pressure on machine builders to develop new and more flexible products fast. That is why the MCz600 and MCz200 Industrial PC Machine Controllers have been designed to be quick and easy to install and commission. They have a robust, flexible and reliable design that allows for easy development and use, as well as for easy component and application integration.

## Benefits:

### **Fast machine development due to integration of logic, motion and visualization**

The Control Techniques solution provides an environment for programming controllers in all key programming languages with seamless support for the generation of visualizations.

### **Ease of use due to open standards**

The use of open standards such as IEC61131-3 and PLCopen provides ease-of-use. These standards are supported by the majority of automation vendors, and most automation engineers are trained in their use.

### **Maximum choice for component integration due to PC based architecture**

PC based architecture, including the Windows operating system, allows for the easy integration of third party components. This provides machine builders flexibility to choose best-in-class components for all applications.

### **Simple application integration due to standard onboard interfaces**

Standard onboard interfaces including four Ethernet ports and up to four USB ports, mean that the Industrial PC Machine Controller can be easily integrated with any application or machine.

### **Robustness due to rugged design**

The Industrial PC Machine Controller does not contain rotating fans or internal cabling, and is designed to operate in elevated temperatures. This increases reliability and reduces the need for maintenance, even in dusty environments.



## Specifications:

### MCz600

- 4th generation Intel® Core™ i7 processor at 1.7 GHz with 4 GB DDR3L memory
- 64 GB solid state hard drive
- 2 MB NVRAM
- 4 x 10/100/1000 base-T RJ-45 ports
- 4 x USB ports (2 x USB 2.0, 2 x USB 3.0 compliant)
- 1 x VGA, 1 x HDMI
- 2 x RS-232, 2 x RS-422/485
- Audio line-in/line-out
- Windows embedded standard 7
- Compact, fanless design
- Power requirement 24 V DC  $\pm$  20 %
- Operating temperature - 20 ~ 60 °C
- IP40 ingress protection

### MCz200

- Intel® Atom E3845 1.91 GHz processor with 4 GB DDR3L memory
- 64 GB solid state hard drive
- 2 MB NVRAM
- 3 x 10/100/1000 base-T RJ-45 ports
- 3 x USB ports (2 x USB 2.0, 1 x USB 3.0 compliant)
- Isolated DIO 4-ch digital input, 4-ch digital output
- 1 x VGA, 1 x HDMI
- 1 x RS-232, 1 x RS-422/485
- Audio line-out
- Windows embedded standard 7
- Compact, fanless design
- Power requirement 24 V DC  $\pm$  20%
- Operating temperature - 20 ~ 60°C
- IP40 ingress protection

# Machine Controllers: MCI200, MCI210 and SI-Applications



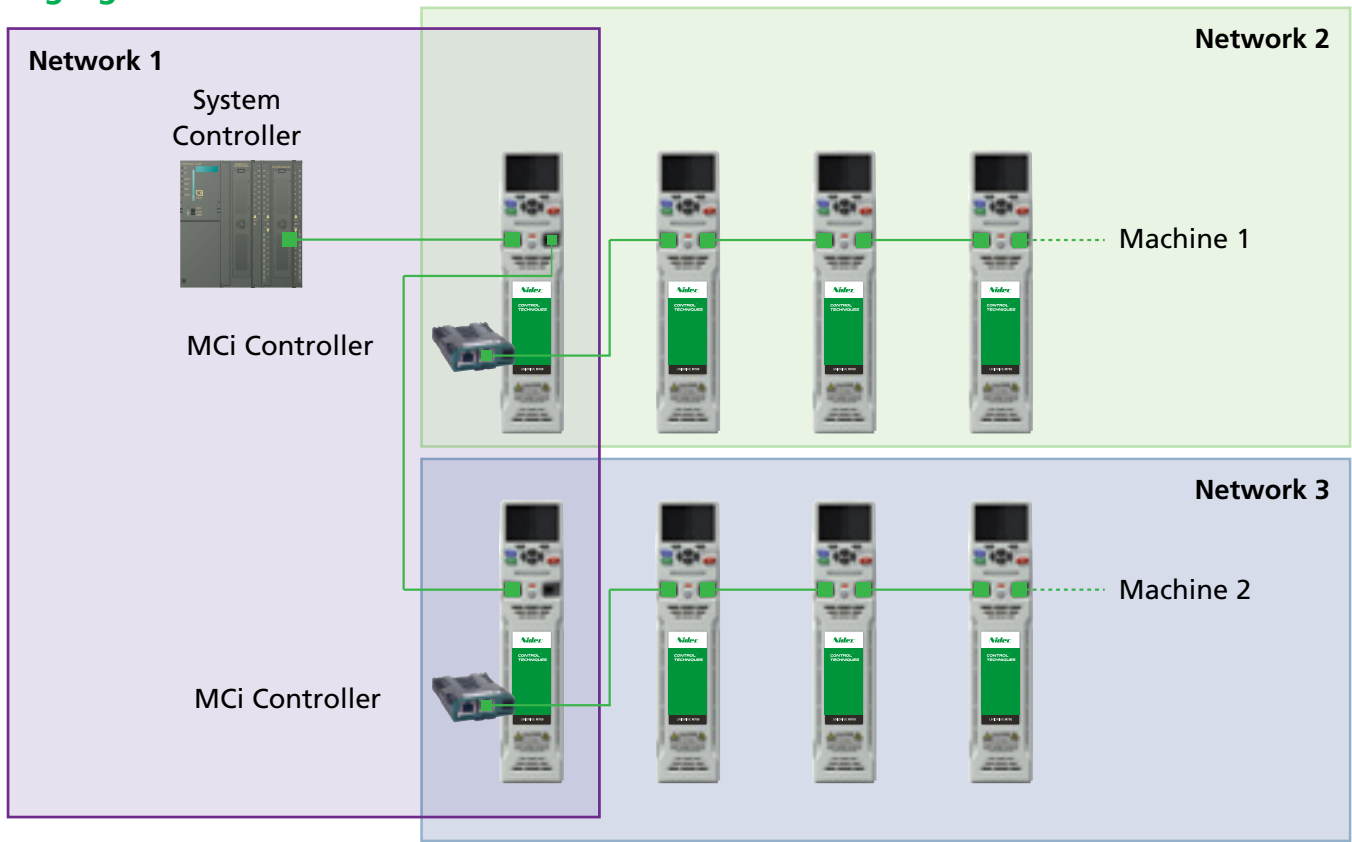
## Second processor for PLC programs and multi-axis control

MCI modules add a powerful processor to Unidrive M700 which can execute comprehensive application programs to extend system and machine control capability. As a result of the highly flexible plug-in option module format, system design is streamlined by removing the need for PLCs and other external components. Programs are fast and easy to develop thanks to the user-friendly Machine Control Studio software which uses industry standard IEC 61131-3 programming languages to build highly flexible and productive systems. MCI programs can access and manage Unidrive M's embedded Advanced Motion Controller across a wide range of networks to provide perfectly synchronized multi-axis machine performance and throughput.

## Save costs & streamline machine design

- MCI modules eliminate the need for external PLCs and motion controllers
- Plug-in option modules powered from the drive's internal power supply mean less wiring and less physical space is required
- Simple integration with external components such as I/O, HMIs and other networked drives can be achieved using Unidrive M's integrated standard Ethernet ports or fieldbuses supported by SI option modules (EtherCAT, PROFINET, PROFIBUS, CANopen)
- MCI210 has two additional Ethernet ports with an internal switch

## Segregated network control



## Build high performance systems and productive machines

- MCi modules execute comprehensive programs that can control multiple drives and motors simultaneously across real-time networks
- M700's onboard Ethernet using RTMoE (Real Time Motion over Ethernet) provides synchronization and communication between drives using the Precision Time Protocol (PTP) as defined by IEEE1588 V2
- Performance is optimized by having a motion controller embedded in each networked drive
- MCi210 ensures higher performance by delivering:
  - Two additional Ethernet ports with an internal switch
  - Support for standard Ethernet protocols, along with RTMoE for PTP synchronization
  - Modbus TCP/IP master (up to 5 nodes)
  - Parallel interface with drive processor provides faster data exchange
  - Machine control over two segregated Ethernet networks enables greater flexibility in machine design
  - Extends connectivity with 3 x digital inputs, 1 x digital output and 1 x digital I/O

# Remote I/O: I/O 201-BC I/O 202-BC

Control Techniques I/O offering is a digital machine control network that has been designed to work with other Control Techniques' products as a complete solution. The Control Techniques I/O provides a seamless real-time connection between Control Techniques' controllers and the machine's sensors and actuators.







## Benefits:

- Design simplicity for easy set-up and operation
  - Field power connection only on the first module
  - Simple DIN rail plugging/unplugging mechanism
  - Configuration via Machine Control Studio
- Rugged design for longevity
  - Simple to wire
  - Robust wiring
- Compact design for limited space applications

## Specification:

- Convenient, modular I/O for industrial networks
- Guaranteed interoperability with no network programming
- Full range of digital and analog slices available
- Mounts on standard 35mm DIN rails
- Compatible with Modbus TCP/IP, EtherCAT
- Ethernet network for motion and I/O
- Use a single programming environment for I/O and motion application development
- CE, UL approved
- Temperature range - 20°C to 60°C
- IP20



EtherCAT

Modbus TCP/IP

# Ethernet Switch: SW100-5

Control Techniques Ethernet switch means there is no need for additional components to support different networks because one switch supports multiple industrial Ethernet protocols. The switch has been designed to integrate with other Control Techniques' products in order to deliver maximum throughput for machine builders.

## Benefits:

### Management of different industrial Ethernet protocols

One single switch supports multiple industrial Ethernet protocols like PROFINET, Ethernet, Modbus TCP/IP, EtherNet/IP, and IEEE1588.

### Versatile network topologies and redundant power supply connections

Ensures high flexibility and reliability of machines and plants.

### Enhanced security

Prevents unauthorized access to critical areas of control system networks. Managed Ethernet switches using VLANs split the industrial network into several subnets.

### Increased network performance

Achieved with intelligent data transmission management that splits the network into different VLANs:

- Reduced network path
- Delivering messages only where required to reduce network load
- Lowest latency message handling, configurable priority handling
- High precision time synchronization supporting protocols such as IEEE1588
- Reduced broadcast load using VLAN segregation

### Fast installation and commissioning time

Through network discoverable Unidrive M protocol which allows setup via a web page interface and plug'n'play configuration tools.



**Rapid maintenance, debugging and troubleshooting of an industrial automation network:**

Each managed Ethernet switch can be monitored by the industrial network, allowing master controllers to identify problems with machine critical infrastructure.

**Specification:**

- 5 Ethernet ports
- 24 V power supply
- IPv6
- DHCP for IP address assignment
- Support EtherNet/IP, Modbus TCP/IP and IEEE 1588 PROFINET protocols for device management and monitoring
- EtherNet/IP EDS file available
- PROFINET GSDML file available



EtherNet/IP

Modbus TCP/IP

PROFINET

# AC and Servo Drives and Motors

Control Techniques offer a wide range of drive and motor solutions designed specifically to meet the needs of industrial customers.

## AC and servo drives for industrial applications

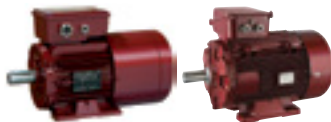


Unidrive M offers defined feature-sets to optimize productivity across a multitude of automation applications. Includes industry standard Ethernet IEEE 1588 V2 comms, IEC 61131-3 motion and automation programming and high speed I/O.

0.25 kW – 2.8 MW (0.33 hp – 4,200 hp)

100 V, 200 V, 400 V, 575 V, 690 V

## Motors for manufacturing automation



### Dyneo® series

- Premium efficiency Permanent Magnet synchronous motors
- IP55 & IP23, IE3 & IE4
- 1 – 750 hp (0.75 – 550 kW)
- 375 – 5,500 rpm

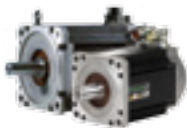


### ACCU-Torqu® series

- 5000:1 constant torque individual motors
- TENV, TEFC and TEBC
- 1/4 – 300 hp (0.2 – 260 kW)
- 1,200 – 1,800 rpm



## Servo Motors for manufacturing automation



### Unimotor hd series

- 230 & 460 V compact low inertia servo motor for high dynamic applications
- Frame sizes 55, 67, 89, 115, 142, & 190 mm (IEC mounting)
- 6.4 lb.in – 750 lb.ft (0.72 – 85.0 Nm)
- 3x peak torque
- IP65 rating, UL, CE compliant



### Unimotor fm series

- 230 & 460 V flexible high performance brushless servo motor
- Frame sizes 75, 95, 115, 142, 190 and 250 mm (IEC mounting)
- 10.6 lb-in to 1,203 lb-in (1.2 – 136 Nm)
- 3x peak torque
- IP65 rating, UL and CE compliant



### NT series

- 230 V compact ct NEMA or metric flange servo motor
- Frame sizes in English (NEMA 23 or 34) or Metric (IEC-72-1)
- Continuous torque ranges from 7.5 lb-in to 56 lb-in (0.84 – 6.33 Nm)
- IP65 rating, UL compliant



### XV series

- 230 V economical metric motors
- Metric frame sizes 40, 60, 80 & 130 mm
- 0.9 lb-in to 101 lb-in (.11 – 11.5 Nm)
- IP55 & IP65 rating, UL and CE compliant

# Software Solutions

## Machine Control Studio

Machine Control Studio provides a flexible and intuitive environment for programming. The software provides programming for:

- Unidrive M200-M700's onboard PLC
- M700 fitted with MCI200 or MCI210 integrated machine control modules
- MCz200 and MCz600 Industrial PC machine controllers
- Ethernet network data configurations

## IEC 61131-3 motion and automation programming

The programming environment is fully IEC 61131-3 compliant and therefore familiar, fast and easy to use for control engineers around the world.

The following IEC 61131-3 programming languages are supported:

- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)
- Additionally, Continuous Function Chart (CFC) is supported

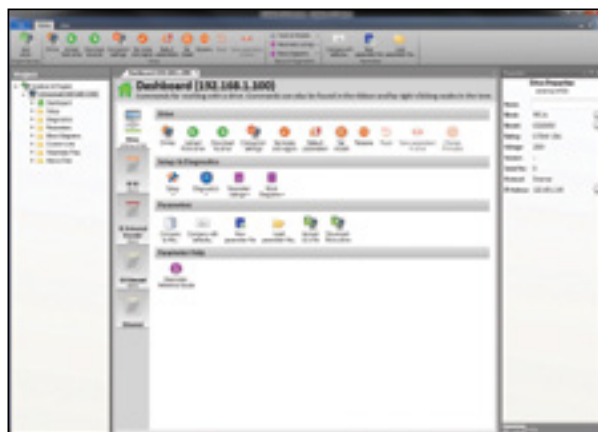




## Connect Commissioning Tool

The Connect tool is for commissioning, optimizing and monitoring system performance. Its development draws from extensive user research, using human centred design principles to give the ultimate user experience:

- Task-based operations are simplified with intuitive graphical tools in a familiar Windows environment
- Dynamic logic diagrams and enhanced searchable listings
- Drive and motor performance can be optimized with minimal specialized knowledge
- Tool is scalable to match application requirements
- Supports the import of Unidrive SP parameter files and allows full drive cloning (i.e. parameter sets and application programs)
- Matching Unidrive M to Nidec motors can be achieved quickly and easily using Unidrive M Connect's motor database
- Multiple communications channels for a more complete overview of the system
- Drive discovery gives the ability to find drives on a network automatically without the user having to specify their addresses



# Engineering Solutions

Control Techniques' solutions group offers comprehensive automation solutions with full engineering services. Projects can vary from individual machines to comprehensive factory automation solutions. Dedicated local teams offer:

- Industry-specific solutions optimized for maximum reliability and productivity
- Expert engineers who can design innovative, energy saving solutions
- Comprehensive software development
- Continuous maintenance to ensure trouble-free operation
- Flexibility for future expansion

## Adding value to your business

Comprehensive maintenance and service packages lead to long term partnerships, ensuring value is continuously added to customers' businesses:

- Management of future equipment or machine retrofitting
- Upgrades to hardware/software as technologies advance
- On-site software development for fine-tuning automation
- Provision of add-on functionality as your needs expand
- Support for staff training needs
- Regional knowledge allows collaboration with local supply chains and easy adherence to local industry standards





# Control Techniques

## Solving your challenges

### An enhanced global presence that benefits all our customers

Through our integrated Drives & Motors organization, we have an extensive global presence that provides comprehensive local support and services. This includes:



5,500 employees



#### 40+ Automation Centers

Providing excellent customer support for any product, automation solutions or service requirements



#### 23 Manufacturing sites

Producing a comprehensive range of high quality products, optimized for industry-specific customer requirements



#### 8 Engineering and Design facilities

Develops market leading products and feature-sets using the latest design technology



#### 3 Regional despatch hubs

For quick delivery of product

Our extensive sales and service networks in Europe, Asia Pacific and the Americas are backed-up by hundreds of carefully selected distributors and service partners, often in remote locations, all over the world.



## Case study: Drives and MCz200 IPC help Dominion Power save \$38,000 per year in labor costs

Control Techniques MCz200 IPC has been selected by Dominion Power for use at its Possum Point power station on the Potomac River in the USA. Possum Point is a 650 acre site with four generating units. Dominion is one of the US's largest producers and transporters of energy with a portfolio of approximately 24,300 megawatts of generation.

### The challenge:

Possum Point needed to replace a 40 year old control system that controlled 22 cooling tower fans across two towers. The existing system was over 40 years' old. A major issue was the need for manual fan blade pitch changes due to seasonal changes in air density which consumed about 480 man hours per year, as well as associated infrastructure costs such as cranes.

### The solution:

A Control Techniques MCz200 IPC, along with a Control Techniques Unidrive M700 was selected and is used to control induction and servo motors controlling 22 cooling tower fans.

### The benefits:

In a standard fan motor, the variables are fan blade pitch and air density with a fixed maximum horse power at a fixed speed. In contrast, the variables in a drive-controlled fan motor are speed and air density with a fixed maximum horse power at a fixed fan blade pitch. It therefore costs nothing in man hours to adjust speed, as this is done by the drive. The labor saving is estimated at \$38,000/yr.

A further saving occurred because the previous system did not offer brake control. This meant fan direction had to be changed manually. If a fan was still rotating before changing direction it could place strain on the drive shaft and gearboxes, creating maintenance issues. Under the control of the MCz200 IPC and Unidrive M700, the fans are now guaranteed to come to a stop before changing direction.

**CONTROL TECHNIQUES™**

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