



# UNIDRIVE M Overview

## AC and Servo Drive Family for Manufacturing Automation



Unidrive M100  
Unidrive M200  
Unidrive M300  
Unidrive M400  
Unidrive M600  
Unidrive M700  
Unidrive M800

0.25 kW - 1.2 MW Heavy Duty  
(0.33 hp - 1600 hp)  
100 V | 200 V | 400 V | 575 V | 690 V



## Control Techniques - a global leader in motor control and power conversion technology

As part of Emerson (NYSE: EMR), Control Techniques is a global leading manufacturer of motor control and power conversion technology for commercial and industrial applications. Our innovative products are used in the most demanding applications requiring performance, reliability and energy efficiency.

With Manufacturing and Engineering & Design facilities in Europe, the USA and Asia, our 93 subsidiary Drive Centers and resellers in 70 countries offer customers local technical sales, service and design expertise. Many also offer a comprehensive system design and build service.

## Emerson - a legacy of performance

Emerson is a diversified global manufacturing and technology company, ranked number 120 in the 2012 Fortune 500® annual list of America's largest corporations. We offer a wide range of products and services in the industrial, commercial and consumer markets through our Process Management, Industrial Automation, Network Power, Climate Technologies and Commercial & Residential Solutions businesses. Recognized widely for our engineering capabilities and management excellence, Emerson has approximately 133,000 employees and 235 manufacturing locations worldwide.

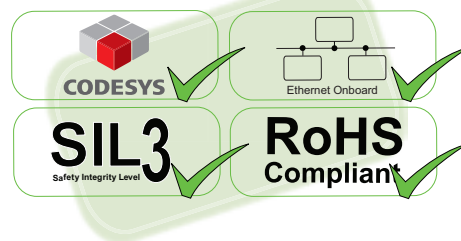




The Unidrive M Manufacturing Automation drive family

## Unidrive M – a Manufacturing Automation drive family that is tailored to customer needs

Unidrive M is designed specifically for Manufacturing Automation applications which is Control Techniques' traditional area of expertise. Led by the results of extensive customer-driven market research, we have tailored each Unidrive M model to specific application needs identified within Manufacturing Automation, taking customer choice to new heights. Unidrive M is evolving the future of Manufacturing Automation with the latest drive technology which includes over 30 patents pending; a global achievement combining Control Techniques' worldwide Engineering & Design resource and product testing processes.





**Plastic production line**

Unidrive M – the world’s most comprehensive class leading family of drives dedicated to Manufacturing Automation. Control Techniques’ exciting new Unidrive M offers the widest possible variety of functionality and solutions for motor control applications with a range of 0.25 kW to 1.2 MW.

Unidrive M delivers seven function-focused drive models, all with superior motor performance and an individual feature set to best match the customer’s application and system connectivity needs. Easily create faster, more productive systems, with reduced development time and countless possibilities within the Machine Automation industry.

### **Key family benefits include:**

Customer choice taken to new heights


- Precise functionality to suit your needs – select from seven levels to optimize your time, design simplicity and investment
- Ultimate drive family for new customers – widest functionality, power choice and minimized dimensions for Manufacturing Automation applications

Intelligent Machine Architecture (IMA) – programmable control devices linked together through open standard Ethernet

- IMA enables the selection and easy integration of the world’s best products into your machine design
- Accelerated machine development and innovation through integrated industry standard CODESYS (IEC 61131-3) for motion and PLC programming

World leading drive performance

- Increased throughput – exceptional motor control using standard induction, permanent magnet, servo and linear motors in open or closed loop configuration for total design flexibility



Control Techniques' new Unidrive M family incorporates extensive feedback from hundreds of machine builders and end users in Asia, Europe and the Americas to create a unique range that enhances machine performance, reduces commissioning and diagnostic times, lowers machine costs and provides the flexibility for every application.

- Increased productivity through better machine control – onboard real-time Ethernet with hardware based Precision Time Protocol (IEEE 1588 V2) provides fast and flexible communications and synchronization

#### Ease of use

- Fast installation and start-up – intuitive keypads, software tools and easy cable management minimizes work
- Simple upgrade – fits existing mountings and cable connections, with trouble-free parameter transfer for existing Control Techniques' Unidrive SP and Commander SK users

### Heavy Duty power range:

- Panel mount: 0.25 to 250 kW (0.33 to 400 hp)
- Modular range: Ratings up to 1.2 MW (1,600hp)

### Voltage ranges:

- 100 V (100 V - 120 V  $\pm$  10%)
- 200 V (200 V - 240 V  $\pm$  10%)
- 400 V (380 V - 480 V  $\pm$  10%)
- 575 V (500 V - 575 V  $\pm$  10%)
- 690 V (500 V - 690 V  $\pm$  10%)



# Unidrive M scalable Manufacturing Automation drive family

Each Unidrive M model offers an incremental level of functionality, designed to solve more advanced application needs. The family is designed to provide exactly the right drive feature-set for each Manufacturing application, sharing a common software foundation and range of common click-in optional modules.

## M100



Value drive with quality and performance for open loop applications

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## M200



Flexible machine integration through communications  
(Direct upgrade for Commander SK)

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## M300



Enhance throughput with Machine Safety

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## M400



Fast set-up and diagnosis with real-text display, plus integrated CODESYS based PLC

(Direct upgrade for Commander SK with LogicStick and extended power range)



**CODESYS**  
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Up to 7.5 kW (10 hp)

Up to 22 kW (30 hp)

Up to 110 kW (150 hp)

Open loop vector or V/Hz induction motor control

Enhanced open loop Rotor Flux Control for induction motors (RFC-A)

## M600



High performance drive for induction and sensorless permanent magnet motors



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## M700



Class leading induction and permanent magnet servo motor performance, with real-time Ethernet  
(Direct upgrade for Unidrive SP)



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## M800



Ultimate performance through advanced onboard motion control



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Functionality,  
Performance &  
Flexibility

Up to 1.2 MW (1600 hp)

Open loop vector or V/Hz induction motor control

Enhanced open loop Rotor Flux Control for induction motors (RFC-A)

Open loop permanent magnet motor control (RFC-S)

Active Front End (AFE) power quality convertor

Closed loop Rotor Flux Control for induction motors (RFC-A)  
(M600 requires SI-Encoder option)

Closed loop permanent magnet/servo motor control (RFC-S)



## Unidrive M highlights

### Performance control for every motor

Control Techniques' unique motor control algorithms combined with the latest microprocessor technology ensure that Unidrive M drives offer the highest stability and bandwidth for all industrial motor types. This enables you to maximize machine throughput in every application and with every motor; from standard AC induction motors to dynamic linear motors and from energy saving permanent magnet motors to high performance servo motors.



Motor control options available include:

Control Mode	Control Strategy	Features	Applies to
Open loop vector or V/Hz induction motor control	Frequency Speed	Open loop motor control for induction motors. Easiest configuration. V/Hz can be used in multi-motor systems.	All
<b>Enhanced</b> open loop Rotor Flux Control for induction motors (RFC-A)	Speed Torque	Vector algorithm utilizing closed loop current control to greatly enhance performance for all induction motor sizes.	M200 - M800
<b>New</b> open loop permanent magnet motor control (RFC-S)	Speed Torque Position	Open loop motor control for permanent magnet motors utilizing closed loop current control. This mode offers good dynamic performance and enables more compact and higher efficiency motor technologies to be used.  This mode also supports simple positioning without the need for encoder position feedback.	M600 - M800
<b>Enhanced</b> closed loop Rotor Flux Control for induction motors (RFC-A)	Speed Torque Position	Dynamic speed or position control of induction motors, supporting a wide range of feedback devices.	M600 - M800
<b>Enhanced</b> closed loop permanent magnet/servo motor control (RFC-S)	Speed Torque Position	Closed loop control of high efficiency and servo permanent magnet motors supporting a wide range of feedback devices. This mode also supports the control of Synchronous Reluctance Motors.	M700 - M800
<b>Enhanced</b> Active Front End (AFE) Power Quality Convertor	Regenerative	Active Front End (AFE) to return excess braking energy back onto the power line, reducing energy costs instead of dissipating this energy as heat. The AFE provides power factor control for power quality management and greatly reduces unwanted power harmonics.	M600 - M800





## Intelligent Machine Architecture - open automation systems

Unidrive M maximizes machine throughput. This is achieved through a synchronized high performance network of intelligent control devices, sensors and actuators, linked together through open standard Ethernet.

### Open Ethernet networking

The Unidrive M family uses standard Ethernet for high performance automation and motion control. This network enables communications between drives, I/O, PCs and other automation components in a system.

### IEC 61131-3 motion and automation programming

IEC 61131-3 is the international standard that specifies five programming languages optimized for use in automation equipment. Over recent years IEC 61131-3 has become widely used and is supported by the majority of automation vendors providing access to an enormous talent pool of engineers. The system is configured within the industry leading CODESYS software programming environment.



### Fieldbus compliance

Using onboard functions and click-in System Integration (SI) option modules, Unidrive M offers connectivity to all common fieldbus communications such as PROFIBUS, DeviceNet, CANopen and EtherCAT\*. Our SI modules are certified by third parties to ensure full compliance with standards and trouble-free configuration and operation.

\* Future availability

### Onboard safety

Machine safety features enhance machine throughput while protecting people and assets, helping to meet SIL3 (Safety Integrity Level 3). Different Unidrive M models offer alternative levels of integrated safety functions to suit various manufacturing needs, reducing external components and machine costs.

- Single Safe Torque Off (STO) inputs provide an easy entry level for safety integration.
- Dual Safe Torque Off (STO) inputs provide enhanced safety functionality.
- Advanced safety\* to meet the IEC 61800-5-2 functional safety standard, covering numerous functions including STO, Safe Stop 1 and 2, Safe Limited Speed, Safe Limited Position.

\* Future availability

### Powerful and easy field service and upgrade

The Unidrive M family is designed to extend the field service life of previous generations of products. It also provides the easiest possible upgrade for OEM machine designs that currently use Control Techniques' Commander SK and Unidrive SP drives.

- Unidrive M200 and M400 provide a direct upgrade path from Commander SK.
- As a variant of the Unidrive M700, M701 provides a direct upgrade path from Unidrive SP.
- All variants of Unidrive M700 are able to take a Smartcard (parameter copying device) from Unidrive SP and import drive settings.
- Unidrive M700 and M701 have the same control connector terminal layout as Unidrive SP.
- The SI-Applications Plus module allows existing Unidrive SP SyPTPro programs to be easily recompiled for Unidrive M700.
- Unidrive M enables easy retrofit as existing fixing points for Unidrive SP or Commander SK installations can be used with conversion plates available where required.

## Energy efficiency

Unidrive M is designed to enhance the energy efficiency of manufacturing machinery:

- Low losses, up to 98% efficient.
- Low power standby mode. In some applications, drives can sit idle for significant periods; Unidrive M's reduced standby power saves energy.
- Easy common DC bus configuration enables braking energy to be recycled within the drive system, reducing energy usage and eliminating external supply components.
- Unidrive M supports sensorless (open loop) control of compact high efficiency permanent magnet motors.



Highly efficient permanent magnet motors from Leroy Somer

## Control Techniques matched servo motors

Control Techniques offer two ranges of AC brushless servo motors to match Manufacturing Automation application needs

### Unimotor fm

**Flexible high performance AC brushless servo motor**  
**0.72 Nm – 136 Nm (408 Nm Peak)**

Unimotor fm is a flexible high performance AC brushless servo motor range matched for use with Unidrive M. The motors are available in seven frame sizes with various mounting arrangements, motor lengths and a wide range of feedback options.

### Unimotor hd

**Compact servo motor for demanding applications**  
**0.72 Nm - 85.0 Nm (255 Nm peak)**

Unimotor hd is Control Techniques' high dynamic servo motor range, designed for maximum torque density. This brushless AC servo motor range provides an exceptionally compact, low inertia solution for applications where very high torque is required during rapid acceleration and deceleration profiles.



Control Techniques Unimotor hd high dynamic brushless AC servo motor range



Packaging application





**Textile machine**

Unidrive M is the embodiment of extensive market research into real customer needs and an innovative global engineering and design collaboration. This has embraced cutting edge modern development and testing methods, resulting in 30 patents pending ...and counting.

## Unidrive M100 AC drive



## Value drive with quality and performance for open loop applications

M100 delivers an economical open loop drive for general Manufacturing Automation applications, with Control Techniques' proven quality and class leading motor operation.

### Other Unidrive M100 benefits include:

#### Quick and easy to install and configure

- Simple and easy to read high brightness LED keypad as standard
- No unnecessary features
- 10 most commonly used parameters listed on front of drive

#### Reduce machine size and cost

- Compact drive dimensions, among the smallest in class at every power rating

#### Save energy

- Low losses up to 98% efficient
- Low power standby mode

#### Robust design for manufacturing environments

- Conformal coating supported through extensive environmental testing and certification

### Typical applications:

- Frequency control for conveyors, fans, pumps and mixers

### M101 variant

Provides a speed reference potentiometer keypad to enhance customer choice and ease of use

### Key data

Heavy Duty rating: 0.25 – 7.5 kW (0.33 - 10 hp)  
Supply phases: Size 1 to 4: 110 V drives – 1 phase, 230 and 400 V drives - 1 or 3 phase

#### Standard features

Keypad: M100: Fixed LED  
M101: Fixed LED with speed reference potentiometer  
Parameter cloning via: SD card

#### Options

Adaptor: AI-Back-up Adaptor

#### Voltage ratings

100 V (100 V - 120 V $\pm$ 10%)	✓
200 V (200 V - 240 V $\pm$ 10%)	✓
400 V (380 V - 480 V $\pm$ 10%)	✓
575 V (500 V - 575 V $\pm$ 10%)	
690 V (500 V - 690 V $\pm$ 10%)	

#### Control mode

Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	
Open loop permanent magnet motor control (RFC-S)	
Closed loop Rotor Flux Control for induction motors (RFC-A)	
Closed loop permanent magnet motor control (RFC-S)	
Active Front End (AFE) power quality convertor	



## Unidrive M200 AC drive



### Voltage ratings

100 V (100 V - 120 V ± 10%)	✓
200 V (200 V - 240 V ± 10%)	✓
400 V (380 V - 480 V ± 10%)	✓
575 V (500 V - 575 V ± 10%)	✓
690 V (500 V - 690 V ± 10%)	

### Control mode

Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	
Closed loop Rotor Flux Control for induction motors (RFC-A)	
Closed loop permanent magnet motor control (RFC-S)	
Active Front End (AFE) power quality convertor	

## Flexible machine integration through communications

- M200 adds useful networking capability, additional I/O and improved motor control performance
- Easy upgrade for existing Commander SK users

M200 delivers substantial communication and application integration through optional RS485 plus a wide range of industry standard fieldbus and I/O SI modules. Enhances machine up-time and performance with its remote control monitoring and diagnostics possibilities.

## Other Unidrive M200 benefits include:

### Enhance up-time and system flexibility

- Reduce machine down-time through communications for remote diagnostics
- Application flexibility through configurable I/O
- Enhanced system integration through a selection of optional click-in Ethernet, fieldbus and additional I/O SI modules

### Improved motor control

- Greatly enhanced performance through our RFC-A vector algorithm, utilizing closed loop current control

## Typical applications:

- Speed control for conveyors, fans, positive displacement pumps and mixers, where their functions are controlled remotely via fieldbus or Ethernet communications

## M201 variant

Provides a speed reference potentiometer keypad to enhance customer choice and ease of use

## Key data

Heavy Duty rating:

0.25 - 22 kW (0.33 - 30 hp)

Supply phases:

Size 1 to 4: 110 V drives – 1 phase, 230 and 400 V drives - 1 or 3 phase  
Size 5 upwards: 3 phase

### Standard features

Keypad:

M200: Fixed LED  
M201: Fixed LED with speed reference potentiometer

Option slots:

1 (Size 2 and above)

Parameter cloning via:

PC tools, SD card

### Options

Keypad:

Remote mountable plain text multi-language LCD (and adaptor plate)

SI Modules:

Communications, additional I/O

Adaptors:

AI-Back-up Adaptor & AI-485 Adaptor

## Unidrive M300 AC drive



### Voltage ratings

100 V (100 V - 120 V $\pm$ 10%)	✓
200 V (200 V - 240 V $\pm$ 10%)	✓
400 V (380 V - 480 V $\pm$ 10%)	✓
575 V (500 V - 575 V $\pm$ 10%)	✓
690 V (500 V - 690 V $\pm$ 10%)	

### Control mode

Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	
Closed loop Rotor Flux Control for induction motors (RFC-A)	
Closed loop permanent magnet motor control (RFC-S)	
Active Front End (AFE) power quality convertor	

## Enhance throughput with Machine Safety

- M300 adds integrated Machine Safety

M300 helps machine builders maximize up-time and meet modern functional safety standards. Dual onboard Safe Torque Off (STO) inputs offer easy SIL3 conformity and reduce the need for external components, minimizing overall machine dimensions and costs.

## Other Unidrive M300 benefits include:

**Enhance productivity through integration with the automation system and reduce machine downtime**

- Optional RS485 and a wide range of fieldbus communication SI modules allow remote control and diagnostics with different networks
- Flexible I/O

**Quick and easy to install and configure**

- Simple fixed LED keypad as standard
- 10 most commonly used parameters listed on front of drive

**Reduce machine size and cost**

- Compact drive dimensions, among the smallest in class at every power rating

**Save energy**

- Low losses up to 98% efficient
- Low power standby mode

## Typical applications:

- Speed control for material transport, cutting, woodworking, machine tools; where protection to people or assets is required

## Key data

Heavy Duty rating:	0.25 - 22 kW (0.33 - 30 hp)
Supply phases:	Size 1 to 4: 110 V drives – 1 phase, 230 and 400 V drives - 1 or 3 phase Size 5 upwards: 3 phase

### Standard features

Machine safety:	2 x Safe Torque Off terminals
Keypad:	Fixed LED
Option slots:	1 (Size 2 and above)
Parameter cloning via:	PC tools, SD card

### Options

Keypad:	Remote mountable plain text multi-language LCD
SI Modules:	Communications, additional I/O, advanced safety*
Adaptors:	AI-Back-up Adaptor & AI-485 Adaptor

\*Future availability

## Unidrive M400 AC drive



Voltage ratings	
100 V (100 V - 120 V ± 10%)	✓
200 V (200 V - 240 V ± 10%)	✓
400 V (380 V - 480 V ± 10%)	✓
575 V (500 V - 575 V ± 10%)	✓
690 V (500 V - 690 V ± 10%)	✓

Control mode	
Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	
Closed loop Rotor Flux Control for induction motors (RFC-A)	
Closed loop permanent magnet motor control (RFC-S)	
Active Front End (AFE) power quality convertor	

## Fast set-up and diagnosis with real-text display, plus integrated CODESYS based PLC

- M400 adds an optional enhanced LCD keypad, precise frequency following and onboard Programmable Logic Control (PLC)
- Easy upgrade for existing Commander SK users with LogicStick



M400 minimizes machine downtime with its optional intuitive advanced LCD keypad which offers real-text multi-language display for rapid set-up and superior diagnostics. Onboard CODESYS based PLC with a real-time task can be used for simple logic control to enhance drive application capability.

## Other Unidrive M400 benefits include:

**Maximize throughput while protecting people and machinery, and easily meet machine safety requirements**

- Dual STO for safety system integration, eliminating external components

**Enhance productivity through integration with the automation system and reduce machine downtime**

- Optional RS485 and a wide range of fieldbus communication SI modules allow remote control and diagnostics across different networks
- I/O can be configured to accept an encoder or frequency/direction inputs for frequency following

**Reduce machine size and cost**

- Compact drive dimensions, among the smallest in class at every power rating
- Enhanced functionality with onboard PLC programming provides a low cost solution, minimizing additional equipment such as PLCs, safety contactors etc

**Save energy**

- Low losses up to 98% efficient and low power standby mode

## Typical applications:

- Speed control for conveyors, positive displacement pumps, material transport, cutting, woodworking, where fast diagnostics are required

## Key data

Heavy Duty rating:

0.25 - 110 kW (0.33 - 150 hp)

Supply phases:

Size 1 to 4: 110 V drives – 1 phase, 230 and 400 V drives - 1 or 3 phase. Size 5 upwards: 3 phase

### Standard features

Intelligence:  
Feedback:  
Machine safety:  
Keypad:  
Option slots:  
Parameter cloning via:

Onboard PLC  
Encoder input – Speed follower  
2 x Safe Torque Off terminals  
No keypad as standard  
1 (Size 2 and above)  
PC tools, SD card

### Options

Keypad:

Removable plain text multi-language LCD  
Remote mountable plain text multi-language LCD  
Communications, additional I/O, feedback, advanced safety\*  
AI-Back-up Adaptor & AI-485 Adaptor

SI Modules:

Adaptors:

\*Future availability

## Unidrive M600 AC drive



## High performance drive for induction and sensorless permanent magnet motors

- M600 adds enhanced motor control, higher performance onboard PLC with CODESYS programming and greater system expansion capability

M600 delivers increased machine performance with sensorless induction and sensorless permanent magnet motor control, for dynamic and efficient machine operation. An optional encoder port can be used for precise closed loop velocity applications and digital lock/frequency following. Additional I/O, global fieldbus communications and encoder feedback options maximize system connectivity and flexibility.



## Other Unidrive M600 benefits include:

### Enhanced onboard PLC

- Onboard CODESYS based PLC with a real-time task can be used for basic logic control, speed following and digital lock to enhance drive application capability

### Maximize productivity with high performance control with all AC motors

- Advanced RFC control algorithm for maximum stability and control, especially with high power motors
- High bandwidth motor control algorithm with 62.5  $\mu$ s current loop update rates
- 200% motor overload for heavy industrial machinery applications

### Save energy

- High performance control of open loop energy efficient industrial permanent magnet motors, with dynamic control and high starting torque
- Low losses up to 98% efficient
- Low power standby mode

### Reduce machine size and cost

- Compact drive dimensions, among the smallest in class at every power rating
- Onboard programmable automation for simple applications

### Flexible integration with automation systems

- Fit up to three SI modules to add speed feedback, I/O and fieldbus communications

### Easy-to-use interface

- Optional plain text LCD keypad

## Typical applications:

- Speed control with high starting torque for extruders, slitters, material transport, compressors, manufacturing cranes, hydraulic replacement, ratio control, gearing, winding (coilers), web handling, metal cutting





**Winder on a metal processing line**

## Key data

Heavy Duty rating: 0.37 kW – 1.2 MW (0.5 - 1600 hp)  
Supply phases: 3 phase

### Standard features

Intelligence: Onboard PLC and Digital Lock Control  
Onboard comms: RS485  
Machine safety: 1 x Safe Torque Off (STO) terminal  
Keypad: No keypad as standard  
Option slots: 3  
Parameter cloning via: PC tools, Smartcard, SD card

### Options

Keypad: Advanced plain text multi-language LCD with or without real-time clock  
Remote mountable plain text multi-language LCD  
SI Modules: Communications, additional I/O, speed feedback and additional safety\*  
Adaptor: SD-Smartcard Adaptor

\*Future availability

Voltage ratings	
100 V (100 V - 120 V ± 10%)	
200 V (200 V - 240 V ± 10%)	✓
400 V (380 V - 480 V ± 10%)	✓
575 V (500 V - 575 V ± 10%)	✓
690 V (500 V - 690 V ± 10%)	✓

Control mode	
Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	✓
Closed loop Rotor Flux Control for induction motors (RFC-A)	Opt
Closed loop permanent magnet motor control (RFC-S)	
Active Front End (AFE) power quality convertor	✓

## Unidrive M700 AC drive



## Class leading induction and servo permanent magnet motor performance, with real-time Ethernet

- M700 adds onboard Ethernet, comprehensive position feedback and high performance control of dynamic permanent magnet servo motors
- Fully compatible upgrade for existing Unidrive SP users

M700 delivers maximum machine throughput through greater control with single and multi-axis network synchronization. Onboard real-time Ethernet (IEEE 1588 V2), advanced motion control and high speed I/O for position capture enables machine builders to easily create more sophisticated and flexible machines.

## Other Unidrive M700 benefits include:

### Maximize machine productivity through integration with centralized control systems

- Ethernet IEEE 1588 V2 hardware implementation for maximum synchronization accuracy
- Integrated dual port Ethernet switch for easy connectivity
- Up to three SI modules to add position feedback, I/O and fieldbus communications

### Maximize machine productivity through shaft performance with any motor technology

- High bandwidth motor control algorithm for open and closed loop induction, synchronous reluctance and PM servo motors with up to 3,300 Hz current loop bandwidth and 250 Hz speed loop bandwidth
- Flexible feedback from robust resolvers to high resolution encoders

### Flexible universal encoder port

Increase flexibility and reduce system costs through simultaneously connecting up to three\* high performance encoder channels as standard. As an example, the drive can interface with a feedback encoder, reference encoder and provide a simulated encoder output without the need for additional option modules.

- Two universal encoder input channels
  - Support for standard incremental and SinCos encoders, including those with absolute commutation signals
  - Support for communications based encoders with up to 4 Mb rate and line compensation to support long cable lengths of up to 100m
    - Support includes BISS C, EnDat 2.2, HIPERFACE and SSI
  - Support for Resolver for feedback in harsh environments
- One simulated encoder output
  - Position reference for CAMs, digital lock and electronic gearbox applications
  - Implemented through hardware to maximize performance

\*The functionality is dependent upon the encoder types being used

### Onboard PLC and Advanced Motion Controller

Simple onboard CODESYS based PLC with a real-time task for interfacing with the drives 1.5 axis Advanced Motion Controller. Key features include:

- 250 µs cycle time
- Motion profile generator
- Electronic gearbox
- Interpolated CAM
- Homing function
- High speed position freeze



### Typical applications:

- Speed and position control for gearing and ratio control, winding (coilers), web handling, metal cutting, flying shear, rotary knife, test stands, printing, packaging machines, textiles, woodworking, tire manufacturing

### Key data

Heavy Duty rating:	0.37 kW – 1.2 MW (0.5 - 1600 hp)
Supply phases:	3 phase
<b>Standard features</b>	
Intelligence:	Onboard PLC and Advanced Motion Controller
Onboard comms:	M700 & M702 – Ethernet, M701 – RS485
Feedback:	2 x Encoder inputs 1 x Simulated encoder output
Machine safety:	M700 & M701 - 1 x Safe Torque Off (STO) terminal M702 – 2 x STO terminals
Keypad:	No keypad as standard
Option slots:	3
Parameter cloning via:	PC tools, Smartcard, SD card
<b>Options</b>	
Keypad:	Advanced plain text multi-language LCD with or without real-time clock Remote mountable plain text multi-language LCD
SI Modules:	Communications, additional I/O, position feedback, legacy SYPT applications, advanced machine control processing (with or without Ethernet) and additional safety*
Adaptor:	SD-Smartcard Adaptor

\* Future availability

### Select the M700 feature-set for your application

To even more closely match customer needs, the M700 offers the following 3 variants:

#### M700 - Ethernet



Onboard real-time Ethernet is included on the standard M700, with 1 x Safe Torque Off (STO) and both analog and digital I/O, making it an incredibly versatile high performance AC drive.

#### M701 - Unidrive SP replacement



Designed to match Control Techniques' highly popular Unidrive SP feature-set. This includes RS485 communications, 1 x STO, analog and digital I/O, identical control connectors, with Unidrive SP Smartcard parameter sets supported to make upgrading to Unidrive M as simple as possible.

#### M702 - Safety Enhanced



The safety enhanced M702 has 2 x STO, onboard real-time Ethernet and digital I/O; where easy integration with modern control and safety systems is paramount.

Voltage ratings	
100 V (100 V - 120 V ± 10%)	
200 V (200 V - 240 V ± 10%)	✓
400 V (380 V - 480 V ± 10%)	✓
575 V (500 V - 575 V ± 10%)	✓
690 V (500 V - 690 V ± 10%)	✓

Control mode	
Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	✓
Closed loop Rotor Flux Control for induction motors (RFC-A)	✓
Closed loop permanent magnet motor control (RFC-S)	✓
Active Front End (AFE) power quality convertor	✓

## Unidrive M800 AC drive



## Ultimate performance through advanced onboard motion control

- M800 adds a powerful second micro processor onboard for high performance CODESYS based machine control

M800 delivers our most powerful advanced onboard motion control, real-time drive-to-drive synchronization, high speed digital I/O and integrated safety features, greatly reducing the need for expensive external components. Comprehensive application programs are intuitively written using the industry standard CODESYS environment to build highly flexible and productive machines quickly.



## Other Unidrive M800 benefits include:

### Ultimate machine productivity through powerful networked, onboard automation and motion control

- Onboard MCI co-processor based machine controller, capable of controlling the overall machine
- MCI machine controller configured using industry standard IEC 61131-3 programming languages within the CODESYS programming environment
- Additional MCI click-in modules can be added for multi-processing, giving even greater machine control capability
- Achieve performance without effort through access to a comprehensive library of drive and machine control function blocks and applications

### Ethernet communications with IEEE 1588 V2 network synchronization

- IEEE 1588 V2 hardware implementation for maximum synchronization accuracy
- Integrated dual port switch for easy connectivity
- Integration with external I/O and control of non-intelligent drives

### Maximize machine productivity through shaft performance with any motor technology

- High bandwidth motor control algorithm, including servo control with up to 3,300 Hz current loop bandwidth and 250 Hz speed loop bandwidth
- Flexible three channel encoder port, for feedback encoder, reference encoder and a simulated encoder output. Encoder inputs are able to accept a wide range of feedback devices, from robust resolvers to high resolution SinCos encoders.

### Maximize throughput while protecting people and machinery, meeting modern machine safety requirements

- Dual STO for integration with safety systems and elimination of external components
- Advanced safety\* to meet the IEC 61800-5-2 functional safety standard, covering numerous functions including STO, Safe Stop 1 and 2, Safe Limited Speed, Safe Limited Position etc

\*Future availability



## Typical applications:

- Speed and position control with onboard application software for gearing and ratio control, winding (coilers), web handling, metal cutting, flying shear, rotary knife, test stands, printing, packaging machines, textiles, woodworking, tire manufacturing

## Scalable machine control

**M800 - Integrated MCI200 machine controller and Ethernet networking**



The M800 offers powerful CODESYS programming and Ethernet communications capability through the drive's integrated network interface. M800 is ideal for applications requiring machine axis control and high speed interfacing with other control devices such as PLCs, I/O and HMIs.

**M810 - Integrated MCI210 machine controller offering dual Ethernet networking**



The M810 offers the same high performance CODESYS programming capability as the M800, but with the addition of a dual port switched Ethernet interface directly on the CODESYS microprocessor board, plus increased program memory. This greatly extends the machinery control performance through increasing the data throughput capability; it also enables simultaneous connectivity to two separate Ethernet networks.



**Wire machine**

## Key data

Heavy Duty rating:	0.37 kW – 1.2 MW (0.5 - 1600 hp)
Supply phases:	3 phase
<b>Standard features</b>	
Intelligence:	M800 - Onboard MCI200 Machine Controller M810 - Onboard MCI210 Machine Controller
Onboard comms:	Ethernet
Feedback:	2 x Encoder inputs 1 x Simulated encoder output
Machine safety:	2 x Safe Torque Off (STO) terminals
Keypad:	No keypad as standard
Option slots:	2
Parameter cloning via:	PC tools, Smartcard, SD card
<b>Options</b>	
Keypad:	Advanced plain text multi-language LCD with or without real-time clock Remote mountable plain text multi-language LCD
SI Modules:	Communications, additional I/O, position feedback, additional machine control processing (with or without Ethernet) and additional safety*
Adaptor:	SD-Smartcard Adaptor

Voltage ratings	
100 V (100 V - 120 V ± 10%)	
200 V (200 V - 240 V ± 10%)	✓
400 V (380 V - 480 V ± 10%)	✓
575 V (500 V - 575 V ± 10%)	✓
690 V (500 V - 690 V ± 10%)	✓
















Control mode	
Open loop vector or V/Hz induction motor control	✓
Open loop Rotor Flux Control for induction motors (RFC-A)	✓
Open loop permanent magnet motor control (RFC-S)	✓
Closed loop Rotor Flux Control for induction motors (RFC-A)	✓
Closed loop permanent magnet motor control (RFC-S)	✓
Active Front End (AFE) power quality convertor	✓

\*Future availability

# Integrate, automate, communicate with Unidrive M options

Unidrive M drives support a wide range of optional click-in System Integration (SI) modules that allow them to integrate seamlessly with existing Manufacturing Automation systems and other vendor supplied equipment. These include communications, I/O, feedback devices, enhanced safety features and onboard PLCs.

Control Techniques' high performance drives use a high speed parallel bus between the drive and SI modules which removes delays, improving the drive's reaction time. Communications interfaces are independently certified for conformance with the relevant standards to ensure performance and interoperability.

Option		Description	
<b>System Integration Modules</b>			
SI-Encoder		Incremental encoder input interface module. Provides Closed loop Rotor Flux Control for induction motors (RFC-A) on M600.	
SI-PROFIBUS		PROFIBUS interface module.	
SI-DeviceNet		DeviceNet interface module.	
SI-CANopen		CANopen interface module supporting various profiles, including several drive profiles.	
SI-Ethernet		External Ethernet module that supports PROFINET RT, EtherNet/IP and Modbus TCP/IP and has an integrated web server that can generate emails. The module can be used to provide high speed drive access, global connectivity and integration with IT network technologies, such as wireless networking.	
SI-EtherCAT*		EtherCAT interface module.	
SI-Applications Plus (Unidrive SP Sypt option)		An SM-Applications compatible module, which allows existing SYPTPro application programs to be re-compiled for Unidrive M700.	
MCi200		System integration module that provides a second processor, allowing advanced machine control using industry standard CODESYS programming environment.	
MCi210		System integration module that provides a second processor, allowing advanced machine control using industry standard CODESYS programming environment. Also it has additional memory and a dual port switched Ethernet interface directly on the CODESYS processor, extending machinery control performance and enables the M700 and M800 to have simultaneous connectivity to 2 separate Ethernet networks.	
SI-I/O		Extended I/O interface module to increase the number of I/O points on a drive.	
SI-Safety*		Safety module that provides an intelligent, programmable solution to meet the IEC 61800-5-2 functional safety standard.	
<b>Drive interface units</b>			
AI-Back-up Adaptor		Port adaptor that allows the drive to use an SD card for parameter cloning, and an input for 24 V back-up.	
SD-Smartcard Adaptor		Conversion device that allows an SD card to be inserted into the Smartcard slot, for parameter cloning.	
AI-485 Adaptor		Port adaptor that allows the drive to communicate via RS485.	
<b>Other hardware</b>			
Remote I/O		Flexible I/O system for remote connectivity.	

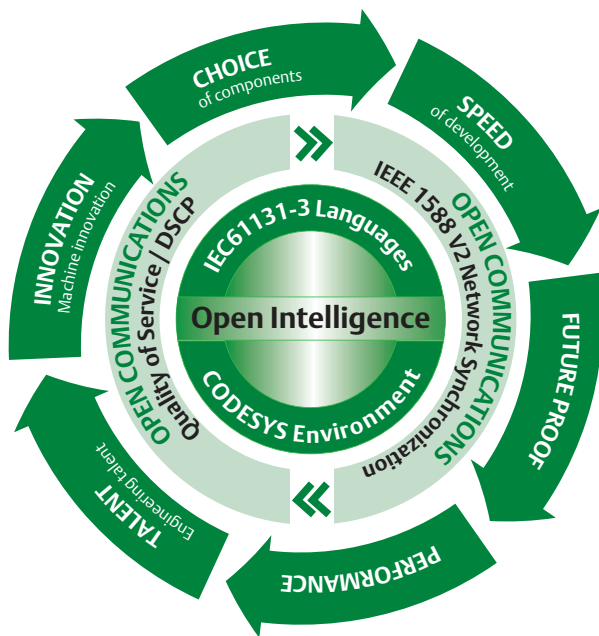
\*Future availability



	Type	Applicable to						
		M100	M200	M300	M400	M600	M700	M800
	Feedback					•	•	•
	Communications		•	•	•	•	•	•
			•	•	•	•	•	•
			•	•	•	•	•	•
			•	•	•	•	•	•
			•	•	•	•	•	•
	Applications						•	
							•	•
							•	•
	Additional I/O		•	•	•	•	•	•
	Safety			•	•	•	•	•
	Back-up	•	•	•	•			
						•	•	•
	Communications		•	•	•			
	External additional I/O						•	•



## Intelligent Machine Architecture – Open technology, exceptional performance



Control Techniques Intelligent Machine Architecture is an open approach to automation, designed to maximize machine throughput. This is achieved through a synchronized high performance network of intelligent control devices, sensors and actuators, linked together through open and globally available, industry standard Ethernet. Open standards provide significant benefits to machine builders and OEMs:

- Choice to select the 'best-in-class' for every machine component
- Familiarity with standards accelerates machine development and innovation
- Broad acceptance of open standards makes it easier to recruit skilled engineering staff with the required expertise

### How is Intelligent Machine Architecture different?

- Standard networking hardware - no limits on integration possibilities
- Performance without effort - ease of use is prioritized with high level software tools that are proven to speed up the machine development and maximize machine performance
- Increased network efficiency - intelligence is networked and not centralized, removing traffic bottlenecks
- Inclusive networking - support for PROFINET, EtherNet/IP and Modbus TCP/IP allows interaction with the widest range of automation equipment from a global pool of automation providers
- Only leading technologies - Intelligent Machine Architecture is based on feedback from customers and adopts only the leading open standards throughout

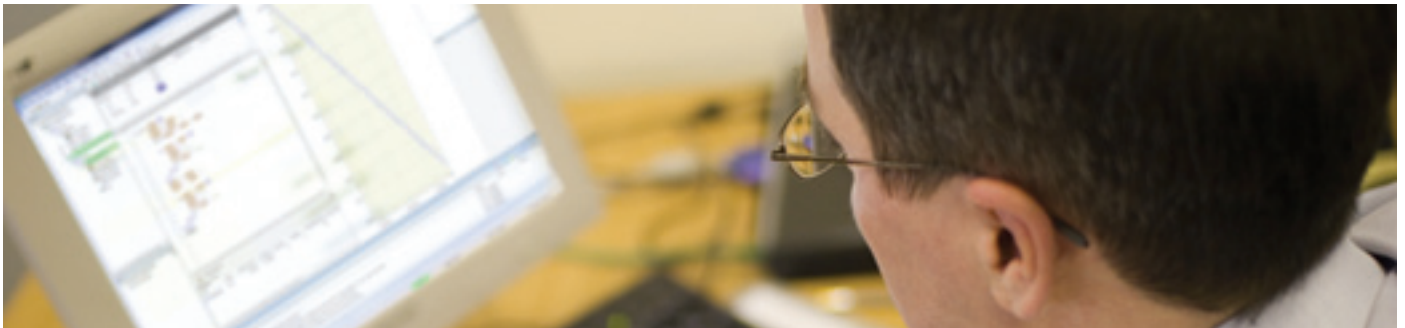
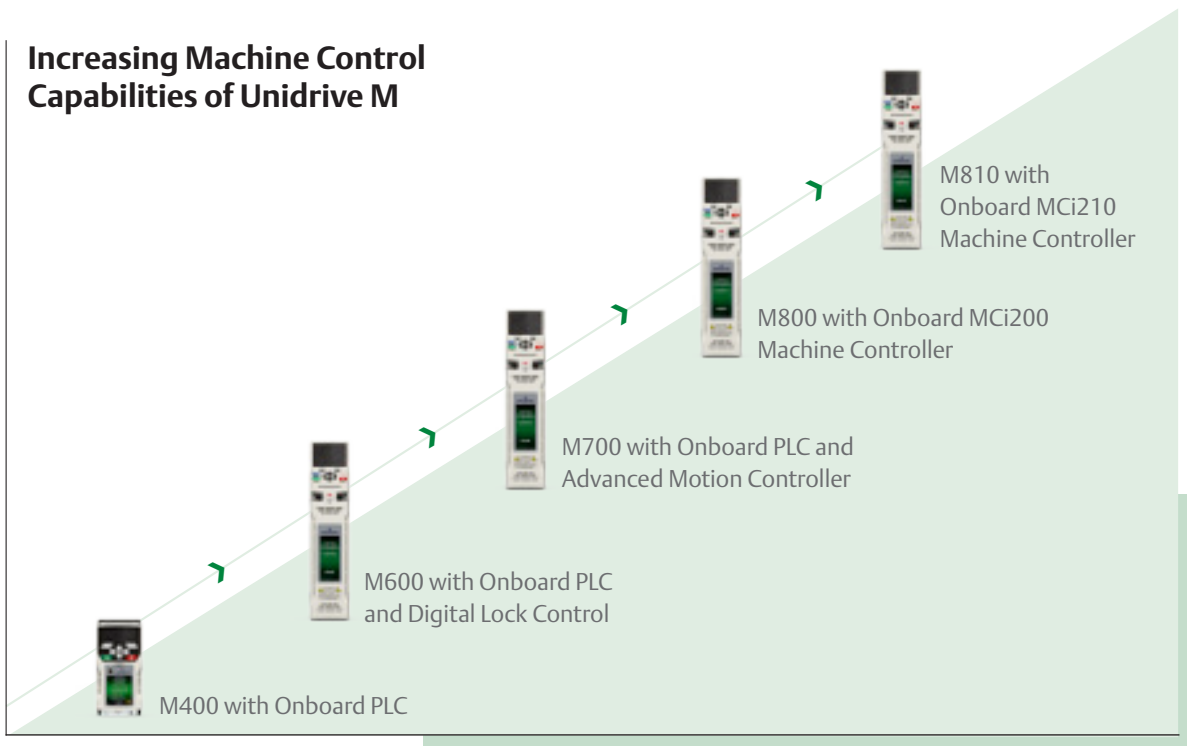
### IEC 61131-3 motion and automation programming

Unidrive M offers the choice to integrate machine control functionality within the drive:

- Simple onboard CODESYS based PLC
- Advanced 1.5 axis Motion Controller, key features include:
  - ⇒ 250 µs cycle time
  - ⇒ Motion profile generator
  - ⇒ Electronic gearbox
  - ⇒ Interpolated CAM
  - ⇒ Homing function
  - ⇒ High speed position freeze
- High performance MCI200 and MCI210 Machine Control modules for extra control performance



## Increasing Machine Control Capabilities of Unidrive M



## Machine Control Studio - Powered by CODESYS

Control Techniques Machine Control Studio provides a flexible and intuitive environment for programming Unidrive M's new automation and motion control features. The new software offers programming for:

- Unidrive M400, M600 and M700's onboard PLC
- Unidrive M800 and M810 with integrated machine control
- High performance MCi200 and MCi210 Machine Control modules
- Ethernet network data configurations

Machine Control Studio is powered by CODESYS, the leading open software for programmable machine control. The programming environment is fully IEC 61131-3 compliant, meaning that it is familiar and therefore fast and easy to use for control engineers around the world.



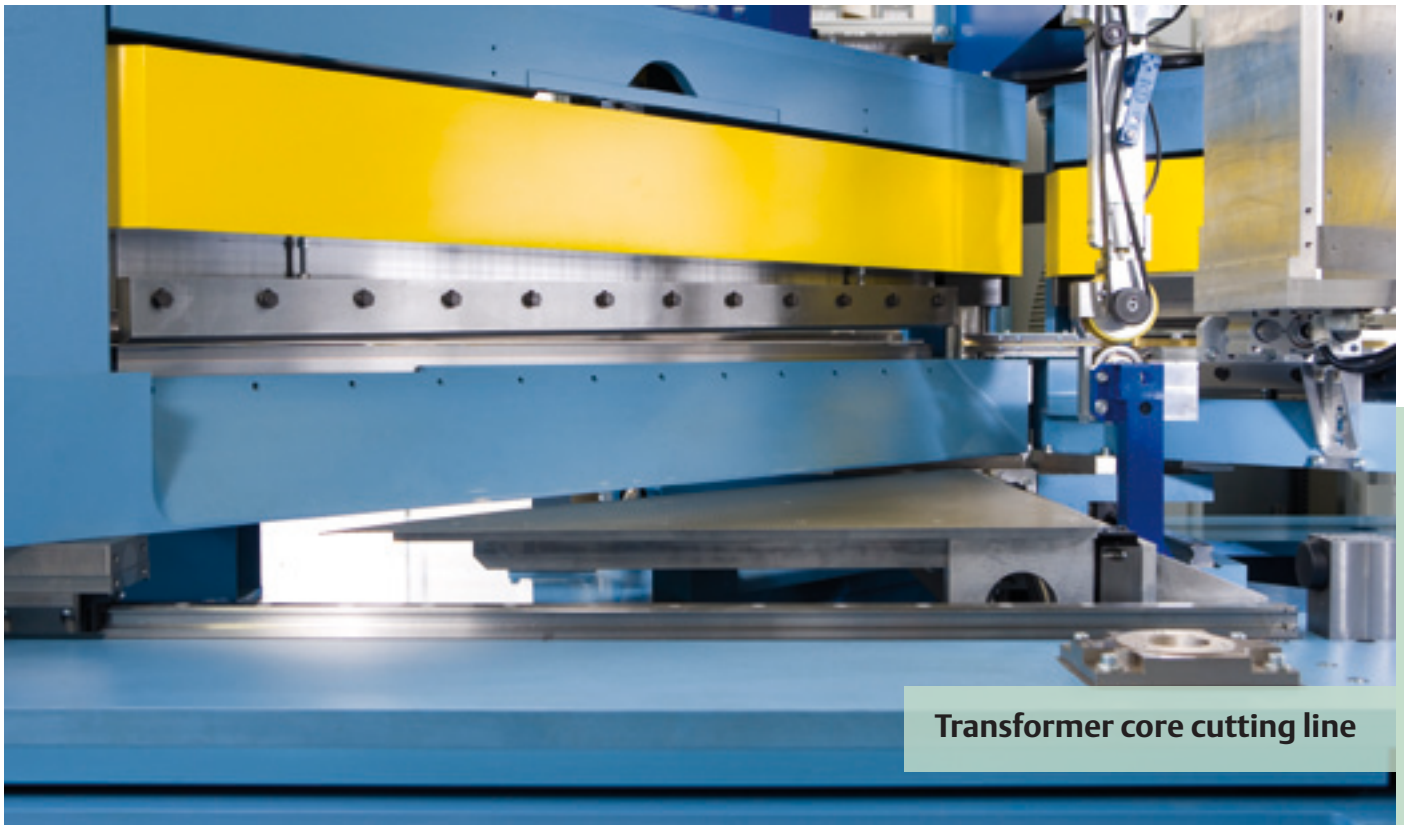
The following IEC 61131-3 programming languages are supported:

- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)

Also supported:

- Continuous Function Chart (CFC)

Intuitive IntelliSense functionality helps to write consistent and robust programming, speeding up software development. Programmers have access to a vibrant open-source community for function blocks. Control Techniques also provides support for customers' own function block libraries, with on-line monitoring of program variables with user defined watch windows and help for on-line change of program, in line with current PLC practice.



Transformer core cutting line

## Open, Efficient, Synchronized Ethernet

Control Techniques Intelligent Machine Architecture uses standard Ethernet to connect the machine controller parts and other devices such as PCs, I/O and HMI's together. Ethernet provides machine builders and manufacturers with real benefits:

- Maximize machine productivity through high performance deterministic Ethernet, suitable for complete Machine Automation and demanding synchronized motion functions.
- Access future developments in IT based industries where billions of nodes are installed, future proofing your investments .
- Access to a massive choice of network monitoring and diagnostics tools.

Through advances in Ethernet technology, standard Ethernet hardware now delivers the highest levels of machine performance in industrial networking. For communication between drives, PCs,

I/O and other devices, Unidrive M uses open protocols such as TCP/IP and UDP, delivering exceptional performance:

- Network synchronization of less than 1  $\mu$ s (typically <200 ns)
- 250 $\mu$ s cycle time for the most demanding motion applications
- Virtually unlimited node count
- Bandwidth protection through a network gateway that manages non real-time Ethernet messages
- Master/follower and peer-to-peer communications capabilities



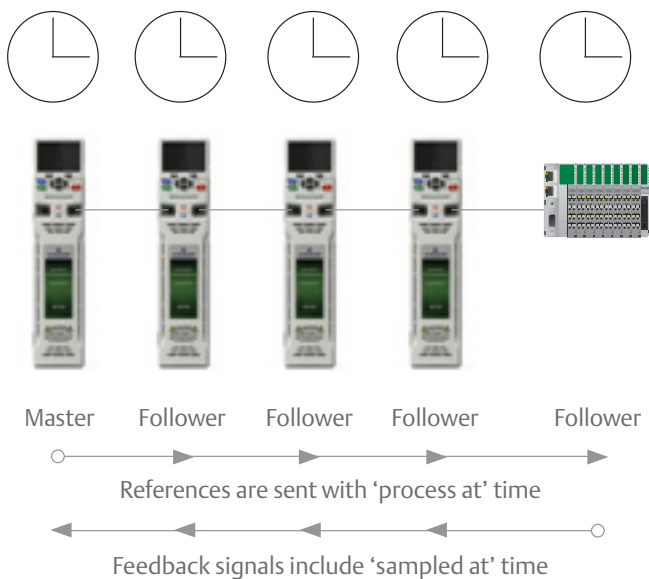
## Network synchronization

Network synchronization is a common requirement across many industries including industrial automation, entertainment, telecommunications and power generation. This requirement led to the development of the Precision Time Protocol (PTP) standard which provides a mechanism for precisely synchronizing clocks across all PTP capable nodes in an Ethernet network. PTP is defined by the international standard IEEE 1588 V2.

The wide range of applications for PTP has driven demand for chip manufacturers to provide network controllers that economically support this protocol. This has led to a massive and increasing choice of networking products that cost-effectively integrate PTP, including industrial Ethernet switches and I/O. Unidrive M integrates PTP onboard the drive within a dual port Ethernet switch enabling high precision synchronization across the Ethernet network.

### IEEE 1588 V2 clock explanation

IEEE 1588 V2 distributed clocks are used to automatically synchronize the position, speed and current loops across all drives.



## Traffic management

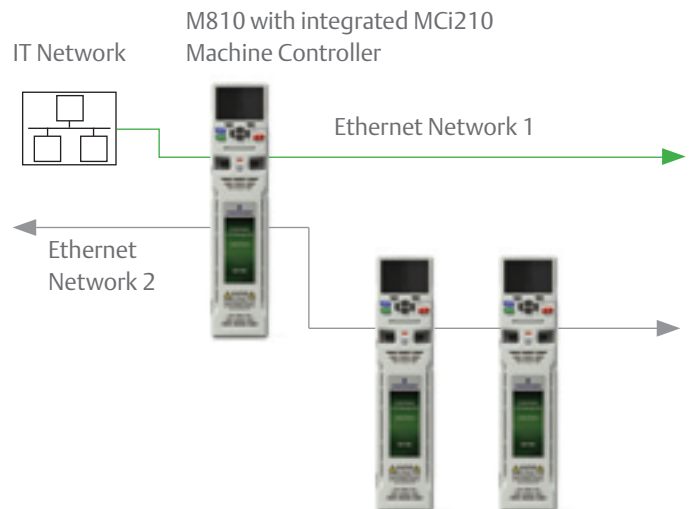
### Manage non-critical network traffic through a network gateway

Unidrive M integrates a network gateway feature within the drive's dual port switch. This uses standards called Differentiated Services Code Point (DSCP) and Quality of Service (QoS) to protect network bandwidth by eliminating or delaying noncritical messages from outside the control network.

## Eliminate non-critical network traffic through segregated networks

Unidrive M enables segregated Ethernet networks, enabling the control network to be totally protected from external traffic.

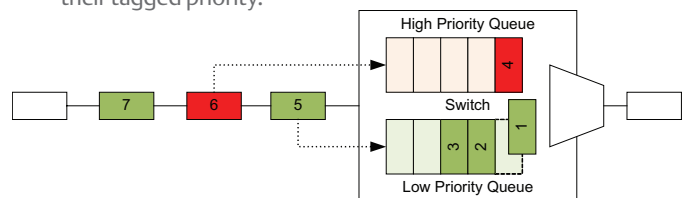
### Segregated Ethernet networks



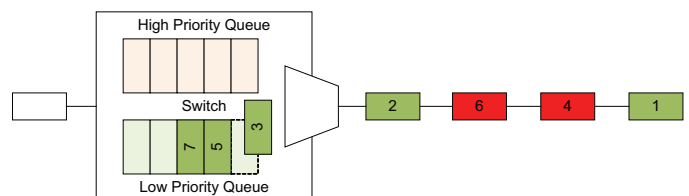
## Minimizing latency

### Quality of Service (QoS)

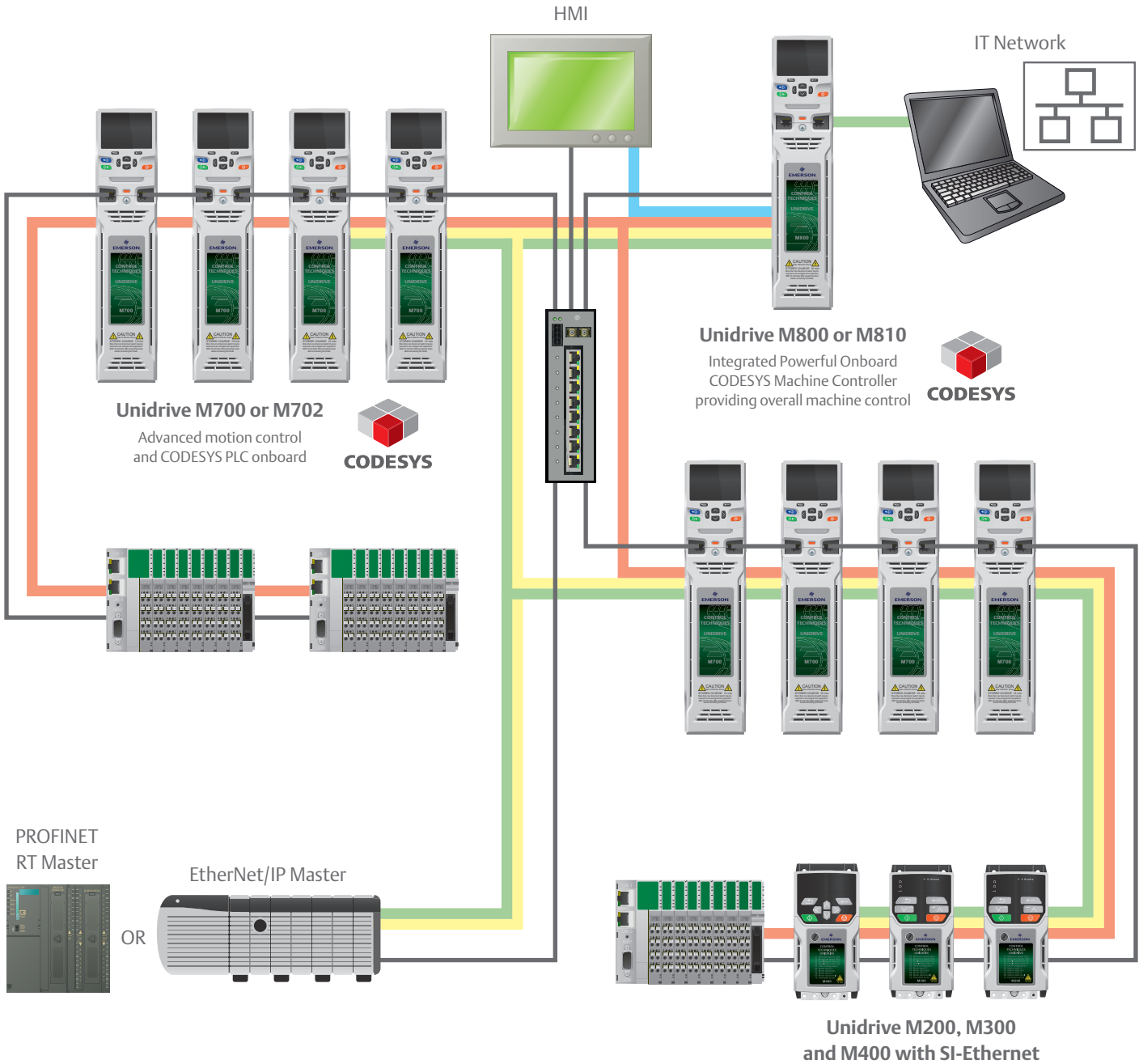
- Provides a method of prioritizing time-critical messages.
- Messages entering the switch are placed in queues based on their tagged priority.



- Messages leaving the switch are taken from the higher priority queues first, allowing high priority frames to jump ahead of low priority frames.



# Unidrive M Flexible Ethernet Communications



- Cable connections
- Synchronized communications using IEEE 1588 V2 PTP
- Profinet RT or EtherNet/IP communications
- Modbus TCP/IP communications
- IT communications - Managed using QoS to ensure network reliability

System Integration (SI) option modules allow additional connectivity with EtherCAT, PROFIBUS, DeviceNet CANopen and I/O. Plus connectivity to legacy CNet system













Unidrive M's onboard real-time Ethernet (using IEEE 1588 V2) provides improved machine control with fast and flexible communications. Synchronization can be achieved across the network below 1  $\mu$ s, with update rates as low as 250  $\mu$ s with a virtually unlimited node count.

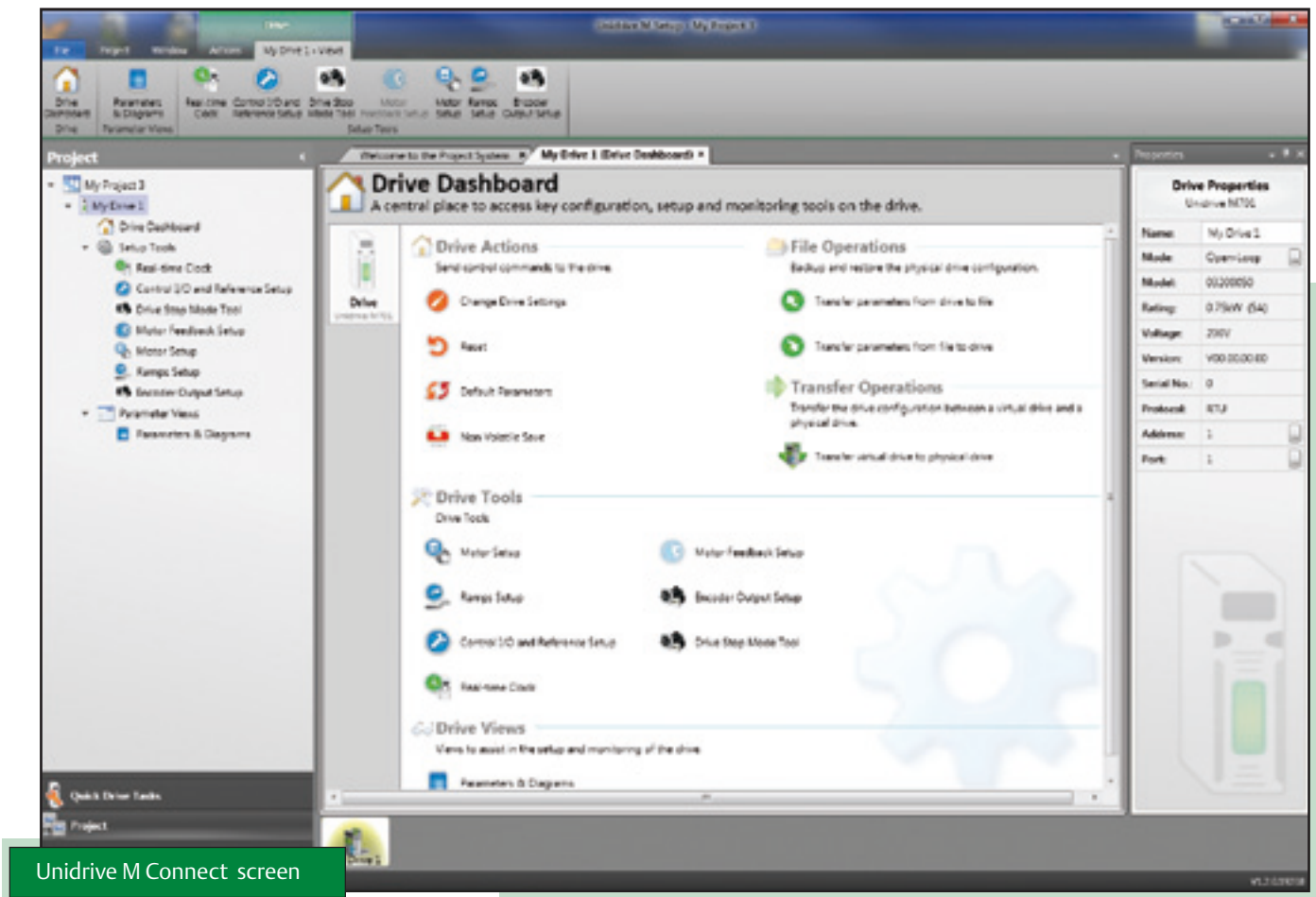
## Unidrive M set-up, configuration and monitoring

Unidrive M is quick and easy to set-up. The drives may be configured using a selection of keypads, SD or Smartcard or the supplied commissioning software that guides the user through the configuration process.

### User interface options

Unidrive M benefits from a number of keypad choices to meet your application needs:

Type		Benefit	M100	M200	M300	M400	M600	M700	M800
Fixed LED keypad		Simple LED keypad fitted as standard for quick and easy commissioning and use.	•	•	•				
Fixed LED keypad with speed reference potentiometer		Simple LED keypad with user friendly speed reference potentiometer for quick and easy commissioning and use.	M101	M201					
CI-Keypad		Intuitive plain text, multi-language LCD keypad for rapid set-up and superior diagnostics maximizes machine up-time. Novel clipless fit provides easy removal.				Opt			
Remote keypad		All the features of the CI-Keypad LCD, but remote mountable. This allows flexible mounting on the outside of a panel.		Opt	Opt	Opt	Opt	Opt	Opt
KI-Keypad		Advanced plain text, multi-language LCD keypad for in depth parameter and data descriptions, for enhanced user experience.					Opt	Opt	Opt
KI-Keypad RTC		All the features of the KI-Keypad, but with battery operated real-time clock. This allows accurate time stamping of events, aiding diagnostics.					Opt	Opt	Opt



## Unidrive M Connect commissioning tool

Based on Control Techniques' 25 years of experience, Unidrive M Connect is our latest drive configuration tool for commissioning, optimizing and monitoring drive/system performance. Its development draws from extensive user research, using human centered design principals to give the ultimate user experience:

- Fast task based commissioning and easy maintenance of the Unidrive M family is simplified via familiar Windows interface.
- Intuitive graphical tools enhance and simplify user experience.
- For experienced users, dynamic drive logic diagrams and enhanced searchable listings are present.
- Drive and motor performance can be optimized with minimal specialized drive 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 program).
- Multiple simultaneous 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.
- Automatic RTU baud rate scanning on the Unidrive M drives which have a 485 connection.

## Unidrive M's portable memory devices

### Smartcard

The optional Smartcard memory device can be used to back-up parameter sets and basic PLC programs, as well as copying them from one drive to another. It also allows:

- Simplified drive maintenance and commissioning
- Quick set-up for sequential build of machines
- Machine upgrades to be stored on a Smartcard and sent to the customer for installation

### SD card

Unidrive M uses popular SD cards for quick and easy parameter and program storage using an adaptor, allowing them to fit in the drive Smartcard slot. SD cards provide a huge memory capability allowing a complete system reload if required, and can be easily pre-programmed on a common PC.

## Unidrive M frame sizes and ratings



Frame size		1	2	3 (M100 to M400)	4 (M100 to M400)
Frame sizes available	M100	•	•	•	•
	M200, M300	•	•	•	•
	M400	•	•	•	•
	M600, M700, M800				
Dimensions (H x W x D)	mm	139 x 75 x 130	180 x 75 x 150	200 x 90 x 160	245 x 115 x 175
	in	5.5 x 3.0 x 5.1	7.1 x 3.0 x 5.9	7.9 x 3.5 x 6.3	9.7 x 4.5 x 6.9
Max Continuous Heavy Duty kW Rating	@ 100 V	0.25 kW - 0.37 kW (0.33 hp - 0.5 hp)	0.75 kW - 1.1 kW (1.0 hp - 1.5 hp)		
	@ 200 V	0.25 kW - 0.75 kW (0.33 hp - 1 hp)	0.37 kW - 1.5 kW (0.5 hp - 2 hp)	2.2 kW (3 hp)	3 kW - 4 kW (4 - 5 hp)
	@ 400 V	N/A	0.37 kW - 1.5 kW (0.5 hp - 2 hp)	2.2 kW - 4 kW (3 hp - 5 hp)	5.5 kW - 7.5 kW (7.5 hp - 10 hp)
	@ 575 V	N/A			
	@ 690 V				

### Notes:

Modular ratings up to 1.2 MW through parallel connected drives





3 (M600 to M800)	4 (M600 to M800)	5	6	7	8	9*
		•	•			
		•	•	•	•	•
•	•	•	•	•	•	•
379 x 83 x 200	379 x 123.5 x 200	379x 141x 200	379 x 210 x 227	548 x 270 x 280	785 x 310 x 290	940 x 310 x 290
14.9 x 3.3 x 7.9	14.9 x 4.9 x 7.9	14.9 x 5.6 x 7.9	14.9 x 8.3 x 8.9	21.6 x 10.6 x 11.0	30.9 x 12.2 x 11.4	37.0 x 12.2 x 11.4
N/A						
0.75 kW - 2.2 kW (1 hp - 3 hp)	3 kW - 4 kW (3 hp - 5 hp)	5.5 kW (7.5 hp)	7.5 kW - 11 kW (10 hp - 15 hp)	15 kW - 22 kW (20 hp - 30 hp)	30 kW - 37 kW (40 hp - 50 hp)	45 kW - 55 kW (60 hp - 75 hp)
0.75 kW - 4 kW (1 hp - 5 hp)	5.5 kW - 7.5 kW (10 hp)	11 kW - 15 kW (20 hp - 25 hp)	18.5 kW - 22 kW (30 hp)	30 kW - 45 kW (50 hp - 75 hp)	55 kW - 75 kW (100 hp - 125 hp)	90 kW - 110 kW (150 hp)
		1.5 kW - 4 kW (2 hp - 5 hp)	5.5 kW - 22 kW (7.5 hp - 30 hp)	30 kW - 37 kW (40 hp - 50 hp)	45 kW - 55 kW (60 hp - 75 hp)	75 kW - 90 kW (100 hp - 125 hp)
N/A				15 kW - 45 kW (20 hp - 60 hp)	55 kW - 75 kW (75 hp - 100 hp)	90 kW - 110 kW (125 hp - 150 hp)

\*Future availability

## Unidrive M Frame Sizes and Ratings



Frame size		10	10	11 *	11 *
Frame sizes available	M100				
	M200, M300				
	M400				
	M600, M700, M800	•	•	•	•
Dimensions (H x W x D)	mm	1054 x 310 x 290	400 x 310 x 290	1410 x 310 x 290	570 x 310 x 290
			730 x 310 x 290		880 x 310 x 290
	in	41.5 x 12.2 x 11.4	15.8 x 12.2 x 11.4	55.5 x 12.2 x 11.4	22.4 x 12.2 x 13.9
			28.7 x 12.2 x 11.4		34.7 x 12.2 x 11.4
Max Continuous Heavy Duty kW Rating	@ 200 V	45 kW - 90 kW (60 hp - 125 hp)	45 kW - 90 kW (60 hp - 125 hp)	N/A	
	@ 400 V	90 kW - 160 kW (125 hp - 250 hp)	90 kW - 160 kW (125 hp - 250 hp)	185 kW - 250 kW (300 hp - 400 hp)	185 kW - 250 kW (300 hp - 400 hp)
	@ 575 V	75 kW - 132 kW (100 hp - 200 hp)	75 kW - 132 kW (100 hp - 200 hp)	150 kW - 225 kW (200 hp - 300 hp)	150 kW - 225 kW (200 hp - 300 hp)
	@ 690 V	90 kW - 160 kW (125 hp - 200 hp)	90 kW - 160 kW (125 hp - 200 hp)	185 kW - 250 kW (250 hp - 300 hp)	185 kW - 250 kW (250 hp - 300 hp)

### Notes:

Modular ratings up to 1.2 MW through parallel connected drives

Dimensions include mounting brackets but line chokes not included

\*Future availability



Automotive assembly plant



## Unidrive M feature and specification table

Feature		Unidrive						
		M100	M200	M300	M400	M600	M700	M800
Maximum Heavy Duty Ratings	Motor shaft power (kW)	7.5	22	22	110	1200	1200	1200
	Motor shaft power (hp)	10	30	30	150	1600	1600	1600
	Continuous current (A)	17	47	47	224	2286	2286	2286
Maximum Normal Duty Ratings	Motor shaft power (kW)	N/A	30	30	132	1500	1500	1500
	Motor shaft power (hp)	N/A	40	40	200	2000	2000	2000
	Continuous current (A)	N/A	63	63	266	2786	2786	2786
Voltage rating	100 V (100 V - 120 V ± 10%)	•	•	•	•			
	200 V (200 V - 240 V ± 10%)	•	•	•	•	•	•	•
	400 V (380 V - 480 V ± 10%)	•	•	•	•	•	•	•
	575 V (500 V - 575 V ± 10%)		•	•	•	•	•	•
	690 V (500 V - 690 V ± 10%)		•	•	•	•	•	•
Performance	Current loop update	166 μs				62 μs		
	Heavy Duty peak rating	180 % (3s)				200 % (3s)		
	Maximum output frequency*	550 Hz						
	Switching frequency range	0.67, 1, 2, 3, 4, 6, 8, 12, 16 kHz - 3 kHz default				2, 3, 4, 6, 8, 12, 16 kHz - 3 kHz default		
	High performance current controllers						•	•
Control modes	Open loop vector or V/Hz induction motor control	•	•	•	•	•	•	•
	Open loop Rotor Flux Control for induction motors (RFC-A)		•	•	•	•	•	•
	Open loop permanent magnet motor control (RFC-S)					•	•	•
	Closed loop Rotor Flux Control for induction motors (RFC-A)					Opt	•	•
	Closed loop permanent magnet motor control (RFC-S)						•	•
	Active Front End (AFE) power quality convertor					•	•	•
Onboard intelligence	Programmable Logic Control (PLC)				•	•	•	•
	Real-time tasks				•	•	•	•
	Digital lock control					•	•	•
	Advanced Motion Controller						•	•
	Machine Controller							•
	Enhanced Machine Controller							M810

For full drive voltage and current ratings, please refer to the individual Unidrive M model brochure, or contact your local Drive Center or distributor for details

\*Higher output frequencies are optionally available. Please contact your local Drive Center or distributor for details

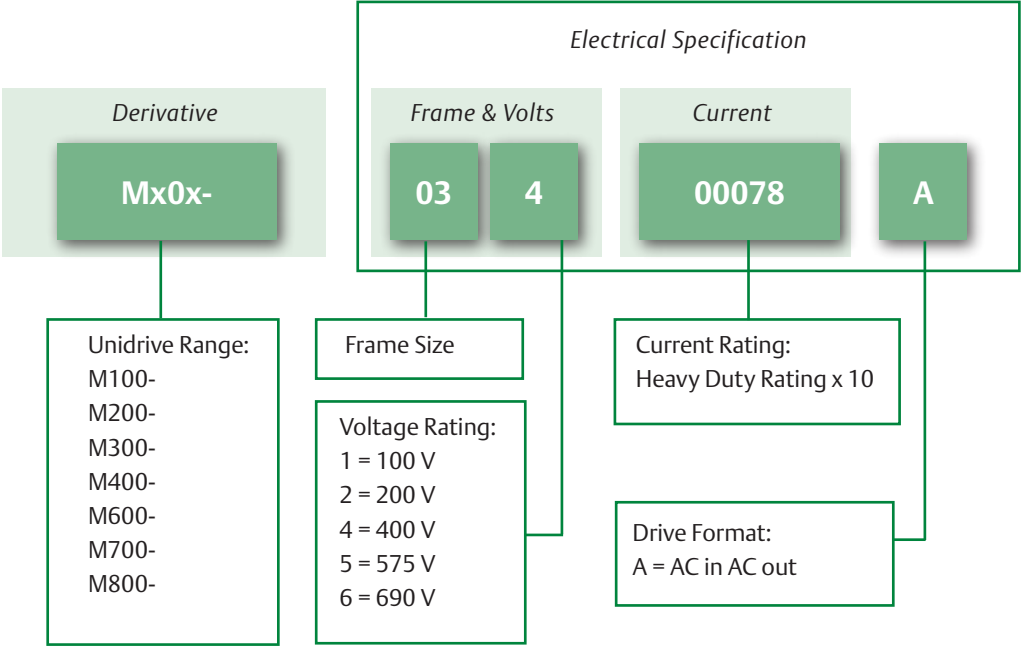


Feature		Unidrive						
		M100	M200	M300	M400	M600	M700	M800
Onboard comms	RS485					•	M701	
	Ethernet (2 switched ports)						•	•
	Ethernet (2 x 2 switched ports)							M810
Drive status	Status LED				•	•	•	•
Keypad	Fixed LED	•	•	•				
	Fixed speed reference potentiometer	M101	M201					
	Remote mountable LCD (RS485 port adaptor required)		Opt	Opt	Opt	Opt	Opt	Opt
	Removable plain text LCD				Opt	Opt	Opt	Opt
	Removable plain text LCD with real-time clock					Opt	Opt	Opt
SI module slots	0	•						
	1		•	•	•			
	2							•
	3					•	•	
Options	AI-Back-up Adaptor	•	•	•	•			
	AI-485 Adaptor		•	•	•			
	Communications (SI-PROFIBUS, SI-DeviceNet, SI-CANopen, SI-EtherCAT*)		•	•	•	•	•	•
	SI-Ethernet		•	•	•	•	•	•
	Additional I/O (SI-I/O)		•	•	•	•	•	•
	Position feedback (SI-Encoder)					•	•	•
	SI-Applications Plus (Uni SP SYPT option)						•	
	Machine controller (MCI200 and MCI210)						•	•
	Safe Motion (SI-Safety*)			•	•	•	•	•
Mechanical attributes	Tile mounting					Frame sizes 3,4,5		
	DIN rail mounting on frame sizes 1 and 2	•	•	•	•			
	Mechanical retrofit capabilities	Commander SK compatible mechanical footprint either as standard or with conversion plates				Unidrive SP compatible mechanical footprint either as standard or with conversion plates		
	Common DC bus connections					Frame sizes 3,4,5,6		

\*Future availability

Feature		Unidrive						
		M100	M200	M300	M400	M600	M700	M800
Parameter back-up	Serial/Ethernet port cloning (using AI-485 Adaptor on M200, M300 & M400)		Opt	Opt	Opt	•	•	•
	SD card and adaptor	Opt	Opt	Opt	Opt	Opt	Opt	Opt
	Smartcard reader support					•	•	•
	Electronic motor nameplate parameter storage (EnDat, HIPERFACE, BISS encoders)						•	•
Feedback	Encoder Input 1				•	Opt	•	•
	Encoder Input 2						•	•
	Simulated encoder output						•	•
Onboard I/O	Analog Inputs/Outputs	1/0	2/1	2/1	2/2	3/2	3/2 M702: 0/0	0/0
	Digital Inputs/Outputs/Bidirectional Inputs or Outputs	3/0/1	4/0/1	4/0/1	5/0/2	4/1/3	4/1/3 M702: 3/3/0	3/3/0
	Relay Output	1	1 (Frame sizes 1 to 4) 2 (Frame sizes 5 and above)			1	1	1
Onboard safety	1 x STO terminal					•	•	
	2 x STO terminals			•	•		M702	•
	Advanced safety							Future option
Power and motor control	Stationary autotune for permanent magnet motors					•	•	•
	Mechanical load resonance compensation						•	•
	Wide operating range back-up DC supply					•	•	•
	24 V control back-up	Opt	Opt	Opt	Opt	•	•	•
Other	Fan operation	Temperature controlled with standby (off)				Temperature controlled with user adjustable speed limit		
	User replaceable fan(s)	•	•	•	•	•	•	•
	Ingress rating	IP20 / NEMA1 / UL open class				IP20 / NEMA1 / UL TYPE 1 * *UL open class as standard, additional kit needed to achieve Type 1  IP65 / NEMA4 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted		
	Conformal coating	•	•	•	•	•	•	•
	Heatsink mounted braking resistor support (up to frame size 5)					•	•	•
	Standby mode (energy saving)	•	•	•	•	•	•	•

# Unidrive M Range - Identification



For a full list of patents and patent applications, visit [www.controltechniques.com/patents](http://www.controltechniques.com/patents).

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