Nidec

Drives

5 YEAR WARRANTY

Unidrive

High performance, scalable & future-proof

AC drives

Nidec Drives

The ultimate Universal Drive

Unidrive M

0.75 kW - 2.8 MW Heavy Duty
(1.0 hp - 4,200 hp)
200 V | 400 V | 575 V | 690 V

Control Techniques has set the standard in motor control since 1973.

Every company has a flagship; a product that leads the charge. For us, it's Unidrive, our high performance drive family.

Unidrive is the accumulation of almost half a century of motor control expertise, and it is the embodiment of what Control Techniques is all about. Unidrive is our crown jewel.

In 1996, we were the first to integrate the control of multiple motor types into one physical product, and hence the universal drive concept was born. Now, more than a million motors across the world rely on a Unidrive.

Unidrive integrates, with all of its benefits, seamlessly into your system. Plus, with its scalable control and motion architecture, it's the drive for what you need today and for where you want to go tomorrow.

5-year warranty as standard*

Our Unidrive series is so reliable we are confident enough to supply it with a five-year warranty as standard.

Now you can buy with the same confidence.

*Warranty terms and conditions apply.

Performance control

Matched for every type of motor

The bread and butter of Control Techniques is honing our unique motor control algorithms, taking pride in our craft as any good craftsman would.

This ensures that our Unidrive M drives offer the highest control stability and bandwidth for every industrial motor type. Unidrive M enables maximum machine throughput in every application and with every motor, from AC induction motors to dynamic linear motors and from energy saving hybrid permanent-magnet motors to high performance servo motors.

Feedback

The built-in, ultra-flexible speed and position feedback interface supports a wide range of feedback technologies from robust resolvers to high resolution encoders, including SinCos, EnDat (2.1, 2.2, 3.0), SSI, HIPERFACE and BiSS.

High performance and high power

With Unidrive there is no compromise between power and control performance. Unidrive supports high output switching frequencies throughout the power range, making it the drive of choice when your application demands uncompromised high performance control at high powers.

Sensorless

Unidrive supports sensorless control of induction, permanent-magnet, and hybrid PM motors, reducing system cost and improving robustness.

Control

High bandwidth motor control supporting switching frequencies up to 16 kHz, for open and closed loop induction, servo and hybrid PM motors, giving up to 3,000 Hz current loop bandwidth and 250 Hz speed loop bandwidth.

Unidrive, with its high speed variants, is suitable for applications where output frequencies above 600 Hz are needed, such as spindles and centrifuges.

Universally applicable

Having one universal drive in control of multiple parts of the application radically simplifies machine design.

Your engineering team only have one product to learn, allowing them to spend more time on other tasks.

It also means a single, universal replacement for any maintenance, repair or operational need.

Case study:

BPI Solutions, UK and Romania

Packaging firm blows maintenance issues away by converting from DC to AC drives

BPI Packaging solutions is a manufacturer of flexible packaging film, with seven sites in the UK and Romania. The Winsford, UK site produces innovative, sustainable film used in various applications from NHS PPE to surgical waste bags. In a bid to become more efficient BPI decided to convert from DC to AC drives. Seven extruders were converted to Unidrive M and Dyneo+ solutions. By swapping to AC the customer benefitted from 30% energy savings, lower maintenance cost and improved machine performance.

Save energy through
A wide range of energy features

Unidrive M has been designed to bring improved energy efficiency to all applications, delivering up to 98% efficiency, minimising losses during the conversion process.

The easy common DC bus configuration of the drive enables braking energy to be recycled within the drive system, reducing energy usage and eliminating external supply components. Even more, Unidrive M series drives can be configured in a regenerative mode, providing an Active Front End (AFE) for regenerative AC drive systems.

Application of an AFE not only results in the most energy efficient solution but also dramatically reduces supply harmonics.

Meanwhile, in some applications drives can sit idle for significant periods, but even in such scenarios energy can be saved with the low power standby mode of Unidrive M drives.

Nidec hybrid permanent-magnet motors

Pairing Unidrive M with Nidec's Dyneo+ hybrid permanent-magnet motors, delivers exceptional efficiency levels across all operating speeds, especially at lower speeds where the efficiency is much higher in comparison to induction motors.

The energy savings possible can result in a quick return on your investment and will continue to save you money day after day, with the important added benefit of a lower carbon footprint.

Dyneo+ hybrid permanent-magnet motor

Integrated safety

The new paradigm of system design

Modern industrial processes face a three-fold challenge: the constant demand for increased machine throughput, matched by a parallel need to reduce complexity and points of failure, all the while ensuring the health and safety of human operators and allowing them interaction with the running process.

Modernising system design, replacing traditional electro-mechanical safety components with the capabilities of the latest generation of variable speed drives, is the new standard across industries to increase efficiency and availability.

Unidrive offers integrated single or dual Safe Torque Off (STO) inputs, certified to SIL3 / PLe, providing an elegant and more reliable solution over traditional motor contactors.

Enhanced, decentralised motion safety with the MiS210

Relying only on a centralised safety PLC can mean additional cost through complexity of the wiring and the safety software.

The MiS210 safety option for Unidrive extends the built-in STO with motion safety capability and enables decentralised flexibility with the option of safety over network connectivity. This can reduce demand upon - and therefore reduce the cost of - the central safety PLC, with the additional benefit of reduced wiring and faster reaction times.

The safety module simply clicks into place, with no screws or other mounting requirements. Once fitted, the safety functions provided by the MiS210 are seamlessly incorporated into the drive's feature set. Taking advantage of the Safe EnDat protocol, the MiS210 achieves up to SIL3 / PLe with just a single encoder.

The MiS210 has been independently assessed by TUV Rheinland to meet the following standards:

- IEC 61508 SIL3
- IEC 62061
- ISO 13849-1 PLe
- IEC 61800-5-2
- European Machinery Directive 2006/42/EC

MiS210 adds the following motion safety functions to Unidrive:

- Safe Stop 1 (SS1)
- Safe Stop 2 (SS2)
- Safely Limited Speed (SLS)
- Safe Operating Stop (SOS)
- Safe Direction (SDI)
- Safe Speed Monitor (SSM)
- Safe Emergency Stop (SES)
- Safely Limited Position (SLP)
- Safely Limited Acceleration (SLA)
- Safe Brake Control (SBC)
- Two Hand Control (STHC3)

Additionally, these motion safety functions can be controlled over the following safe networks:

- Safety over Ethernet with CIP Safety
- Fail Safe over EtherCAT, FSoE

Nidec Drives

Multi-Protocol
A single drive that does it all

Control Techniques' philosophy has always been to support innovators, regardless of which communications protocol they may use. It's for them that we've developed the most flexible high performance drive platform on the market.

Having multiple protocols supported by one drive means that different systems can share one design, reducing engineering effort and complexity, and helping to rationalise inventory of parts and spares.

But we didn't stop there. Today Unidrive M series drives offer EtherNet/IP, PROFINET RT, Modbus/TCP and RTMoE as standard, on a single drive platform, simultaneously.

With this, Unidrive M delivers even more performance and extends the range of supported applications and achievable topologies. Using only the standard on-board communications it is possible to connect an HMI via Modbus TCP/IP, simultaneously with a high performance connection to a central PLC using EtherNet/IP or PROFINET RT.

CONTROL TECHNIQUES RTMoE	✓ 250 µs drive-to-drive synchronous data transfer
EtherNet/IP	✓ Support for RPI as low as 2 ms
Modbus TCP/IP	✓ Maximum of up to 10 concurrent connections
PROFINET	✓ Support for 1 ms cyclic link cycle times

RTMoE

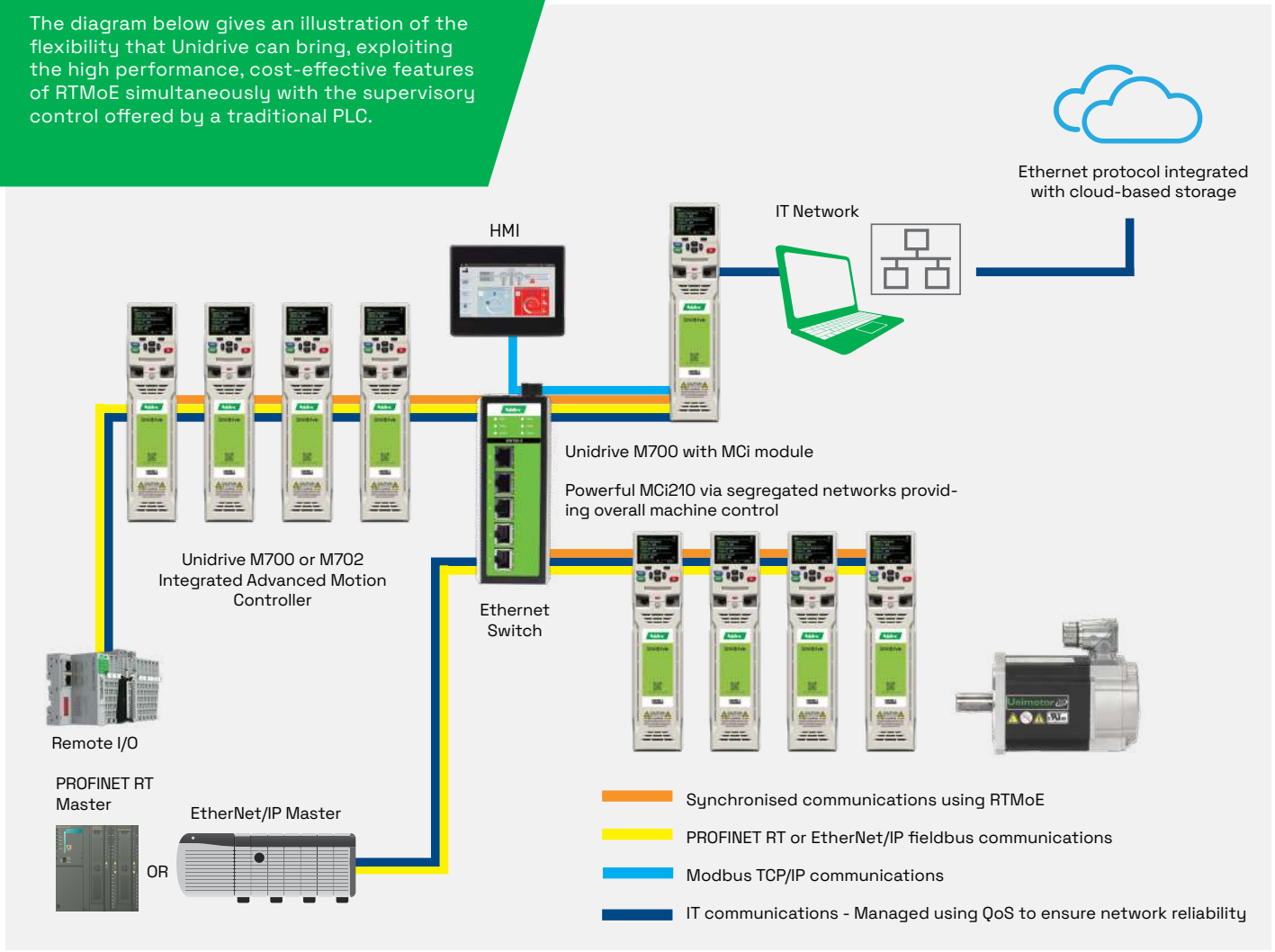
Real-Time Motion over Ethernet (RTMoE) is included as standard on Unidrive M700 and M702 drives. It provides synchronised communication between drives at 250 µs cycle time, using the Precision Time Protocol as defined by IEEE1588 V2. Inter-axis synchronisation using RTMoE delivers the ability to implement complex, highly accurate electronic line-shaft applications without the need for a powerful PLC. Therefore it's all at a fraction of the cost of other solutions available on the market today.

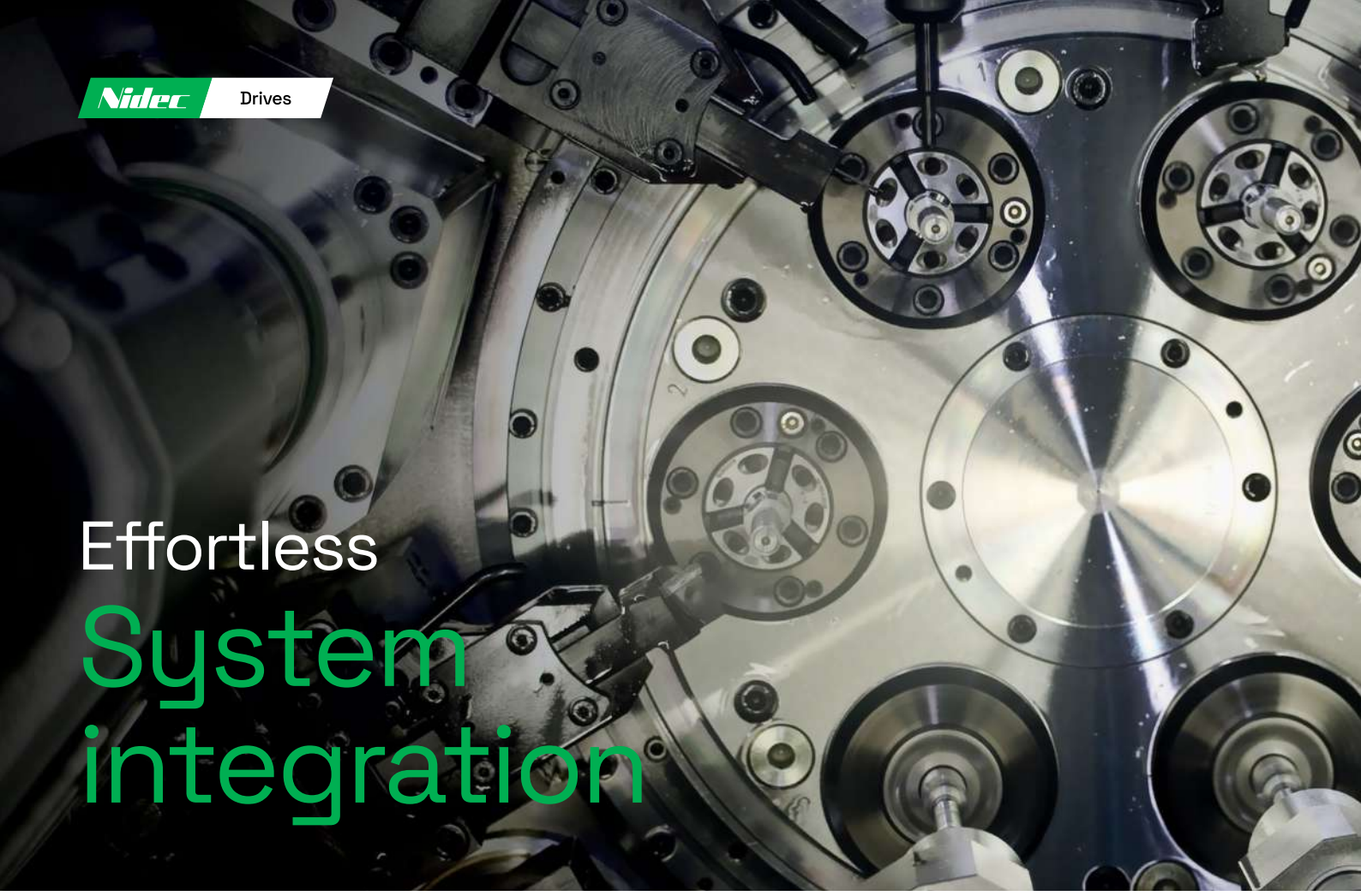
Traffic management

Every Ethernet based Unidrive incorporates dedicated network switches that allow the drives to be conveniently daisy-chained together; reducing the system wiring cost and saving valuable panel space. Using these dedicated switches also means that traffic on the network is perfectly managed to prevent network overload and the inherent performance degradation that may otherwise bane similar systems.

Cost-optimised integration

The diagram below gives an illustration of the flexibility that Unidrive can bring, exploiting the high performance, cost-effective features of RTMoE simultaneously with the supervisory control offered by a traditional PLC.





Effortless System integration

Truly comprehensive

Integration is at the heart of everything we do. Our modular drive expansion systems are designed to allow integration into virtually any setup.

Unidrive supports a multitude of control bus technologies from the state of the art to traditional fieldbuses.

For synchronised systems Unidrive offers high performance communications over EtherCAT and POWERLINK. For non-synchronised systems there's PROFINET, EtherNet/IP and Modbus TCP/IP.

Unidrive is equally at home in new designs as well as retrofit and modernisation projects. We support CANopen, Interbus, PROFIBUS and DeviceNet.

SI-EtherCAT

SI-CANopen

SI-POWERLINK

SI-Interbus

SI-PROFINET

SI-PROFIBUS

SI-Ethernet

SI-DeviceNet

PLC Controlled Motion

PLC Controlled Motion facilitates the integration of Control Techniques drives into major PLC architectures, simplifying the process to the point where our drives can be swapped into an application in a matter of hours.

A single installation will load all the function blocks and documentation required, as well as example projects to get the application up and running as quickly as possible. With the guided setup sequence provided inside the Connect software tool, users are taken through the setup process step-by-step, resulting in a ready-to-use configuration that can be loaded straight into the drive.

Utilising the high performance Advanced Motion Controller inside Unidrive M once again yields significant performance benefits, and gives the possibility to create complex motion completely decoupled from the performance and computational power of the external PLC.

Fequency Control

- Allows frequency control of an open-loop axis.

RPM Control

- Allows speed control of a closedloop (including sensorless) axis.

Speed Control

- Allows speed control of an axis, with dynamic control over motion parameters. With dedicated jogging reference.

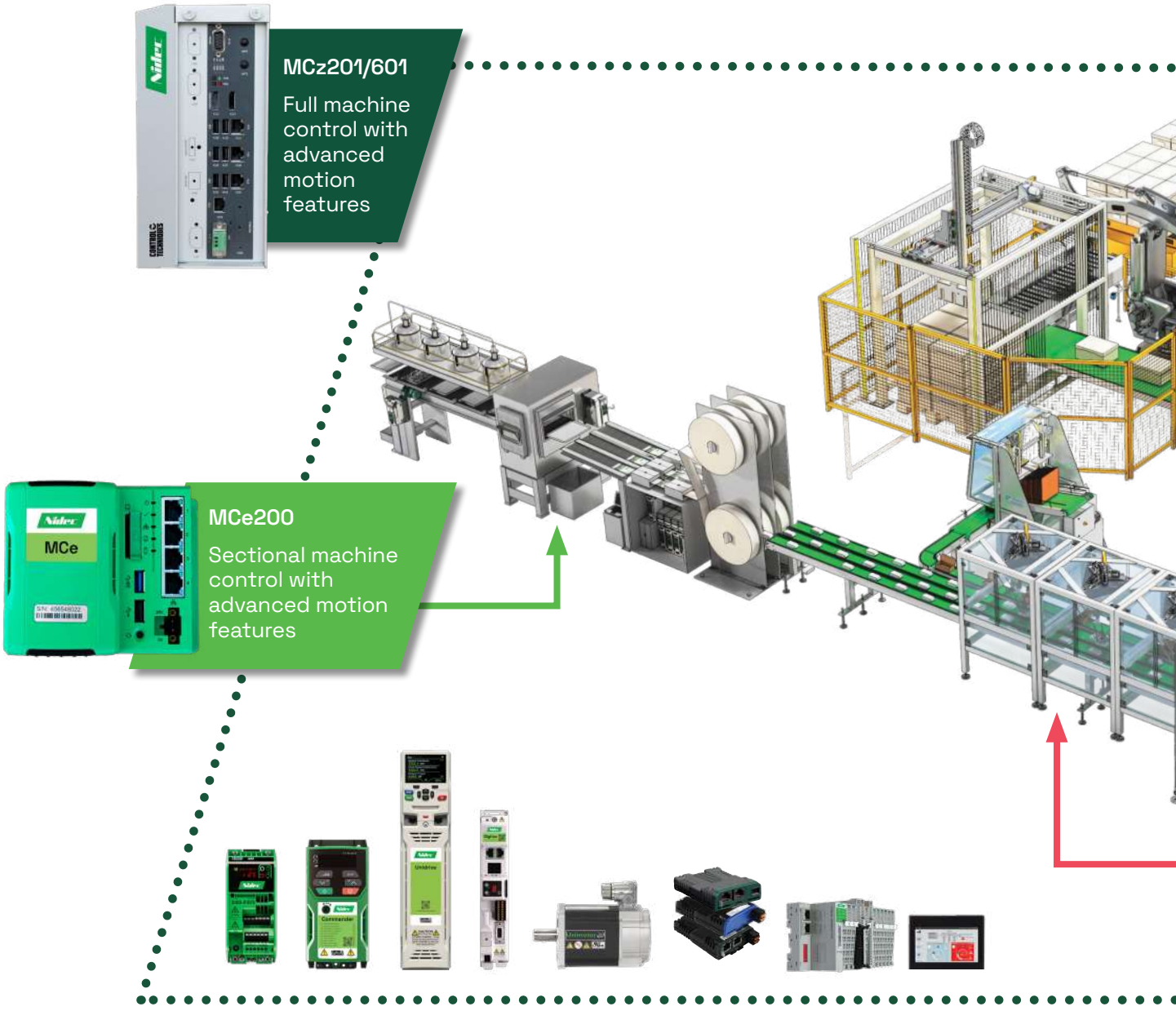
Position Control

- Single motion or up to 10 index moves can be defined and executed.
- Multiple homing modes

PLC Controlled Motion

- Electronic gearbox synchronised motion to another PLC Controlled Motion axis.
- Master reference switchable during PLC run-time.
- Multiple homing modes.

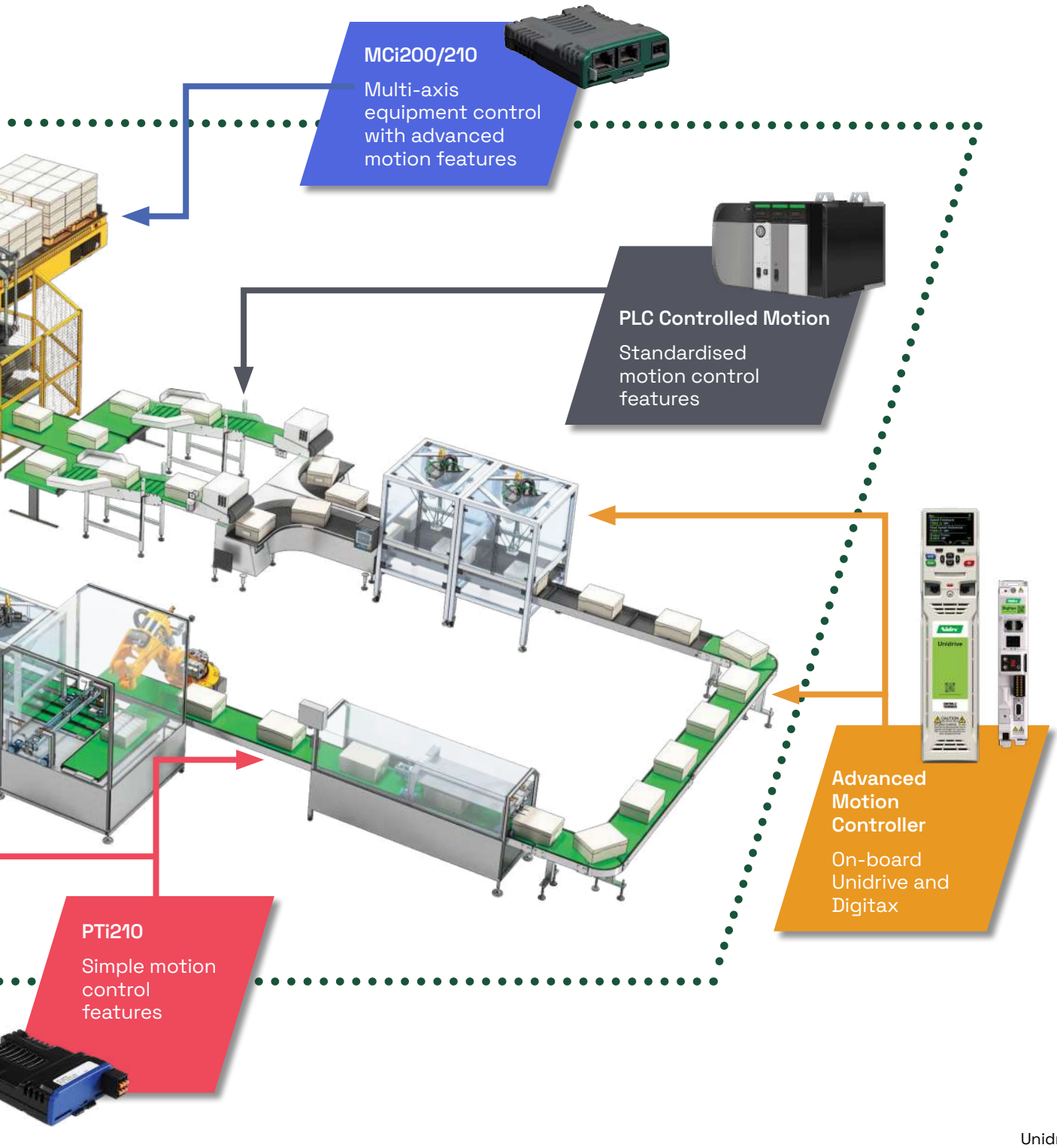
Complete automation portfolio



For more details about these products please visit www.controltechniques.com

Exceptional performance to suit all budgets

With the flexibility of our product portfolio, you can discover the optimal solution in terms of both performance and cost. Each section of the line can be seamlessly connected, forming a macro environment where your machinery operates at the necessary levels to meet essential business productivity and output targets.



Nidec Drives

Application programming
Machine Control Studio

Fast Programming and Commissioning

The Machine Control Studio programming environment provides a flexible and intuitive environment for programming automation and motion control features.

The software provides programming for:

- On-board PLC
- MCi200 or MCi210 integrated machine control modules
- Ethernet network data configurations

Productivity features also supported:

- Intuitive IntelliSense functionality helps to write consistent and robust programs speeding up software development
- Programmers have access to a vibrant Open-source community for function blocks
- Machine Control Studio also supports customers' own function block libraries

Familiar automation programming languages

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 programming languages are supported:

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

Global
Drive obsessives

Over the years our Control Techniques teams have used the flexibility of the Unidrive platform to develop packaged software solutions for a myriad of applications.

Through diverse application engineering expertise distributed across the world in our Drive Centre and Partner network, we have built up a vast résumé of software and experience that is yours to draw upon when you choose Unidrive.

Our Global Application Community exists to maintain connections across this network to ensure Control Techniques continues to provide class-leading drive applications support, wherever you are.

Globally organised expertise, development and support.

- Drive sales, technical support, repair and application expertise
- Drive sales
- Country Partners
- DFS Panel Shop

Visit controltechniques.com or scan the QR code to find your nearest drive centre or distributor

Using Unidrive

We make it quick and easy

Control Techniques' keypads, memory devices and software tools make it easy to access the full feature set of Unidrive M drives, allowing users to optimise drive tuning, back-up the configuration set, and troubleshoot quickly and painlessly.

Connect

Our Connect PC tool is for commissioning, optimising and monitoring drive and system performance. Its development draws from our extensive user research, using human centred design principles to give a superior user experience.

- Direct connection to drives via serial or Ethernet simplifies and speeds up commissioning
- Task-based drive operations are simplified with intuitive graphical tools in a familiar Windows environment
- Dynamic drive logic diagrams and enhanced searchable listings bring clarity to the commissioning and fault finding processes
- Drive and motor performance can be optimised with minimal drives knowledge
- Multiple communication channels for a more complete overview of the system
    - Automatic drive discovery gets you up and running in the shortest possible time

Configuration security

Access to our drives' configuration can be set across multiple levels and secured with a PIN code. So deciding who has access to which settings can be entirely in your control.

With the commissioning done, parameter sets and small PLC programs can be backed-up or restored from Smartcards and with the Connect PC tool, as well as copied from one drive to another, including from legacy products.

Standard SD cards can also be used for quick and easy parameter and program storage with an available adaptor. SD cards provide massive memory capacity allowing a complete system reload if required, and can be easily programmed on a common PC.

Free download

Drive set-up

Quickly find everything you need for quick and easy installation of your drives.

Visit: www.drive-setup.com

Free download

Diagnostic Tool

Quickly solve any error codes that the drive may show. You can download our Diagnostics Tool app at:
controltechniques.com/mobile-applications

Get it from Microsoft | Download on the App Store | GET IT ON Google Play

*For Microsoft users, please note that this mobile app operates with Windows 10 only.

Unidrive:

The drive for your industry and application

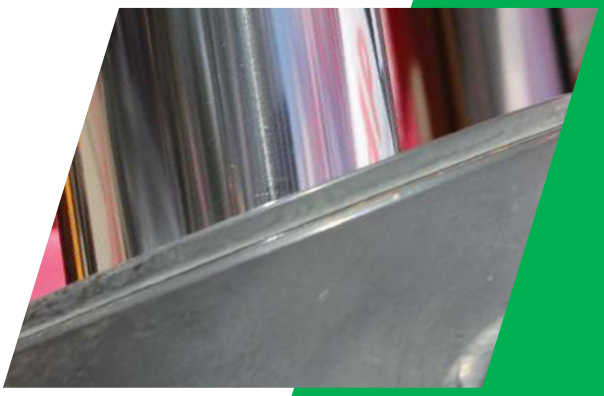
Torque control

Extrusion

Test rigs

Casting

Winding



Speed control

Hydraulic pumps

Cranes

Hoisting

Printing

Conveyors

Position control

Stacking

Retreading

Labeling

Packaging

- Precision torque control with up to 250 µs update rate
- Sensorless control of induction, permanent-magnet and hybrid PM motors
- 98% efficient, minimal energy lost during the power conversion process
- Easy common DC bus configuration, dynamic braking, and regenerative mode
- Full spectrum of stand-alone, modular and pre-assembled drives up to 2.8MW (4,200hp)
- On-board PLC to execute programs for logic and sequencing

- Fully configurable S-ramps
- High bandwidth speed loop and switching frequencies supported up to 16 kHz
- Built-in, universal feedback interface supporting everything from resolvers to incremental and absolute encoders
- Stationary autotune
- Low acoustic noise due to adjustable multi-speed fan and intelligent thermal management
- Integrated Safe Torque Off (STO) input(s), certified to SIL3 / PLe

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- Support for virtually all control bus technologies, including traditional fieldbuses and serial communications
- Effortless integration into PLC architectures with PLC Controlled Motion
- Built-in, 1.5 axis advanced motion controller with cam profiles, homing, and electronic gearbox
- Scalable integrated motion control reduces demand on, or can entirely replace, a central PLC
- Comprehensive motion safety functions, including over safe networks

High power modules and Pre-assembled cubicle drives

High power modular drives

Unidrive M's modular offering gives you never before seen flexibility in building compact, reliable high-power solutions. Paralleled together, Unidrive M can control asynchronous and synchronous motors up to 2.8 MW (4,200 hp). At the top of the modular drives range, the 500 kW / 700 hp Power Module delivers unmatched power density, while keeping both footprint and system costs to a minimum.

The Unidrive M modules can be paralleled together into a wide range of flexible solutions to solve all system needs, including Active Front End and multi-pulse rectifier configurations.

Efficient system build

Designing and building a high power drive cubicle takes immense engineering knowhow. Most people don't have that expertise in-house. But we do. And we've put it all into our DFS freestanding drives.

The cubicle system is designed to make the most of our high power modular drives, benefiting the applications that need them the most.
The results are maximum energy efficiency in an ingress protected package.

Our cubicle drives come pre-assembled, easy to set up, with all necessary system components included. Even more, we can ship your freestanding drive to you at very short lead times.

Case study:

Bandag, Johannesburg, South Africa

Increased productivity and energy savings for global retread company, helping 9 million tyres cover more mileage.

The installation of two M700 drives - 750 kW each, connected to a common gearbox - has helped the company achieve significant business performance improvements. The plant has seen an approx. 10% monthly energy saving since deploying the technology, not only saving money but contributing to a lower carbon footprint.

Case study:

Big thinking increases capacity for test rigs

Rewinds & J. Windsor

“The Control Techniques’ DFS drive cubicle is doing everything we want. The upgrade to the new system has increased our flexibility as a firm. Moving from our old 250 kW drive to 500 kW means we can now test much bigger motors, up to 1 MW in-house, reducing our service costs. We can now take on more work and test and repair other companies motors”

Paul Challiner, Rewinds & J. Windsor,
Electrical Department Manager

Hydraulic counterweight with Four-quadrant pump

Established in 1946, Rewinds & J. Windsor is one of the largest independently owned electric motor and rotating equipment repairers in the UK. Operating across three sites, the company offers a range of electrical, mechanical, and electronic engineering services across the UK and Ireland. The company's motor testing facility in Liverpool, tests, builds, and repairs a wide range of motors from wind turbines to big brand car motors.

The Challenge

Recently, Rewinds & J. Windsor's test rig broke down. At 250 kW, it had limitations on the size of the motor it could test.

The company took action to find an easy to use alternative which could test bigger motors, to allow it to expand in-house capabilities.

The Solution

A 500 kW Control Techniques' DFS drive, was just the solution. The pre-assembled, ready to install drive cubicle system, is designed for use in high power applications where energy saving and high ingress protection are essential.

Apostolos Papadopoulos, Area Sales Manager UK North West, Control Techniques, said, "The DFS drive provided Rewinds & J. Windsor with a fast and easy to install solution; the product was in stock and shipped within days from order."

Case study:

No drama programming and operation in stage & theatre

Royal Shakespeare Theatre

Cutting edge
Automation

As part of a four-year £112 million transformation at the Royal Shakespeare Theatre in Stratford-upon-Avon, Dutch theatre automation company Trekwerk was responsible for the renovation of the over-stage installation. The contract was awarded to Control Techniques' Rotterdam Drive Centre and around 100 AC drives and servo motors were used throughout the project.

The Challenge

The challenge was to automate the movement of back-drops and scenery, and the complex system of lighting arrays, which included the development, design, manufacture and installation of 60 winches plus hoists for 30 light arrays.

Often different productions are performed in the matinee and the evening and the RSC has just two hours to complete the changeover, so it must be swift and easy to control.

The theatre renovation was designed to bring actors and audiences closer together with stage remodelling and lighting effects that could only be achieved with the cutting-edge electronics offered by Trekwerk and Control Techniques.

The Solution

A total of 46 drives were fitted to 60 winches with at least half positioned above the thrust stage.

Any of these could be configured for different duties from lifting scenery to controlling actors' 'flight'. Sixteen of these winches were positioned in the 'slot area' specifically for reconfiguring the stage and 14 unique Trekwerk Synchro Disc winches provided silent five-line lifting of the 'flybars' for rapid scenery changes during productions.

All of the winches were fitted with Control Techniques 15 kW Unidrive AC drives operating in servo mode and twinned with Unimotor 190 fm servo motors, fitted with double encoders for precise positioning and speed control.

The Benefit

All drives communicate with each other using Control Techniques' own high-speed network, as well as communicating with the Trekwerk control system.

Three TNM control desks were pre-programmed with all critical movements for each performance and override joy-stick control can be used to provide manual speed up/slow down control to maintain synchronicity.

The detailed motor movements are programmed within the second processor module in each drive, and all programmed movements can be reviewed in the 3D graphics within the control system to flag up any potential problems and eliminate any chance of collisions.

Nidec Drives

Unidrive

Specifications

Dimensions

Frame size	Dimensions H x W x D mm (in)	Weight kg (lb)	DC Bus Choke/AC Line Choke	
			Internal	External
3	365 x 83 x 200 (14.4 x 3.3 x 7.9)	4.5 (9.9)	✔	-
4	365 x 124 x 200 (14.4 x 4.9 x 7.9)	6.5 (14.3)	✔	-
5	365 x 143 x 200 (14.4 x 5.6 x 7.9)	7.4 (16.3)	✔	-
6	365 x 210 x 227 (14.4 x 8.3 x 8.9)	14 (31)	✔	-
7	508 x 270 x 280 (20 x 10.6 x 11.0)	28 (62)	✔	-
8	753 x 310 x 290 (29.7 x 12.2 x 11.4)	52 (115)	✔	-
9A	1049 x 310 x 290 (41.3 x 12.2 x 11.4)	66.5 (147)	✔	-
9E	1010 x 310 x 290 (39.7 x 12.2 x 11.4)	46 (101)	-	✔
10E	1010 x 310 x 290 (39.7 x 12.2 x 11.4)	46 (101)	-	✔
11E	1190 x 310 x 312 (46.9 x 12.2 x 12.3)	63 (139)	-	✔
12	1750 x 295 x 526 (68.9 x 11.6 x 20.7)	D: 113 (249) T: 130 (287)	-	✔

Electrical Ratings

A.C. Supply Ratings:	200 V drive: 200 to 240 VAC ±10 % 400 V drive: 380 to 480 VAC ±10 % 575 V drive: 500 to 575 VAC ±10 % 690 V drive: 500 to 690 VAC ±10 %
Supply Phases:	3 phases (single phase ratings available on request)
Supply Types:	TN-S, TN-C-S, TT and IT
Input Frequency:	45 to 66 Hz
D.C. Supply:	Connect up to 10 drives in parallel via D.C. bus
Active Front End:	All variants support regen mode for the inverter to regenerate energy back tot the grid
Braking Transistor:	Built-in as standard (frame 3 to 8) or optional (frame 9 to 12)
Output Frequency (Open-loop):	Standard drives: 599 Hz High speed drives: 3,000 Hz
Output Frequency (Closed-loop or sensorless RFC):	Standard drives: 550 Hz High speed drives: 1,250 Hz
EMC with internal filter:	EN61800-3 (2nd environment) and EN61000-6-2 (Immunity)
EMC with external filter:	EN/IEC 61000-6-3 and EN/IEC 61000-6-4
Switching Frequency:	2 to 16 kHz
Current Loop:	62.5 µs

Environmental Specifications

Enclosure type:	IP20 / NEMA1 / UL Open Class / UL Type 1 with additional kit
Ambient temperature:	Without derate: -20 to 40 °C (-4 to 104 °F) With derate: -20 to 55 °C (-4 to 131 °F)
Humidity:	95 % maximum (non-condensing)
Altitude:	0 to 3,000 m (9,900 ft) De-rate 1 % per 100 m (330 ft) above 1,000 m (3,300 ft)
Random Vibration:	Tested in accordance with IEC 60068-2-64
Mechanical Shock:	Tested in accordance with IEC 60068-2-29
Conformal Coating:	All drives have conformally coated PCBs as standard
Corrosive Gases:	Levels must not exceed Class 3C2 of IEC 60721-3-3

Compliance

EN/IEC 61800-5-1 (Electrical Safety)

EN/IEC 61131-2 (I/O)

Safe Torque Off independently assessed by TÜV to IEC 61800-5-2 SIL 3 and EN ISO 13849-1 PLe

UL 508C (Electrical Safety)

DNV certified for use in Marine & Offshore applications

Product Marks

Overload Limits

Typical overload limits (based on drive rated current)				
Operating mode	Closed-loop from cold	Closed-loop from 100 %	Open-loop from cold	Open-loop from 100 %
Normal duty overload (size 11 and below)	110 % for 165 s	110 % for 9 s	110% for 165 s	110% for 9 s
Normal duty overload (size 12)	110 % for 180 s	110 % for 10 s	110 % for 180 s	110 % for 10 s
Heavy duty overload (size 8 and below)	200 % for 28 s	200% for 3 s	150 % for 60 s	150 % for 7 s
Heavy duty overload (size 9A, 9E, 10, 11)	170 % for 42 s	170 % for 5 s	150 % for 60 s	150% for 7 s
Heavy duty overload (size 12)	140 % for 60 s	140 % for 10 s	140 % for 60 s	140 % for 10 s

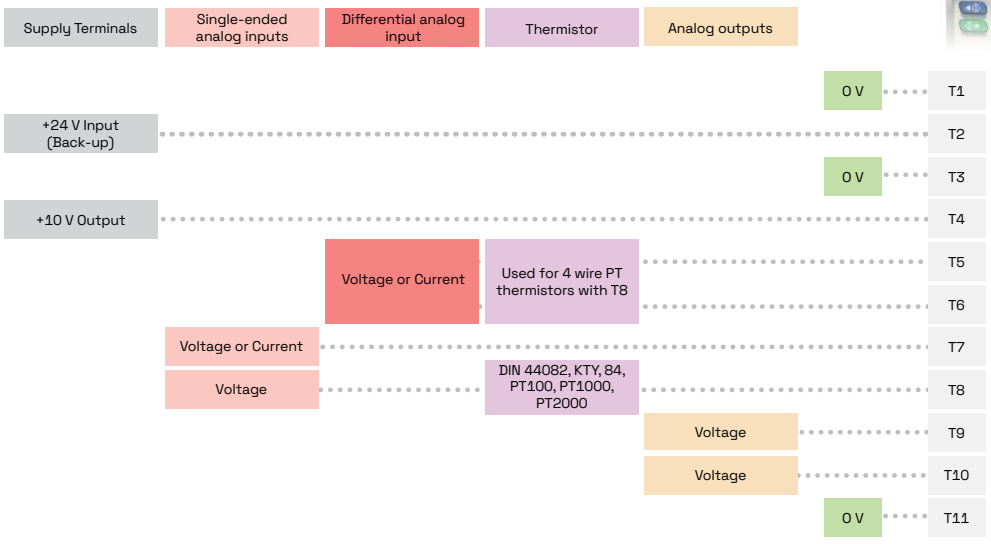
Drive Feature Table

Standard Drive:	M600	M701	M700	M702
High Speed Drive:	X	HS71	HS70	HS72
STO SIL3:		Single Channel		Dual Channel
I/O Terminals		Analog & Digital I/O		Digital I/O Only
Onboard Comms:		MODBUS RTU		Ethernet/IP, MODBUS TCP, RTMoE, PROFINET
Closed-loop control	With SI Option	✔	✔	✔
Encoder Inputs:	X	2	2	2
Encoder Outputs:	X	2	2	2
Advanced Motion Controller:	X	✔	✔	✔
Regen Mode (Use as an active front end):	✔	✔	✔	✔
Supported Motors				
Asynchronous (Induction) Motor	✔	✔	✔	✔
Synchronous (PM) Motor	✔	✔	✔	✔
Synchronous Reluctance Motor	✔	✔	✔	✔
Hybrid PM Assisted Motor	✔	✔	✔	✔
Closed-loop control	With SI Option	✔	✔	✔

Inputs & Outputs

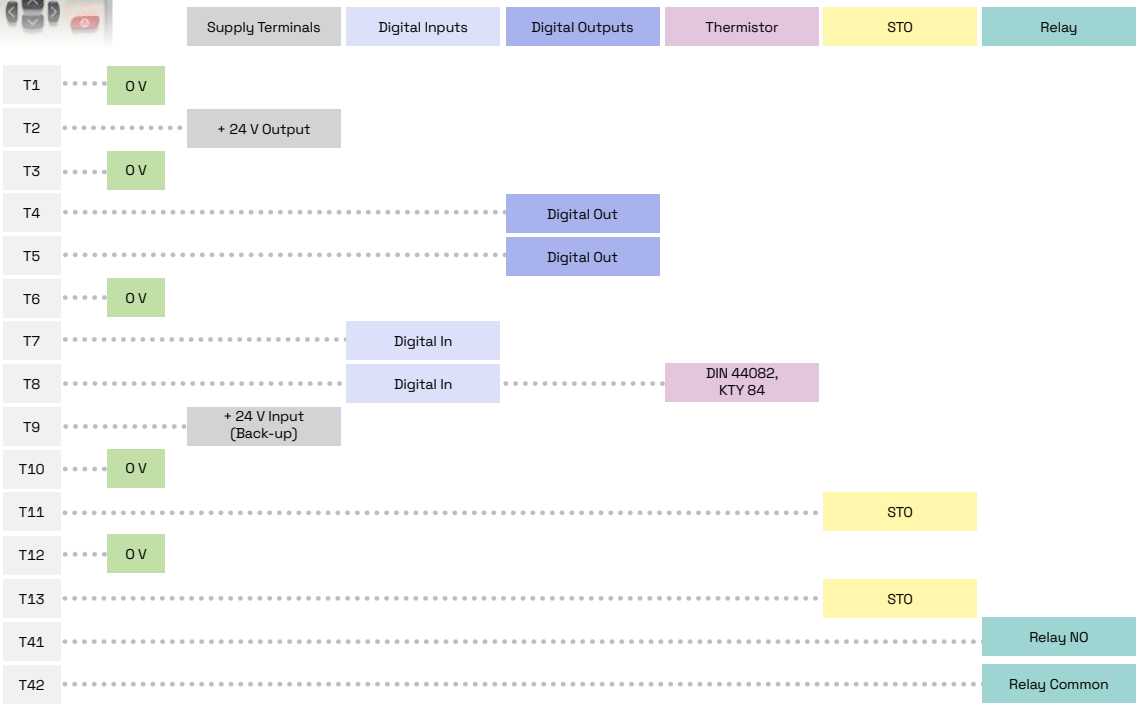
Unidrive M600, M700, M701, HS70 & HS71

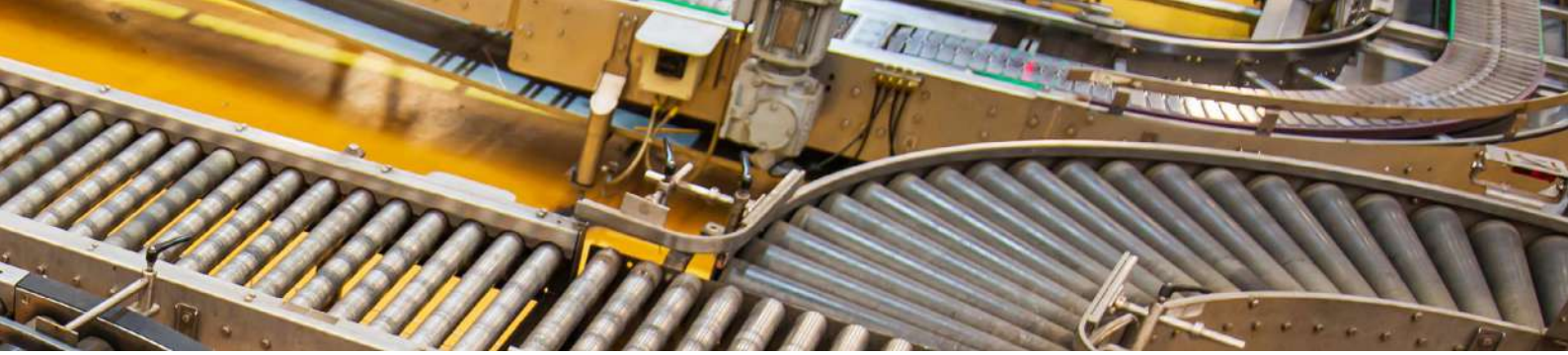
Up to 3 analog inputs, 2 analog outputs, 6 digital inputs, 3 digital outputs, 1 STO & 1 relay



Unidrive M702 & HS72

Up to 2 digital inputs, 2 digital outputs, 2 STO & 1 relay





	Supply Terminals	Digital Inputs	Digital Outputs	STO	Relay
T21	0 V				
T22	+ 24 V Output				
T23	0 V				
T24		Digital In	Digital Out		
T25		Digital In	Digital Out		
T26		Digital In	Digital Out		
T27		Digital In			
T28		Digital In			
T29		Digital In			
T30	0 V				
T31				STO	
T41					Relay NO
T42					Relay Common

Accessory Inputs & Outputs

Each drive can have up to three SI option modules.

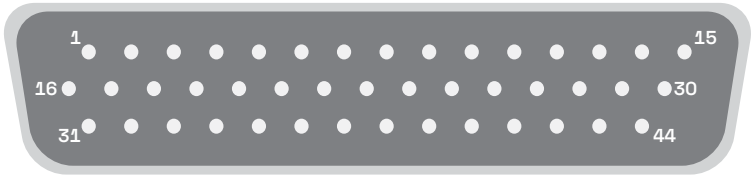
SI-I/O

Up to 3 analog inputs, 1 analog outputs,
8 digital inputs, 4 digital outputs, & 2 relays

	Digital Inputs	Digital Outputs	Single-ended analog inputs	Differential analog input	Analog outputs	Relays
T1	0 V					
T2	Digital In	Digital Out				
T3	0 V	Digital In	Digital Out			
T4	Digital In	Digital Out				
T5	Digital In	Digital Out				
T6	0 V					
T7	Digital In		Voltage	Voltage		
T8	Digital In		Voltage			
T9	Digital In		Voltage or Current			
T10	0 V					
T11	Digital In				Voltage or Current	
T21						Relay NO
T22						Relay Common
T23						Relay NO

SI-I/O 24 Plus

Up to 16 digital inputs, 8 digital outputs, an encoder input & an encoder output



1 Encoder + Vdc Out	2 A\	3 A	4 U\	5 U	6 DO1	7 DO2	8 DO3	9 DI1	10 DI2	11 DI3	12 DI4	13 DI5	14 I/O + Vdc In	15 I/O 0V
16 Encoder 0V	17 B\	18 B	19 V\	20 V	21 DO4	22 DO5	23 DO6	24 DI6	25 DI7	26 DI8	27 DI9	28 DI10	29 I/O + Vdc In	30 I/O 0V
31 Z\	32 Z	33 W\	34 W	35 Motor thermistor	36 DO7	37 DO8	38 DI11	39 DI12	40 DI13	41 DI14	42 DI15	43 DI16	44 I/O 0V	

Unidrive
Ordering guide

Order code for drives

M700 - 03 4 00730 A 10100A B 100

Drive Range
M700 = Multi-protocol
M701 = RS485 Modbus RTU
M702 = Safety enhanced
M600 = Open-loop
M000= Unassigned power module

Frame Size

Voltage Rating
2 = 200 V
4 = 400 V
5 = 575 V
6 = 690 V

Current Rating (A):
Heavy Duty
Rating x 10

Power Format
A = AC in AC out (with internal line choke)
D = DC in AC out (inverter)
E = AC in AC out (external line choke required)
T = AC in AC out (12 pulse rectifier plus inverter)

Region
00 = 50 Hz
01= 60 Hz

Brake Transistor
B = Brake Transistor included
N = No Brake Transistor

Order Codes for Control Pods for Unassigned Drives (M000)

Control Module Range for unassigned power module (M000)		
Mxxx-STANDARD011100A0100		Single module systems
Mxxx-MASTER00011100A0100		Master control pod for systems with more than one module.
M000-FOLLOWER011100A0100		Follower pod for systems with multiple modules

For more information on Modular Systems please see the latest issue of the Modular Power Brochure or scan the QR code to visit our website.

Unidrive

Model number and ratings

200 to 240 Vac +/-10%

Product Code M600/M700/M701/M702	Supply Phases	Heavy Duty			Normal Duty		
		Max Cont. Current (A)	Motor Power (kW)	Motor Power (HP)	Max Cont. Current (A)	Motor Power (kW)	Motor Power (HP)
Mxxx - 03200050A	3	5	0.75	1	6.6	1.1	1.5
Mxxx - 03200066A	3	6.6	1.1	1.5	8	1.5	2
Mxxx - 03200080A	3	8	1.5	2	11	2.2	3
Mxxx - 03200106A	3	10.6	2.2	3	12.7	3	3
Mxxx - 04200137A	3	13.7	3	3	18	4	5
Mxxx - 04200185A	3	18.5	4	5	25	5.5	7.5
Mxxx - 05200250A	3	25	5.5	7.5	30	7.5	10
Mxxx - 06200330A	3	33	7.5	10	50	11	15
Mxxx - 06200440A	3	44	11	15	58	15	20
Mxxx - 07200610A	3	61	15	20	75	18.5	25
Mxxx - 07200750A	3	75	18.5	25	94	22	30
Mxxx - 07200830A	3	83	22	30	117	30	40
Mxxx - 08201160A	3	116	30	40	149	37	50
Mxxx - 08201320A	3	132	37	50	180	45	60
Mxxx - 09201760A	3	176	45	60	216	55	75
Mxxx - 09202190A	3	219	55	75	266	75	100
Mxxx - 09201760E	3	176	45	60	216	55	75
Mxxx - 09202190E	3	219	55	75	266	75	100
Mxxx - 10202830E	3	283	75	100	325	90	125
Mxxx - 10203000E	3	300	90	125	360	110	150

380 to 480 Vac +/-10%

Product Code M600/M700/M701/M702	Supply Phases	Heavy Duty			Normal Duty		
		Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)	Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)
Mxxx - 03400025A	3	2.5	0.75	1	3.4	1.1	1.5
Mxxx - 03400031A	3	3.1	1.1	1.5	4.5	1.5	2
Mxxx - 03400045A	3	4.5	1.5	2	6.2	2.2	3
Mxxx - 03400062A	3	6.2	2.2	3	7.7	3	5
Mxxx - 03400078A	3	7.8	3	5	10.4	4	5
Mxxx - 03400100A	3	10	4	5	12.3	5.5	7.5
Mxxx - 04400150A	3	15	5.5	10	18.5	7.5	10
Mxxx - 04400172A	3	17.2	7.5	10	24	11	15
Mxxx - 05400270A	3	27	11	20	30	15	20
Mxxx - 05400300A	3	30	15	20	31	15	20
Mxxx - 06400350A	3	35	15	25	38	18.5	25
Mxxx - 06400420A	3	42	18.5	30	48	22	30
Mxxx - 06400470A	3	47	22	30	63	30	40
Mxxx - 07400660A	3	66	30	50	79	37	50
Mxxx - 07400770A	3	77	37	60	94	45	60
Mxxx - 07401000A	3	100	45	75	112	55	75
Mxxx - 08401340A	3	134	55	100	155	75	100
Mxxx - 08401570A	3	157	75	125	184	90	125
Mxxx - 09402000A	3	200	90	150	221	110	150
Mxxx - 09402240A	3	224	110	150	266	132	200
Mxxx - 09402000E	3	200	90	150	221	110	150
Mxxx - 09402240E	3	224	110	150	266	132	200
Mxxx - 10402700E	3	270	132	200	320	160	250
Mxxx - 10403200E	3	320[1]	160	250	361	200	300
Mxxx - 11403770E	3	377	185	300	437	225	350
Mxxx - 11404170E	3	417[1]	200	350	487[1]	250	400
Mxxx - 11404640E	3	464[1]	250	400	507[1]	315	450
Mxxx - 12404800T	3	480[1]	250	400	608[1]	315	500
Mxxx - 12405660T	3	566[1]	315	450	660[1]	355	550
Mxxx - 12406600T	3	660[2]	355	550	755[1]	400	650
Mxxx - 12407200T	3	720[3]	400	600	865[4]	500	700

[1] At 2 kHz switching frequency.
[2] 140% Overload at 35°C and below and 125% above that.
[3] 140% Overload at 30°C and below and 125% above that.
[4] 110% Overload at 30°C and below and No Overload above that.

500 to 575 Vac +/-10%

Product Code M600/M700/M701/M702	Supply Phases	Heavy Duty			Normal Duty		
		Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)	Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)
Mxxx - 05500030A	3	3	1.5	2	3.9	2.2	3
Mxxx - 05500040A	3	4	2.2	3	6.1	4	5
Mxxx - 05500069A	3	6.9	4	5	10	5.5	7.5
Mxxx - 06500100A	3	10	5.5	7.5	12	7.5	10
Mxxx - 06500150A	3	15	7.5	10	17	11	15
Mxxx - 06500190A	3	19	11	15	22	15	20
Mxxx - 06500230A	3	23	15	20	27	18.5	25
Mxxx - 06500290A	3	29	18.5	25	34	22	30
Mxxx - 06500350A	3	35	22	30	43	30	40
Mxxx - 07500440A	3	44	30	40	53	45	50
Mxxx - 07500550A	3	55	37	50	73	55	60
Mxxx - 08500630A	3	63	45	60	86	75	75
Mxxx - 08500860A	3	86	55	75	108	90	100
Mxxx - 09501040A	3	104	75	100	125	110	125
Mxxx - 09501310A	3	131	90	125	150	110	150
Mxxx - 09501040E	3	104	75	100	125	110	125
Mxxx - 09501310E	3	131	90	125	150	110	150
Mxxx - 10501520E	3	152	110	150	200	130	200
Mxxx - 10501900E	3	190	132	200	200	150	200
Mxxx - 11502000E	3	200	150	200	248	175	250
Mxxx - 11502540E	3	254[1]	185	250	288[1]	225	300
Mxxx - 11502850E	3	285[1]	225	300	315[1]	250	350
Mxxx - 12503150	3	315	250	350	376	250	350
Mxxx - 12503600	3	360	250	350	428	300	400
Mxxx - 12504100	3	410	300	400	480	330	450
Mxxx - 12504600	3	460	330	450	532	370	500

[1]At 2 kHz switching frequency.

500 to 690 Vac +/-10%

Product Code M600/M700/M701/M702	Supply Phases	Heavy Duty			Normal Duty		
		Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)	Max Cont. Current (A)	Motor Power (kW)	Motor Power (hp)
Mxxx - 07600190A	3	19	15	20	23	18.5	25
Mxxx - 07600240A	3	24	18.5	25	30	22	30
Mxxx - 07600290A	3	29	22	30	36	30	40
Mxxx - 07600380A	3	38	30	40	46	37	50
Mxxx - 07600440A	3	44	37	50	52	45	60
Mxxx - 07600540A	3	54	45	60	73	55	75
Mxxx - 08600630A	3	63	55	75	86	75	100
Mxxx - 08600860A	3	86	75	100	108	90	125
Mxxx - 09601040A	3	104	90	125	125	110	150
Mxxx - 09601310A	3	131	110	150	155	132	175
Mxxx - 09601040E	3	104	90	125	125	110	150
Mxxx - 09601310E	3	131	110	150	155	132	175
Mxxx - 10601500E	3	150	132	175	172	160	200
Mxxx - 10601780E	3	178	160	200	197	185	250
Mxxx - 11602100E	3	210	185	250	225	200	250
Mxxx - 11602380E	3	238[1]	200	250	275[1]	250	300
Mxxx - 11602630E	3	263	250	300	305	315	400
Mxxx - 12603150	3	315	280	400	376	355	450
Mxxx - 12603600	3	360	355	450	428	400	500
Mxxx - 12604100	3	410	400	500	480	450	600
Mxxx - 12604600	3	460	450	600	532	500	650

[1]At 2 kHz switching frequency.

Accessories ordering guide

Comprehensive options for flexibility

Optional Drive Programming and Operator Interface		Part No.	Description
KI – Keypad Plus (For Remote Mounting)		82400000022700	KI-Keypad Plus's large and clear colour display makes the drive status information and parameter descriptions easy to read and readily accessible. It enables easy access to key drive features for enhanced machine performance, with the helpful wizard quickly guiding the user through configuration. Bluetooth allows remote and flexible connectivity for PC tool commissioning and programming, without needing to open the cabinet, for smarter and safer working. 10 user selectable parameters can be shown on the status screen, with real-time information, plus all parameters can be scaled and their units customised.
KI-Keypad		82400000016000	Plain text, multi-language LCD keypad with up to four lines of text for in-depth parameter and data descriptions.
Remote Keypad (IP66)		82500000000001	Remote mountable, intuitive plain text, multilingual LCD keypad for rapid setup and helpful diagnostics from the outside of a panel. Meets IP66 (NEMA 4)
Remote Keypad RTC		82400000019600	Remote mountable keypad, allowing flexible mounting on the outside of a panel (meets IP54/NEMA 12). The keypad offers Hand-Off-Auto control and can present up to four lines of real text with multi-language translation, enhancing clarity and increasing ease of use. Battery operated real-time clock allows scheduling of run and off periods and adds accurate time stamping to logged events, aiding diagnostics
KI-485 Adaptor		82400000016100	This adaptor can be fitted in place of the drive keypad and provides additional ports to communicate via RS485. The adaptor is commonly used for programming the drive.
Operator Interface (HMI)		eSMART04-MCh040 eSMART07M-MCh070	The MCh panels and MChMobile Software have been designed for the easy development of HMI applications including factory and building automation.
Smartcard		2214-0010	The optional Smartcard memory device can be used to back-up parameter sets, as well as copying them from one drive to another
SD card using SD Card Adaptor		82400000016400	Conversion device that allows an SD card to be inserted into the Smartcard slot, for parameter cloning and application programs

System Integration Modules	Description		Part No.
Optional Input/Output	Remote I/O Via RTMoE or Modbus TCP for M700 and M702 or for M701 when using an MCi210 module.		I0210-BC
	SI-I/O 3 x Analog / digital inputs, 1 x analog output / digital input 4 x digital inputs / outputs, 2 x relays		82400000017800
	SI-I/O 24 Plus 16 x Digital inputs (8 high speed), 8 x digital outputs and an incremental encoder input.		82400000022000
	HD44 breakout terminal interface for SI-I/O 24 Plus		2216-0002-01
	HD44 male to female cable for SI-I/O 24 Plus		3471-0002
Applications with PLC or Motion Functionality	SI-Applications Plus Compatible module which allows existing SyPTPro application programs to be re-compiled for M700		82400000016500
	SI-Apps Compact Compatible module which allows existing SyPTPro application programs to be re-compiled for M70x		82400000020700
	MCi200 Advanced machine control using industry standard IEC61131-3 programming languages		82400000022100
	MCi210 Extended advanced machine control using industry standard IEC61131-3 programming languages with simultaneous connectivity to 2 separate Ethernet networks		82400000022200
	PTi210 Motion Made Easy module provides simple, fast and effective motion control solutions with free PowerTools Studio configuration software.		82400000021400
Communications	SI-EtherCAT		82400000018000
	SI-PROFIBUS		82400000017500
	SI-Ethernet		82400000017900
	SI-DeviceNet		82400000017700
	SI-CANopen		82400000017600
	SI-PROFINET		82500000018200
	SI-POWERLINK		82400000021600
	SI-Interbus 500kbps SI-Interbus 2Mbps		82400000021220 82400000021230

System Integration Modules	Description		Part No.
Feedback	SI-Encoder Supports AB and Tamagawa encoders for closed-loop control or as an auxiliary encoder.		82400000018100
	SI-Universal Encoder Supports upto 2 additional encoders including: AB, SinCos, Endat, BiSS, SC Hiperface and SSI encoders for closed-loop control or as a auxiliary encoders.		82400000018300
Safety	MiS210 Safety module providing FSoE, CIP Safety, and other motion safety functions. See further details on page 7.		82400000021100

Auxiliary Components	Frame Size	Part No.
Internal brake resistor	3	1220-2752
	4 & 5	1299-0003
DC bus paralleling kit	3	3470-0048
	4	3470-0061
	5	3470-0068
	6	3470-0063
	6 (connect to frame 3,4 & 5)	3470-0111
Through hole IP65 kit	3	3470-0053
IP65 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted using the following kits.	4	3470-0056
	5	3470-0067
	6	3470-0055
	7	3470-0079
	8	3470-0083
Through hole IP55 kit	9A	3470-0119
IP55 / UL TYPE 12 rating can be achieved for frame sizes 9A and 9E using the following kits:	9E & 10E	3470-0105
	10D Inverter	3470-0108
	10C Rectifier	3470-0106
	11E & 11T	3470-0126
	11D Inverter	3470-0130
	11C Rectifier	3470-0123
UL type 1 conduit kit	3 & 4	6521-0071
	5	3470-0069
	6	3470-0059
	7	3470-0080
	8 & 9A	3470-0088
	9E & 10	3470-0115
	11	3470-0136

Auxiliary Components	Frame Size	Part No.
These mounting brackets ensure the drive can be mounted on existing Unidrive SP surface mount & Commander SK installations.	4	3470-0062
	5	3470-0066
	6	3470-0074
	7	3470-0078
	8	3470-0087
	9A (M700 only), 9E & 10	3470-0118
Line reactor	9E (200 V/400 V)	4401-0181
	9E (575 V/690 V)	4401-0183
	10 (200 V/400 V)	4401-0182
	10 (575 V/690 V)	4401-0184
	11 (400 V)	4401-0259
	11 (575 V/690 V)	4401-0261
Finger-guard grommet	9 & 10	3470-0107
Lifting tool	8 & 9A	7778-0045
	9E, 10 & 11	7778-0016
Cable grommet kit	7	3470-0086
	8 - Single cable	3470-0089
	8 - Dual cable	3470-0090
	9A, 9E, 10 & 11	3470-0107
Tile mount kit	3	3470-0049
	4	3470-0060
	5	3470-0073
Optional external EMC filters		
Unidrive M built-in EMC filter complies with EN 61800-3. External EMC filters are required for compliance with EN 61000-6-4.	3 - 200 V	4200-3230
	3 - 400 V	4200-3480
	4 - 200 V	4200-0272
	4 - 400 V	4200-0252
	5 - 200 V	4200-0312
	5 - 400 V	4200-0402
	5 - 575 V	4200-0122
	6 - 200 V	4200-2300
	6 - 400 V	4200-4800
	6 - 575 V	4200-3690
	7 - 400 V	4200-1132
	7 - 575/690 V	4200-0672
	8 - 400 V	4200-1972
	8 - 575/690 V	4200-1662
	9A - 400 V	4200-3021
	9A - 575/690 V	4200-1660
	9E & 10 - 400 V	4200-4460
	9E & 10 - 575/690 V	4200-2210
	11 - 400 V	4200-0400
	11 - 575/690 V	4200-0690
	12 - 400 V	4200 - 6326
	12 - 690 V	4200 - 6327

General kit items	Description	Part No.
2-wire Encoder Interface Adapter (Unidrive M)	Encoder Interface Adapter for Endat 3.0	82400000023000
15-Way D-Type Converter	Encoder breakout adapter	82000000012200
15V Single Ended Logic Adapter	Converts 15 V single ended logic signals, obtained from sources such as Hall Effect digital position sensors or encoders into compatible signals for Unidrive M	82000000013601
24V Single Ended Logic Adapter	Converts 24 V single ended logic signals, obtained from sources such as Hall Effect digital position sensors or encoders into compatible signals for Unidrive M	82000000014800
Keypad Blanking Cover	Moulded cover designed to occupy the keypad recess on the drive. (10 pieces per pack).	3470-0058
Frame 3 & 4 Power Split Connectors	Contains two 3 way connectors instead of the single 6 way connector. This allows supply and motor looms to be made separately.	3470-0064
I/O Extender	Comissioning adapter to extend I/O connections.	3000-0009

Frame 12 Kits and accessories

Area of drive / cubicle	Part No.	Description	Availability
Input/Output wiring connections	6772-0006	VX25/TS8 AC input wiring kit	Available from Nidec Drives
	6772-0007	VX25/TS8 output wiring kit	Available from Nidec Drives
	6772-0008	VX25/TS8 earth kit	Available from Nidec Drives
	6772-0014	Output busbar pass-through kit	Available from Nidec Drives
	6772-0012	DC input busbar kit	Available from Nidec Drives
	6772-0016	VX25/TS8 DC input wiring kit (No fuse holders)	Available from Nidec Drives
	6772-0032	VX25/TS8 DC input wiring kit (IEC fuse holders)	Available from Nidec Drives
	6772-0033	VX25/TS8 DC input wiring kit (UL fuse holders)	Available from Nidec Drives
Cubicle fitting kit	6772-0009	VX25 fitting kit	Available from Nidec Drives
	6772-0010	TS8 fitting kit	Available from Nidec Drives
	4595.000	VX25/TS8 Wall bracket Available from Rittal	Available from Rittal
AFE filter/fitting kit	6772-0022	AFE filter fitting kit VX25/TS8	Available from Nidec Drives
	6772-0020	AFE filter/drive divide kit	Available from Nidec Drives
	4200-6326	400 V AFE filter	Available from Nidec Drives
	4200-0037	575 / 690 V AFE filter	Available from Nidec Drives
Lifting and ramp	6500-0158	Frame 12 ramp	Available from Nidec Drives
	6500-0159	Pallet truck kit	Available from Nidec Drives
Cubicle ventilation	9681.846	VX25 roof plate	Available from Rittal
	3240.200	VX25/TS8 Outlet filter with mat	Available from Rittal
	3172.200	Spare outlet filter mats (Qty.5)	Available from Rittal

Nidec

The world's leading global manufacturer of electric motors and controls

Nidec, the world's largest motor brand.

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Energy efficient motor and drive technology for commercial, industrial, and home appliances

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ng to help improve safety,
mental protection and
required for automobiles

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DC motors for all industries
and applications

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CONTROL TECHNIQUES

KB

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