

# TRIO MOTION TECHNOLOGY DX4 SERVO PACKAGES



- THE MOTION SPECIALIST -



# DX4 200V Servo Solutions

The DX4 Servo drive and motor system...  
Everything you need, nothing more!

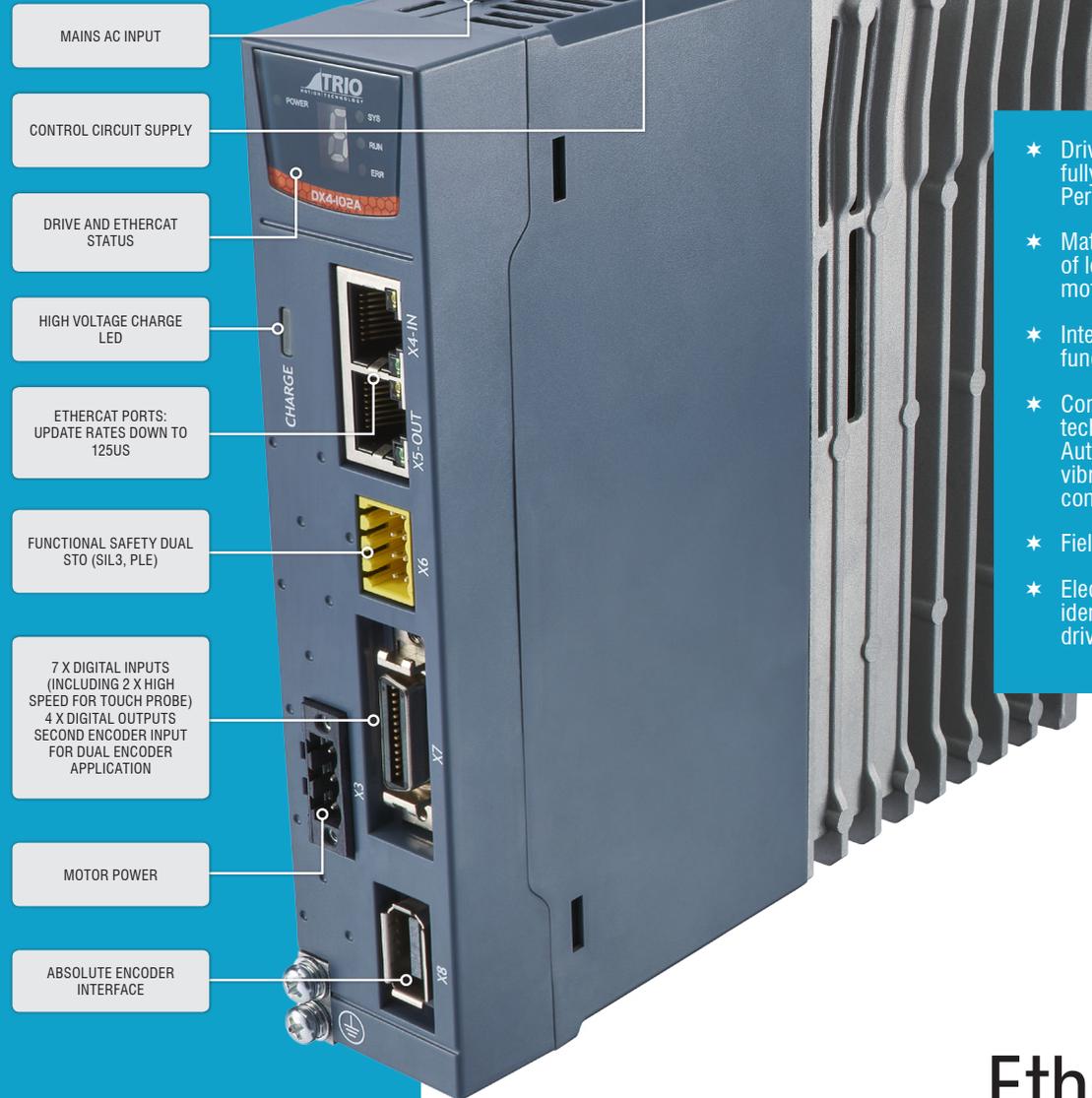
Introducing DX4, our all new servo drive and motor packages that provide performance and dependability. Optimised in every detail to do more with less and with features to deliver scalable servo-based solutions in demanding motion centric machine automation.

DX4 servo drives and matched motor packages provide performance and dependability machinery designers expect, and additionally are optimized in every detail to 'do more with less'. This philosophy is achieved by tightly integrated drive control and axis functions within the motion controller and seamless integration within the software tool *Motion Perfect*. By providing optimal functionality at drive level and system level expansion at controller level, DX4 provides an everything needed without added complexity. System level scalable servo-based solutions can be solved thanks to deterministic real-time performance of EtherCAT, adding hardware at network level as needed and combined with Trio motion expertise in demanding motion-centric machine automation.

Designed to work seamlessly with Trio's EtherCAT controllers, DX4 is fully integrated into Trio's application development tool, *Motion Perfect*, our single software environment for system planning, configuration virtualisation and machine programming.

Your system needs can easily be scaled within our Trio solution architecture, through our range of *Motion Coordinators* and high performance of EtherCAT distributed Flexslice I-O systems, adding function where it is needed, as it is needed, simplifying the drive system for optimal motion centric machine applications.

With a focus on ease of use, and electronic name plate function, the DX4 solution minimizes setup time allowing you to focus on your application.



- \* Drive and *Motion Coordinator* fully integrated into *Motion Perfect*
- \* Matched with MX motor range of low and medium inertia motors
- \* Internal drive protection functions
- \* Comprehensive tuning technology including: Auto-tuning function, adaptive vibration suppression, friction compensation
- \* Field upgradable firmware
- \* Electronic nameplate motor identification for simplified drive set-up

# DX4

## 200V Servo Solutions

Frame sizes to suit all requirements



### 50W - 400W

DX4-1A5A  
DX4-101A  
DX4-102A  
DX4-104A

### 750W - 1.5kW

DX4-108A  
DX4-110A  
DX4-115A

### 2kW - 3kW

DX4-120A  
DX4-130A

DX4 comes in power ratings from 50W to 3kW matched with the MX series motors it offers a high-dynamic performance, and high-precision with absolute 23-bit encoder and electronic nameplate to simplify configuration for machine solutions.



# TRIO PRODUCTS

## 200V System Solutions

### Motion Optimised Automation Package



### EtherCAT Motion Coordinator

The *Motion Coordinator* system allows you to control up to 128 servo or stepper motors with Digital I/O and additional equipment such as HMI's all controlled from a single master. Our controllers can be coupled with the EtherCAT Flexslice range of fast flexible compact I/O expansion that can even be used with 3rd party masters.

Preliminary specifications may change without notice



### DX4 200V Servo Drive Range

Drive and *Motion Coordinator* fully integrated into *Motion Perfect*.

Compact size.

Zero stacking gap installation.

200V ac from 50W up to 3kW.

350% overload capability.

Matched with MX motor range of low and medium inertia motors.



### MXL Low and MXM Medium Inertia Motors

Low and medium inertia options to match the load.

23-bit absolute multi-turn (battery option required) offers tighter control and eliminates homing cycles.

Pre-made cables with in-line battery option (absolute encoder).

IP65 rated connectors.

# Selection Table

## 200V Servo Solutions

### DX Drives Matched to Motors

The MXL family of servo motors include solutions with 17-bit or 23-bit encoders, are suitable for application speeds up to 6000 rpm, include variants with an integrated brake.

Low inertia allows very fast response times and these motors develop a very high torque despite their small size. In combination with our servo drives, they are ideal for applications with high dynamic responses and fast and precise positioning.

Our servo drive systems can be used in a wide range of applications thanks to their high performance, available power range and compact dimensions.



200V		
DX4	MXL	MXM
50W	✓	✗
100W	✓	✗
200W	✓	✗
400W	✓	✗
750W	✓	✗
1kW	✓	✓
1.5kW	✓	✓
2kW	✓	✓
3kW	✓	✗

# APPLICATION SOLUTIONS

## 200V Servo Solutions

Scalable System Solutions for Machinery OEMs



### Factory Automation

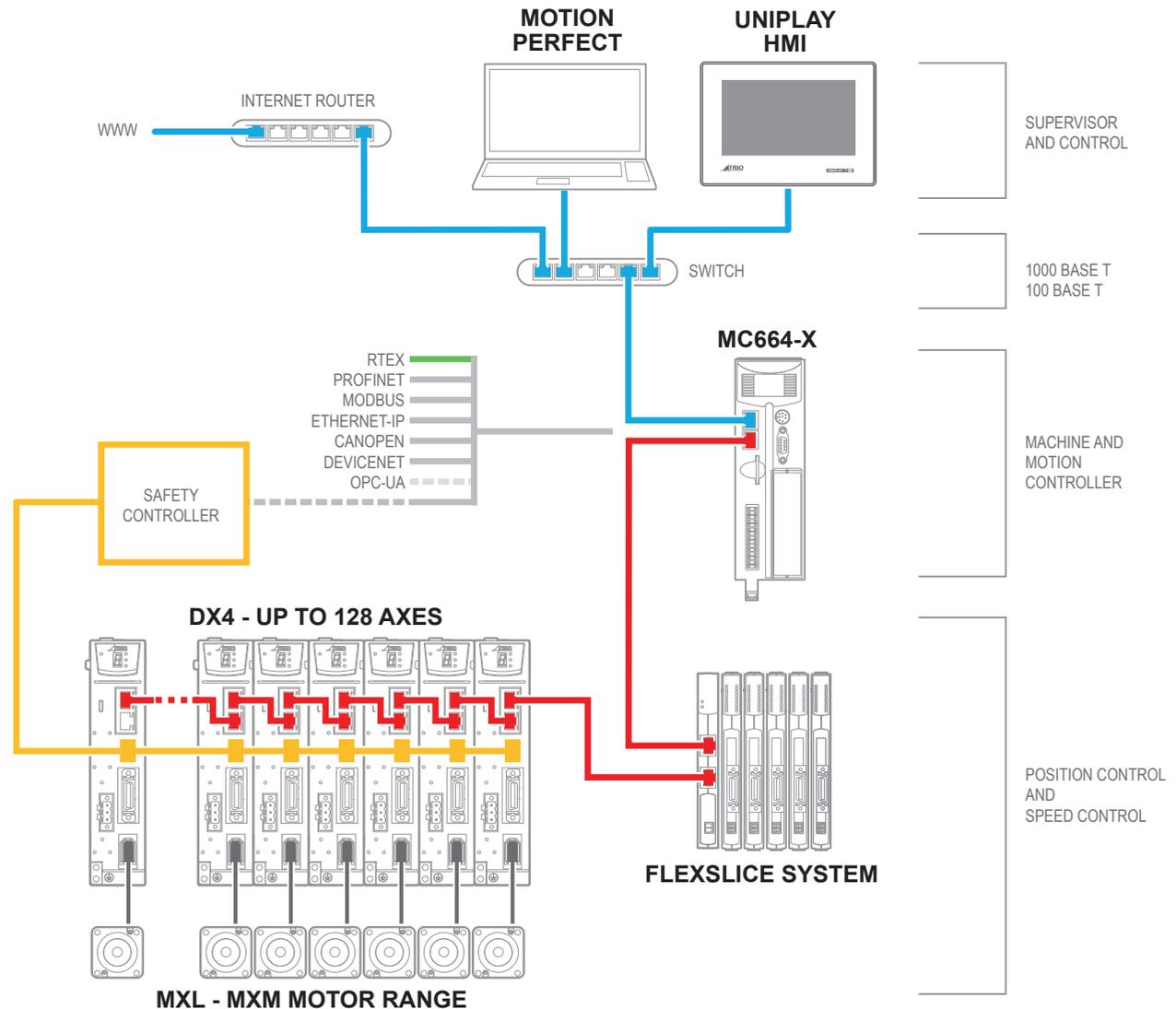
Communicate on all major Ethernet Technologies and Fieldbus level networks.

### Automation Packages for Machine Control

Scalable Control Architectures.  
Open Communications and Tools.  
Safety.

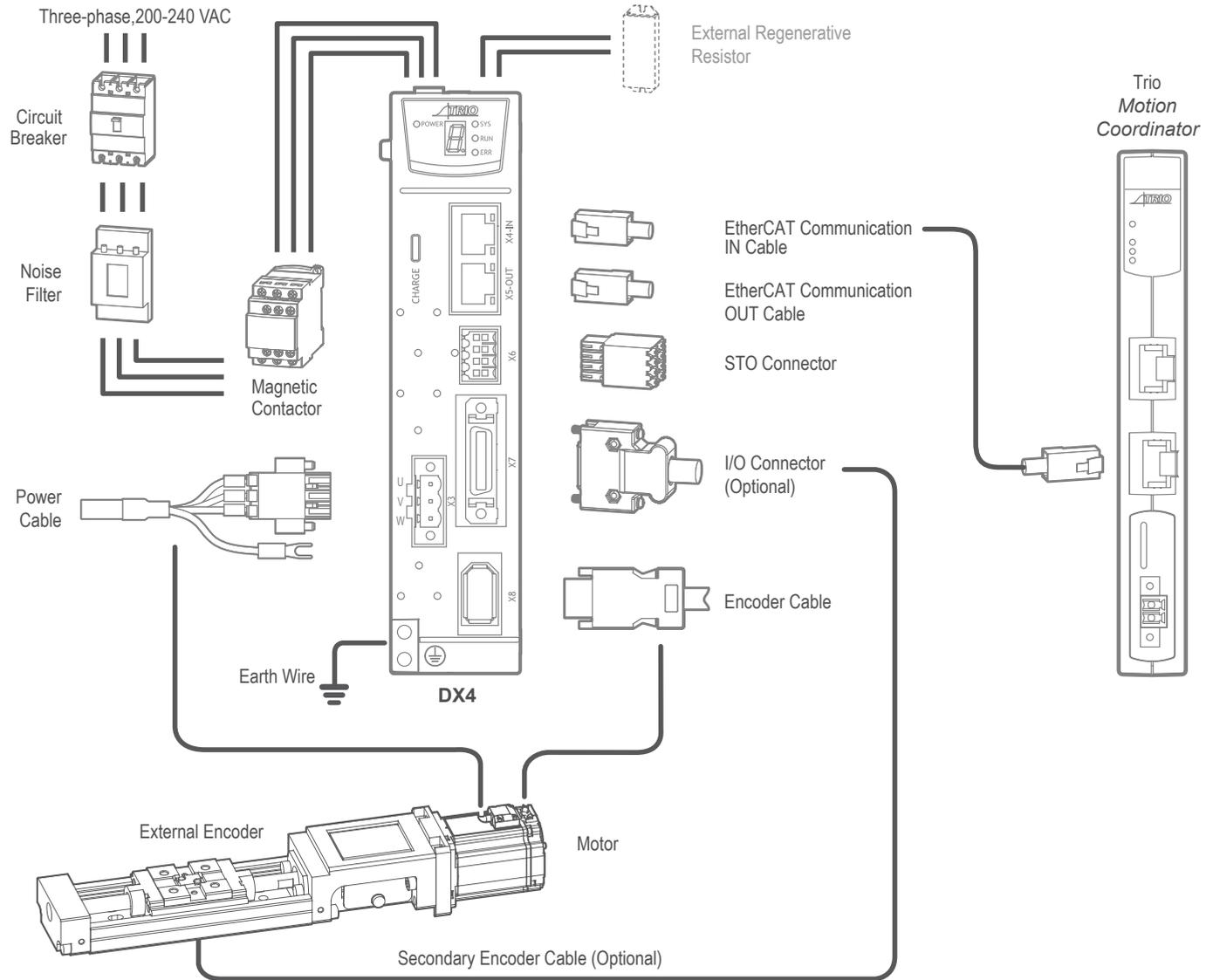
### Motion Control Range

*Motion Coordinator* with scalable CPU performance.  
Packaged Servo Offering.  
Modular Decentralised IO Systems:  
Digital / Analogue IO, Stepper & Servo axes, Temperature Control and more.



Preliminary specifications may change without notice

# DX4 Wiring Solution Example



# DX4

## 200V Servo Solution

### Specification

Drive Model: DX4-		1A5A	101A	102A	104A	108A	110A	115A	120A	130A
Continuous Output Current [Arms]		0.9	1.1	1.5	2.9	5.1	6.9	8.2	11.3	16
Instantaneous Max Output Current [Arms]		3.3	4	5.8	11.5	19.5	21	24.6	33.9	54
Power Supply Capacity [kVA]	Single-phase	0.2	0.3	0.6	1.2	1.9	2.6	4	-	-
	Three-phase	0.2	0.3	0.5	0.9	1.6	2	3	3.5	4.5
Power Supply	Main Circuit	Single-phase or Three-phase 200V ac to 240V ac. • -15% to +10%, 50Hz or 60Hz 270V dc to 324V dc. • -15% to +10% DX4-115* is de-rated to 1.2kW when used with a single-phase supply. DX4-120* and DX4-130* can only be used with a three-phase supply.								
	Control Circuit	Single-phase 200V ac to 240V ac • -15% to +10%, 50Hz or 60Hz 270V dc to 324V dc. • -15% to +10%								
Control Method		SVPWM								
Feedback		Serial communication encoder with MX motors								
Environmental Conditions	Temperature	Ambient temperature: -5°C to 55°C (recommended max ambient temperature not below 40° for zero stacking installation). Storage temperature: -20°C to +85°C								
	Humidity	Both operating and storage: 5% to 95% (with no condensation).								
	Protection Class	IP20								
	Altitude	1,000m or less								
	Vibration Resistance	4.9m/s <sup>2</sup>								
	Shock Resistance	19.6m/s <sup>2</sup>								
	Power System	TN System								
Mounting		Base-mounted								
Performance	Speed Control Range	1:5000								
	Coefficient of Speed Fluctuation	±0.01% of rated speed max. (For a load fluctuation of 0% to 100%) 0% of rated speed max. (For a rated Voltage fluctuation of ±10%) ±0.1% of rated speed max. (For a temperature fluctuation of 25°C ±25°C)								
I/O Signals	Second Encoder Input	Supports A, B, and Z TTL differential type sensor signal. Maximum line frequency of 500kHz.								
	Input Signals	Allowable voltage range: 24V dc ±20% Number of input points: 7 (2 for high-speed optocoupler inputs, fixed as Touch Probe) Touch Probe Signals: TP1 (Touch Probe 1), TP2 (Touch Probe 2). All other inputs are general purpose but can be assigned specific functions during commissioning. These inputs can also be inverted so act as active-low.								
	Output Signals	Allowable Voltage range: 5V dc to 30V dc Number of output points: 4 All outputs are general purpose but can be assigned specific functions during commissioning. These outputs can also be inverted so act as active-low.								

Drive Model: DX4-		1A5A	101A	102A	104A	108A	110A	115A	120A	130A
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type12, IEC 61800-7 CiA402 Drive Profile								
	Physical Layer	100BASE-TX (IEEE802.3)								
	Communications Connectors	X4-IN (RJ45): EtherCAT signal input connector X5-OUT (RJ45): EtherCAT signal output connector								
	Cable	Category 5, Shielded/Foiled Twisted Pairs (CAT5e SF/UTP)								
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input								
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.								
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)								
	Process Data	Assignments can be changed with PDO mapping.								
	MailBox (CoE)	Emergency messages, SDO requests, SDO responses.								
	MailBox (FoE)	Supports firmware update via FoE								
	MailBox (EoE)	Supports firmware update via EoE								
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched). Applicable DC cycles: 125 µs to 8 ms								
	Slave Information Interface	256 bytes (read-only)								
	CiA402 Drive Profile	Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode Cyclic Synchronous Torque Mode Touch Probe Function Torque Limit Function Homing Mode Profile Position Mode Profile Velocity Mode Profile Torque Mode Interpolated Position Mode								
Display	One 7-segment LED									
Indicator Lamps	CHARGE, POWER, RUN, SYS, ERR, L/A IN, L/A OUT									
Regenerative Processing	DX4-1A5*, DX4-101*, DX4-102* and DX4-104* must connect an external regenerative resistor. Other models are built in.									
Protective Functions	Overcurrent, Overvoltage, Undervoltage, Overload, Regeneration Error, Overspeed, etc.									
Utility Functions	Alarm history, Jogging, Load inertia identification, Auto-Tuning, etc.									
Safe Torque Off	According to IEC 61800-5-2. Cat.4, PLe according to ISO 13849-1, SIL3 according to IEC 61508, IEC 62061.									

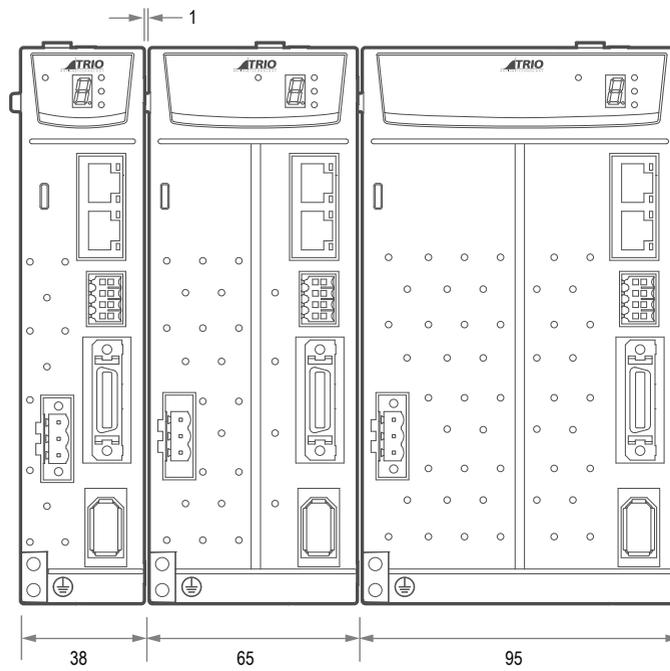
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# DX4 200V Servo Solutions

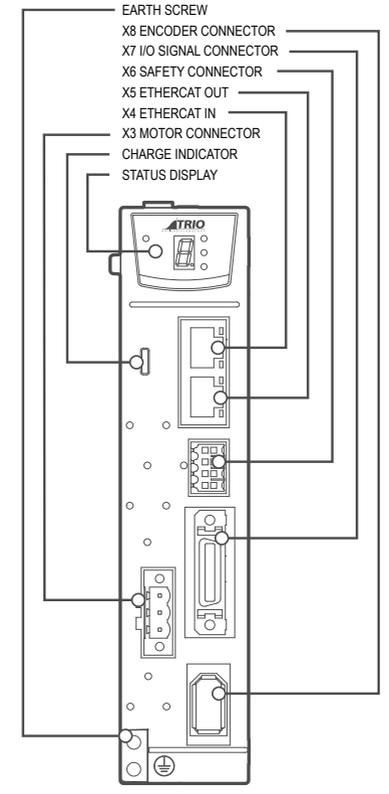
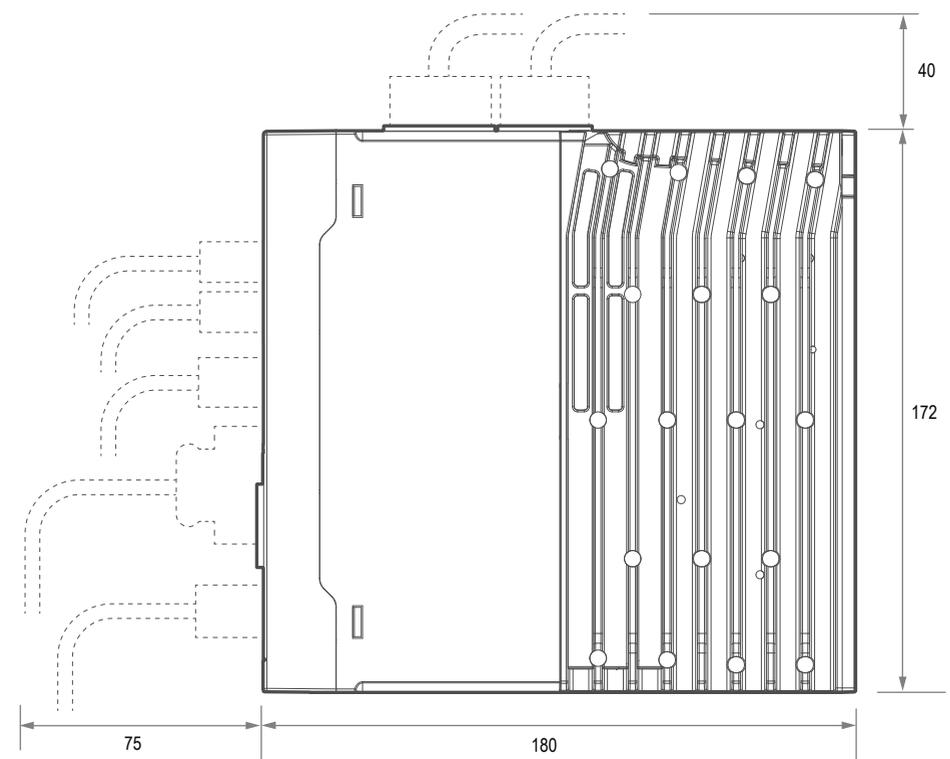
## Dimensions



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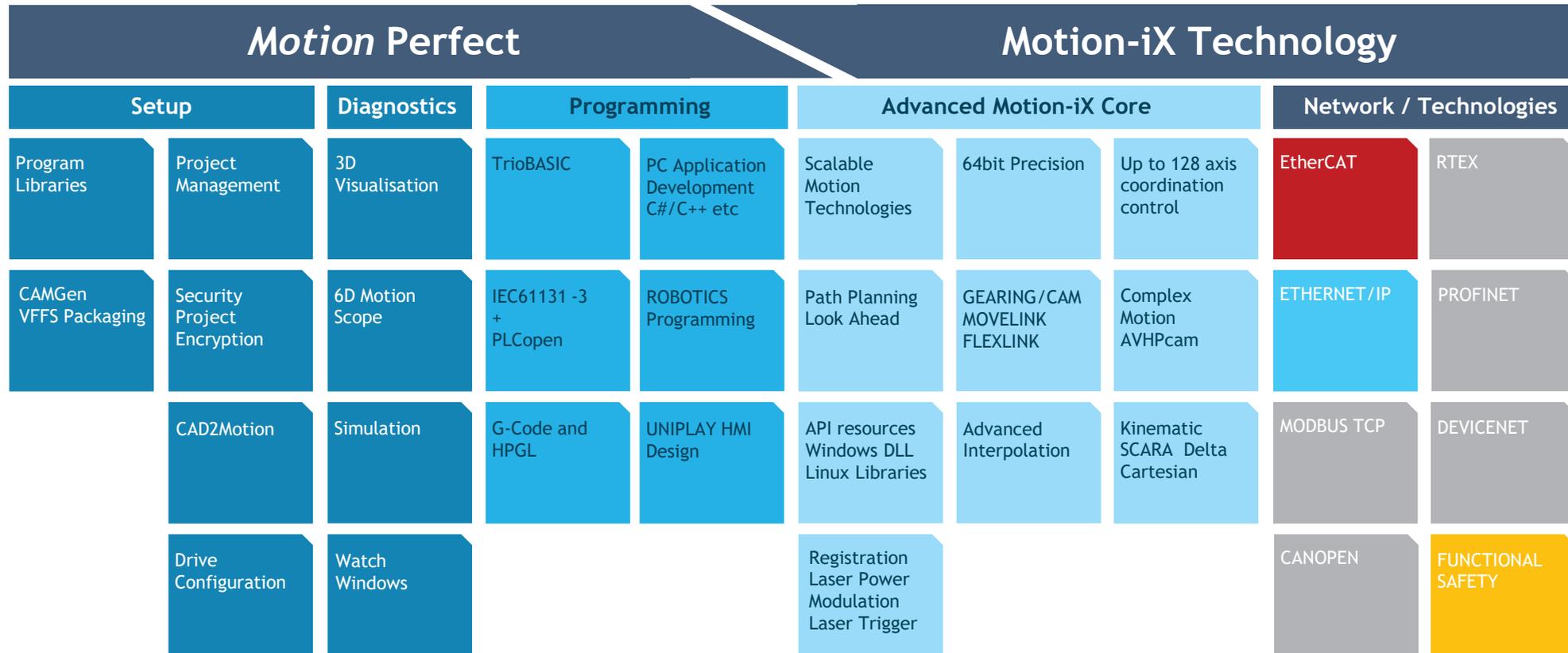
- DX4-1A5A
- DX4-101A
- DX4-102A
- DX4-104A
- DX4-108A
- DX4-110A
- DX4-115A
- DX4-120A
- DX4-130A



Product	Output Power	Height (mm)	Width (mm)	Depth (mm)
DX4-1A5A	50W	172	38	180
DX4-101A	100W	172	38	180
DX4-102A	200W	172	38	180
DX4-104A	400W	172	38	180
DX4-108A	750W	172	65	180
DX4-110A	1kW	172	65	180
DX4-115A	1.5kW	172	65	180
DX4-120A	2kW	172	95	180
DX4-130A	3kW	172	95	180

All Models : Voltage = 200V ac

## Motion Optimal Engineering Technologies



Combining an advanced motion core with Trio's ease-of-use, Motion-iX offers performance and dependability of packaged solutions, from “The Motion Specialist”, where motion is the core and not just a bolt-on capability.

Motion-iX – a unified software engineering framework for machine development, that places the focus on optimising motion and complex kinematics, including robotics such as SCARA, to deliver truly optimal machine control performance.

Motion-iX includes development in IEC61131 and PLCopen, and boasts inverse kinematics capabilities to truly coordinate all machine axes as one, including

Not all technologies are used with all Trio product. robots to maintain tight synchronisation or robots and machine as one. Virtualization allows simulation of the mechanics and motion to significantly reduce development and testing, delivering optimal control every time, by minimising machine cycle times.

# Motion Perfect

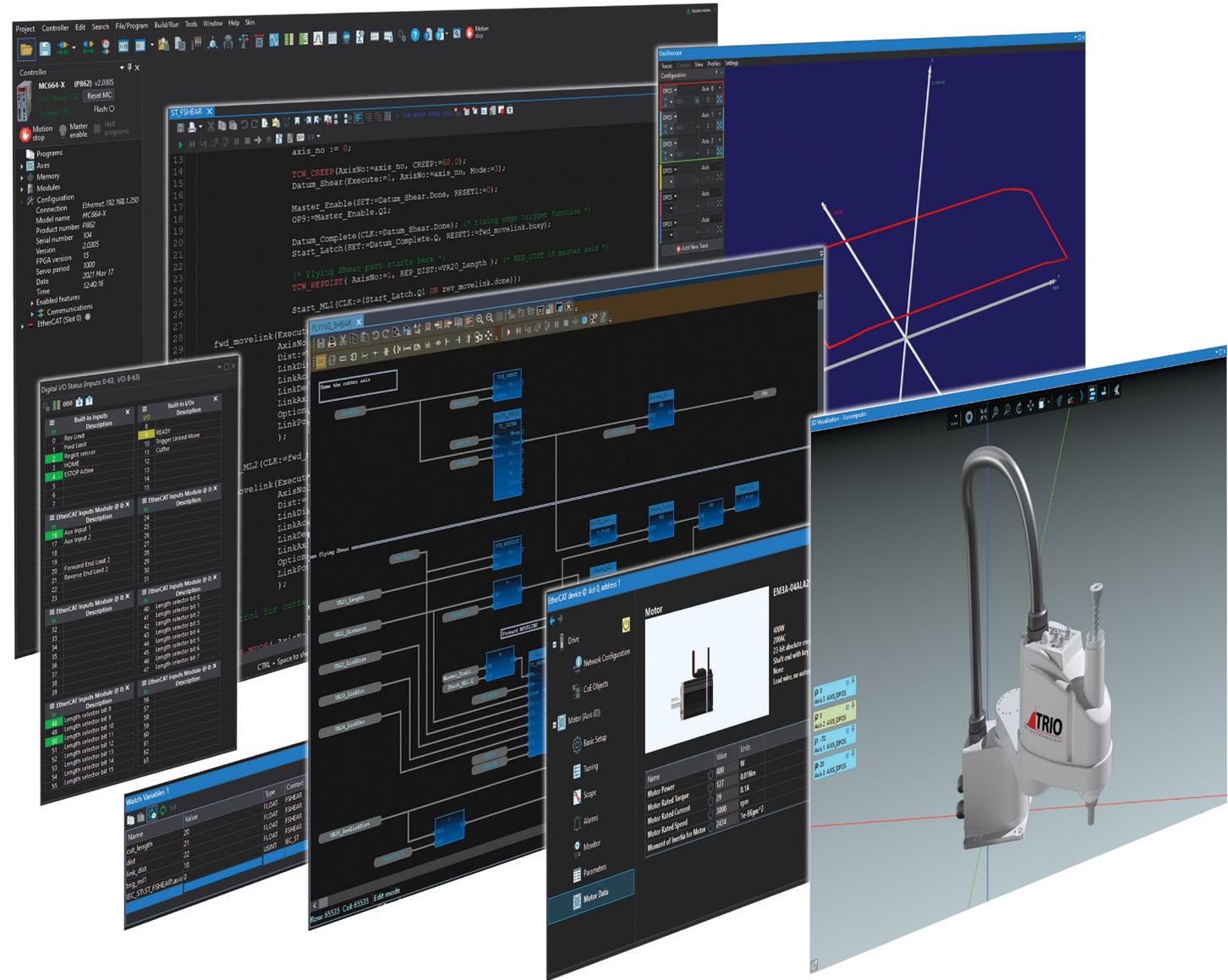
Design, Develop, Test, Deploy and Secure



Built on Trio's **Motion-iX** core technology, *Motion Perfect* provides the user with a re-designed easy to understand interface for rapid application development, controller and drive configuration and monitoring of functions.

The commissioning of DX Servo Drives is made simple with a series of Device Configuration Screens allowing access to status information and diagnostics at a glance. All motor axes can be detected, setup, monitored and controlled in real-time from the easy to use dialogue windows.

*Motion Perfect* includes access to IEC 61131 and PLCopen and the robotics solution; TrioRPS. Advanced visualisation including a 3D oscilloscope and IP protection of your projects are also included within *Motion Perfect*.





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# TRIO MOTION TECHNOLOGY DX4 SERVO PACKAGES

Trio Motion Technology specialises in advanced motion control as a core, providing a range of *Motion Coordinators*, drives and motors, expansion interfaces, I/O modules and HMI's built on *Motion-ix* technologies and designed to enable the control of industrial machines with the minimum of external components.

In support of the Trio concept, we aim to offer the best technical support by telephone, email, our comprehensive website and training courses held throughout the year. Please look at our web site for details.

[www.triomotion.com](http://www.triomotion.com)



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