Programmable Logic Controller

Motion Controller & EtherCAT Smart I/O

LSIS

C O N T E N T S

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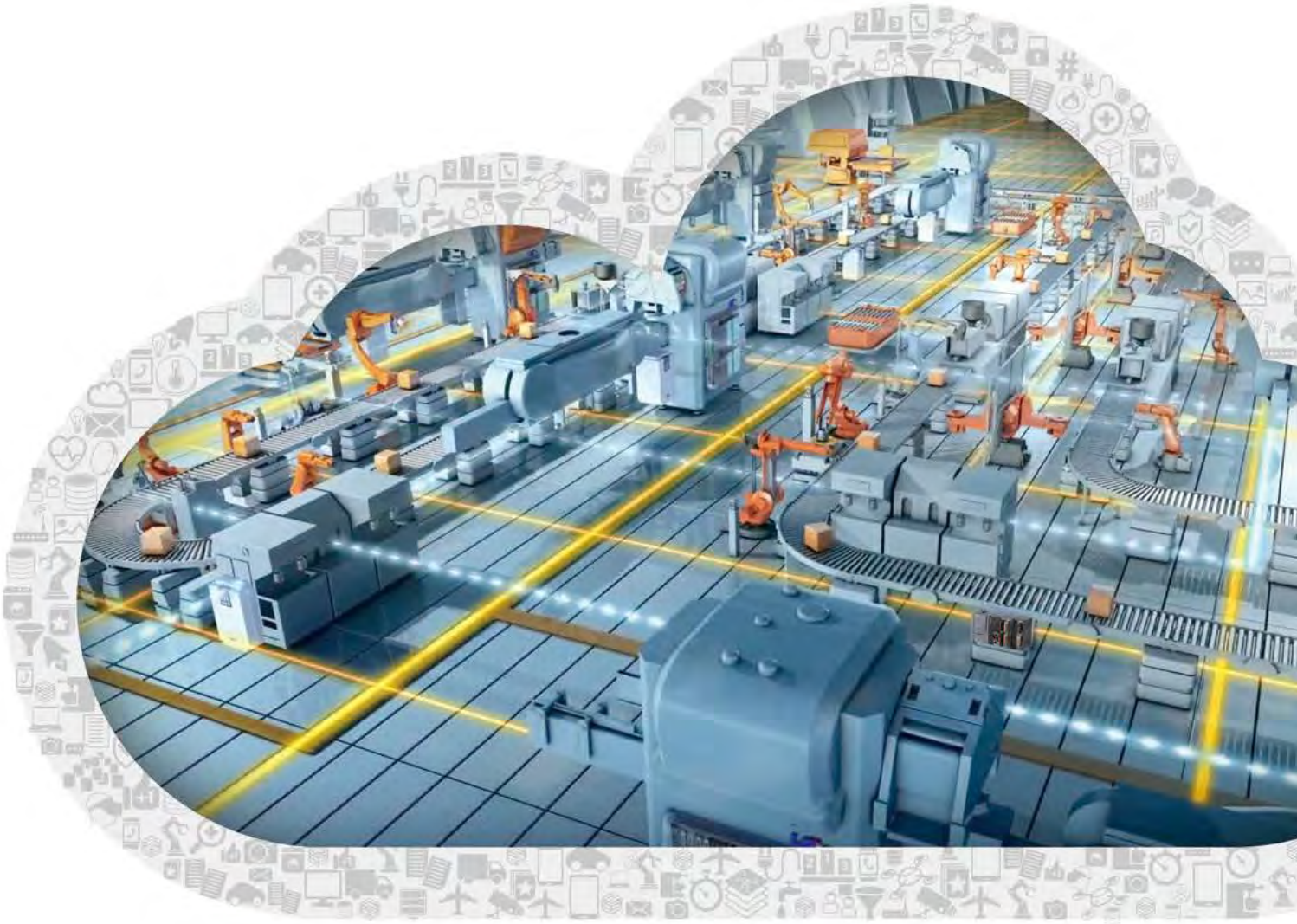


MOTION CONTROLLER

XMC-E32A

True Realization of Smart Factory Automation We Have Dreamed of!
Innovative Motion Control Solution to Introduce Future of Factory Automation

The XMC-E32A programmable motion controller realizes automation of manufacturing industries with a cost-effective yet easy and user friendly engineering solution.
The XMC-E32A delivers high performance EtherCAT-based motion control functions along with a variety of embedded functions and high-tech capabilities specialized for numerical control and robots. In addition to LSIS PLC, HMI and servo products, the XMC-E32A will help you create an even better and optimal solution.

Feature

Take Your First Step into New Future of Smart Motion

Innovation of the 4th Industrial Revolution, Innovation of smart motion that leads to innovation and new future, LSIS Motion Controller

Professional

- CAM control: Up to 32 CAM profiles (32,768 points / 32 CAM profiles)
- Supports G-code
- Robot control: Delta3, Delta3R, Linear Delta and etc.

Productivity

- High-speed program processing: 6.25ns (Basic command)
- EtherCAT-based high speed cycle times: 0.5/1/2/4ms (Same as main task's cycle time)
- Built-in Digital and Analog IO

Efficiency

- Integration with a variety of EtherCAT devices
  - Servo Drive (Up to 32 axes), Remote I/O (Up to 32 I/Os), AC Drives, Robots and etc.
- Various built-in functions
  - 8 digital inputs / 16 digital outputs, Encoder inputs (2 ch), Ethernet Analog Input (2 ch)/Output (2 ch)_E32A RS-232C/RS-485_E32C

Convenience

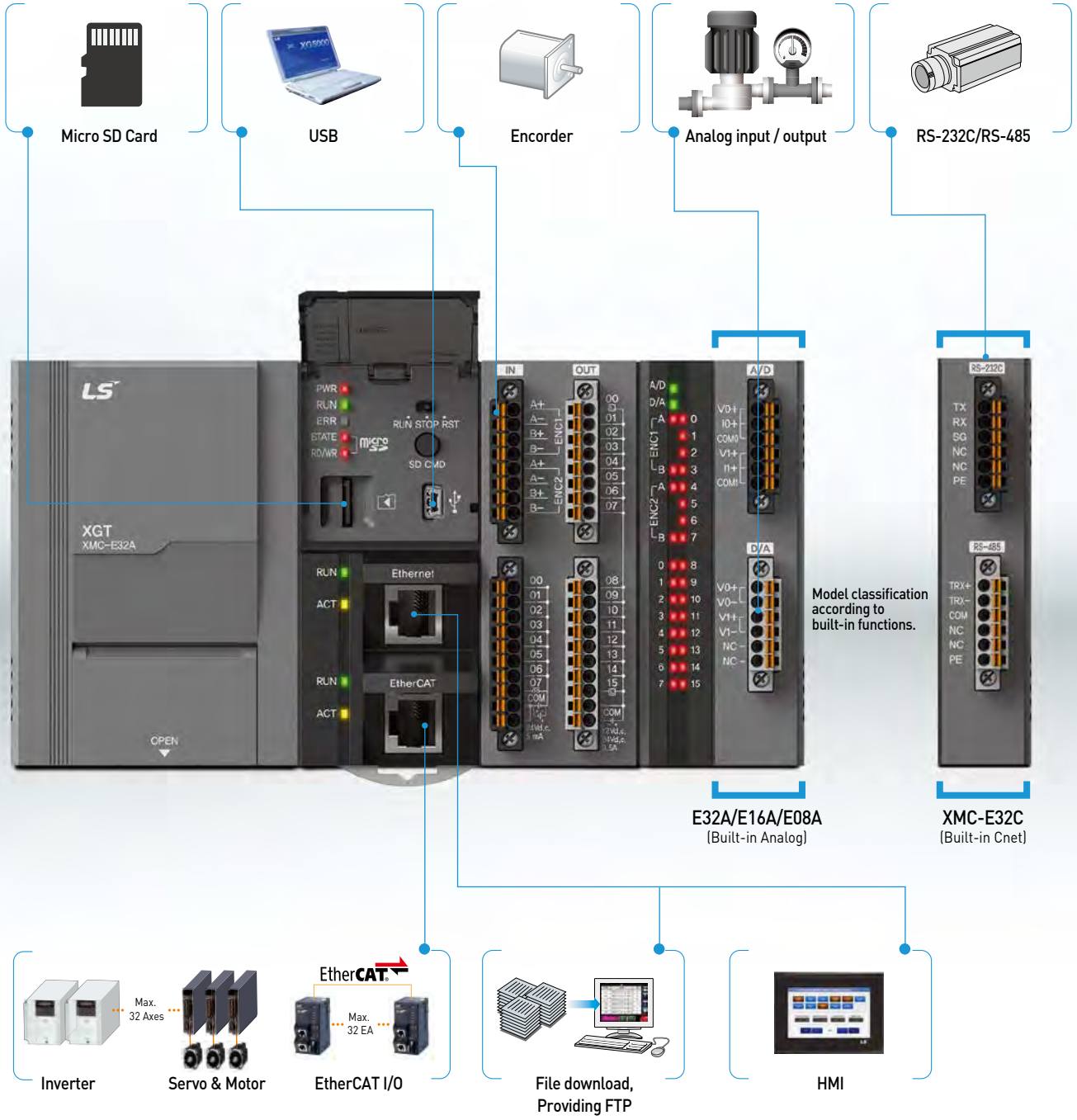
- XG5000 software for programming and monitoring
  - Sole, integrated architecture for programming, diagnosing and simulating for both motion controller and PLC
  - IEC standard Motion Function Blocks
- SD card slot (SD card not included)
  - Saving and executing programs, Data Logging

* Refer to page 8 (Performance Specification) for supported axis information.

System Configuration XMC-E32A/E16A/E08A/E32C

EtherCAT-based Motion Control System Ensures Efficient System Environment

Motion Controller delivers an optimized solution to a system that has a need for motion control.
With 8 digital inputs / 16 outputs, 2 analog Inputs / Output (XMC-E32A/E16A/E08A only), 2 encoder inputs, RS-232C/RS-485(XMC-E32C only), and EtherCAT devices (Servo Drive, INV, EtherCAT I/O, Robot), all can be connected rapidly and easily.

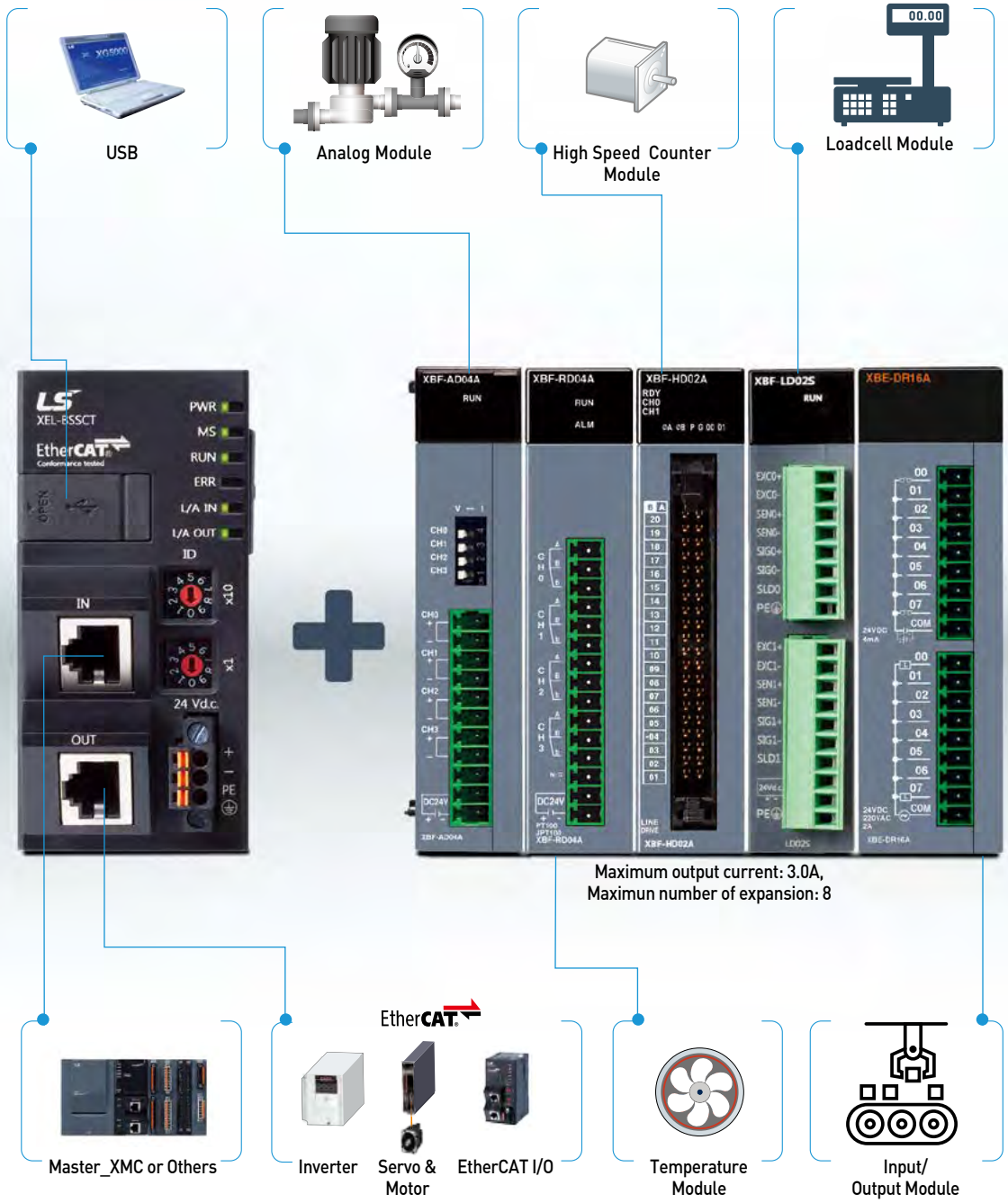


* Refer to page 8 (Performance Specification) for supported axis information.

System Configuration XEL-BSSCT

EtherCAT-based Connectivity

Connectivity with EtherCAT master (XMC-E32A/16A/08A/E32C) offers a total motion solution with devices such as sensors and analog modules



XMC-E32A/E16A/E08A/E32C

General Specification

Item	Specification				Related specifications
Ambient temperature	0~55℃				-
Storage temperature	-25 ~ +70℃				-
Ambient humidity	5~95RH (Non-condensing)				-
Storage humidity	5~95RH (Non-condensing)				-
Vibration resistance	Ocasional vibration			-	-
	Frequency	Acceleration	Amplitude	How many times	IEC61131-2
	5≤f < 8.4Hz	-	3.5mm	10 times each directions (X, Y and Z)	
	8.4 ≤ f ≤150Hz	9.8m/s² (1G)	-		
	For continuous vibration				
	Frequency	Acceleration	Amplitude		
	5 ≤ f <8.4Hz	-	1.75mm		
	8.4 ≤ f ≤ 150Hz	4.9m/s² (0.5G)	-		
Shock resistance	Peak acceleration : 147 m/s² (15G) Duration : 11ms Half-sine, 3 times each direction per each axis				IEC61131-2
Noise resistance	Square wave Impulse noise	AC: ±1,500 V DC: ±900 V			LSIS standard
	Electrostatic discharge	Voltage : 4kV (contact discharging)			IEC61131-2 IEC61000-4-2
	Radiated electromagnetic field noise	80~1,000㎒, 10 V/m			IEC61131-2, IEC61000-4-3
	Fast transient /bust noise	Segment	Power supply module	Digital/analog input/output communication interface	IEC61131-2 IEC61000-4-4
		Voltage	2kV	1kV	
Environment	Free from corrosive gasses and excessive dust				-
Altitude	Up to 2,000m				-
Pollution degree	Less than equal to 2				-
Cooling	Air-cooling				-

Power Specification

Item		Specification			Remark
Input	Rated input voltage	AC100V~AC240V			
	Input frequency	50/60Hz			
	Input current	0.7A or less			AC110V
		0.4A or less			AC240V
	Inrush current	120Apeak or less			AC240V, Phase 90 degree
	Leakage current	3mA or less			
	Efficiency	65% or more			
	Permitted momentary power failure	10ms or less			
Output	Output voltage	Voltage	Output voltage ripple range	Current	
		+5V	4.90~5.20V	4A	
		+24V	21.1~26.9V	0.4A	
	Ripple & Noise	Voltage	10ms or	Noise	
		+5V	100mVpp or less	200mVpp or less	
		+24V	400mVpp or less		
	Protecting overcurrent	Voltage	Current		
		+5V	4.4A or more		
		+24V	0.44A or more		

XMC-E32A/E16A/E08A/E32C

Perfomance Specification

Item			Specification
Operation method			Main task/Periodic task: Fixed cyclic operation, repetitive operation. Initial task: Only once at the time of entering the RUN
Control period			Main task cyclic time: 0.5ms, 1ms, 2ms, 4ms Periodic task cyclic time: Multiple setting of main task
I/O Control method			Synchronized update with main task cycle (Refresh method)
Program language			Ladder Diagram (Function block), Structured Text, G-Code
Number of instruction	Operator		18
	Basic function		202
	Basic function block		174
	Special function block		97
Processing speed	Basic		6.25ns or more (General point/coil)
	Move		5ns or more (Word type)
	Arithmetic		30ns or more (Word type)
Program	number		Max. 256
	Capacity		10MB (Motion program), 10MB (NC program)
Data area	Symbolic variable (A)		4.096KB (Retain setting available up to 2,048KB)
	Input variable (I)		16KB
	Output variable (Q)		16KB
	Direct variable (M)		2,048KB (Retain setting available up to 1,024KB)
	Flag variable	F	128KB
		K	18KB
		U	1KB
		L	22KB Note1)
		N	49KB Note1)
Timer			No limit in number of I/O points, Time range: 0.001~4,294,967,295sec (1,193hour)
Counter			No limit in number of I/O points, Counter range: 64 bit range
Program			Initial program, Main task program, Periodic task program, NC program
Operation mode			RUN, STOP
Restart mode			Cold, Warm
Self-diagnosis function			Task cycle error, Task time occupancy rate exceed, memory abnormal, power abnormal, etc.
Back-up method			Retain area setting in basic parameter or retain variable setting.
Number of control axis	XMC-E32A, E32C		32 axes (Real/Virtual axis), 4axis (Virtual axis), 64 slaves (Max 32 slaves in case of 32 axes (Serov, INV) control)
	XMC-E16A		16 axes (Real/Virtual axis), 2axis (Virtual axis), 32 slaves (Max 16 slaves in case of 16 axes(Serov, INV) control)
	XMC-E08A		8 axes (Real/Virtual axis), 1axis (Virtual axis), 16 slaves (Max 8 slaves in case of 8 axes(Serov, INV) control)
CAM operation	XMC-E32A, E32C		32 profiles/32,768 points
	XMC-E16A		16 profiles/16,384 points
	XMC-E08A		8 profiles/8,192 points
Communication			EtherCAT (CoE: CANopen over EtherCAT, FoE: File Access over EtherCAT)
Communication/Control period			0.5ms, 1ms, 2ms, 4ms (Same with main task period)
Servo drive			EtherCAT servo drive which supports CoE
Control unit			Pulse, mm, inch, degree
Control method			Position, Velocity, Torque (Servo drive support), Synchronous, Interpolation
Range of position / Velocity			±LREAL, 0
Torque unit			Rated torque % designation
Acc./Dec. profile			Trapezoidal, S-curve(Regarding Jerk value set by function block)
Rage of Acc/Dec			±LREAL, 0
Manual operation			JOG operation
Absolute system			Available (When using absolute encoder type servo drive)
Encoder input	Channel		2 channels
	Max.input		500kpps
	Input method		Line drive input (RS-422A IEC specification), Available open collector output type encoder
	Input type		CW/CCW, Pulse/Dir, Phase A/B

Note1) "L and N' area are supported by XMC-E32C only.

Perfomance Specification

Item		Specification
Input / Output	Digital input / Output	8 point / 16 points (Tr. output)
	Analog input / Output Note1)	Channels: 2ch In, 2ch Out Input/Output voltage range: -10~10V / 0~10V / 1~5V / 0~5V Input current range : 4~20mA / 0~20mA Max, resolution : 14bit (1/16000), Accuracy: 0.2% (25℃), 0.3% (0~55℃) Conversion speed: 0.5ms / channel Absolute maximum input: Voltage 15 VDC, Current 30mADC
Coordinate systems	Applicable robot	Cartesian, Delta
	Settings	XG5000
	Control language	Function block
SD Memory	Type	Micro SD/SDHC
	File system	FAT32
	Capacity	Max. 32GB installation (Memory over 8GB can use only 8GB of overall area)
	Service	Program back-up/Restoration, Booting operation , Data log
Embedded ethernet	Communication speed	Auto/10Mbps/100Mbps
	Communication port	1 port
	Communication distance	Max. distance between nodes: 100m
	Service	Loader service (XG5000) XGT Protocol (LS protocol), Modbus TCP FTP Server: Able to read/Write SD Memory files from other devices SNTP Client: Network time synchronization with server
Embedded cnet Note2)	Communication port	Ch 1: RS-232C, Ch 2: RS-485
	Service	XGT Protocol, Modbus Protocol, User-defined Protocol LS Bus (LS AC drive) Protocol
USB	Performance	USB 2.0, 1 port
	Service	Loader service (XG5000)
Error indication		Indicated by LED
Weight		790g

Note1) Analog Input/Output are supported by XMC-E32A/E16A/E08A
Note2) Built-in Cnet communication is supported by XMC-E32C

EtherCAT Communication Specification

Item	Specification
Communication protocol	EtherCAT
Support specification	CoE (CANopen over EtherCAT)
Physical layer	100BASE-TX
Communication speed	100Mbps
Topology	Daisy chain
Communication cable	Over cat. 5 STP (Shielded Twisted-pair) cable
Communication period	0.5ms/1ms/2ms/ 4ms
Synchronous jitter	Under 1us
Synchronous communication	PDO (Process Date Object) Mapping through CoE
Non-Synchronous communication	SDO (Service Data Object) Communication through CoE
Communication setting	Set the communication configuration using XG5000

XEL-BSSCT

Perfomance Specification

Classification	Item			Specification
Performance specification of adapter	Maximum number of expansion			8
	Operation mode			RUN, STOP (The test operation through the XG5000 is only available in STOP mode.)
	Refresh time			DC Sync0 time x refresh time (0 ~ 100)
	Standard input filter			1, 3, 5, 10, 20, 70, 100ms
	Self-diagnosis function			Indication of a current error and warning
	EEPROM		Self-recovery function	Enable/disable automatic recovery
			EEPROM size	4 KB
	Memory	System flag area	F	2 KB
		Extension module mapping area	I	2 KB
			Q	2 KB
			U	1 KB
	External connection terminal		Programming port	USB 1 channel
			Communication port	RJ45 2 ports (Response to shield)
			Power port	3-Pin push-in/screw fixing type connector
	Status indicator LED			6 types including PWR, MS, RUN, ERR, IN and OUT
Communication specification of EtherCAT	Maximum number of expansion modules to be mounted			8 modules
	Communication protocol			EtherCAT
	Data transfer speed			100Mbps
	Physical layer			100BASE-TX (IEEE 802.3)
	Topology			Conforms to the specification of EtherCAT master.
	Transmission media			STP (Shielded Twisted-pair) cable with Category 5 or higher
	Transmission distance			100m or less between the nodes
	Size of PDO data for transmission and reception			Input: Up to 1,024 byte, output: Up to 1,024 byte
	Size of mailbox data			Input: Up to 256 byte, output: Up to 256 byte
	Mailbox support command			SDO requests, SDO information
	Refresh method			Free-Run, Refresh Sync mode (For LSIS Co., Ltd. only)
	Node address setting method			Rotary switch, master, PADT
	Node address setting range			Explicit ID(1 ~ 99)
				Alias Address(1 ~ 65535)
				Applies the EEPROM value set by the master when setting PADT 0

Power Specification

Item		Specification	Condition
Input	Rated input voltage	DC24V	
	Input voltage range	DC20.4 ~ 28.8V(-15%, + 20%)	Within -15% and +20% of the rated input
	Input current	Less than 1.3A (Typ.1A)	Input +DC28.8V, maximum load
	Inrush current	50A peak or less	Input +DC28.8V, maximum load
	Efficiency	80 % or more	Input +DC28.8V, maximum load
	Permitted instantaneous interruption	Within 10 ms	Input +DC28.8V, maximum load
Output	Rated output voltage	DC5V (±2%)	
	Output current	3.0A	
Indication of voltage status		LED On when the output voltage is normal	
Cable specification		22 ~ 20 AWG (0.3 ~ 0.5mm^2)	

Motion Solution

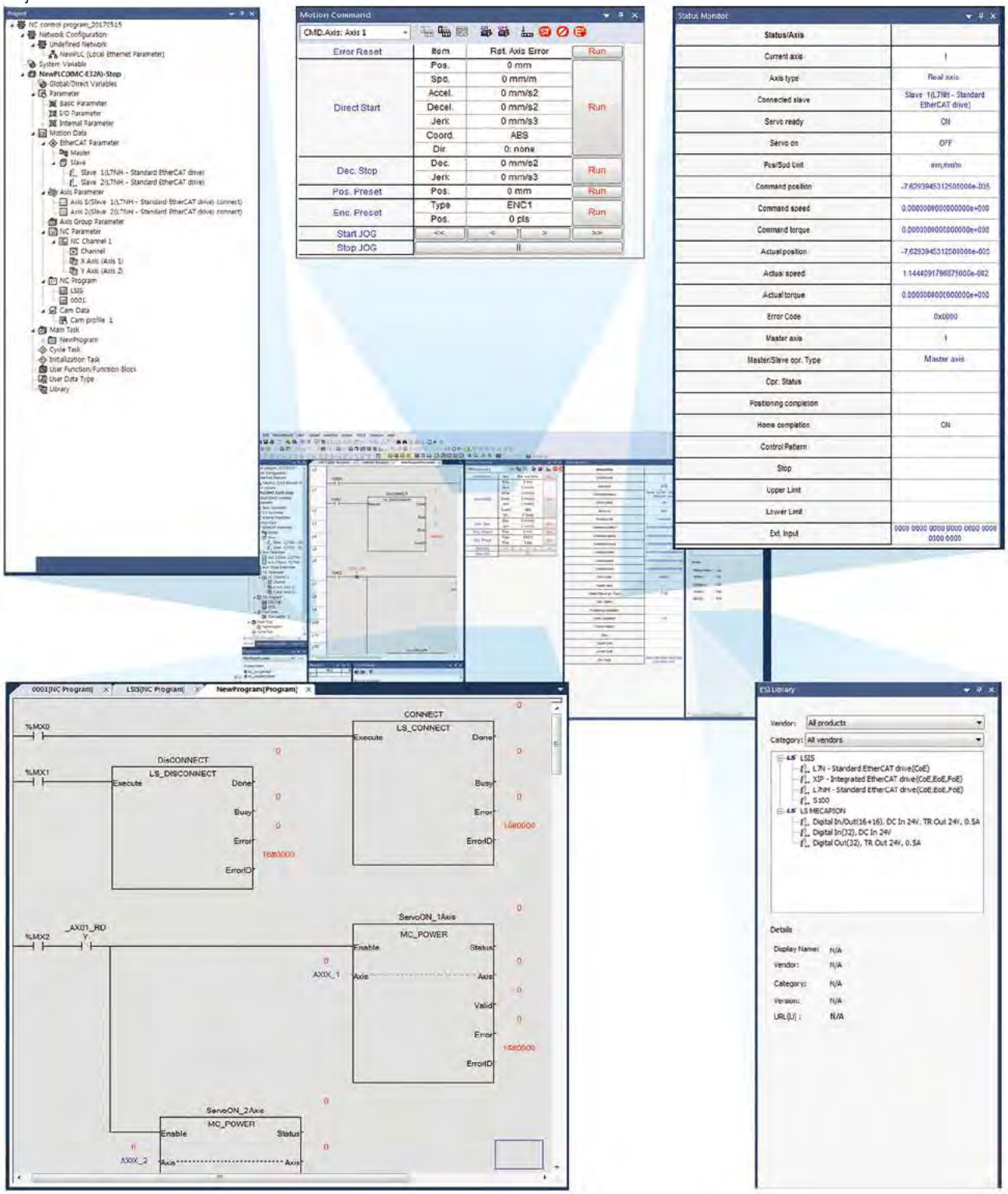
XG5000: All You Need for both PLC Programming and Motion Control

All the control windows, that is, project, program editor, motion control commands and status monitor, are implemented in a single tool, XG5000.

Project Tree

Motion Command

Status Monitor



Program Editor

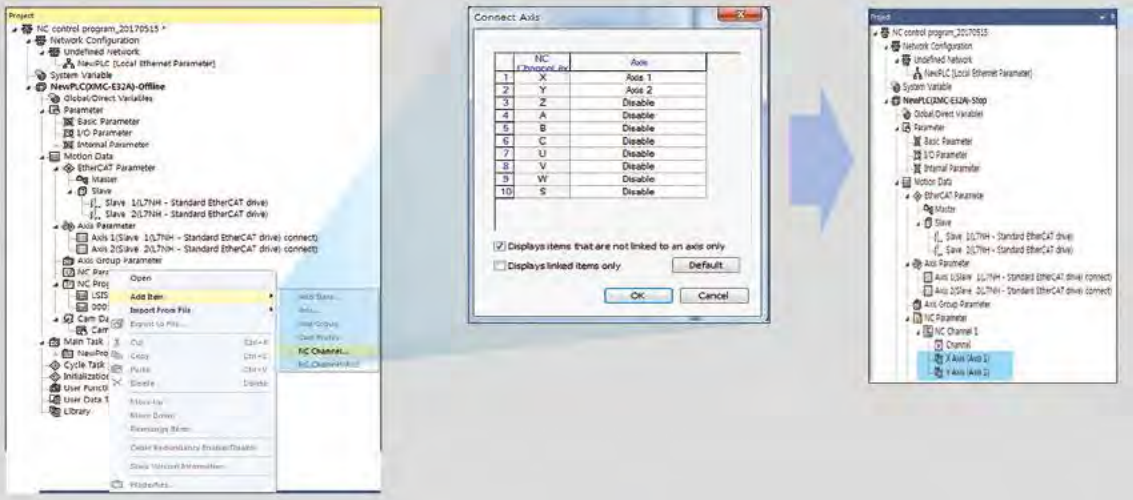
ESI Library

Motion Solution

G-code Commands Available for Controlling CNC Equipments

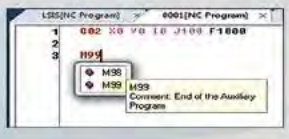
Control CNC equipments such as packing machine and cutting machine easily with G-code commands.

Choose NC channel & axis

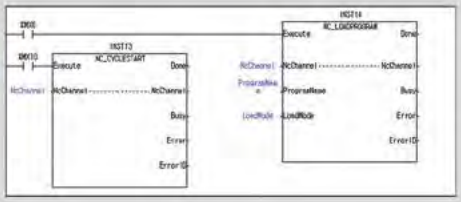


NC programming by G-code & M-code

Main program



Sub program

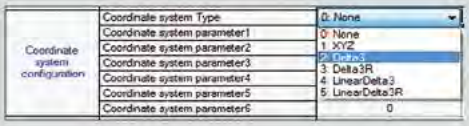


NC program control by NC Function Block (NC_LOADPROGRAM, NC_CYCLESTART)

Robot Control: Innovative Control Function for Smart Solution

With the support of group motion in coordinate system, it is possible to control various types of robots such as Cartesian, Delta3, Delta3R and Linear Delta.

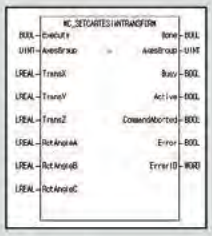
or



Coordinate system and tool setting via MC_SETKINTRANSFORM

(Set in axis group parameter)

XYZ/Delta3/Delta3R/Linear Delta



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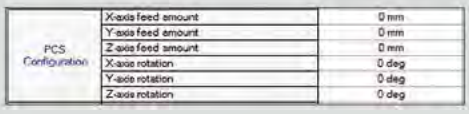
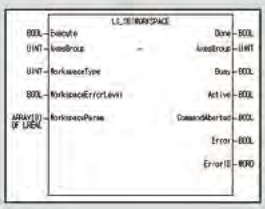


PCS setting via MC_SETCARTESIANTRANSFORM

(Set in axis group parameter)

Indicate the position of the machine by moving or rotating based on the product coordinate system



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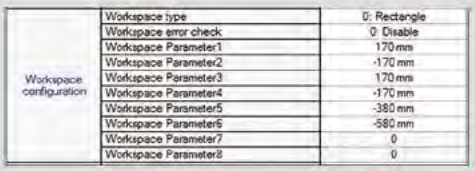
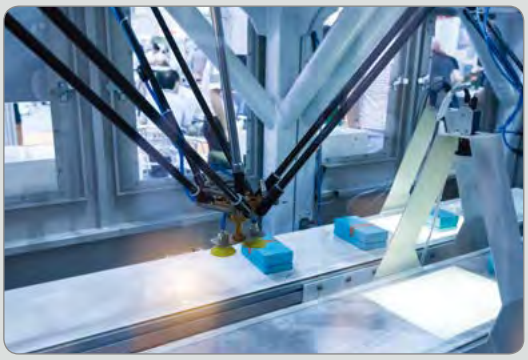


Work space setting via MC_SETWORKSPACE

(Set in axis group parameter)

Safe workspace setting to prevent safety accidents

Starting operation by coordinate system dedicated command such as MC_MOVECIRCULARABSOLUTE2D, LS_MOVELINEARTIMEABSOLUTE, etc.

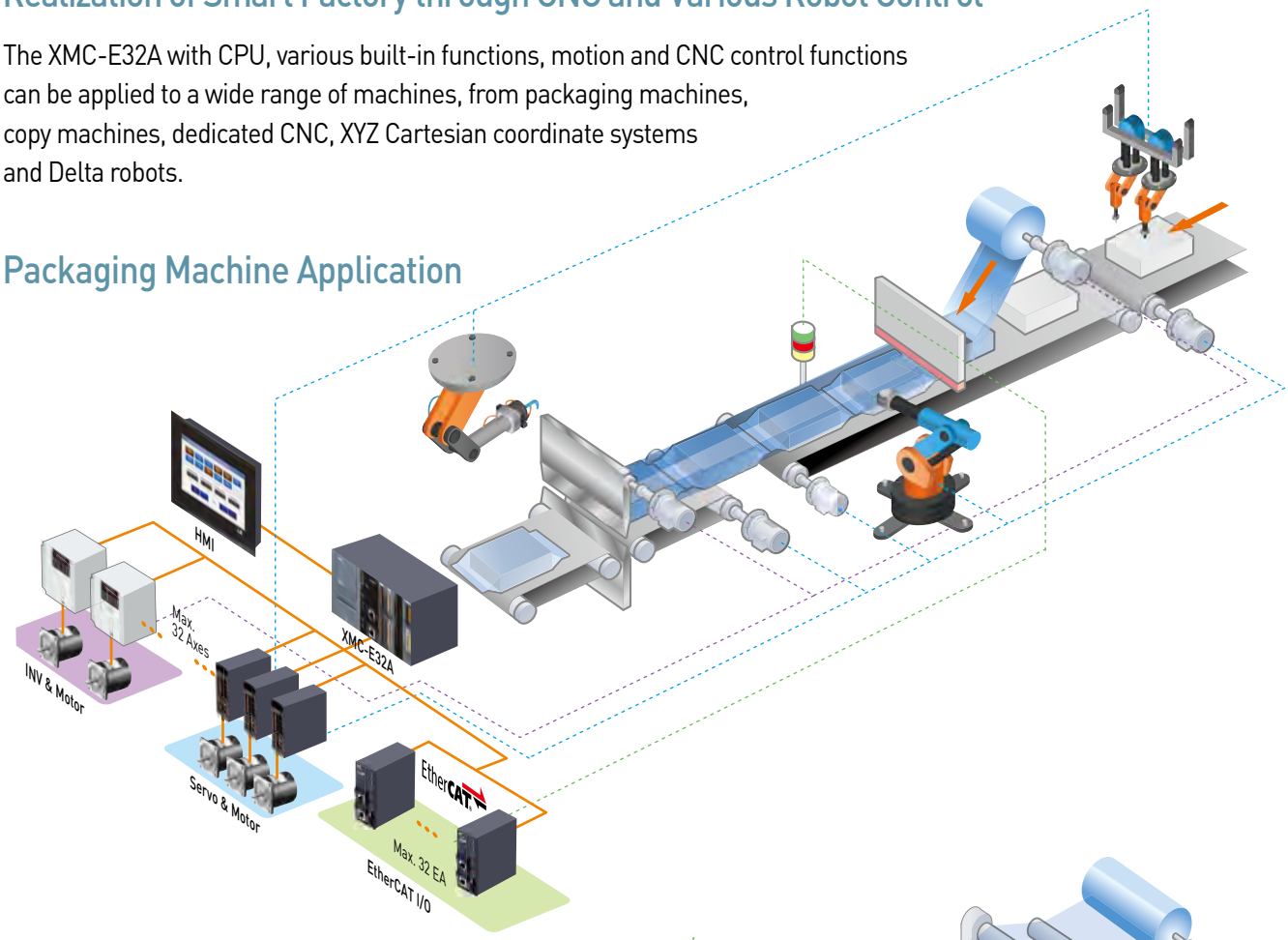


Application

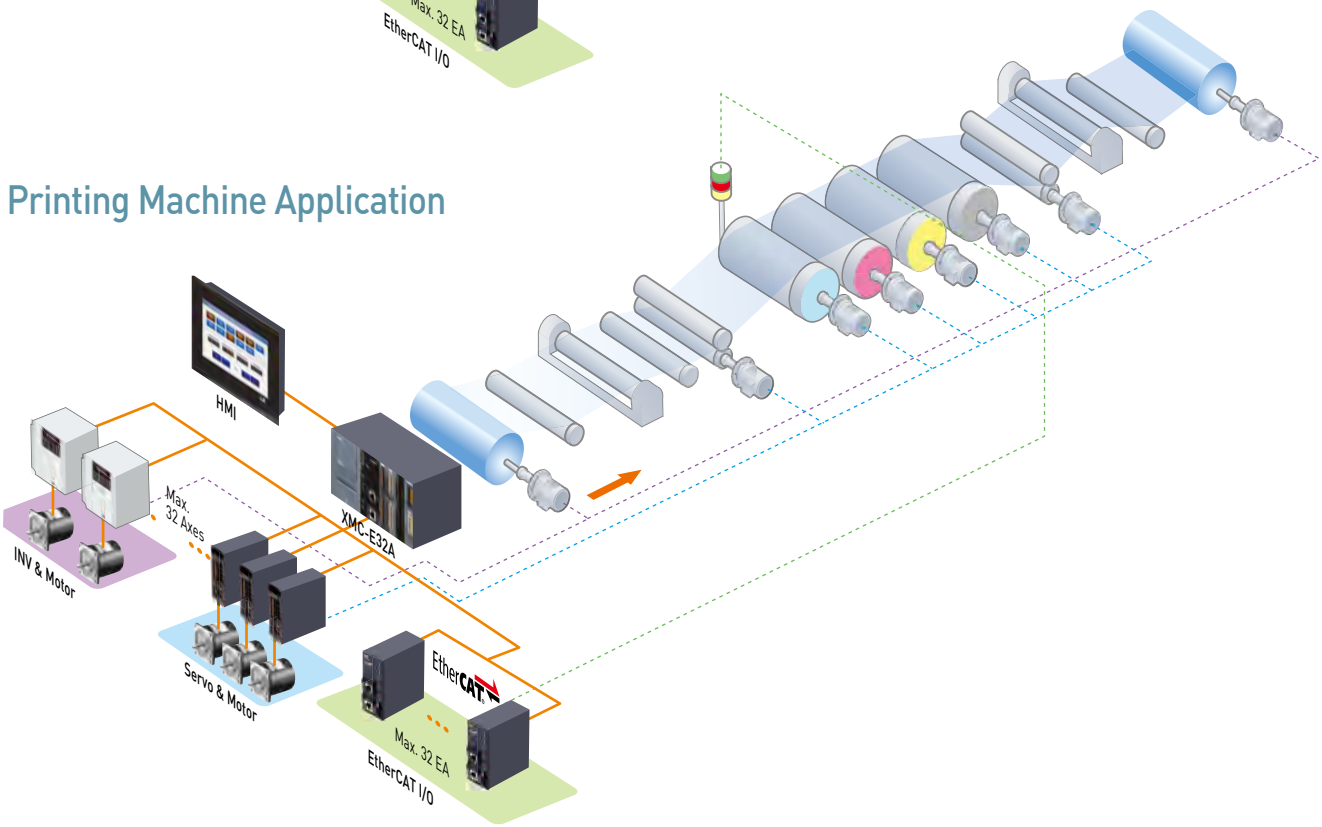
Realization of Smart Factory through CNC and Various Robot Control

The XMC-E32A with CPU, various built-in functions, motion and CNC control functions can be applied to a wide range of machines, from packaging machines, copy machines, dedicated CNC, XYZ Cartesian coordinate systems and Delta robots.

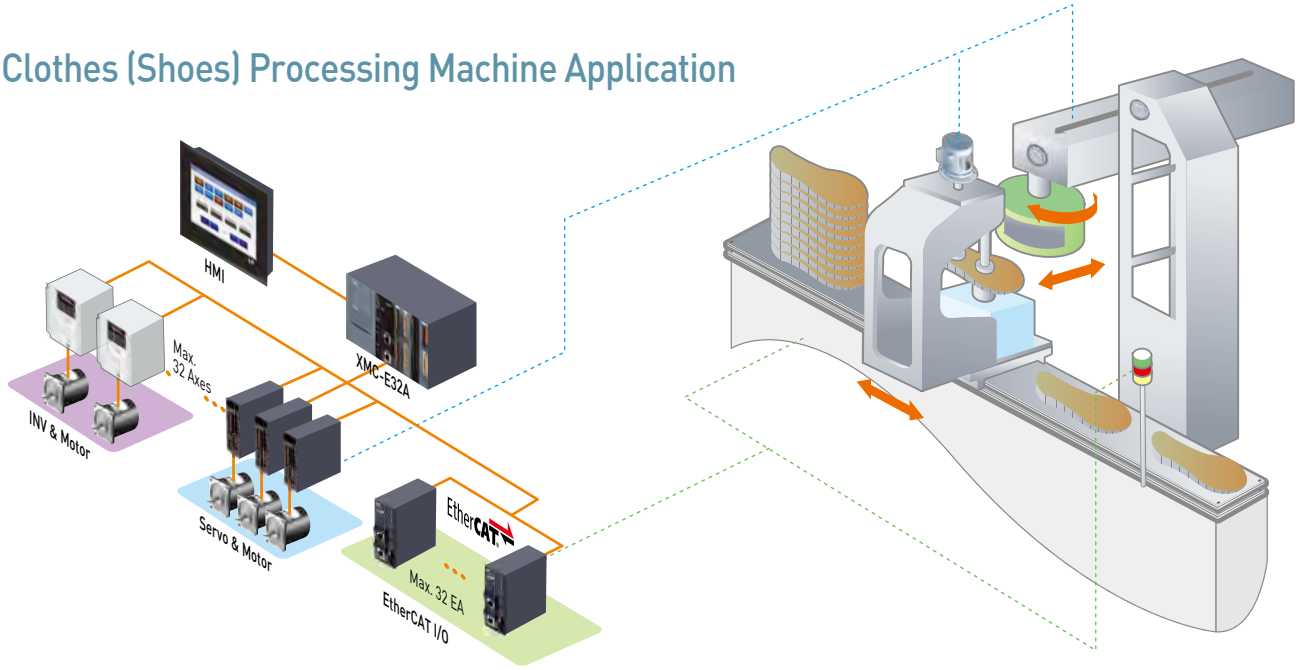
Packaging Machine Application



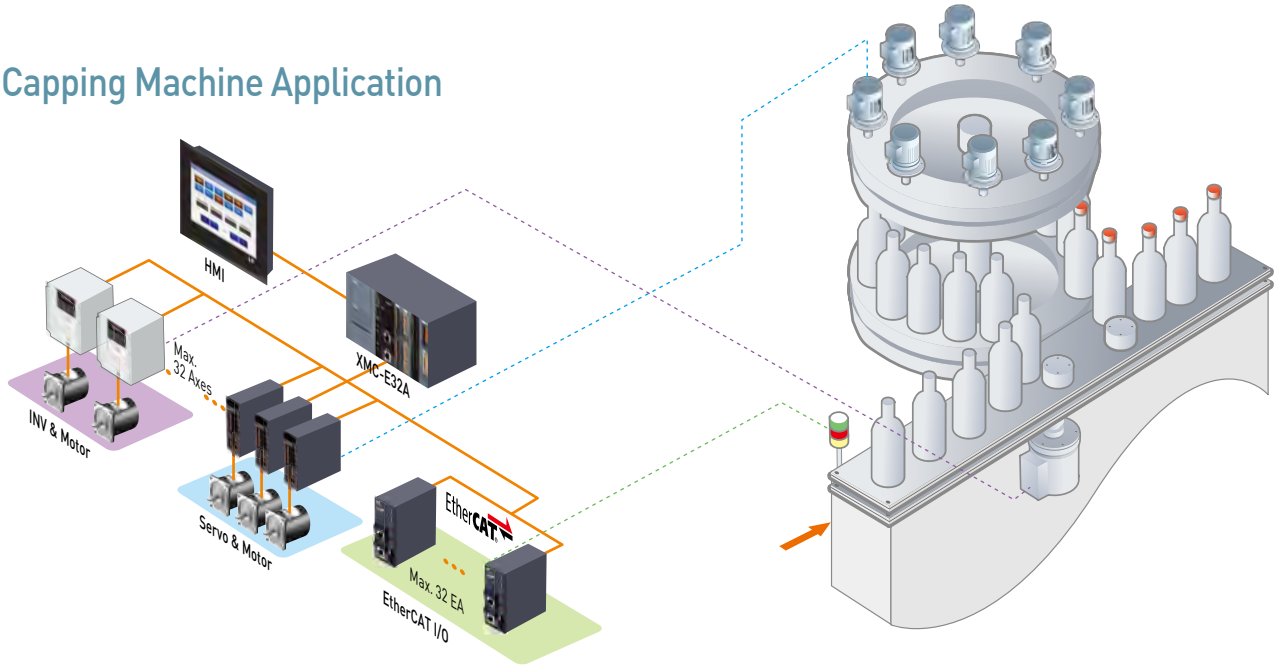
Printing Machine Application



Clothes (Shoes) Processing Machine Application



Capping Machine Application

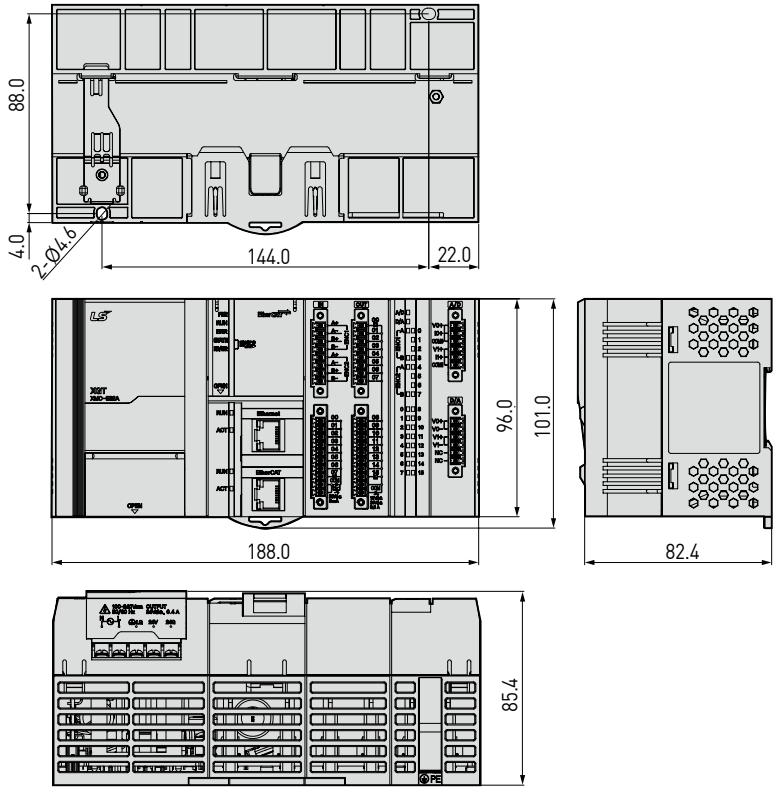


※Refer to LSIS servo drive/motor catalogue and LSIS planetary gearbox catalogue for further details.

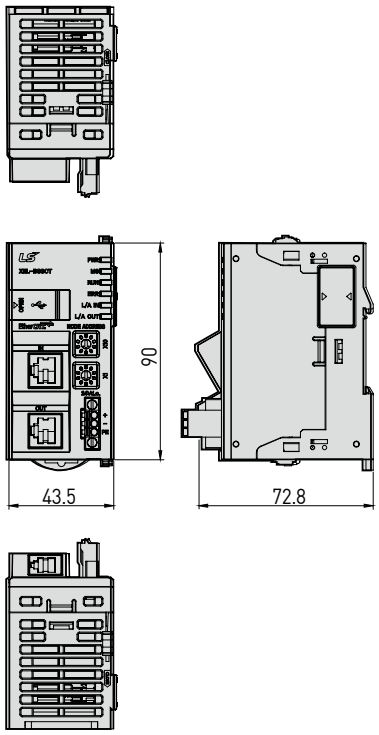
FUTURING SMART ENERGY

We open up a brighter future through
efficient and convenient energy solutions.

XMC-E32A/E16A/E08A/E32C



XEL-BSSCT



• According to The WEEE Directive, please do not discard the device with your household waste.

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2019. 04

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