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EtherCAT Solutions & Automation Controllers

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EtherCAT Solution & Automation Controller Overview

Introduction

EtherCAT is a standard protocol able to connect drives, sensors and I/O devices, and is now a popular control fieldbus in the Industrial Automation sector. Advantech, to fulfill demands of smart factories and equipment manufacturers, provides an EtherCAT I/O and EtherCAT controller portfolio.

Real-time I/O for Industry 4.0

To bridge IT and OT, data needs to be aggregated from the field. Following current trends, different data types and volume from the field will grow exponentially, therefore traditional SCADA systems with standard I/O will become overwhelmed trying to handle complex and time sensitive tasks. In the meantime, Ethernet-based real-time I/O solutions have become price-acceptable in the market. Controllers with time-deterministic responses and low cycle-times not only provide a very good solution, but they also reduce the huge effort required for integrators to handle all data communications.

Real-time I/O for Machine Control

EtherCAT features high speeds, deterministic data performance, and synchronization. These can fulfill serial servo network requirements of equipment manufacturers. With standard based EtherCAT, machine builders can design with off-the-shelf ETG certified products. In addition, all products from different vendors connected on the same EtherCAT bus can communicate with each other to achieve complex motion and I/O control.

Control Platform with EtherCAT Slice I/O Expansion

The trend in controller platforms is for smaller and more powerful applications. AMAX-5500 series are designed for automation users. Their fanless design provides high reliability and their compact size facilitates installation in space limited cabinets. A front-accessible design facilitates easy installation and maintenance. They are not only reliable and user friendly, but they also enhance I/O scalability. I/O expansion is through an EtherCAT slice I/O interface on the right hand side. One the other side, it can be expanded for GigE PoE / USB 3.0 / serial / CAN / Wireless interfaces (AMAX-5580 only). Its high flexibility makes it a perfect embedded automation platforms that can fulfill most requirements for smart factory solutions.

AMAX-4800/AMAX-5000 with EtherCAT

AMAX-4800 series is a pioneer of EtherCAT I/O. It features high volume I/O with good C/P ratio and user friendly designs. If a customer faces the challenge of limited space, AMAX-5000 series offers great flexibility for future I/O expansion. It has an EtherCAT modularized slice I/O architecture in a very compact and slim form factor. Plus, the easy slide-in design reserves space for extra expansion capability for future demands.

AMAX-5400 PCIe Expansion Module

- Supports 4 slots max and PCIe x4 for first slot
- Auto board ID configuration for software identification
- Full-bandwidth USB3.0 for vision application
- Multiple interfaces: USB3.0, PoE / GigE, RS-232/422/485, CAN, wireless
- AMAX-5400E with PCI-mini +SIM card slot for cellular networking

CANopen



AMAX-5000 EtherCAT Slice I/O Module

- Standard EtherCAT I/O Module
- Compact design and easy for slide-in
- Removable push-in terminal
- Supports centralized and decentralized I/O topology
- Supports multi-range for one module
- Sample rate 100S/s per channel for analogue Input
- LED indicator for status check
- Wide operation temperature from -25 ~ 60°C

EtherCAT

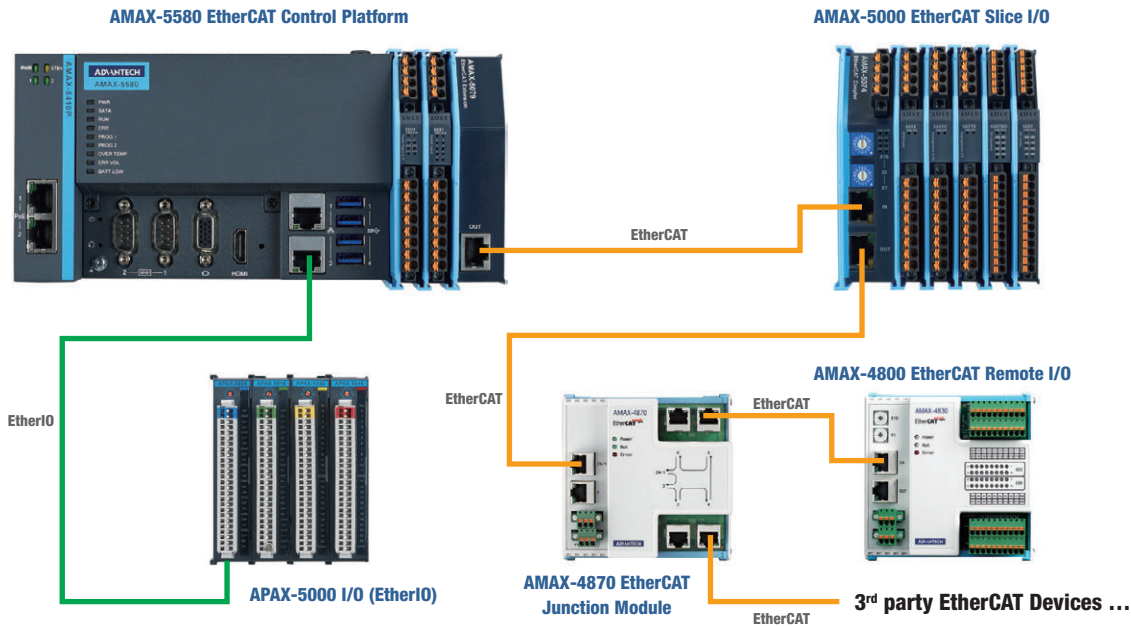


AMAX-5500 Control Platform

- Intel® Core™ (6th Gen) / Intel® Celeron® / Intel Atom® X series processors
- DDR4 4G/8G memory
- Internal expansion slot for PCIe-mini card / M.2
- Rich peripherals: HDMI, GbE, serial, CAN, USB
- Windows Embedded 10 support
- Dual power input and hardware monitoring
- CE/FCC/UL certification



AMAX-5000 System



AMAX-5500 Series:



EtherCAT Control Platform

- **AMAX-5580** Intel® Core™ (6th Gen) / Intel® Celeron® Control Platform (Selectable CODESYS ready solution)



- **AMAX-5570** Intel Atom® Control Platform (Selectable CODESYS ready solution)

AMAX-5000 Series:



EtherCAT Slice I/O

- **AMAX-5001** EtherCAT power module
- **AMAX-501X** EtherCAT AI module
- **AMAX-502X** EtherCAT AO module
- **AMAX-505X** EtherCAT DIO module
- **AMAX-5060** EtherCAT relay module
- **AMAX-508X** EtherCAT counter /encoder module
- **AMAX-5090** EtherCAT serial communication module



- **AMAX-5074** EtherCAT coupler module
- **AMAX-5070** Modbus TCP coupler module
- **AMAX-5072** EtherNet/IP coupler module
- **AMAX-5079** EtherCAT extension module

AMAX-5400 Series:



PCIe Expansion Module for AMAX-5580 Controller

- **AMAX-5400E** PCIe mini card expansion module



- **AMAX-5410** GigE vision frame grabber module
- **AMAX-5410P** PoE vision frame grabber module



- **AMAX-5424V** USB3.0 module



- **AMAX-5490** RS-232/422/485 communication module
- **AMAX-5495** CAN Port Module
- **AMAX-5493M** PROFIBUS DP Module

AMAX-4800 Series:



EtherCAT Remote I/O

- **AMAX-4870** EtherCAT junction module
- **AMAX-486X** EtherCAT relay output module
- **AMAX-481X** EtherCAT AI module
- **AMAX-482X** EtherCAT AO module
- **AMAX-483X** EtherCAT DIO module
- **AMAX-485X**

APAX-5000 Series:



I/O Backplane

- **APAX-5001** 1-slot backplane module
- **APAX-5002** 2-slot backplane module



Analog I/O Modules

- **APAX-501X** Analog input modules
- **APAX-502X** Analog output modules



Digital I/O Modules

- **APAX-504X** Digital I/O modules
- **APAX-5060** Relay output modules
- **APAX-5080** Counter modules



Remote Serial Modules

- **APAX-5090** 4-port RS-232/422/485 virtual COM with APAX bus (EtherIO)

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Control Platforms

NEW



Model		AMAX-5570	AMAX-5580
Description		Intel Atom® X Series Cabinet Control Platform with EtherCAT Slice I/O Expansion	Intel® Core™ (6th Gen) / Intel® Celeron® Modular Control Platform with EtherCAT Slice I/O Expansion
Hardware	BIOS	AMI EFI 128Mbit Flash BIOS	
	Watchdog Timer	Programmable 255 levels timer interval, from 1 to 255 sec	
	CPU	Intel Atom® x6413E processor	Intel® Core™ (6th Gen) processors Intel® Celeron® processor
	Memory	DDR4 2666 MHz, 4 GB	DDR4 2666 MHz, 4 GB for Intel® Celeron® processor / 8 GB for Intel® Core™ processors (two socket support up to 16 G)
	Graphics Engine	Intel® 10th Gen UHD Graphics	Intel® 9th Gen LP GT2
	Ethernet	Realtek 8119i GbE	Intel® i210-IT GbE
	LED Indicators	LEDs for Power, Run (Programmable), LAN (LINK, ACT)	LEDs for Power, Storage, Run (Program) and Abnormal status, LAN (LINK, ACT)
	Storage	64 GB eMMC on board	1 x M.2 2280 M-Key slot for SATA storage
	Expansion	1 x Full-size mPCIe (PCIe / USB 2.0 / SATA signal) 1 x M.2 2242 B-Key (USB 3.0 / SATA signal)	1 x Full-size mPCIe (PCIe / USB 2.0 signal) AMAX-5400 PCIe modules, optional for left side (max.4) AMAX-5000 Slice I/O modules, optional for right side
I/O Interface	Serial Ports	1 x RS-232/422/485 (terminal), 50~115.2kbps 1 x 485 (terminal), 50~115.2kbps, 2 x CAN Bus (terminal)	2 x RS-232/422/485 (DB9), 50~115.2kbps
	LAN Ports	2 x RJ-45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ-45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T
	USB Ports	2 x USB ports (USB 3.2 compliant)	4 x USB ports (USB 3.0 compliant), 1 x internal USB
	Display	1 x HDMI, supports up to 1920 x 1080 @ 60 Hz	1 x VGA, supports up to 1920 x 1200 @ 60 Hz 1 x HDMI, supports up to 4096 x 2160 @ 24Hz
	Isolation	CAN & Serial Port isolation (2500 V _{DC})	—
	Grounding Protection	Chassis grounding	
	Power Connector	1 x 2-pin	1 x 7-pin, dual power input with alarm output
General	Power Requirement	24 V _{DC} ± 20%	
	Power Consumption	9 W (Typical), 48 W (local I/O), 85 W (Slice I/O local supply)	15 W (Typical), 42 W (local I/O), 122 W (Max. with PoE expansion)
	OS Support	Supports Microsoft® Windows 10 64-bit	Supports Microsoft® Windows 10 64-bit, WES 7 32/64-bit
	Enclosure	Aluminum housing	Aluminum alloy and zinc alloy housing
	Mounting	DIN-rail	
	Weight (Net)	Approx. 0.6 kg	Approx. 1.3 kg
	Dimension (W x H x D)	48.5 x 100 x 70 mm	139 x 100 x 80 mm
	Certification	CE, FCC, UL 61010-2-201, BSMI	CE, FCC, UL, BSMI
Environment	Operating Temperature	-20 ~ 60°C (-4 ~ 140°F) @ 5~85% RH with 0.7 m/s airflow	-10 ~ 60°C (14 ~ 140°F) @ 5~85% RH with 0.7m/s airflow
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)
	Relative Humidity	95% RH @ 40°C, non-condensing	95% RH @ 40°C, non-condensing
	Shock Protection	Operating, IEC 60068-2-27, 50G, half sine, 11 ms	Operating, IEC 60068-2-27, 10G, half sine, 11 ms
	Vibration Protection	Operating, IEC 60068-2-64, 2 Grms, random, 5~500 Hz, 1hr/axis (eMMC)	Operating, IEC 60068-2-64, 1 Grms, random, 5~500 Hz, 1hr/axis (M.2)

✓: supported, —: not supported, △: optional

CODESYS Ready Edge Controller Overview

Integrated PC-based SoftPLC & SoftMotion Control Solutions

Based on Flexible Expansion I/O Modules offer Focus Solution Package



Introduction

PC-Based edge controllers are powered by CODESYS control kernel Soft-PLC equipped with Industrial Ethernet and Fieldbus for OT applications. Support for IEC-61131-3 PLCopen languages enables engineers to easily program PLCs and SoftMotion and CNC Robotics modules for various motion control applications. To provide comprehensive control solutions, Advantech also offers flexible expansion options, including industrial Ethernet I/O, peripheral I/O, slice I/O, and distributed I/O modules. Moreover, to ensure easy data access with IT-OT integration, uplink connectivity with MQTT, OPC UA and ODBC (database) protocol support is provided. The platform portal utility's self-diagnosis function enhances controller reliability. Furthermore, Advantech's WISE-PaaS platform can be leveraged for field-side management to improve legacy machinery to intelligent (M2) to enhance productivity and equipment flexibility.

Real-Time Industrial Ethernet & Fieldbus SoftLogic for OT Control

AMAX-600 series offer split-core and split-systems to make edge control more reliable by integrating IPC platform and PLC to provide a cost effective field application. IEC-61131-3 PLC open cross language platform for PLC programming shortens development schedule. (IL/ST/LD/FBD/SFC) CODESYS control kernel Soft-PLC supports real-time 50 μ s processing cycle time and is equipped with standard industrial Ethernet and fieldbus protocols for easy connection with a variety I/O in the field. Comprehensive diagnostics functionality display, check and detect bus status, messages, communication problems, and error codes directly from controller application. With a distributed control structure design users can easily maintain and upgrade their controller for a variety of applications.

EtherCAT PROFINET EtherNet/IP CANopen Modbus

Seamlessly IT-OT Integrated Communication Protocols

In a connected Industry 4.0 architecture, modern controllers also exchange their information with other systems. The CODESYS PLC handler is an easy-to-use software interface (API) for the communication between CODESYS controllers and external client systems. An external client like a service panel can access the IEC 61131-3 variables and the online services of the controller using this API. OPC UA and MQTT (Sparkplug) are another standard Interface for communication in smart factory systems. Moreover, the ODBC the function also provides a standard format that gives the user easy access to a variety of database like MySQL, SQLite, MsSQL etc.

Turn your PLC into a Motion Controller

Develop your motion tasks without leaving your familiar logic controller development environment. CODESYS SoftMotion is an add-on component for the system and is seamlessly integrated in the IEC-61131-3 development interface. Thanks to the integration and availability of logic and motion control in one device with a single engineering interface, you save costs for additional hardware and engineering tools. Cabling and data exchange between logic and motion control are greatly simplified. SoftMotion controls single-axis and synchronized multi-axis movements like electronic cams or electronic gears. CNC robots could convert G-code, handling Interpolator overrides, coordinate transformations, path pre-processing and modulation, and even 2D/ 3D Kinematics for up to 6-axis robots.

Make Your Machinery More Intelligent

Edge controller default package includes SoftPLC and Visualization tools. Users can visit Advantech's WISE-Marketplace to upgrade licenses for SoftMotion or CNC Robotics. The Platform Portal utility's self-diagnosis function enhances controller reliability and lets the user monitor hardware information and CODESYS task updates. Furthermore, Advantech WISE-PaaS platform can be leveraged for field-side management to enhance productivity and equipment flexibility. With these add-on value features, users can realize Industrial 4.0 smart manufacturing.

CODESYS Ready Edge Controllers

AMAX-600 Series Real-Time SoftLogic Controllers

NEW



Model		AMAX-637	AMAX-657	AMAX-658
Description		Intel Atom® X Series E3940® Cabinet Controller with 1 x iDoor Expansion	Intel Atom® X Series x6413E® Cabinet Controller with Slice I/O Expansion	Intel® Core™ (6th Gen) / Intel® Celeron® Modular Controller with Slice I/O Expansion
CODESYS SoftLogic	Runtime	CODESYS V3.5 Control RTE SL + Visualization (Target & Web)		
	Visualization	Target Visualization (Local HMI), Web Visualization (Web Browser)		
	Advance Motion Control	SoftMotion & CNC Robotic (Optional-Upgrade from Advantech Marketplace)		
	Industry Ethernet	EtherCAT, PROFINET, EtherNet/IP Scanner (IEC/CIFX) Modbus/TCP Server and Client		
	Fieldbus Support	Modbus/RTU Client (Master) PROFIBUS Master & CANopen Master (optional by iDoor module)		
	Uplink	OPC UA Server, MQTT (Sparkplug), ODBC for Database		
	Motion Control Capability	32-axis with 1ms cycle time	64-axis with 1ms cycle time	Intel® Core™ i7: 256-axis with 1ms cycle time Intel® Core™ i5: 128-axis with 1ms cycle time Intel® Celeron®: 64-axis with 1ms cycle time
Hardware	BIOS	AMI EFI 128Mbit Flash BIOS		
	CPU	Intel Atom® x5-E3940 processor	Intel Atom® x6413E processor	Intel® Core™ (6th Gen) processors Intel® Celeron® processor
	Memory	8 GB	4 GB	DDR4 2666 MHz, 4 GB for Intel® Celeron® processor / 8 GB for Intel® Core™ processors
	Ethernet	Intel® i210-IT GbE, 802.1Qav, IEEE1588/802.1AS, 802.3az		
	LED Indicators	LEDs for Power, RTC Battery, LAN, RUN (CODESYS program run)	LEDs for Power, LAN, RUN (CODESYS program run)	LEDs for Power, Storage, LAN, RUN (CODESYS program run), and Abnormal status
	Storage	128 GB SSD	64 GB eMMC	128 GB SSD
	Expansion	1 x Full-size mPCIe (PCIe / USB 2.0 signal) 1 x 2.5" SSD/HDD slot	1 x M.2 B-Key (USB 3.0 / SATA signal)	AMAX-5400 PCIe modules, optional for left side (max.4) AMAX-5000 Slice I/O modules, optional for right side
I/O Interface	Local Digital I/O	8 Digital Input (Wet/Dry), 8 Digital Output (Sink)	–	–
	Serial Ports	2 x RS-232/422/485 (terminal)	1 x RS-232/422/485 (terminal), 1 x 485 & 2 x CAN Bus (terminal)	2 x RS-232/422/485 (DB9)
	LAN Ports	2 x RJ-45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ-45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ-45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T
	USB Ports	3 x USB 3.2 ports 1 x USB 2.0 ports	2 x USB 3.2 ports	4 x USB 3.0 ports 1 x internal USB
	Display	2 x DP 1.2, supports up to 4096 x 2306 @60 Hz	1 x HDMI, supports up to 1920 x 1080 @60 Hz	1 x VGA, supports up to 1920 x 1200 @60 Hz 1 x HDMI, supports up to 4096 x 2160 @24 Hz
	Isolation	DI & DO & Serial Ports (2500 V _{DC})	CAN & Serial Port isolation (2500 V _{DC})	–
	Grounding Protection	Chassis grounding		
	Power Connector	1 x 2-pin	1 x 2-pin	1 x 7-pin, dual power input with alarm output
General	Power Requirement	10~36 V _{DC}	24 V _{DC} ± 20%	24 V _{DC} ± 20%
	Power Consumption	21 W (Typical), 47 W (Max)	9 W (Typical), 48 W (local I/O), 85 W (Slice I/O local supply)	15 W (Typical), 42W (local I/O), 122 W (Max. with PoE expansion)
	OS Support	Microsoft® Windows 10 IoT Enterprise LTSC 64 bits		
	Enclosure	Aluminum alloy housing	Aluminum alloy housing	Aluminum and zinc alloy housing
	Mounting	DIN-rail		
	Weight (Net)	Approx. 1.1 kg	Approx. 0.6 kg	Approx. 1.3 kg
	Dimension (W x H x D)	75 x 150 x 105 mm	48.5 x 100 x 70 mm	139 x 100 x 80 mm
	Certification	CE, FCC, UL61010, CCC, BSMI	CE, FCC, UL61010-2-201, BSMI	CE, FCC, UL62368, BSMI
Environment	Operating Temperature	-40 ~ 60°C (-40 ~ 140°F)	-20 ~ 60°C (-4 ~ 140°F)	-10 ~ 60°C (14 ~ 140°F)
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)
	Relative Humidity	10~95% RH @ 40°C, non-condensing	10~95% RH @ 40°C, non-condensing	10~95% RH @ 40°C, non-condensing
	Shock Protection	Operating, IEC 60068-2-27, 50G, half sine, 11 ms	Operating, IEC 60068-2-27, 50G, half sine, 11 ms	Operating, IEC 60068-2-27, 10G, half sine, 11 ms
	Vibration Protection	Operating, IEC 60068-2-64, 4 Grms, random, 5~500 Hz, 1hr/axis (SSD) Operating, IEC 60068-2-64, 0.3 Grms, random, 5~500 Hz, 1hr/axis (HDD)	Operating, IEC 60068-2-64, 2 Grms, random, 5~500 Hz, 1hr/axis (eMMC)	Operating, IEC 60068-2-64, 1 Grms, random, 5~500 Hz, 1hr/axis (M.2)

✓ : supported, – : not supported, △ : optional

PCIe Expansion Modules

PCIe Modules



Model	🔌 AMAX-5400E	🔌 AMAX-5410	🔌 AMAX-5410P
Description	PCIe mini card expansion module	2-port GigE vision frame grabber module	2-port PoE vision frame grabber module
Communications	PCI mini card Interface: Full size mini PCIe 2.0 SIM Card Slot: Nano SIM card Antenna: 1x SMA hole on the top	Ethernet Compatibility: IEEE 802.3, IEEE 802.3u, IEEE802.3ab, IEEE802.3x, IEEE802.3af Speed: 10/100/1000 Mbps No. of Ports: 2 Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports. Input Voltage: 24 V _{DC} direct from AMAX-5000 controller	Ethernet Compatibility: IEEE 802.3, IEEE 802.3u, IEEE802.3ab, IEEE802.3x, IEEE802.3af Speed: 10/100/1000 Mbps No. of Ports: 2 Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports. Input Voltage: 24 V _{DC} direct from AMAX-5000 controller Output PoE: Power 48 V _{DC} PoE Power output, 15.4 W per port, total Max. 20 W
LED Indicator	PWR, Standby		
Enclosure	Aluminum housing		
Interface	PCIe x1		
Power Consumption	0.5 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}	
Isolation Voltage	2,500 V _{DC}		
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		
Operating/Storage Humidity	5~95% RH (non-condensing)		
Certification	CE, FCC class A		



Model	AMAX-5490	AMAX-5495	AMAX-5493M
Description	2-port Isolated RS-232/422/485 communication module	2-port CAN module	1-port PROFIBUS DP Master Module
Communications	Serial Communication Data Bits: 5, 6, 7, 8 Stop Bits: 1, 1.5, 2 Parity: None, even, odd Baud Rate: 50 bps~230.4 kbps Data Signals: RS-232: TxD, RxD, GND RS-422: Tx+, Tx-, Rx+, RX RS-485: Data+, Data- FIFO: 256 bytes Flow Control: Xon/Xoff	CAN Protocol: CAN2.0 AB Max. Speed: 1Mbit/s Signal Support: CAN_H, CAN_L	PROFIBUS DP Controller: Hilscher netX100 Protocol: PROFIBUS DP V1 Signal interface: Iso. RS-485, RxD/TxD-P, RxD/TxD-N Speed: 9.6 kbps~12 Mbps
LED Indicator	PWR, STBY, TX1, RX1, TX2, RX2		PWR, STBY
Enclosure	Aluminum housing		
Interface	PCIe x1		
Power Consumption	2 W @ 24 V _{DC}	3 W @ 24 V _{DC}	3 W @ 24 V _{DC}
Isolation Voltage	2,500 V _{DC}		
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		
Operating/Storage Humidity	5~95% RH (non-condensing)		
Certification	CE, FCC class A		

✓: supported, -: not supported, △: optional

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EtherCAT Slice I/O Modules

Digital I/O



Model		 AMAX-5051	 AMAX-5052	 AMAX-5056	 AMAX-5057	 AMAX-5056SO	 AMAX-5057SO	
Description		8-ch DI module	16-ch DI module	8-ch sink type DO module	16-ch sink type DO module	8-ch source type DO module	16-ch source type DO module	
Digital Input/ Output	Input Channels	8-ch.	16-ch.	–	–	–	–	
	Output Channels	–	–	8-ch.	16-ch.	8-ch.	16-ch.	
	Rating	Dry Contact Logic level 1: close to Iso.GND Logic level 0: open		Rated Voltage 10~30 V _{DC}		Rated Voltage 10~30 V _{DC}		
		Wet Contact Rated voltage: 24 V _{DC} Logic level 1: 10~30 V _{DC} and -10~-30 V _{DC} Logic level 0: -3~-3 V _{DC}		Rated Current Output Logic level 1: 0.3 A per channel Logic level 0: 25 μA per channel (leakage current)		Rated Current Output Logic level 1: 0.5 A per channel Logic level 0: 10 μA per channel (leakage current)		
		Input / Output Delay	From logic level 0 to 1: 4 ms From logic level 1 to 0: 4 ms		From logic level 0 to 1: 10 us From logic level 1 to 0: 100 us		From logic level 0 to 1: 150 us From logic level 1 to 0: 2 ms	
	Digital Filter	3ms		–		–		
LED Indicator		Pwr, Run, Error, DIO status						
Interface		100 Mbps EtherCAT						
Power Consumption		2 W @ 24 V _{DC}			2.5 W @ 24 V _{DC}		2 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}
Isolation Voltage		2,000 V _{DC}						
Watchdog Timer		System (1.6 seconds)						
Operation/Storage Temperature		-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)						
Operating/Storage Humidity		5~95% RH (non-condensing)						
Certification		CE, FCC class A						

Digital I/O with Timestamp



Model		AMAX-5051T	AMAX-5056T
Description (English)		8-ch DI module (2-ch w/ timestamp, 6-ch w/o timestamp)	2-ch sink type DO module w/ timestamp
Digital Input/Output	Input Channels	2-ch. w/ timestamp	6-ch. w/o timestamp
	Output Channels	–	–
	Rating	Wet Contact: Logic level 1: 11~30 V _{DC} Logic level 0: -3~-5 V _{DC} (similar to EN 61131-2, type 3)	
		Dry Contact: Logic level 1: Close GND Logic level 0: Open Wet Contact: Logic level 1: 11~30 V _{DC} Logic level 0: -3~-5 V _{DC} (similar to EN 61131-2, type 3)	
	Input / Output Delay	< 0.5 µs	< 10 µs
	Resolution Timestamp	1 ns	–
	DI Latch / DO Sync	First Edge & Last Edge DI Latch	–
LED Indicator		Pwr, Run, Error, DI status	
Interface		100 Mbps EtherCAT	
Power Consumption		2 W @ 24 V _{DC}	
Isolation Voltage		2,000 V _{DC}	
Watchdog Timer		System (1.6 seconds)	
Operation/Storage Temperature		-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)	
Operating/Storage Humidity		20~95 % RH (non-condensing) / 5~95% RH (non-condensing)	
Certification		CE, FCC class A	

Relay Module

NEW



Model		AMAX-5060
Description (English)		4-ch Relay w/ 2-ch DI Module
I/O	Relay Channels	4-ch.
	Relay Type	Form A (SPST)
	Contact Rating	250 V _{AC} @ 5 A 30 V _{DC} @ 5 A
	Breakdown voltage	500 V _{AC} (50/60 Hz)
	DI Channels	2-ch.
	DI Rating	Wet Contact Rated voltage: 24 V _{DC} Logic level 1: 10~30 V _{DC} Logic level 0: 0~3 V _{DC}
	DI Filter	Selectable
LED Indicator		PWR, RUN, ERROR, DI/O status
Interface		100 Mbps EtherCAT
Power Consumption		2 W @ 24 V _{DC}
Isolation Voltage		2,000 V _{DC}
Watchdog Timer		System (1.6 seconds)
Operation/Storage Temperature		-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)
Operating/Storage Humidity		20~95 % RH (non-condensing) / 5~95% RH (non-condensing)
Certification		CE, FCC class A

✓: supported, –: not supported, △: optional

EtherCAT Slice I/O Modules

Analog I/O



Model		AMAX-5017C	AMAX-5017V	AMAX-5017H	AMAX-5024
Description		6-Ch Current AI Module	6-Ch Voltage AI, multi-gain, 16-bit	4-Ch High speed AI module	4-Ch AO multi-gain, 16-bit
Analog Input	Channels	6-ch.	6-ch.	4-ch.	4-ch.
	Input Type	mA	V, mV	V, mA	V, mV, mA
	Input Impedance	120Ω	>10M Ω	Differential 800 kΩ, Common-mode 200 kΩ for voltage input Differential 500 Ω, Common-mode 200 kΩ for current input	—
	Input / Output Range	±20 mA, 0~20 mA, 4~20 mA	±150 mV, ±500 mV, ±1V, ±5 V, ±10 V	±10 V, 0~20 mA	0~5 V, 0~10 V, ±5 V, ±10 V, 4~20 mA, 0~20 mA
	Resolution	16-bit with ±0.2% FSR accuracy @ 25°C	16-bit with ±0.1% FSR accuracy @ 25°C	16-bit with ±0.1% FSR accuracy @ 25°C	16-bit with ±0.01% FSR accuracy @ 25°C
	Sample Rate	100 sample/s (per channel)		10k sample/s (per channel)	
	Burn-out Detection	✓	—	—	—
	Slew Rate	—	—	—	Configurable
	Drift	—	—	—	± 50 ppm/°C
	Current Load Resistor	—	—	—	Max. 500 Ω
	Voltage Load Resistor	—	—	—	Min. 1 KΩ
LED Indicator		Pwr, Run, Error			
Interface		100 Mbps EtherCAT			
Power Consumption		2 W @ 24 V _{DC}		2.5 W @ 24 V _{DC}	3.5 W @ 24 V _{DC}
Isolation Voltage		2,000 V _{DC}			
Watchdog Timer		System (1.6 seconds)			
Operation/Storage Temperature		-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)			
Operating/Storage Humidity		5~95% RH (non-condensing)			
Certification		CE, FCC class A			

Temperature Modules



Model		AMAX-5015	AMAX-5018
Description		4-Ch RTD (2/3 wire)	6-Ch Thermocouple (Open detect)
Analog Input	Channels	4-ch.	6-ch.
	Input Type	RTD: 2 or 3 wire	mV, V, T/C: J, K, T, E, R, S, B
	Input Impedance	—	>2 MΩ
	Voltage Range	—	±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V
	Temperature Range	Pt 100 RTD: Pt -50 ~ 150°C Pt 0 ~ 100°C Pt 0 ~ 200°C Pt 0 ~ 400°C Pt -200 ~ 200°C IEC RTD 100 ohms (a = 0.00385) JIS RTD 100 ohms (a = 0.00392) Pt 1000 RTD -40 ~ 160°C Balco 500 RTD -30 ~ 120°C Ni 518 RTD -80 ~ 100°C 0 ~ 100°C	Type-J (-210 ~ 1200°C) Type-K (-270 ~ 1372°C) Type-T (-270 ~ 400°C) Type-E (-270 ~ 1000°C) Type-R (0 ~ 1768°C) Type-S (0 ~ 1768°C) Type-B (300 ~ 1820°C)
	Resolution	16-bit with ±0.1% FSR accuracy	
	Sample Rate	100 sample/s (per channel)	
	Burn-out Detection	✓	—
	LED Indicator	Pwr, Run, Error	
	Interface	100 Mbps EtherCAT	
Power Consumption		2 W @ 24 V _{DC}	
Isolation Voltage		2,000 V _{DC}	
Watchdog Timer		System (1.6 seconds), Communication (Programmable)	
Operation/Storage Temperature		-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)	
Operating/Storage Humidity		5~95% RH (non-condensing)	
Certification		CE, FCC class A	

PWM and Serial Communication Modules

NEW



NEW



Model		AMAX-5086	AMAX-5090
Description		2-ch PWM with 2-ch Digital Input EtherCAT Slice I/O Module	1-port Isolated RS-232/422/485 Communication EtherCAT Slice I/O Module
Input/Output Channels		2-ch PWM Output, 2-ch DI Input	1-ch Serial Port
Function		PWM Maximum Output Current 0.5 A Duty Cycle 0~100% Load Type Ohmic, Inductive, Lamp Load Resolution: Up to 300 Hz: 15-bit Up to 600 Hz: 14-bit Up to 1.2 kHz: 13-bit Up to 2.4 kHz: 12-bit Up to 4.8 kHz: 11-bit Up to 9.6 kHz: 10-bit Up to 19.2 kHz: 9-bit	Interfaces RS-232/422/485, Modbus RTU Data Transfer Channels Tx/D, Rx/D Full/Half Duplex Data Buffer 1,000 bytes receive/transmit buffer Termination Resistor Typ. 120 Ω, default turn off
Signal Input		—	RS-232/422/485, Modbus RTU
Input/Output Frequency		Output 1~125 KHz	1,200~115,200 bps
LED Indicator		PWR, RUN/ERROR PWM1, PWM2, DI1, DI2	PWR, RUN/ERROR Tx/D, Rx/D
Interface		100 Mbps EtherCAT	
Power Consumption		3W @ 24V _{DC}	2W @ 24V _{DC}
Isolation Voltage		2,000 V _{DC}	
Operating Temperature		-25 ~ 55°C (-14 ~ 131°F)	-25 ~ 60°C (-14 ~ 140°F)
Storage Temperature		-40 ~ 85°C (-40 ~ 185°F)	
Relative Humidity		95% RH @ 40°C, non-condensing	
Certification		CE, FCC class A, cTUVus	

✓: supported, —: not supported, Δ: optional

1

Edge Software & Industry Solutions

2

Intelligent HMI & Monitors

3

Automation Computers

4

Intelligent Systems

5

Mission Critical CompactPCI Platforms

6

Intelligent Transportation & Substation Certified Systems

7

Industrial Server & Cloud Solutions

8

AI & Advanced Computer Vision

9

Video Infrastructure Solutions

10

Network & Security Solutions

11

Industrial Communication

12

Industrial Gateways

13

EtherCAT Solutions & Automation Controllers

14

Intelligent Motion Control Solutions

15

Data Acquisition (DAQ) Solutions

16

Remote I/O, Wireless I/O & Sensors

17

Serial/USB Communications

EtherCAT Slice I/O Modules

Encoder / Counter Modules

NEW



Model	AMAX-5080	AMAX-5081	AMAX-5082
Description	2-Ch Counter/Encoder 32-bit	1-Ch TTL/RS-422 Encoder/Counter	1-ch SSI Encoder Module
Encoder / Counter Input	Channels	2-ch.	1-ch.
	Counting Range	32-bit	32-bit
	Counter Mode	- up/down - bi-direction - up - A/B phase - Quadrature mode - Frequency measurement	- Event counting - Frequency measurement - Pulse width measurement - PWM output - PSO (Position Synchronized Output) - Quadrature mode
	Signal Input	Logic level 0: 0~5V _{DC} Logic level 1: 11~30V	Single-ended 5V RS-422 differential
	Sample Rate	1 MHz * 4	10 MHz * 4
LED Indicator	Pwr, Run, Error, A+, A-, B+, B-, Z+, Z-, L+, L-		PWR, R/E, CLK, Data, DO0, DO1, L
Interface	100 Mbps EtherCAT		
Power Consumption	2 W @ 24 V _{DC}		3 W @ 24 V _{DC}
Isolation Voltage	2,000 V _{DC}		
Watchdog Timer	System (1.6 seconds), Communication (Programmable)		
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		-25 ~ 45°C (-14 ~ 113°F) / -40 ~ 85°C (-40 ~ 185°F)
Operating/Storage Humidity	5~95% RH (non-condensing)		
Certification	CE, FCC class A		

Infrastructure



Model	AMAX-5001	AMAX-5074	AMAX-5070	AMAX-5072	AMAX-5079
Description	2-ch Power Input with 4-ch Digital Input EtherCAT Slice I/O Module	EtherCAT Coupler with ID Switch Slice I/O Module	Modbus TCP Coupler with ID Switch Slice I/O Module	EtherNet/IP Coupler with ID Switch Slice I/O Module	EtherCAT Extension Slice I/O Module
Power Requirement	24 V _{DC} ± 20%	24 V _{DC} ± 20%	24 V _{DC} ± 20%	24 V _{DC} ± 20%	–
Dual Power Input	Supported	Supported	Supported	Supported	–
Max Current on Bus	2A (provides power for approx. 10pcs AI/O modules or 20pcs DI/O modules)				–
Diagnosis Function	Over/Under voltage for input 1&2 Over current output on bus				–
Input Channels	4-ch. (Digital Input)	–	–	–	–
Rating	Wet Contact Rated voltage: 24 V _{DC} Logic level 1: 10~30 V _{DC} and Logic level 1: -30~-10 V _{DC} Logic level 0: -3~3 V _{DC}	–	–	–	–
Input/Output Delay	From logic level 0 to 1: 4 ms From logic level 1 to 0: 4 ms	–	–	–	–
Digital Filter	3 ms	–	–	–	–
Function	–	Coupling EtherCAT I/O modules to 100 BASETX EtherCAT network	Coupling EtherCAT I/O modules to Modbus TCP network	Coupling EtherCAT I/O modules to EtherNet/IP network	–
Cable	–	Ethernet/EtherCAT cable (min. Cat. 5), shielded			
Distance Between Stations	–	Max. 100 m (100BASETX)			
Bus Interface	–	2 x RJ-45 (1 x Input, 1 x Output)	2 x RJ-45 (1 x Input, 1 x Output)	2 x RJ-45 (1 x Input, 1 x Output)	1 x RJ-45
LED Indicator	PWR, RUN / ERROR, Power Diagnosis LED				–
Interface	100 Mbps EtherCAT		Modbus TCP	EtherNet/IP	100 Mbps EtherCAT
Power Consumption	2 W @ 24 V _{DC}	2.5 W @ 24 V _{DC}	3 W @ 24 V _{DC}	3 W @ 24 V _{DC}	No power from bus
Isolation Voltage	2,000 V _{DC}	LAN Port 1,500 V _{DC}			
Operating/Storage Temp.	-25 ~ 60°C (-14 ~ 140°F)/-40 ~ 85°C (-40 ~ 185°F)				
Relative Humidity	95% RH @ 40°C, non-condensing				
Certification	CE, FCC class A, cTUVus				

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EtherCAT Remote I/O Modules

Digital I/O



Model		AMAX-4830	AMAX-4830SO	AMAX-4833	AMAX-4834	AMAX-4856
Description		16-ch DI / 16-ch DO module (Sink)	16-ch DI / 16-ch DO module (Source)	32-ch DI module	32-ch DO module (Sink)	32-ch DI / 32-ch DO module (Sink)
Digital Input/Output	Input Channels	16-ch.		32-ch.	–	32-ch.
	Output Channels	16-ch.		–	32-ch.	32-ch.
	Digital Input	Input Voltage: Logic 0: 3 V _{DC} max. Logic 1: 10~30 V _{DC}		Input Voltage: Logic 0: 3 V _{DC} max. Logic 1: 10~30 V _{DC}	–	Input Voltage: Logic 0: 3 V _{DC} max. Logic 1: 10~30 V _{DC}
	Digital Output	Load voltage: 5~40 V _{DC} Load current: 350 mA/ch (sink) @ 25°C 250 mA/ch (sink) @ 60°C Opto-isolator Response Time: 100 us	Load voltage: 5~40 V _{DC} Load current: 250 mA/ch (sink) @ 25°C 200 mA/ch (sink) @ 60°C Opto-isolator Response Time: 100 us	–	Load voltage: 5~40 V _{DC} Load current: 350 mA/ch (sink) @ 25°C 250 mA/ch (sink) @ 60°C Opto-isolator Response Time: 100 us	Load voltage: 5~40 V _{DC} Load current: 350 mA/ch (sink) @ 25°C 250 mA/ch (sink) @ 60°C Opto-isolator Response Time: 100 us
LED Indicator		Pwr, Run, Error				
Interface		100 Mbps EtherCAT				
Power Consumption		Typical 85 mA @ 24 V Max. 110 mA @ 24 V				
Isolation Voltage		2,500 V _{DC} (I/O)				
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)				
Operating/Storage Humidity		5~95% RH (non-condensing)				
Certification		CE, FCC class A				

Analog I/O



Model		AMAX-4817	AMAX-4820
Description		8-ch, 16-bit AI module	4-ch, 16-bit AO module
Analog Input	Channels	8-ch.	4-ch.
	Input Type	V	V, mA
	Input Impedance	120 Ω	–
	Input / Output Range	0~10 V, ±10 V	Voltage: 0~5 V, 0~10 V, ±5 V, ±10 V Current: 0~20 mA, 4~20 mA
	Common-Mode Voltage Range	±275 V	–
	Resolution	16-bit with ±0.1% FSR accuracy @ 25°C	16-bit with ±0.1% FSR accuracy @ 25°C
	Sample Rate	10k sample/s (per channel)	
	Current Load Resistor	–	< 625 Ω
	Voltage Load Resistor	–	> 1 kΩ
LED Indicator		Pwr, Run, Error	
Interface		100 Mbps EtherCAT	
Power Consumption		Typical 160 mA @ 24 V; Max. 190 mA @ 24 V	
Isolation Voltage		2,500 V _{DC} (I/O)	
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)	
Operating/Storage Humidity		5~95% RH (non-condensing)	
Certification		CE, FCC class A	

✓: supported, –: not supported, △: optional

- 1 Edge Software & Industry Solutions
- 2 Intelligent HMI & Monitors
- 3 Automation Computers
- 4 Intelligent Systems
- 5 Mission Critical CompactPCI Platforms
- 6 Intelligent Transportation & Substation Certified Systems
- 7 Industrial Server & Cloud Solutions
- 8 AI & Advanced Computer Vision
- 9 Video Infrastructure Solutions
- 10 Network & Security Solutions
- 11 Industrial Communication
- 12 Industrial Gateways
- 13 EtherCAT Solutions & Automation Controllers
- 14 Intelligent Motion Control Solutions
- 15 Data Acquisition (DAQ) Solutions
- 16 Remote I/O, Wireless I/O & Sensors
- 17 Serial/USB Communications

EtherCAT Remote I/O Modules

Digital Input + Relay Output



Model		AMAX-4862
Description		16-ch DI / 16-ch relay module
Digital Input/ Relay Output	Input Channels	16-ch.
	PhotoMOS Relay Channels	–
	Relay Channels	16-ch.
	Digital Input	Input Voltage: Logic 0: 3 V _{DC} max. Logic 1: 10~30 V _{DC}
	Relay Output	Relay type: Form A Contact Rating (resistive): 2 A @ 250 V _{AC} , 2 A @ 30 V _{DC} Max. Switching Power: 500 VA, 60 W Max. Switching Voltage: 270 V _{AC} , 125 V _{DC} Resistance: 30 mΩ max. Operating Time: Max. 10 ms Releasing Time: Max. 5 ms Life Expectancy: Mechanical 2 x 10 ⁷ ops. at no load. Electrical 3 x 10 ⁴ ops. @ 2 A/250 V _{AC}
LED Indicator		Pwr, Run, Error
Interface		100Mbps EtherCAT
Power Consumption		Typical 85 mA @ 24 V Max. 130 mA @ 24 V
Isolation Voltage		1,500 V _{DC} (PhotoMOS Relay) / 2,500 V _{DC} (I/O)
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)
Operating/Storage Humidity		5~95% RH (non-condensing)
Certification		CE, FCC class A

Junction



Model		AMAX-4870
Description		6-port EtherCAT junction module
EtherCAT Junction	Ports	In: 1 port Out: 5 ports
	Cable	Ethernet CAT 5E
LED Indicator		Pwr, Run, Error
Interface		100 Mbps EtherCAT
Power Consumption		Typical 140 mA @ 24 V; Max. 190 mA @ 24 V
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)
Operating/Storage Humidity		5~95% RH (non-condensing)
Certification		CE, FCC class A

✓: supported, –: not supported, △: optional

