Robot & Motion Control
Product Selection Guide

www.nexcobot.com
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About NexCOBOT

Reliable Partner for the Intelligent Robot Control Solutions

NexCOBOT, a NEXCOM company, is committed to being your trustworthy partner in building open and modular intelligent robot control and motion control solutions. To surpass customers’ expectations, NexCOBOT makes the difference by utilizing its industrial computing experience, having a strategic sales and marketing team in the US, a highly talented R&D team in both US and Taiwan, manufacturing in Taiwan and in China, and by providing exceptional levels of global customer service. With these core strengths, NexCOBOT has enabled its customers to win key projects in a diverse range of industries.

NexCOBOT provides open EtherCAT-based intelligent solution for industrial and educational robot applications. Its offerings include the modular components of a full-fledged industrial robot system, ranging from: controller platforms, robotic control and simulation software, teach pendants, control cabinets to robot bodies. As well as general robots, collaborative robots (cobots) are supported by its advanced robotic control features and software. Robot gateways can allow data transfer from robot system to SQL database or Cloud.

NexCOBOT offers several intelligent robot solutions: there is NexROBA for education which, uses several robot packages for various educational purposes making them ideal for scientific research, while the MiniBOT Robot is specially designed for college courses and vocational training centers.
NexROBA, for industry, is an open and modular EtherCAT-based robot solution with development flexibility and expandability of the system to fit different application requirements. The solution supports a broad selection of industrial robots, such as 7-axis and 6-axis articulated robots, delta robots, SCARA robots, all of which can be enabled to operate collaboratively.

NexCOBOT’s machinery solutions comprise of EtherCAT motion control, CNC controller and gateway, and EtherCAT I/O System. Each of the product series is developed with state-of-the-art technologies to satisfy the changing demands for the IIoT market.

NexCOBOT’s total robot and machinery solutions integrate NexCOBOT’s products and third-party solutions such as robot bodies, servo motors, control panels, machine vision, and control software with full compatibility tests.

NexCOBOT also provides quality services, such as customization, product training, direct technical support, and after-sales service to ensure the success of your projects.

In addition to the above, the design manufacturing service-to-market business model gives the NexCOBOT core competencies to build a strong world-class service network by providing customized service, global logistics, local access, and real-time support. Operating in subsidiaries, from China, Italy, Japan, Taiwan to the United States, NexCOBOT is able to better facilitate customers’ requirements as well as closely work with global partners in different regions.

As Taiwan’s leading technology provider in robotic and motion control, NexCOBOT provides customized solutions and real-time support through a world-class technical service team. NexCOBOT Taiwan’s state-of-the-art research and development team operates a design manufacturing service-to-market business model to ensure the success of projects. NexCOBOT aims to penetrate global system integrators and solution providers.

NexCOBOT China provides integration services that combine robotic and motion controllers, machine CNC gateways, and IIoT total solution, for automotive, semiconductor, biomedical, and other industrial markets.

OPMT is a leading company of the multi-axis linkage machine tool industry. The advanced and innovative technology of 5-axis high precision CNC machine is application-ready for diversified manufacturing applications such as automotive, aerospace, and healthcare. OPMT’s manufacturing line leverages NexCOBOT’s technology of robot and IIoT to fulfill their smart manufacturing total solutions.
Total EtherCAT Motion Solution

The future of robot and machinery solutions is a production environment where devices, machines, robots, and sensors are interoperable. To be able to do that, the adoption of standard-based fieldbus for automation devices is essential, and EtherCAT is the technology that could potentially become the key standard Ethernet fieldbus. To enable smart manufacturing, NexCOBOT’s leading robot and machinery solution combines EtherCAT fieldbus, advanced motion control and robotic automation technology to bolster the capabilities of smart machines. Based on standard EtherCAT communication, the solution lineup features open and decentralized designs to meet application requirements such as CNC machines, industrial robots, general machines, and collaborative robots.

CNC Machines
• 2.5D & 3D Machining
• CAD/CAM Conversion
• Mills, Lathes, Plasma Cutters
General Machines
- Standalone Machines
- XYZ Table
- Vision Inspection Systems

Collaborative Robots
- 7-axis, Dual-arm
- Hand-guiding
- Force Limit

Industrial Robots
- Articulated Robots
- SCARA Robots
- Delta Robots
NexROBA & NexMotion Solutions

NexCOBOT’s robot and machinery solutions can be categorized into two parts: NexROBA and NexMotion. NexROBA is an open robot solution that provides modular solution to customers, including control boards, fanless controllers, control cabinets, and teach pendants. Depending on application needs, combinations of modular products are flexibly offered to better fit customers’ requirements in their robot systems. Several types of robot bodies from different vendors are proven to run with NexROBA control system. For educational users, a variety of robot development packages are even provided for science research or teaching purposes.

**Education**

- **MiniBOT**
  - Educational Robot

- **Delta**
  - Robot Edu
  - Develop. Pack

- **SCARA**
  - Robot Edu
  - Develop. Pack

- **MiniBOT 7R**
  - 7-axis Edu. Robot

**Industry**

- **NET-GRC Series**
  - Robot Controller

- **NET-ARC Series**
  - Advanced Robot Controller

- **RCB Series**
  - Mini-ITX Board

- **Control System**
  - Control Cabinet

- **TP100**
  - Teach Pendant

- **3rd-party Robot Body**
  - HIWIN, Effort, Han’s
NexMotion is an complete EtherCAT-based motion control solution. NexCOBOT has developed its technology competence on EtherCAT communication, from master to slave, and has put advanced motion control based on it. Thus providing a comprehensive range of products, including EtherCAT master controllers, motion controllers, CNC controllers, EtherCAT slave modules, and even EtherCAT slave chips. Each of the product series is developed with state-of-the-art technologies to satisfy the changing demands of the robot and machinery market.
NexROBA Solution

Open and Modular Robotics

NexCOBOT’s NexROBA is an open and modular solution, based on standard EtherCAT communication. Since every set of industrial robots is a system, NexROBA offers the flexibility to provide modules in a robotic system, such as robot controllers, EtherCAT I/O, and teach pendant, depending on customer’s needs. The software of this system provides robotic control functions in terms of Visual Studio DLLs, allowing customers to develop applications with their own user interfaces. NexROBA supports many standard industrial robots including: 6-axis articulated robot, 3/4-axis delta robot and 4-axis SCARA robot.

Smart Manufacturing

Robots are a perfect example of the move towards computerized industrial manufacturing and the smart factory vision put forward by Industry 4.0 and the Internet of Things (IoT). Almost all aspects of these next generation devices are digitized, spanning machine control, monitoring, management, and data reporting and analysis. Even operators interact with machines digitally using a human machine interface (HMI). Smart factories provide many benefits, including a reduction in operator hours and opportunities to increase throughput, boost yields, improve efficiency, and reduce downtime through insights gained from advanced data analytics.

Robotic System Components

A robotic production line involves many aspects beyond the robots, some of which can be challenging. There are actuation controls, sensing, data processing, and operational intelligence that may present issues around system integration, machine-to-machine communication, and information integration. Taken a step further, smart manufacturing based on IoT, smart robots, cyber-physical system, and big data technologies introduces additional layers of complexity.

Simplifying the Design of Robotic Systems

Robots play a major role in making manufacturing processes more productive and less labor intensive, which is especially important in some regions, where there is a labor shortage. But impeding many manufacturers is the complexity of robotic system design, which is made more difficult by the need to identify and integrate subsystems from multiple vendors. Greatly simplifying the robotic design process, NexCOBOT working closely with various solution providers, has developed open modular solutions for a range of robotic applications. With pre-integrated and pre-validated robotic control modules. NexROBA, NexCOBOT’s EtherCAT robot solution, performs precise robotic control.
Open Architecture Controller to Develop Your Own Robotic Control System

NexROBA, NexCOBOT’s robot solution, has an open development environment in which users can freely develop their own EtherCAT-based robotic control programs. The Windows-based environment makes it easy to integrate applications such as machine vision, simulation software, and other peripherals into the control system. It also opens the possibility for users to develop time-deterministic programs by providing accessibility to an RTX-based real-time execution kernel.

Complete Robotic Control Libraries to Fasten Development

NexROBA also provides C/C++ libraries of General Robotic Control (GRC) for basic types of industrial robots, including 6-axis articulated robots, 4-axis SCARA robots and 3/4-axis Delta robots. For those wanting to build a robotic control system, these APIs are handy to use and perform point-to-point movement, jog teaching, linear or circular movement of robots, which tremendously reduces development time. Users can leverage APIs in the Windows layer or in the RTX layer to easily build programs for their robotic applications.
Industrial robot is one of the key topics of Industry 4.0 and gradually plays a significant role in various manufacturing fields. Education of industrial robots, however, is far behind from what the trend has become. NexCOBOT, as a promoter of open and modular robots, addresses this problem and presents NexROBA Educational Solution. MiniBOT Training Package and Robot Development Package are provided to meet both educational and research purposes in school.

**MiniBOT Training Package**

- **Target Scenario:**
  - High School/College Robot Course
  - Vocational Training Center

- **Feature:**
  - Compact Robot
  - Teaching Material

**Robot Development Package**

- **Target Scenario:**
  - School Laboratory,
  - Scientific Research

- **Feature:**
  - Development Openness
  - Standard Robot Arm
MiniBOT Training Package

MiniBOT Training Package is an educational EtherCAT-based robot designed by NexCOBOT. It is built based on design concept of general industrial 6-axis articulated robot with useful features for educations. Academy users can leverage MiniBOT Training Package to set up course easily as it also comes with training material reference which could greatly save time and effort required for teachers.

Robot Development Package

For scientific research, NexCOBOT has released a series of Robot Development Packages that consist of an industrial robot body, NexCOBOT’s open robot controller, and related circuits and wiring in a control cabinet. It is an open robot platform which allows users to save time and effort as they focus their attention on robotic application studies and robotic control development.

All the hardware installation and circuit integration of a robot, including motors, drives, speed reducers etc., are done by NexCOBOT. To further reduce development time, it also comes with C/C++ NexGRC APIs which save users’ needs to create their own. The real-time environment further enables users to perform programs required for time-deterministic tasks.

1. **NexGRC**
   - Robot Control Software
   - PTP Example
   - C/C++ Programming

2. **Robot Controller**
   - NET3600E-GRC Controller
   - Intel Core-i5 CPU

3. **Control Cabinet**
   - Tailor-made Cabinet
   - 622 x 470 x 315 mm
   - Military-grade Connector

4. **Motor/Drive/Related Circuits**
   - EtherCAT Slave Drive & Circuit Control
   - 100 ~ 400W Motors

5. **6R Robot Body**
   - Articulated Robot
   - 6-axis Operation
   - 5 kg Load

* The robot system is based on EtherCAT

* Robot stand & teach pendent are optional
MiniBOT Robot
6-axis Robot Package for Education

Main Features
- EtherCAT-based
- Compact design
- Suitable for education
- Standard 6-axis articulated robot

Contents
- Control cabinet
- Robot control API
- Articulated 6-axis robot
- Open robot controller

Product Overview

EtherCAT Communication
Based on standard EtherCAT communication, MiniBOT provides an expandable distributed control system. It is also a good material for EtherCAT-related training.

Industrial Robot Design
By referring to design of general industrial 6-axis articulated robots, MiniBOT is built in the same concept. Its nude mechanical architecture makes it easy to learn the structure of an industrial robot.

Open Development Environment
MiniBOT comes with a utility tool to directly operate the robot. Robotic control APIs are also provided in Windows platform, so that users can leverage its openness to develop any kind of robot applications.

Specifications

Robot Arm
- Degree of freedom: 6
- Payload: 1kg
- Driving system: EtherCAT close-loop stepper
- Position feedback: incremental encoder
- Operation range: 595mm (maximum)
  - Hardware limit: J1: 336° (+176° ~ -160°)
  - J2: 236° (+208° ~ -28°)
  - J3: 224° (+157° ~ -67°)
  - J4: 319° (+184° ~ -135°)
  - J5: 257° (+129° ~ -128°)
  - J6: 720° (+360° ~ -360°)
- Repeatability: ±0.12mm
- Weight: arm 30kg
- Input voltage: single phase 100~240Vac

Controller
- DI/O: 15-ch DI/16-ch DO (DB37 connector)
- 1 x Intel® GbE LAN port
- 1 x VGA
- 2 x USB 2.0 (external)
- 1 x USB 3.0, 1 x USB 2.0 (inside cabinet)
- 1 x Emergency stop bottom
- Weight: control cabinet 20kg

Software
- NexGR C runtime (robot control runtime)
- NexMotion studio (configuration utility)
- Provide standard robot motion control functions
- Support C++, C# and VB.Net for user programming
- OS: WES7
Robot Operating Space

Installation

Ordering Information

Robot Package
- MiniBOT robot package (P/N: 7900000179X00)

Optional
- Robot stand (P/N: 7900000180X00) 70 x 70 x 78 (cm)
- Robot stand (P/N: 7900000183X00) 80 x 80 x 78 (cm)
- Gripper package (P/N: 7900000181X00)
- Terminal board package (P/N: 7900000182X00) 2m and DB-37 terminal board
Articulated Robot Solution

Main Features
- Standard EtherCAT communication
- Robotic function APIs provided
- 1 ms control cycle time

Product Overview
NexROBA solution provides an open programming environment for users to develop their own robot applications. It consists of robot body and NexCOBOT’s robot controller in the control cabinet. Motor drives, I/O signals and related circuits are all integrated based on EtherCAT control network. I/O and motor control can easily be expanded through EtherCAT communication. Beside general system configuration, NexROBA solution always allows the flexibility to change components in the robot system for unlimited possibilities.

Specifications
Robot
- Degree of freedom: 6
- Nominal load capacity: 5kg
- Motion range
  - Maximum reach radius: 710mm (Point P)
  - J1: ±165°
  - J2: +85° ~ 125°
  - J3: +185° ~ 55°
  - J4: ±190°
  - J5: ±115°
  - J6: ±360°
- Position repeatability: ±0.03 mm
- Cycle time: 0.5 s
- Weight: 40 kg
- Installation: floor, ceiling, wall-mounting

Controller
- Intel® Core™ i5-3610ME processor pre-installed
- 2 x 2GB DDR3 SDRAM, pre-installed
- 500GB HDD
- 1 x EtherCAT port (Intel® B2574L)
- 1 x Intel® GbE LAN port
- 2 x DisplayPorts and 1 x VGA or 2 x DisplayPorts and 1 x DVI-D
- 4 x USB 3.0 & 2 x USB 2.0 ports
- 1 x CFast socket
- 5 x RS232 & 1 x RS232/422/485 with Auto Flow Control

Programming
- Language: visual C/C++
- Command set: position command, velocity command, torque command
- Parameters: position, velocity, torque
- RT example (RTX project)
- User API example (win32 dll project)
- GUI example (C# project)

Ordering Information
Robot Package
- NexROBA 6R Edu package (P/N: 79J2ROBO01X00)

Optional
- Robot stand (P/N: 7900000160X00)
- Teach pendant (P/N: 10IH0010001X00)
Robot Operating Space

Software Architecture

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<th>Operating System</th>
<th>HMI Example</th>
<th>C/C++ / VB/C#... Program</th>
<th>HMI Program</th>
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</thead>
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<tr>
<td>Windows</td>
<td>User Control APIs Example (Win32 DLL)</td>
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<tr>
<td></td>
<td>Host Service (ShareMemory)</td>
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<tr>
<td>Real-Time Extension</td>
<td>User RT Application Example</td>
<td>C/C++</td>
<td></td>
</tr>
<tr>
<td>RTX</td>
<td>NexROBA Kernel (Lib)</td>
<td>NexROBA</td>
<td>NexECM</td>
</tr>
</tbody>
</table>
Delta Robot Solution

Main Features
- Standard EtherCAT communication
- Robotic function APIs provided
- 1 ms control cycle time

Product Overview
NexROBA solution provides an open programming environment for users to develop their own robot applications. It consists of robot body and NexCOBOT’s robot controller in the control cabinet. Motor drives, I/O signals and related circuits are all integrated based on EtherCAT control network. I/O and motor control can easily be expanded through EtherCAT communication. Beside general system configuration, NexROBA solution always allows the flexibility to change components in the robot system for unlimited possibilities.

Specifications

**Robot**
- Degree of Freedom: 3
- Nominal load capacity: 0.5kg
- Motion range
  - Horizontal stroke: 250mm
  - Vertical stroke: 100mm
- Position repeatability: ±0.02 mm
- Operation speed: 2m/s (unloaded)

**Controller**
- Intel® Atom™ processor E3826 Dual Core 1.46 GHz processor pre-installed
- 4GB DDR3 SDRAM, pre-installed
- 128GB SSD
- 1 x EtherCAT port
- 1 x Intel® GbE LAN port
- 1 x DVI display output
- 1 x VGA display output (converted from DVI-I to VGA adapter)
- 1 x USB 3.0 & 1 x USB 2.0 ports
- 1 x CFast socket
- 1 x SIM card holder
- 2 x RS232/422/485 with 2.5KV isolation protection, support Auto Flow Control

**Programming**
- Language: Visual C/C++
- Command set: position command, velocity command, torque command
- Parameters: position, velocity, torque
- RT example (RTX project)
- User API example (win32 dll project)
- GUI example (C# project)

Ordering Information

**Robot Package**
- NexROBA miniDelta Edu package (P/N: TBC)

**Optional**
- Conveyor system (P/N: TBC)
- Vision inspection system (P/N: TBC)
- Teach pendant (P/N: 10IH0010001X0)
Software Architecture

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</table>
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- Standard EtherCAT communication
- Robotic function APIs provided
- 1 ms control cycle time

Product Overview
NexROBA solution provides an open programming environment for users to develop their own robot applications. It consists of robot body and NexCOBOT’s robot controller in the control cabinet. Motor drives, I/O signals and related circuits are all integrated based on EtherCAT control network. I/O and motor control can easily be expanded through EtherCAT communication. Besides general system configuration, NexROBA solution always allows the flexibility to change components in the robot system for unlimited possibilities.

Specifications

Robot
- Degree of Freedom: 4
- Nominal load capacity: 6kg
- Motion range
  - Maximum reach radius: 600mm
  - J1: ±130°
  - J2: ±150°
  - J3: 200mm
  - J4: ±360°
- Position repeatability
  - J1+J2: ±0.02 mm
  - J3: ±0.01 mm
  - J4: ±0.01 mm
- Cycle time: 0.5 s
- Weight: 20 kg
- J3 (Z-axis) push force: 100N
- Installation: floor, wall-mounting

Controller
- Intel® Core™ i5-520M processor pre-installed
- 2 x 2GB DDR3 SDRAM, pre-installed
- 500GB HDD
- 1 x EtherCAT port
- 1 x Intel® GbE LAN port
- Dual VGA or VGA/DVI independent display
- 6 x USB 2.0 ports
- 3 x RS232 and 1 x RS232/422/485 with Auto Flow Control
- 1 x PCI expansion (10W max./per slot, 169mm max. length)

Programming
- Language: visual C/C++
- Command set: position command, velocity command, torque command
- Parameters: position, velocity, torque
- RT example (RTX project)
- User API example (win32 dll project)

Ordering Information

Robot Package
- NexROBA SCARA Edu package (P/N: 7900000163X00)

Optional
- Robot stand (P/N: 7900000164X00)
- Teach pendant (P/N: 10IH0010001X0)
Robot Operating Space

Software Architecture

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<tr>
<th>Operating System</th>
<th>HMI Example</th>
<th>C/C++ Program</th>
<th>Host Service (ShareMemory)</th>
<th>User RT Application Example</th>
<th>NexROBA Kernel (Lib)</th>
<th>NexECM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>C#</td>
<td>C/C++</td>
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<td></td>
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<td></td>
<td>User Control APIs Example (Win32 DLL)</td>
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</table>
NexROBA Industrial Solution
Flexible Building Blocks to Meet Various EtherCAT-based Robot Applications

As the need for industrial robots continues to rise, so do the demands for components to complete a robotic solution. However, these components may vary between customers. To address the various requirements of different users, NexROBA presents a modular solution by offering separating components. The following table illustrates how different types of robot customers can be categorized, what components they may need, and how NexROBA provides modular solution to satisfy these needs.

### Robot Application Examples

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<tr>
<th>Subsystem</th>
<th>Component</th>
<th>Auto Pasting Machine</th>
<th>Assembly Line</th>
<th>Industrial Robot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain Knowledge</td>
<td>Auto Giving and Paste on-the-fly</td>
<td>HIWIN RD403, HIWIN RA605</td>
<td>NexCOBOT NET3600E, NexCOBOT NISE 104/105</td>
<td>Robotic, Third-party</td>
</tr>
<tr>
<td>Robot Body</td>
<td>NexCOBOT NET101</td>
<td>NexCOBOT</td>
<td>NexCOBOT</td>
<td>Customer’s</td>
</tr>
<tr>
<td>Robotic Control</td>
<td>NexCOBOT</td>
<td>NexCOBOT</td>
<td>NexCOBOT</td>
<td>Third-party</td>
</tr>
<tr>
<td>Algorithm</td>
<td>EtherCAT</td>
<td>Conveying System and Air Compressor</td>
<td>NexCOBOT</td>
<td>N/A</td>
</tr>
<tr>
<td>Communications</td>
<td>NexCOBOT IPC 1632P</td>
<td>VIPA SLIO</td>
<td>NexCOBOT</td>
<td>Teach Pendant</td>
</tr>
<tr>
<td>Device and Equipment</td>
<td>NexCOBOT AXE-9200</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Control software is a key for robot and machinery, and NexCOBOT provides solutions with different layers of control software. All based on standard EtherCAT communication, NexCOBOT develops NexECM, NexGMC, NexGRC, and NexARC for specific purposes.

### Comprehensive Modular Solution

NexCOBOT robot solution breaks robot systems into discrete modules to liberate system integrators and robotics engineers from specifications lockdown. NexCOBOT offers a broad selection of modular solutions that are essential in the control system of an industrial robot. Its offerings include industrial-grade CPU boards, EtherCAT-based robot controller, control cabinet, EtherCAT slave I/O modules, teach pendant, 3rd-party EtherCAT drives, and robotic control software. Engineers can choose the ones that best fit an application's needs from these products. Building, expanding, and reconfiguring robots with desired functions are now viable and simple thanks to the modular design.

### Powerful Robotic Control Software

The flexibility of robot systems is further enhanced with NexGRC—a robot control software. As EtherCAT communication is leveraged for robotic control, NexGRC provides pre-validated compatibility and smooth communication between robot controllers and EtherCAT slave modules from different brands. More importantly, control algorithms are pre-written and APIs re-embedded to accelerate the planning and control of industrial robots of 6-axis articulated robots, delta robots, and SCARA robots. With unprecedented flexibility from the bottom to the top of the robot development, manufacturers can create robot applications in-house, retaining industry expertise and hands-on knowledge inside the organization.

Control software is a key for robot and machinery, and NexCOBOT provides solutions with different layers of control software. All based on standard EtherCAT communication, NexCOBOT develops NexECM, NexGMC, NexGRC, and NexARC for specific purposes.

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<th>NexARC</th>
<th>NexGRC</th>
<th>NexGMC</th>
<th>NexECM</th>
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<td>General Robot Builder (6-Axis, Delta, SCARA)</td>
<td>System Integrator/ Machine Builder</td>
<td>Controller Maker</td>
</tr>
</tbody>
</table>
**NexGRC**

NexGRC is the control software for general robots, such as 6 axis articulated robots, Delta robots (parallel robot) and SCARA robots. NexGRC provides Microsoft Windows APIs for users to develop their own robot applications. Users can even develop their own robot control interface. NexGRC also includes a powerful integrated development environment “NexMotion Studio”, which can be used to easily configure EtherCAT slave and robot parameters.

**NexARC**

Based on GRC, an ARC (Advanced Robotic Controller) can provide more advanced robot functions for advanced robot makers to build more specialist types of industrial robot, such as a collaborative robot or a 7-axis articulated robot. Supports non-generic industrial robots:

- **Sensor-less Direct Hand-guide Teaching Function**
  - Users can move the robot with their hands

- **Sensor-less Touch-stop Function**
  - The robot will immediately stop when detecting a collision
DMS Service Scope

Original Design Manufacturing Service (ODMS) NexCOBOT offers a complete ODM Service starting from the brand new product design right through to the finished product. We can design products based on the customer’s unique specifications and application requirements. Customization to Order Service (CTOS) NexCOBOT also provides CTOS, which is a quick-to-market solution by modifying the existing products to fit your business requirements, such as BIOS setting, component change by using current PCM layout, chassis color change, and packing accessories etc.

Design & Manufacturing Service Levels

With decades of industrial computing experience, NexCOBOT has the capability to provide different levels of customized service to manufacture innovative products with exceptional high quality. We can assist you to differentiate from competitors, and save significant time and efforts.

- Electronic Design
- PCB Layout Design
- BIOS porting
- EC/ MCU porting
- Driver/ eAPI Porting
- Industrial Design
- Mechanical Design
- Thermal Design
- System Integration Design
- System Validation

New Project
The design of new board & system is available. NRE and quantity commitment are required.

Manufacturing Service
Contract manufacturing: The service includes system assembly & burn-in, software loading & testing. MOQ and manufacturing service charge are required.

Customized Build
Customers can change the membrane and chassis color to re-brand the packing. NexCOBOT can offer dedicated part numbers and BOM. MOQ and service charge are required.

Logo Re-brand
We provide the service to change the membrane to re-brand the company logo on the front panel. Customers need to provide membrane drawing with all color pantone number. There is service charge involved.
Main Features
- Support robot type: articulated (6 axis)/SCARA/Delta
- Robot control command: PTP/linear/3D arc
- Support extension axis control: PTP/jog/halt/stop
- Support C/C++, C# and VB.Net for user programming
- Provide robot GUI with TP100 (optional)

Product Overview
NET-GRC series presents intelligent PC-based robotic controller for robot automation. It integrates NexCOBOT’s general robotic control software, NexGRC, to perform real-time motion control and supports several standard robot like articulated robot (6 axis), SCARA robot and Delta robot. NET-GRC not only provides standard GUI with TP100 for users directly control their own robot hardware, but also provides windows APIs for users developing their own robot control GUI or application. Besides, NET-GRC also adapts an integrated development environment called NexMotion studio to speed up development time for users.

Specifications
**NexGRC Runtime**
- Support robot type: articulated (6 axis)/SCARA/Delta
- Robot control command: PTP/linear/3D arc
- Robot blending motion: aborting/buffered/blending
- Extension single axis no.: up to 8 axes
- Single axis control functions: PTP/jog/halt/stop
- Single axis blending motion: aborting/buffered/blending
- Single axis override functions: position/velocity/acceleration/deceleration
- NexCOBOT EtherCAT master, CoE and DC supported
- Support standard EtherCAT slave devices

**NexMotion Studio**
- EtherCAT devices offline edit and online scan
- EtherCAT master configuration
- PDO mapping edit
- Online SDO edit
- Export ENI
- CiA402 device operation: PP/PV/PT/CSP
- Single axis edit and operation
- Robot edit and operation
- I/O mapping edit and operation
- Provide simulation operation mode

**User Programming**
- Provide windows APIs for user programming
- Support programming language: C/C++, C#, VB.Net

**Pre-Installed Software Package**
- Operating system: Windows Embedded Standard 7
- NexARC runtime
- NexMotion studio
Platform Selection Guide

NET 200-GRC (P/N:A0J10020003X0)
Front-access compact general robotic controller
- CPU: Intel® Celeron® J1900 Quad Core 2.0GHz
- Chipset: Intel® NM10
- Memory: 4GB DDR3L
- Storage: 500GB HDD
- Display: 1 x DVI-I, 1 x DP
- USB: 3 x USB 2.0, 1 x USB 3.0
- LAN ports: 2 (1 x Ethernet, 1 x EtherCAT)

NET 300-GRC (P/N:A0J10030000X0)
Front-access high-performance robotic motion controller
- CPU: Intel® Core™ i5-6500TE Quad Core 2.3GHz
- Chipset: Intel® Q170
- Memory: 4GB DDR4
- Storage: 256GB SSD
- Display: 1 x DVI-D, 1 x HDMI
- USB: 2 x USB 2.0, 4 x USB 3.0
- LAN ports: 3 (2 x Ethernet, 1 x EtherCAT)

Software Architecture

<table>
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<tr>
<th>Operating System</th>
<th>HMI Example</th>
<th>C/C++</th>
<th>HMI Program</th>
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<tr>
<td>Windows</td>
<td>User Control APIs Example (Win32 DLL)</td>
<td>C/C++ VB/C#... Program</td>
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<table>
<thead>
<tr>
<th>Real-Time Extension</th>
<th>Host Service (ShareMemory)</th>
<th>User RT Application Example C/C++</th>
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<tbody>
<tr>
<td>RTX</td>
<td>Robot Kernel (Lib) NexROBA</td>
<td></td>
</tr>
</tbody>
</table>
Main Features

- Support robot type: articulated (6 & 7 axis)
- Robot control command: PTP/linear/3D arc
- Ramp profile: T curve/S curve
- Optimize path planning: joint limit/self-collision avoidance
- Co-Robot function: hand-guide/collision detect stop

Product Overview

NET-ARC series presents intelligent PC-based advanced robotic controller for robot automation. It integrates NexCOBOT’s general robotic control software, NexGRC, and Actin runtime kernel from Energid Technologies, to perform real-time motion control and supports redundant robot like articulated 7 axis robot, or provide Co-Robot functions to standard articulated 6 axis robot. Energid Technologies locate at United State and Energid Technologies develops advanced software and robotic systems for the aerospace, agriculture, manufacturing, transportation, defense, and medical industries. NET-ARC provides standard GUI with TP100 for users directly control their own robot hardware, and adapts an integrated development environment called NexMotion studio to speed up development time for users.

Specifications

**NexARC Runtime**
- Support robot type: articulated (6 & 7 Axis)
- Robot control command: PTP/linear/3D arc
- Robot blending motion: aborting/buffered/blending
- Ramp profile: T curve/S curve
- Optimize path planning: joint limit/self-collision avoidance
- Co-Robot function: hand-guide/collision detect stop
- NexCOBOT EtherCAT Master, CoE and DC supported
- Support EtherCAT slave devices

**NexMotion Studio**
- EtherCAT devices offline edit and online scan
- EtherCAT master configuration
- PDO mapping edit
- Online SDO edit
- Export ENI
- CiA402 device operation: PP/PV/PT/CSP
- Single axis edit and operation
- Robot edit and operation
- I/O mapping edit and operation
- Provide simulation operation mode

**Pre-Installed Software Package**
- Operating system: Windows Embedded Standard 7
- NexARC runtime
- NexMotion studio
**Platform Selection Guide**

**NET 300-ARC (P/N:A0J10030000X0)**
Front-access high-performance robotic motion controller
- CPU: Intel® Core™ i5-6500TE Quad Core 2.3GHz
- Chipset: Intel® Q170
- Memory: 4GB DDR4
- Storage: 256GB SSD
- Display: 1 x DVI-D, 1 x HDMI
- USB: 2 x USB 2.0, 4 x USB 3.0
- LAN ports: 3 (2 x Ethernet, 1 x EtherCAT)

**Supported Robot Types**

1. 7-Axis Robot
2. Dual-Arm Robot
3. 6+N Robot

**Software Architecture**

- **Win32 User Layer**
  - UserApp (exe)
  - ARC UI
  - Shared Memory

- **Kernel Layer**
  - Windows Kernel
  - NexARC Runtime (Motion Control Runtime)
  - NexECM (EtherCAT Master)

- **Hardware**
  - NIC
  - CPU
  - CPU
  - NIC
  - CPU
  - CPU
  - IPC

- **EtherCAT Slave Device**
  - EtherCAT I/O
  - EtherCAT Motor

Visit: [www.nexcobot.com](http://www.nexcobot.com)
Main Features
- Modern, ergonomic, user-friendly and operated comfortably
- Multi channels deadman switch and E-Stop button
- Full IP65 protection
- 10.1” WXGA 1280 x 800 500 nits LED panel
- 5 points projected capacitive touch with Full IP65 protection
- Two external USB 2.0 for data backup
- An emergency-stop button is available as further safety element
- Anti-vibration/shock IEC/EN 61131-2 compliance
- EMC (IEC/EN 61000-6-2/4, IEC/EN 61131-2) compliance
- System frame ground protection (GPE) design

Product Overview
TP-100-VGA is handheld operating teach pendant features an ergonomic housing with a safety elements, 10.1” WXGA resolution Panel and Multi-Touch P-Cap. The handheld control unit is greatest comfortable to used and also support left-hander with optional shoulder Strap.

Specifications

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>TP-100-VGA</th>
</tr>
</thead>
</table>
| Panel                  | - 10.1”, 16:10, WXGA, 1280 x 800  
- Luminance: 500 cd/m²  
- Contrast ratio: 800:1  
- LCD color: 16.7M  
- Viewing angle: 85 (U), 85 (D), 85 (L), 85 (R)  
- Backlight: LED |
| Interface              | - Data back-up: 2 x USB 2.0  
- Controller connector: HDB-44 female  
- Removable HDB-44 control cable (optional)  
- Including power, E-stop buttons, deadman switch, key switch, USB 2.0 and VGA signals |
| Touch                  | - Touch: 5 points P-Cap  
- Touch light transmission: 87%  
- Touch interface: USB  
- Anti-scratch surface: 7H hardness |
| Ratings                | - Power supply voltage: 24 Vdc (19.2 to 28.8 Vdc)  
- Current consumption:  
- TP-100-VGA 0.625A at 24Vdc (max.) |
| Safety Elements        | - Emergency stop button (2 NC channels, B10d=130,000)  
- Contact function: latching  
- Reset: by rotating  
- 3-position Deadman switch (3 channels 2 NO 1 NC, B10d=100,000) |
| Mechanical             | - Dimension: 297.3 x 257.2 x 57.2 mm (78.5mm including E-stop button)  
- Weight (without external control cable):  
- TP-100-VGA 1.5Kg  
- Front bezel: aluminum magnesium alloy; color: Pantone 8424C  
- Back cover: ABS+PC; color: Pantone 432C  
- IP protection class: Full IP65 |
| Operating Elements     | - 2-position key switch (2 channels) |
| Environment            | - Operating temperature: 0°C to 50°C  
- Storage temperature: -20°C to 75°C  
- Operating humidity: 5%-90% relative humidity, non-condensing  
- Vibration resistance/shock-proof/free-fall according to EN 61131-2 |
| System                 | - TP-100-VGA: VGA input  
- USB2.0 upstream |
| Certifications         | - CE (Emission EN61000-6-4; Immunity EN61000-6-2 for installation in industrial environments)  
- FCC Class A |
Function and Ergonomic Design

- Deadman switch
- Finger holding point for being comfortable
- Manual/auto. 2 segment key switch
- HDB-44 external control cable connector
- Holes for optional shoulder strap
- Protect cover
- Emergency stop button
- 10.1" P-Cap touch
- Holes for optional shoulder strap

HDB-44 Pin Definition

<table>
<thead>
<tr>
<th>44-Pin</th>
<th>Function</th>
<th>44-Pin</th>
<th>Function</th>
<th>44-Pin</th>
<th>Function</th>
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<tbody>
<tr>
<td>1</td>
<td>Shielding</td>
<td>12</td>
<td>DS_NO_2-A</td>
<td>23</td>
<td>VGA_BLUE_GND</td>
</tr>
<tr>
<td>2</td>
<td>DC Power+</td>
<td>13</td>
<td>DS_NO_2-B</td>
<td>24</td>
<td>VGA_VSYNC</td>
</tr>
<tr>
<td>3</td>
<td>DC Power-</td>
<td>14</td>
<td>DS_NC_3-A</td>
<td>25</td>
<td>VGA_DDCDAT</td>
</tr>
<tr>
<td>4</td>
<td>ES_NC_1-A</td>
<td>15</td>
<td>DS_NC_3-B</td>
<td>26</td>
<td>VGA_NV</td>
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<tr>
<td>5</td>
<td>ES_NC_1-B</td>
<td>16</td>
<td>KS_NC_1-A</td>
<td>27</td>
<td>USB_5V</td>
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<tr>
<td>6</td>
<td>ES_NC_2-A</td>
<td>17</td>
<td>KS_NC_1-B</td>
<td>28</td>
<td>USB</td>
</tr>
<tr>
<td>7</td>
<td>ES_NC_2-B</td>
<td>18</td>
<td>KS_NC_2-A</td>
<td>29</td>
<td>USB3_RXN</td>
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<tr>
<td>8</td>
<td>RESERVED</td>
<td>19</td>
<td>KS_NC_2-B</td>
<td>30</td>
<td>USB3_TXN</td>
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<tr>
<td>9</td>
<td>RESERVED</td>
<td>20</td>
<td>RESERVED</td>
<td>31</td>
<td>RESERVED</td>
</tr>
<tr>
<td>10</td>
<td>DS_NO_1-A</td>
<td>21</td>
<td>VGA_RED_GND</td>
<td>32</td>
<td>RESERVED</td>
</tr>
<tr>
<td>11</td>
<td>DS_NO_1-B</td>
<td>22</td>
<td>VGA_GREEN_GND</td>
<td>33</td>
<td>Shielding</td>
</tr>
</tbody>
</table>

Ordering Information

Barebone
- TP-100-VGA (P/N: 10I0010000X0)
  10.1" 16:10 WXGA P-Cap multi-touch teach pendant display, VGA input
Robot Controller System

Product Overview
NexCOBOT Robot Control System (RCS) ensures simple and powerful robotic automation. RCS adapts NexCOBOT intelligent PC-based robotic controller and integrates with NexCOBOT’s robotic control software, NexGRC/NexARC, to form an efficient and flexible robotic control system. RCS is designed for small payload robots such as articulated robot (6 axis & 7 axis), SCARA robot and Delta robot. RCS supports several different brand motors which allows users to have more flexibility for their own robot solutions. RCS also provides EtherCAT port and PoE port for user to connect to EtherCAT slaves and machine vision devices, let the robot system easily to extend axis control and integrate with machine vision applications.

Specifications

RCS
- Integrated with NexCOBOT robotic controller: NexGRC/NexARC
- Integrated with NexCOBOT teach pendant: TP100
- Provide PoE for machine vision application: 1 x PoE, IEEE 802.3af compliant
- Provide EtherCAT extension port for connecting more EtherCAT slaves
- Integrated with NexCOBOT safety controller and provide safety I/O
- Provide extension digital I/O: 16in/16out

Including Additional Hardware
- TP100

Pre-Installed Software Package
- Operating system: Windows Embedded Standard 7
- NexGRC/NexARC runtime
- NexMotion studio

NexGRC Runtime
- Support robot type: articulated (6 axis)/SCARA/Delta
- Robot control command: PTP/linear/3D arc
- Robot blending motion: aborting/buffered/blending
- Extension single axis no.: up to 8 axes
- Single axis control functions: PTP/jog/halt/stop
- Single axis blending motion: aborting/buffered/blending
- Single axis override functions: position/velocity/acceleration/deceleration
- NexCOBOT EtherCAT master, CoC and DC supported
- Support standard EtherCAT slave devices

NexARC Runtime
- Support robot type: articulated (6 & 7 Axis)
- Robot control command: PTP/linear/3D arc
- Robot blending motion: aborting/buffered/ blending
- Ramp profile: T curve/S curve
- Optimize path planning: joint limit/self-collision avoidance
- Co-Robot function: hand-guide/collision detect stop
- NexCOBOT EtherCAT Master, CoE and DC supported
- Support EtherCAT slave devices

Main Features
- Compact size
- Suitable for small payload robot
- Wide range motor supported
- Provide PoE for machine vision application
- Integrated with NexCOBOT robotic controller: NexGRC/NexARC
RCB100

RCB 100 robot controller provides robot control functionalities integrated with NexGRC, and rich I/Os such as 2 x I210 LAN port for EtherCAT communication, 1 x VGA port to connect to teach pendant, and 2 x USB 2.0 for software license dongle. RCB100 also comes with isolated digital I/O for multiple usages and PoE port to connect to Industrial cameras.

- Mini-ITX Form Factor (17 x 17 cm)
- 6th Gen Core i7 / i5 / i3 LGA1151 socket
- Intel® H110 chipset
- 2x DDR4 SO-DIMM, support up to 16GB
- 1 x SATA port
- Edge I/O
  - 1 x RS232/422/485 with Auto flow control
  - 1 x HDMI (4096x2160 @24Hz, 24 bpp)
  - 2 x USB 3.0, 4 x USB 2.0
  - 2 x I211AT GbE LAN
  - 1 x PoE, IEEE 802.3af compliant
- Internal I/O
  - 1 x RS232/422/485 with Auto flow control
  - 2 x I210-AT GbE LAN
  - 1 x VGA (1920 x 1200@60Hz)
  - Isolated 12 DI (NPN/PNP), 4 DO (PNP)
- Expansion
  - 1 x PCIe x16 (Gen3.0)
  - 1 x mPCIe
- Support AT/ATX mode
- Environment
  - Operation temperature: 0~60°C with CPU fan and system fan
  - Operation temperature: -20~80°C
  - Relative humidity: 90% non-condensing

Platform Selection Guide

<table>
<thead>
<tr>
<th>Item</th>
<th>RCS 100</th>
<th>RCS 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x H x D)</td>
<td>300 x 270 x 300 mm</td>
<td>480 x 270 x 460 mm</td>
</tr>
<tr>
<td>Processor</td>
<td>6th Gen Celeron G3900</td>
<td>6th Gen Celeron G3900</td>
</tr>
<tr>
<td>Number of axes</td>
<td>7 axis (200W<em>3+100W</em>2+50W*2)</td>
<td>7 axis (option) (Max 750 W<em>7) 8 axis (option) (Max 750 W</em>8)</td>
</tr>
<tr>
<td>Supported motors</td>
<td>Sanyo Denki 48 Vuc servo</td>
<td>Tamagawa AC servo Sanyo Denki AC servo (option)</td>
</tr>
<tr>
<td>Supported Encoder</td>
<td>Tamagawa Nikon</td>
<td></td>
</tr>
<tr>
<td>Rated supply voltage</td>
<td>120V to 240V AC</td>
<td>240V AC</td>
</tr>
<tr>
<td>Protection rating</td>
<td>IP20</td>
<td>IP20</td>
</tr>
</tbody>
</table>
Main Features
- Mini-ITX Form Factor
- 6th Gen Core™ i7/i5/i3 and Intel® Celeron
- Internal USB for software license dongle
- Optional digital isolated I/O
- PoE for machine vision application
- Internal VGA for teach pendant

Product Overview
RCB100 is designed for robotic control application. RCB100 equips with rich I/Os for robot control application, including 2 x i210 LAN port for EtherCAT communication, 1 x VGA port to connect to teach pendant, and 2 x USB 2.0 for software license dongle. RCB100 also comes with isolated digital I/O for multiple usages and PoE port to connect to industrial camera.

Specifications
CPU
- Socket LGA1151, Intel® 6th and next generation Core™ i7/i5/i3 processor and Intel® Celeron® processors, 14nm process

RAM
- Dual DDR4/SG-DIMMs, up to 32GB

Chipset
- Intel® H110 PCH

On Board Interface
- 2 x i210-AT GbE LAN
- 2 x USB 2.0
- 1 x VGA (1920 x 1200@60Hz)
- 1 x RS232/422/485 with auto flow control
- 12in(NPN/ PNP type), 4out(NPN type) (need optional board)

Display
- 1 x HDMI
  (4096x2160 @24Hz, 24 bpp)

Extension slot
- 1 x PCIe x16 Gen3
- 1 x miniPCIe
- 1 x SATA

Edge I/O interface
- 1 x RS232/422/485 with Auto flow control (default RI)
- 2 x USB 3.0, 4 x USB 2.0
- 2 x I211AT GbE LAN (one port can be PoE port, IEEE 802.3af compliant, need optional PSE board)

Audio
- Not support

Power input
- Support AT/ATX mode
- ATX 4-pin connector for 24V ± 10%

Form Factor
- Dimensions: Mini-ITX (6.7-in x 6.7-in)

Environment
- Operating temperatures: 0°C to 60°C with CPU fan and system fan
- Storage temperature: -20°C to 80°C
- Relative humidity: 90%

Certifications
- CE
- FCC Class A
- EN61000-6-4 / EN61000-6-2
**Dimension Drawing**

RCB100 (mini-ITX)

**Ordering Information**

- **RCB100 (P/N: 10J200RCB00X0)**
  MiniITX Intel® 6th-Gen Core™ i7/i5/i3/Celeron board

- **RCBDIO12I4O (P/N: TBD)**
  Isolated 12in, 4out digital I/O board

- **NISKPoE (P/N: TBD)**
  PoE PSE Module
Robot Gateway

Main Features
- Support Mainstream Industrial Robots
- Robot Status Monitoring
- Robot Failure Detection
- Transfer Data to SQL Database
- Compact Design (Din-rail or Screw Mount)

Product Overview
Robot gateway provides an important role of connecting industrial robots to the control system, enabling independent robots to upload operation information. The gateway will transfer robot data to database so that cloud application, such as factory dashboard, can easily access the data and integrate the information together with other systems in the production line.

Specifications

Robot Connectivity
- Supported Protocol: TCP, Modbus/TCP, Fanuc interface
- Data Update cycle: < 100ms for 20 robots
- Robot Data
  - Operation mode
  - Robot status
  - Axis angles
  - Position
  - Velocity
  - I/O Information
  - User-defined data (depending on robots)

SQL Database
- Built-in SQL database in gateway
- Robot information directly stored in SQL format
- Data of multiple robots

Hardware Specifications
- Onboard Intel® Atom™ processor E3826 Dual Core 1.46GHz
- 1x Micro HDMI DisplayPort (type D)
- 16GB eMMC
- 2x Intel® I210AT GbE LAN ports
- 1x USB 3.0 and 1x USB 2.0
- 1x RS232/485 with auto flow control

Environment
- Operating temperature:
  - Ambient with air flow: -5°C to 55°C
  - Storage temperature: -20°C to 75°C
- Relative humidity: 10% to 93% (non-condensing)
- Shock protection:
  - mSATA/eMMC: 50G, half sine, 11ms, IEC60068-27
- Vibration protection w/mSATA or eMMC condition:
  - Random: 2Gms @ 5–500 Hz, IEC60068-2-64

Certifications
- CE Approval
  - EN61000-6-2
  - EN61000-6-4
- FCC Class A
Robot Operating Space

Ordering Information

- RG103 (P/N: TBD)
  Compact Robot Gateway

www.nexcobot.com
NexMotion Solutions

EtherCAT Motion Control
EtherCAT - The Real-time Ethernet Fieldbus

EtherCAT (Ethernet for Control Automation Technology) is a high-performance fieldbus protocol which allows automation equipment, such as servo drives, intelligent sensors and I/O devices to be connected using Ethernet. Because it offers higher accuracy and throughput at a lower cost, EtherCAT has been widely adopted in the automation industry as the mainstream real-time Ethernet protocol for robot and machinery.

NexMotion - Comprehensive EtherCAT Solution

NexCOBOT has been investing R&D resources in developing its own EtherCAT master core architecture. Leveraging industrial grade Ethernet technology, NexMotion, NexCOBOT’s EtherCAT Solution, offers a complete solution, ranging from EtherCAT master platforms to a series of EtherCAT slave modules.

Compared to legacy pulse and voltage commands, EtherCAT commands are digitized to improve its immunity from electrical noise in robot and machinery environments. Furthermore, the Ethernet-based wiring design allows NexMotion products to add greater flexibility and expandability to control systems.

Comprehensive EtherCAT Solution

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<th>Control Software</th>
<th>Slave Module</th>
<th>Slave Chip</th>
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<tr>
<td>NET-ECM Series EtherCAT Master Controller</td>
<td>NexECM EtherCAT Master Stack</td>
<td>NEIO Series High-density I/O Module</td>
<td>NexECM Chip Multi-function EtherCAT Slave Chip</td>
</tr>
<tr>
<td>NET-GMC Series EtherCAT Motion Controller</td>
<td>NexGMC General Motion Control</td>
<td>AXE-5904 4-ch Pulse Output Module</td>
<td></td>
</tr>
</tbody>
</table>
Pre-Verified EtherCAT Slaves

EtherCAT, as a high-speed fieldbus protocol, is supported by many vendors to provide related slave module products. NexCOBOT’s EtherCAT controller, NET Series controllers, has performed strict tests with a number of EtherCAT slaves. Users can ensure compatibility between NET Series controllers and EtherCAT slaves by choosing from the verified slave list to construct an EtherCAT system with guaranteed performance.

EtherCAT Validation Test
- Up to 64 Servo Drives
- Within 250 μs
- Multi-task
* Up to 64 EtherCAT Servo Drives

Drive
- Yaskawa Sigma 5/7
- Hiwin D2, D1
- Omron R88D
- Delta A2E
- Servotronix CDHD
- Sanyo PB4D, R Series
- Panasonic MINAS A5B
- Mitsubishi MR J3-T04
- Schneider LXM32
- MiControl mcDSA-E65
- Maxon MAXPOS

I/O
- NexCOBOT NEIO Series, AXE-5904, AXE-9801
- Prima C1, E1, E2 Series
- VIPA SLIO Series
- Beckhoff EL1, EL2, EL4, EL30, EK1100
- SYN-TEK ESC5500, ESC6022
- WAGO 750 Series

Guaranteed Performance

Based on Microsoft’s Windows OS and well-known real-time extensions, NexCOBOT’s EtherCAT master software, NexECM, executes high-performance EtherCAT. It supports a maximum of 64 slaves and has a communication cycle time of up to 250 μs. The performance of NexECM has been tested in NexCOBOT’s laboratory where more than one hundred EtherCAT slaves are configured for function validation of NexCOBOT’s EtherCAT master. The CiA 402 standard protocol is also supported by NexECM which makes it easy to control EtherCAT slave drives.
NexMotion
- Advanced EtherCAT Master & GMC (General Motion Control)

For users who wants to configure EtherCAT slaves, NexECM also provides a powerful EtherCAT configuration tool called NexECM Configuration Tool. NexECM Configuration Tool help users scan EtherCAT slaves and create ENI (EtherCAT Network Information) files. For servo motor applications and digital I/O applications, NexECM Configuration Tool also provides a friendly user interface to directly control digital I/O, and servo motors based on the CIA402 standard.

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<tr>
<th>ECM (EtherCAT Master)</th>
<th>GMC (General Motion Control)</th>
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</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>• EtherCAT Config. Tool</td>
<td></td>
</tr>
<tr>
<td>• Real-Time API (RTX)</td>
<td></td>
</tr>
<tr>
<td>• CIA 402 Motion Library</td>
<td></td>
</tr>
<tr>
<td>• Microsoft Windows API</td>
<td></td>
</tr>
<tr>
<td>• Advanced Motion Control</td>
<td></td>
</tr>
<tr>
<td>• Powerful Utility</td>
<td></td>
</tr>
<tr>
<td>• EtherCAT configuration</td>
<td></td>
</tr>
<tr>
<td>• Motion builder</td>
<td></td>
</tr>
<tr>
<td>• Group motion</td>
<td></td>
</tr>
<tr>
<td>• Interpolation (Line, Circle)</td>
<td></td>
</tr>
<tr>
<td>• Contouring</td>
<td></td>
</tr>
<tr>
<td>• E-Gear, E-CAM</td>
<td></td>
</tr>
</tbody>
</table>

NexECM

NexECM is a NexCOBOT developed software EtherCAT master stack, NexECM runs on an RTOS platform and provides precise communication cyclic frame from EtherCAT master to EtherCAT slave. NexECM provides all the basic EtherCAT communication functions which allows users to directly access standard EtherCAT slaves, such as process data access, mail box data access and support CoE (CANOpen over EtherCAT).

For users who wants to configure EtherCAT slaves, NexECM also provides a powerful EtherCAT configuration tool called NexECM Configuration Tool. NexECM Configuration Tool help users scan EtherCAT slaves and create ENI (EtherCAT Network Information) files. For servo motor applications and digital I/O applications, NexECM Configuration Tool also provides a friendly user interface to directly control digital I/O, and servo motors based on the CIA402 standard. NexECM provides Microsoft Windows APIs for users to build their own EtherCAT applications. For EtherCAT slaves synchronization control, ECM synchronizes with Distributed Clocks (DC) including Master synchronization.

NexECM Software Architecture

NexECM Configuration Tool

1. Import ESI file, and export ENI file
2. PDO mapping
3. Motor control
4. DI/O control
5. Network quality monitor
Motion Control

NexGMC

NexGMC (General Motion Control) is developed by NexCOBOT as a powerful motion control software which integrates NexECM and motion control kernels. It can be used for any general machines that are EtherCAT-based motor driven.

The NexGMC provides Microsoft Windows APIs for users to develop their own motion control applications and HMI. NexGMC also provides a powerful integrated development environment “NexMotion Studio”, which users can use to easily configure EtherCAT slaves and motion axes or group axes (ex: XY table) parameters.

► NexGMC Architecture

Win32 User Layer

Kernel Layer

Hardware

EtherCAT Slave Device

► NexGRC user scenario
NexMotion Studio - Utility for NexGMC

NexMotion Studio is a powerful utility designed to shorten the development time of motion and robot applications. NexMotion Studio is a Microsoft Windows based application which can run in both 32bit and 64bit environments.

It offers useful operations including:

- EtherCAT Configurator
- Motion Configurator
- Real-Time Programing
- 3D Simulation

Set up / Test of EtherCAT System

Set up / Test of Motion System

Real-Time Program Development

Data Analysis
EtherCAT Configuration
Following NexECM, NexGMC is compatible with standard EtherCAT slaves and NexMotion Studio provides the functionality for users to scan, configure, and test standard EtherCAT slave modules. An ENI file for the EtherCAT system can also be generated with NexMotion Studio.

NexGRC user scenario

NexMotion Studio - Motion Configuration
Besides EtherCAT operation, NexMotion Studio is a tool for users to build, configure, and test a motion group, which are combination of single motion axes with mechanical designs. Users can configure all mechanical parameter of the machine in NexMotion Studio, and users will use the configuration directly when develop their control program with the Windows API NexGMC provides.

NexGRC user scenario
Main Features
- Slave module no.: up to 64
- Cycle time: up to 250 μs
- Synchronization error: ±50ns
- Support CiA 402 standard protocol

Product Overview
NET-ECM series is based on high-performance industrial fanless computer, and integrates NexCOBOT’s EtherCAT Master solutions, Nex-ECM, and runs with RTX extension system to perform real-time communication. NexCOBOT offers integrated APIs for CiA 402, so that users can use these libraries to communicate with EtherCAT slaves. In addition, NET-ECM series also provides an user-friendly utility-NexECM EtherCAT configuration tool. Its functions are listed below:
- Scan EtherCAT slave devices
- Import ESI file, and export ENI file
- Configure EtherCAT slave devices
- Monitor EtherCAT communication quality
- Test functions for EtherCAT slave devices

With these functions, users can easily communicate between master and slave devices.

Specifications

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Features</td>
<td></td>
</tr>
<tr>
<td>Service Commands</td>
<td>Support of all commands</td>
</tr>
<tr>
<td>IRQ Field in Datagram</td>
<td>Use IRQ information from slave in datagram header</td>
</tr>
<tr>
<td>Slaves with Device Emulation</td>
<td>Support slaves with and without application controller</td>
</tr>
<tr>
<td>EtherCAT State Machine</td>
<td>Support of ESM special behavior</td>
</tr>
<tr>
<td>Error Handling</td>
<td>Checking of network or slave errors, e.g. working counter</td>
</tr>
<tr>
<td>Process Data Exchange</td>
<td></td>
</tr>
<tr>
<td>Cyclic PDO</td>
<td>Cyclic process data exchange</td>
</tr>
<tr>
<td>Network Configuration</td>
<td></td>
</tr>
<tr>
<td>Reading ENI</td>
<td>Network configuration taken from ENI file</td>
</tr>
<tr>
<td>Compare Network Configuration</td>
<td>Compare configured and existing network configuration during boot-up</td>
</tr>
<tr>
<td>Explicit Device Identification</td>
<td>Identification used for Hot Connect and prevention against cable swapping</td>
</tr>
<tr>
<td>Station Alias Addressing</td>
<td>Support configured station alias in slave, i.e. enable 2nd address and use it</td>
</tr>
</tbody>
</table>

Access to EEPROM Support functions to access EEPROM via ESC register
Mailbox Support
- Support Mailbox Main functionality for mailbox transfer
- Mailbox Polling Polling mailbox state in slaves
CAN Application Layer Over EtherCAT (CoE)
- SDO Up/Download Normal and expedited transfer
- Complete Access Transfer the entire object (with all sub-indices) at Once
- SDO Info Service Services to read object dictionary
- Emergency Message Receive emergency messages
Distributed Clocks
- Support of distributed clock

Pre-Installed Software Package
- Operating system: Windows Embedded Standard 7
- Real-time extension
  - RTX 2012/RTX 2016 for 32-bit OS
  - RTX 2014/RTX 64 3.0 for 64-bit OS
- EtherCAT Master: NexECMRTx
- EtherCAT configurator
Platform Selection Guide

**NET 101-ECM (P/N:A0J10010101X0)**
Front-access compact EtherCAT controller
- CPU: Intel Atom® processor E3826 Dual Core 1.46GHz
- Chipset: Intel® Bay Trail-I
- Memory: 4GB DDR3L
- Storage: 128GB SSD
- Display: 1 x DVI-I
- USB: 1 x USB 2.0, 1 x USB 3.0
- LAN ports: 2 (1 x Ethernet, 1 x EtherCAT)

**NET 200-ECM (P/N:A0J10020003X0)**
Front-access compact EtherCAT controller
- CPU: Intel® Celeron® J1900 Quad Core 2.0GHz
- Chipset: Intel® NM10
- Memory: 4GB DDR3L
- Storage: 500GB HDD
- Display: 1 x DVI-I, 1 x DP
- USB: 3 x USB 2.0, 1 x USB 3.0
- LAN ports: 2 (1 x Ethernet, 1 x EtherCAT)

**NET 300-ECM (P/N:A0J10030000X0)**
Front-access high-performance EtherCAT controller
- CPU: Intel® Core™ i5-6500TE Quad Core 2.3GHz
- Chipset: Intel® Q170
- Memory: 4GB DDR4
- Storage: 256GB SSD
- Display: 1 x DVI-D, 1 x HDMI
- USB: 2 x USB 2.0, 4 x USB 3.0
- LAN ports: 3 (2 x Ethernet, 1 x EtherCAT)

---

**Software Architecture**

![Software Architecture Diagram](image)

Once you have selected the appropriate platform, for further assistance with your Robot & Motion Control project, please visit www.nexcobot.com.
Main Features
- Motion control up to 32 axes
- Single axis control: PTP/jog/halt/stop
- Axes group control: PTP/linear/3D arc
- Support C/C++, C# and VB.Net for user programming

Product Overview
NET-GMC series presents intelligent PC-based motion controller for robot and machinery. It integrates NexCOBOT’s general motion control software, NexGMC, to perform real-time motion control and supports standard EtherCAT slaves. NET-GMC also provides windows APIs for general motion control application and an integrated development environment called NexMotion studio to speed up development time for automation users.

Specifications

NexGMC Runtime
- Single axis no.: up to 32 axes
- Single axis control functions: PTP/jog/halt/stop
- Single axis blending motion: aborting/buffered/blending
- Single axis override functions: position/velocity/acceleration/deceleration
- Support axes group type: Cartesian coordinated
- Axes group control functions: PTP/linear/2D arc/3D arc
- Axes blending motion: aborting/buffered/blending
- NexCOBOT EtherCAT master, CoE and DC supported
- Support standard EtherCAT slave devices

NexMotion Studio
- EtherCAT devices offline edit and online scan
- EtherCAT master configuration
- PDO mapping edit
- Online SDO edit
- Export ENI
- CiA402 device operation: PP/PV/PT/CSP
- Single axis edit and operation
- Group axes edit and operation
- I/O mapping edit and operation
- Provide simulation operation mode

User Programming
- Provide windows APIs for user programming
- Support programming language: C/C++, C#, VB.Net

Pre-Installed Software Package
- Operating system: Windows Embedded Standard 7
- NexGMC runtime
- NexMotion studio
Platform Selection Guide

**NET 200-GMC (P/N:A0J10020003X0)**
Front-access compact general motion controller
- CPU: Intel® Celeron® J1900 Quad Core 2.0GHz
- Chipset: Intel® NM10
- Memory: 4GB DDR3L
- Storage: 500GB HDD
- Display: 1 x DVI-I, 1 x DP
- USB: 3 x USB 2.0, 1 x USB 3.0
- LAN ports: 2 (1 x Ethernet, 1 x EtherCAT)

**NET 300-GMC (P/N:A0J10030000X0)**
Front-access high-performance general motion controller
- CPU: Intel® Core™ i5-6500TE Quad Core 2.3GHz
- Chipset: Intel® Q170
- Memory: 4GB DDR4
- Storage: 256GB SSD
- Display: 1 x DVI-D, 1 x HDMI
- USB: 2 x USB 2.0, 4 x USB 3.0
- LAN ports: 3 (2 x Ethernet, 1 x EtherCAT)

Software Architecture

**Win32 User Layer**
- UserApp (exe)
- NexMotion Studio
- NexECM (DLL)

**Kernel Layer**
- Windows Kernel
- NexGMC Runtime (Motion Control Runtime)
- Realtime OS

**Hardware**
- NIC
- CPU
- CPU
- NIC
- CPU
- CPU

**EtherCAT Slave Device**
- EtherCAT I/O
- EtherCAT Motor
The Smart Machinery

One of the benefits of adopting the Industry 4.0 framework is the establishment of smart processes extending from receipt of orders to production. Production lines can automatically adjust their operating approaches based on information concerning orders and raw materials, etc., reducing manpower, time, and materials costs, while also boosting flexibility and customization capabilities. This can not only resolve many of the problems that manufacturers currently face, but also enhance product quality, gear factories toward customers’ needs, and make production line operation more competitive.

NexCOBOT is relying on its core competence of industrial PC to propose smart machinery solutions facilitating the end-to-end linkage of manufacturing processes. NexCOBOT’s PC-based CNC controller leverages EtherCAT communication and open development structure to simplify the architecture of production lines. Addressing sealed machine tool from other vendors, NexCOBOT’s Machine IoT Gateway for CNC supports multiple types of communication protocols, and allows CNC machines to connect to the network.

Machine IoT Gateway for CNC

While CNC machines play pivotal roles in manufacturing production processes, because of the sealed design of their built-in controllers, unlike most industrial equipment, they cannot communicate or be integrated with external devices, and it is difficult to access their production data.

NexCOBOT’s Machine IoT Gateway for CNC provides the specialized “IoMT” (Internet of Machine Tool) CNC machine tool communications software, and supports all mainstream CNC machine communication protocols, including the protocols. It can also implement data exchange with a higher-level controller via the Modbus serial communications protocol. This gateway can resolve CNC machine tools’ problem of sealed systems, and achieve the goal of networking by enabling independent CNC machines to upload production information.
NControl

Comprehensive CNC Solutions for 2D/3D Machining

Open Yet Robust

The open software architecture of the NControl series allows flexible programming of various CNC functions, such as enabling CNC machine makers to customize the HMI screen using the built-in editor or Windows-based programming tools.

Specifications

<table>
<thead>
<tr>
<th>Motion Control</th>
<th>NControl 20</th>
<th>NControl 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Interpolated Axes</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>PLC Axes</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Control Spindle</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TCP Function</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Calculation Resolution</td>
<td>0.1um</td>
<td>0.01um</td>
</tr>
<tr>
<td>Number of Control Channel</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Block Ahead</td>
<td>1024</td>
<td></td>
</tr>
<tr>
<td>Constant Jerk Control</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Corner Deceleration</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Smooth Surface Function</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Control Cycle Time</td>
<td>1ms</td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Intel Core 2 Duo P8400</td>
<td>SSD 32G</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCD Size</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Operating System</td>
<td>Win CE 6.0</td>
<td></td>
</tr>
<tr>
<td>LAN Port</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Dimension of Controller</td>
<td>219x268x107(mm)</td>
<td></td>
</tr>
</tbody>
</table>

Premium CNC Features

3D Axes Motion
- Circular 3D interpolation
- Tool Centre Point (TCP)
- TCP for double twist and prismatic heads with 2 or 3 rotary axes
- TCP for non standard kinematics
- Tool direction axis movement
- TCP on rotated planes
- PathView to facilitate development

Centre Head profile

Programmed profile

Profile with TCP active

High-speed Machining
- Look ahead speed planning
- 5-degree polynomial trajectory planning
- TCP with 5-degree polynomial trajectory planning

Multi-channel of Machining
- 2 channels of machining work simultaneously
- Up to 24 channels can be customized

System Architecture

I/O Module

Servo drive

NControl
Main Features

- Support 2D & 3D CNC machining
- Support EtherCAT and Mechatrolink III protocols
- G/M code supported
- Tool center point (TCP) support
- Look ahead speed planning (up to 1024 blocks)
- High speed machining with polynomial interpolation
- TCP with high speed machining
- Multiple CNC channels supported
- Up to 24 channels can be customized

Product Overview

NControl series provides a comprehensive CNC solution to 2D and 3D machining. Providing high level CNC functionalities, such as TCP for 5-axis machining and high speed machining with look ahead and polynomial, NControl series ensures high machining precision with high speed. Derived from NexMotion cloud and open feature, NControl series can upgrade its function without changing any hardware and can easily integrate with 3rd party hardware and software.

Specifications

System
- Intel® Core™ 2 Duo P8400 processor pre-installed
- 2GB DDR3 SDRAM, pre-installed
- 32GB SSD pre-installed
- Windows CE 6.0 pre-installed
- VGA/DVI-I independent display
- 1 x DB44 serial port for 4 x RS232 (COM2: RS232/422/485 with auto flow control)
- 6 x USB 2.0 ports
- 1 x PS2 connector supporting KB/MS
- Fast I/O: 4 digital in/4 digital out
- Analog I/O: 1 in (16-bit)/1 out (16-bit)
- Encoder: 1 in (A/B/Z phase)

CNC Control
- Axes management
  - Circular 3D interpolation
  - Rollover axes
  - Gantry axes
  - Dynamic follower axes
- Canned cycles
  - Spot-facing (G82)
  - Deep drilling with chip take out (G83)
  - Tapping (G84)
  - Reaming or tapping by Tapmatic (G85)
  - Boring with spot facing (G89)

Motion control types
- G code ISO 6983 programming
- M, S, T functions programming
- Look ahead (up to 1024 blocks)
- Velocity feed forward (VFF)
- Tool center point (TCP)
- TCP for double twist and prismatic heads with 2 or 3 rotary axes
- TCP for non-standard kinematics
- Special feature
- Bidirectional pitch compensation

Optional Remote I/O
- Modular type
  - Coupler: C-101
  - Analog I/O module: E-501
- Terminal type
  - Digital I/O module: AXE-9200

Power Requirements
- DC input range: +16 to 30 Vdc input ATX power mode (optional AC/DC 120W power adapter)

Environment
- Operating temperature: Ambient with air flow: -5°C to 55°C (according to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage temperature: -20°C to 80°C
• Relative humidity: 10% to 93% (non-condensing)
• Shock protection:
  - HDD: 20G, half sine, 11ms, IEC60068-2-27
  - CF: 50G, half sine, 11ms, IEC60068-2-27
• Vibration protection w/ HDD condition
  - Random: 0.5Grms @ 5–500 Hz according to IEC60068-2-64
  - Sinusoidal: 0.5Grms @ 5–500 Hz according to IEC60068-2-6

Certifications
• CE
• FCC Class A

Ordering Information

CNC Controller
• NControl20 (P/N: 10J10002000X0)
  2D½ CNC controller for machining and turning center with Win CE 6.0
• NControl20D (P/N: 10J10002001X0)
  2D½ CNC controller for machining and turning center with Win CE 6.0 and WE2009
• NControl30 (P/N: 10J10003000X0)
  3D CNC controller for machining and turning center with Win CE 6.0
• NControl30D (P/N: 10J10003001X0)
  3D CNC controller for machining and turning center with Win CE 6.0 and WE2009
• 19V, 120W AC/DC power adapter w/o power cord
  (P/N: 7410120002X00)
Main Features

- Plug-and-play CNC gateway to integrate controllers to the industrial internet of machines
- Support one-click connection to mainstream CNC Controllers such as Fanuc, Mitsubishi, Heindenhain, Siemens
- Collect important machine information including position, coordinate offsets, alarm, etc.
- Connecting max. 10 CNC controllers via TCP/IP.
- Connect to on-demand combination of controllers with one CNC gateway
- Transfer data to iAT2000 SCADA or MySQL/SQLite database
- Provide dashboard interface to monitor machine status

Product Overview

iAT2000 CNC Gateway provides a convenient interface to integrate major CNC controllers into NexCOBOT I4.0 Solution Network. The NexCOBOT developed software contains APIs to gather data from the non-open CNC systems, and then use SQL software to actively transfer data to Database. The Gateway is a once-for-all solution for all different CNC Controllers in the market, which greatly reduce the effort required for System Integrators to develop various connection interfaces by their own. With the crucial device, SI can focus more on monitoring and analysis development; eventually maximize the effectiveness of factory automation.

Software Feature

Controller Connectivity

- A universal gateway to connect major of CNC controllers
  - Fanuc: 0i-B/0i-C/0i-D/16/18/21/31/32i
  - Mitsubishi: M70/M700/M80/M800
  - HEINDENHAIN: iTNC530
  - Siemens: 828D/840D
  - Syntec: 21/22/220

CNC Data Collection

- NC File
  - Support NC File transfer to and from CNC controller
  - Verify the part under production matches MES
  - Record the production history of every machine
- Controller status
  - Allow plant manager to have full awareness of all machine status
  - Record the complete status of all time for analysis
- Uptime analysis
  - Display uptime and graphical result to improve plant efficiency
- Alarm & history
  - Trace alarm history of each machine for review and optimization

Internal SQL Interface

- Data management
  - Collected data is stored in CNC Gateway as a buffer database in SQL format
  - The buffer database is available for SCADA, main Database, and other applications to retrieve

Cloud Service

- Cloud service compatible with an additional IoT gateway

- Servo spindle load
  - Monitor the reasonable working load to avoid excess temperature on machines, and elongate machine lifespan
- Maintenance management
  - Couple with CNC controller’s self-detection function to predict maintenance schedule and prevent unexpected downtime
- Tool life management
  - Manage tool life to foresee the timing of tool replacement
  - Reduce number of defect parts cause by tool failure
Hardware Specification

Communication Protocols
- CNC protocol
- SQL form database

System Configuration
- Intel Atom® E3826 dual-core 1.46GHz
- 4GB DDR3L system memory
- 500GB SATA 2.0 HDD storage
- Windows 7 Pro 64-bit
- iAT2000 CNC Gateway software package
  - CNC protocol interface
  - CNC data SQL interface

I/O Interface
- 1x External CFast socket
- 1x SIM card holder
- 2x Intel® I210T GbE LAN ports
- 2x USB 2.0 (500mA per each), 1x USB 3.0 (900mA)
- 4x DB9 for COM1 ~ COM4
- 1x 2-pin DC input, support +9 to 30VDC input
- 1x HDMI & 1x DVI-I DisplayPort
- 2x Antenna holes for optional WiFi/3.5G antenna
- 1x Optional mini-PCIe WiFi/3.5G for wireless connectivity

Certification
- CE
- FCC Class A

Power & Dimension
- Power input: +9VDC to 30VD, Max. 30W power consumption
- Dimension: 206 x 131 x 60

Ordering Information
- iAT2000 CNC-5 Gateway (P/N: A0J00010500X0)
  iAT2000 CNC-5 Gateway Windows software (P/N: 88J00010512X0)
  (connect up to 5 CNC controllers)
- iAT2000 CNC-10 Gateway (P/N: A0J00010500X0)
  iAT2000 CNC-10 Gateway Windows software (P/N: 88J00010513X0)
  (connect up to 10 CNC controllers)
NEIO – EtherCAT I/O System

The Ideal I/O for EtherCAT Control Systems

NEIO is a series of EtherCAT slave I/O modules for distributed industrial applications. Each module is equipped with high density I/O (up to 32 points) and powerful features in a compact size. DIN-rail design and daisy-chain wiring powered by EtherCAT technology make it easy to install NEIO modules in the field. NEIO provides wide variety of I/O combinations with standard ESI file so that users can always find suitable I/O modules for their high-speed EtherCAT-based applications.

**Finger-safe Wiring Cover**
Smart latch design for easy opening/closing

- Flexibility to be installed in control cabinets
- Safe operation when connecting to I/O circuits

**On-module LED indicators**
LEDs for module status and I/O information

- Clear I/O status indication
- Quickly diagnose faults with multiple LEDs

**Multiple mounting methods**
DIN-rail mounting and wall mounting

- Works with standard DIN-rail
- Easy to install in most applications

**Detachable screw terminals**
Secure screw connection technology

- Flexible wiring to terminals on-module or off-module
- Easy to switch modules while keeping existing wiring
Features:

- High-Density I/O Points
- Ease-of-maintenance
- State-of-art Design
- Standard EtherCAT Communications
- Rich I/O Selections

User-friendly wiring labels
Professional wiring instructions
- Detailed wiring diagram
- Instantly operate the I/O module with the given wiring information

QR code for ESI file
QR code sticker on module
- Quick access to ESI download link
- Also link to related product information

Rotational pin-assignment marks
Self-explanatory pin-assignment information
- No blind spots when checking pin assignments
- Easy maintenance even when the module is installed in a cabinet
# NEIO – Selection Guide

## EtherCAT Digital I/O Module

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1101</th>
<th>NEIO-B1102</th>
<th>NEIO-B1201</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>DI Module (PNP)</td>
<td>DI Module (PNP / NPN)</td>
<td>DO Module (NPN)</td>
</tr>
<tr>
<td>Wiring Diagram</td>
<td><img src="image" alt="Wiring Diagram" /></td>
<td><img src="image" alt="Wiring Diagram" /></td>
<td><img src="image" alt="Wiring Diagram" /></td>
</tr>
<tr>
<td>Number of Inputs</td>
<td>32</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>24 Vdc</td>
<td>24 Vdc</td>
<td>-</td>
</tr>
<tr>
<td>On-State Voltage, &quot;1&quot;</td>
<td>15–30 Vdc (IEC 61131-2 type 1)</td>
<td>9–24 Vdc</td>
<td>-</td>
</tr>
<tr>
<td>Off-State Voltage, &quot;0&quot;</td>
<td>0–5 Vdc (IEC 61131-2 type 1/2/3)</td>
<td>0–8 Vdc</td>
<td>-</td>
</tr>
<tr>
<td>Input Filter</td>
<td>3 ms</td>
<td>1 ms</td>
<td>-</td>
</tr>
<tr>
<td>Number of Outputs</td>
<td>-</td>
<td>-</td>
<td>32</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>-</td>
<td>-</td>
<td>24 Vdc</td>
</tr>
<tr>
<td>Output Load Type</td>
<td>-</td>
<td>-</td>
<td>Resistive, Inductive</td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>-</td>
<td>-</td>
<td>500 mA/ch</td>
</tr>
<tr>
<td>Switching Time</td>
<td>-</td>
<td>-</td>
<td>Off to On : 100 us On to Off : 150 us</td>
</tr>
<tr>
<td>Power Input</td>
<td>24 Vdc (±20%)</td>
<td>24 Vdc (±20%)</td>
<td>24 Vdc (±20%)</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>0°C to 55°C</td>
<td>0°C to 55°C</td>
<td>0°C to 55°C</td>
</tr>
</tbody>
</table>

## EtherCAT Analog I/O Module

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1841</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Input</td>
<td></td>
</tr>
<tr>
<td>Number of Inputs</td>
<td>8 (single-ended)</td>
</tr>
<tr>
<td>Input Type</td>
<td>Voltage, Current</td>
</tr>
<tr>
<td>Input Range</td>
<td>0 – 5 V, 0 – 10 V, ±5,±10 V 0 – 20 mA, 4 – 20 mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>16-bit</td>
</tr>
<tr>
<td>Sampling Rate</td>
<td>1 kHz per channel</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt; ±0.3% of FSR</td>
</tr>
<tr>
<td>Analog Output</td>
<td></td>
</tr>
<tr>
<td>Number of Outputs</td>
<td>2 (single-ended)</td>
</tr>
<tr>
<td>Output Type</td>
<td>Voltage, Current</td>
</tr>
<tr>
<td>Output Range</td>
<td>0 – 5 V, 0 – 10 V, ±5,±10 V 0 – 20 mA, 4 – 20 mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>16-bit</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt; ±0.2% of FSR for voltage output &lt; ±0.1% of FSR for current output</td>
</tr>
<tr>
<td>Power Input</td>
<td>24 Vdc (±20%)</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>0°C to 55°C</td>
</tr>
</tbody>
</table>
### EtherCAT COM Port Module

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1603</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Channels</td>
<td>4</td>
</tr>
<tr>
<td>COM 1</td>
<td>RS 232/422/485</td>
</tr>
<tr>
<td>COM 2</td>
<td>RS 422/485</td>
</tr>
<tr>
<td>COM 3</td>
<td>RS422/ 485</td>
</tr>
<tr>
<td>COM 4</td>
<td>RS 422/485</td>
</tr>
<tr>
<td>Data Bits</td>
<td>5, 6, 7, 8</td>
</tr>
<tr>
<td>Stop Bits</td>
<td>1, 1.5, 2</td>
</tr>
<tr>
<td>Parity</td>
<td>None, Odd, Even, Space, Mark</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>0.3~115.2 kbps</td>
</tr>
<tr>
<td>Flow Control</td>
<td>RTS/CTS and DTR/DSR (RS-232 only)/ VON/XOFF</td>
</tr>
<tr>
<td>Power Input</td>
<td>24 Vdc (±20%)</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>0°C to 55°C</td>
</tr>
</tbody>
</table>

### EtherCAT Pulse-output Module

<table>
<thead>
<tr>
<th>Model Name</th>
<th>AXE-5904</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of axes</td>
<td>up to 4 MHz</td>
</tr>
<tr>
<td>Pulse Output Rate</td>
<td>CW/CCW, OUT/DIR</td>
</tr>
<tr>
<td>Pulse Command Output</td>
<td>LSz/CFGz/Hs/SVON/RDY/INP/ALM/ARST/DCLR for each axis</td>
</tr>
<tr>
<td>Committed I/O signal</td>
<td>Incremental</td>
</tr>
<tr>
<td>Encoder Input Type</td>
<td>32-bit</td>
</tr>
<tr>
<td>Encoder Resolution</td>
<td>CW/CCW, AB/Z</td>
</tr>
<tr>
<td>Max. Input Frequency</td>
<td>3-channel Per Axis</td>
</tr>
<tr>
<td>General Purpose Input</td>
<td>Power Input</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>0°C to 55°C</td>
</tr>
</tbody>
</table>
NEIO-B1101/B1102

32-CH Digital Input EtherCAT Slave Module

Main Features
- Finger-safe wiring cover
- Detachable screw terminals
- Rotational pin-assignment marks
- On-module LED indicators
- User-friendly wiring label
- Multiple mounting methods

Product Overview
NEIO-B1101 is a 32-channel PNP type digital input EtherCAT slave module. The voltage input of NEIO-B1101 is 24 VDC, which complies with IEC-61131-2 Standard. NEIO-B1102 is a 32-channel PNP/NPN type digital input EtherCAT slave module. The input filter of NEIO-B1102 is 1ms, and its normal input voltage is 24 VDC. All of the NEIO modules are provided with high isolation protection, and verified by the EtherCAT conformance test tool. Therefore NEIO is a reliable module to implement in your applications.

Specifications

Digital Input

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1101</th>
<th>NEIO-B1102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PNP</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>24 VDC</td>
<td></td>
</tr>
<tr>
<td>On-State Voltag, &quot;1&quot;</td>
<td>15–30 VDC (IEC 61131-2 type 1)</td>
<td>9–24 VDC</td>
</tr>
<tr>
<td></td>
<td>11–30 VDC  (IEC 61131-2 type 2/3)</td>
<td></td>
</tr>
<tr>
<td>Off-State Voltag, &quot;0&quot;</td>
<td>0–5 VDC (IEC 61131-2 type 1/2/3)</td>
<td>0–8 VDC</td>
</tr>
<tr>
<td>Input Filter</td>
<td>3 ms</td>
<td>1 ms</td>
</tr>
</tbody>
</table>

Power Requirements
- DC input range: DC 24V ±20% with over-voltage and reversed-voltage protection

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1101</th>
<th>NEIO-B1102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>2 W</td>
<td>2.5 W</td>
</tr>
</tbody>
</table>

Communication
- Protocol: EtherCAT
- Bus interface: 2 x RJ-45 (daisy-chain)
- Media: Ethernet cable (min. CAT 5), shielded
- Distance between stations: maximum 100m (100BASE-TX)
- Data transfer rate: 100M baud

Common Section
- Electrical isolation: 2.5 kV (power contact)
- Operating temperature: 0°C–55°C
- Storage temperature: -40°C–85°C
- Relative humidity: 5–95%, non-condensation, non-operating
- Shock: IEC 60068-2-27
- Vibration: IEC 60068-2-6, IEC 60068-2-64
- Enclosure type rating: IP20
- Mounting type: din-rail (35mm), wall-mount
- Dimensions (mm): 155 x 115 x 57.4 (W x H x D)

Certifications
- CE
- FCC Class A
Dimension Drawing

Ordering Information

- **NEIO-B1101** (P/N: 10J80110100X0)
  32-CH digital input EtherCAT slave module (PNP)

- **NEIO-B1102** (P/N: 10J80110200X0)
  32-CH digital input EtherCAT slave module (PNP/NPN)

- **AC to DC din rail power supply** (P/N: 7440060001X00)
  60 W 24V/2.5A for NISE
Main Features
- Finger-safe wiring cover
- Detachable screw terminals
- Rotational pin-assignment marks
- On-module LED indicators
- User-friendly wiring label
- Multiple mounting methods

Product Overview
NEIO-B1201 is a 32-channel NPN type digital output EtherCAT slave module. Its normal output voltage is 24 VDC, and it supports resistive, inductive types of loads. NEIO-B1202 is a 32-channel PNP type digital output EtherCAT slave module. Its normal output voltage is 24 VDC, and it supports three types of loads - resistive, inductive and capacitive. All of the NEIO modules are provided with high isolation protection, and verified by the EtherCAT conformance test tool. Therefore NEIO is a reliable module to implement in your applications.

Specifications

<table>
<thead>
<tr>
<th>Digital Output</th>
<th>NEIO-B1201</th>
<th>NEIO-B1202</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td>NEIO-B1201</td>
<td>NEIO-B1202</td>
</tr>
<tr>
<td>Type</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Load Type</td>
<td>Resistive, Inductive</td>
<td>Resistive, Inductive, Capacitive</td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>500 mA/ch</td>
<td>500 mA/ch</td>
</tr>
<tr>
<td>Switching Times</td>
<td>Off to On: 100 μs, On to Off: 150 μs</td>
<td>Off to On: 100 μs, On to Off: 150 μs</td>
</tr>
</tbody>
</table>

Power Requirements
- DC input range: DC 24V ±20% with over-voltage and reversed-voltage protection

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>NEIO-B1201</th>
<th>NEIO-B1202</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td>NEIO-B1201</td>
<td>NEIO-B1202</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>2 W</td>
<td>2 W</td>
</tr>
</tbody>
</table>

Common Section
- Electrical isolation: 2.5 kV (power contact)
- Operating temperature: 0°C~55°C
- Storage temperature: -40°C~85°C
- Relative humidity: 5~95%, non-condensation, non-operating
- Shock: IEC 60068-2-27
- Vibration: IEC 60068-2-6, IEC 60068-2-64
- Enclosure type rating: IP20
- Mounting type: din-rail (35mm), wall-mount
- Dimensions (mm): 155 x 115 x 57.4 (W x H x D)

Certifications
- CE
- FCC Class A

Communication
- Protocol: EtherCAT
- Bus interface: 2 x RJ-45 (daisy-chain)
- Media: Ethernet cable (min. CAT 5), shielded
- Distance between stations: maximum. 100m (100BASE-TX)
- Data transfer rate: 100M baud
Dimension Drawing

Ordering Information

- **NEIO-B1201 (P/N: 10J80120100X0)**
  32-CH digital output EtherCAT slave module (NPN)

- **NEIO-B1202 (P/N: 10J80120200X0)**
  32-CH digital output EtherCAT slave module (PNP)

- **AC to DC din rail power supply (P/N: 7440060001X00)**
  60 W 24V/2.5A for NISE

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NEIO-B1811/B1812
32-CH Digital Input/Output EtherCAT Slave Module

Main Features
- Finger-safe wiring cover
- Detachable screw terminals
- Rotational pin-assignment marks
- On-module LED indicators
- User-friendly wiring label
- Multiple mounting methods
- 16-CH digital input
- 16-CH digital output

Product Overview
NEIO-B1811 is a 16-CH digital input/16-CH digital output EtherCAT slave module. The voltage input of NEIO-B1811 is 24 VDC, which complies with IEC-61131-2 standard. Its normal output voltage is 24 VDC, and it supports resistive, inductive types of loads.

NEIO-B1812 is a 16-CH digital input/16-CH digital output EtherCAT slave module. The input filter of NEIO-B1812 is 1ms, and its normal input voltage is 24 VDC. Its normal output voltage is 24 VDC, and it supports three types of loads—resistive, inductive, and capacitive.

All of the NEIO modules are provided with high isolation protection, and verified by the EtherCAT conformance test tool. The mixed I/O module is usually used for fewer DI/O channels needed automation equipment. Mixed DI/O modules along with pure DI or DO modules provide more flexible module selection for users’ applications.

Specifications

**Digital Input**

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1811</th>
<th>NEIO-B1812</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PNP</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>On-State Voltage, “1”</td>
<td>15~30 VDC (IEC 61131-2 type 1)</td>
<td>9~24 VDC</td>
</tr>
<tr>
<td>Off-State Voltage, “0”</td>
<td>0~5 VDC (IEC 61131-2 type 1/2/3)</td>
<td>0~8 VDC</td>
</tr>
<tr>
<td>Input Filter</td>
<td>3 ms</td>
<td>1 ms</td>
</tr>
</tbody>
</table>

**Digital Output**

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1811</th>
<th>NEIO-B1812</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Load Type</td>
<td>Resistive, Inductive</td>
<td>Resistive, Inductive, Capacitive</td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>500 mA/ch</td>
<td>500 mA/ch</td>
</tr>
<tr>
<td>Switching Times</td>
<td>Off to On: 100 μs</td>
<td>Off to On: 100 μs</td>
</tr>
<tr>
<td></td>
<td>On to Off: 150 μs</td>
<td>On to Off: 150 μs</td>
</tr>
</tbody>
</table>

**Communication**
- Protocol: EtherCAT
- Bus interface: 2 x RJ-45
- Media: Ethernet cable (min. CAT5), shielded
- Distance between stations: maximum 100m (100BASE-TX)
- Data transfer rate: 100M baud

**Power Requirements**
- DC input range: DC 24V ±20% with over-voltage and reversed-voltage protection

<table>
<thead>
<tr>
<th>Model Name</th>
<th>NEIO-B1811</th>
<th>NEIO-B1812</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>2.2 W</td>
<td>2.2 W</td>
</tr>
</tbody>
</table>
Common Section
• Electrical isolation: 2.5 kV (power contact)
• Operating temperature: 0°C–55°C
• Storage temperature: -40°C–85°C
• Relative humidity: 5–95%, non-condensation, non-operating
• Shock: IEC 60068-2-27
• Vibration: IEC 60068-2-6, IEC 60068-2-64
• Enclosure type rating: IP20
• Mounting type: din-rail (35mm), wall-mount
• Dimensions (mm): 155 x 115 x 57.4 (W x H x D)

Certifications
• CE
• FCC Class A

Ordering Information
• NEIO-B1811 (P/N: 10J80181100X0)
  32-CH digital input/output EtherCAT slave module
• NEIO-B1812 (P/N: 10JB0181200X0)
  32-CH digital input/output EtherCAT slave module
• AC to DC din rail power supply (P/N: 7440060001X00)
  60 W 24V/2.5A for NISE

www.nexcobot.com
Main Features

- Finger-safe wiring cover
- Detachable screw terminals
- Rotational pin-assignment marks
- On-module LED indicators
- User-friendly wiring label
- Multiple mounting methods
- 8-CH analog inputs (single-ended)
- 2-CH analog outputs (single-ended)
- 8-CH digital inputs
- 8-CH digital outputs

Product Overview

NEIO-B1841 is a cost-effective EtherCAT I/O slave module. Each NEIO-B1841 is equipped with 8-CH analog input, 2-CH analog output, 8-CH digital input, 8-CH digital output. NEIO-B1841 provides adjustable input range of voltage and current, so that it can fulfill different application requirements. NEIO-B1841 also provides watchdog function, when it is disconnected, watchdog function can keep the module in a safe state and restore to normal operation. All of the NEIO modules are provided with high isolation protection, and verified by the EtherCAT conformance test tool.

Specifications

**Analog Input (voltage input)**
- Number of channels: 8 (single-ended)
- Input type: voltage, current
- Input range: 0~5V, 0~10V, ±5V, ±10V, 0~20mA, 4~20mA
- Resolution: 16-bit
- Sampling rate: 1 kHz/ch
- Accuracy: < ±0.3% of FSR

**Analog Output**
- Number of channels: 2 (single-ended)
- Output type: voltage, current
- Output range: 0~5V, 0~10V, ±5V, ±10V, 0~20mA, 4~20mA
- Resolution: 16-bit
- Accuracy
  - < ±0.2% of FSR for voltage output
  - < ±0.1% of FSR for current output

**Digital Input**
- Number of channels: 8 (PNP/NPN)
- Input voltage: 24 V<sub>CC</sub>
- On-state voltage, “1”: 9~24 V<sub>DC</sub>
- Off-state voltage, “0”: 0~6 V<sub>DC</sub>
- Input filter: 1ms

**Digital Output**
- Number of channels: 8 (PNP)
- Input voltage: 24 V<sub>CC</sub>
- Output load type: resistive, inductive, capacitive
- Max. output current: 500 mA/ch
- Switching time
  - Off to on: 100 us
  - On to off: 150 us

**Communication**
- Protocol: EtherCAT
- Bus interface: 2 x RJ-45 (daisy-chain)
- Media: Ethernet cable (min. CAT 5), shielded
- Distance between stations: maximum 100m (100BASE-TX)
- Data transfer rate: 100M baud

**Power Requirements**
- DC input range: DC 24V ±20% with over-voltage and reversed-voltage protection
Common Section
• Electrical isolation: 2.5 kV (power contact)
• Operating temperature: 0°C–55°C
• Storage temperature: -40°C–85°C
• Relative humidity: 5–95%, non-condensation, non-operating
• Shock: IEC 60068-2-27
• Vibration: IEC 60068-2-6, IEC 60068-2-64
• Enclosure type rating: IP20
• Mounting type: din-rail (35mm), wall-mount
• Dimensions (mm): 155 x 115 x 57.4 (W x H x D)

Certifications
• CE
• FCC Class A

Ordering Information
• NEIO-B1841 (P/N: 10J80184100X0)
  8-CH AI, 2-CH AO, 16-CH DI/O EtherCAT slave module
• AC to DC din rail power supply (P/N: 7440060001X00)
  60 W 24V/2.5A for NISE
Main Features
- Finger-safe wiring cover
- Detachable screw terminals
- Rotational pin-assignment marks
- On-module LED indicators
- User-friendly wiring label
- Multiple mounting methods
  - 1 x RS 232/422/485
  - 3 x RS 422/485

Product Overview
NEIO-B1603 is an EtherCAT to serial conversion module which supports half-duplex and full-duplex communication modes. It offers one RS-232/422/485 and three RS-422/485 interfaces. The transmission speed on NEIO-B1603 module is up to 115.2kbps. NEIO-B1603 can automatically detect the communication mode without setting any jumper and switch. Users can easily and quickly use this module to bridge their existing serial devices to the EtherCAT control network. All of the NEIO modules are provided with high isolation protection, and verified by the EtherCAT conformance test tool. Therefore NEIO is a reliable module to implement in your applications.

Specifications
**COM Port**
- Port type: 1 x RS 232/422/485
- 3 x RS 422/485
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Parity: none, even, odd, space, mark
- Flow control: RTS/CTS and DTR/DSR (RS-232 only), XON/XOFF
- Baud rate: 0.3~115.2kbps

**Communication**
- Protocol: EtherCAT
- Bus interface: 2 x RJ-45
- Media: Ethernet cable (min. CAT5), shielded
- Distance between stations: maximum 100m (100BASE-TX)
- Data transfer rate: 100M baud

**Power Requirements**
- DC 24V ±20% with over-voltage and reversed-voltage protection
- Power consumption: 6 W

**Common Section**
- Electrical isolation: 2.5 kV (power contact)
- Operating temperature: 0°C~55°C
- Storage temperature: -40°C~85°C
- Relative humidity: 5~95%, non-condensation, non-operating
- Shock: IEC 60068-2-27
- Vibration: IEC 60068-2-6, IEC 60068-2-64
- Enclosure type rating: IP20
- Mounting type: din-rail (35mm), wall-mount
- Dimensions (mm): 155 x 115 x 57.4 (W x H x D)

**Certifications**
- CE
- FCC Class A
Ordering Information

- **NEIO-B1603 (P/N: 10J80160300X0)**
  4 COM ports EtherCAT slave module

- **AC to DC din rail power supply (P/N: 7440060001X00)**
  60 W 24V/2.5A for NISE
AXE-5904
Point-to-Point 4-Axis Pulse Type Motion EtherCAT Slave Module

Main Features
- 4-Axis independent control and pulse output up to 4Mpps
- Pulse output options: CW/CCW, OUT/DIR
- 4 x Differential encoder interface, ABZ phase
- EtherCAT slave protocol communication
- Support CiA 402 device profile
- General purpose I/O: 12 DI

Product Overview
AXE-5904 is a 4-axis pulse type point-to-point motion EtherCAT slave module, featuring real-time EtherCAT communication and CiA 402 device profile for machine automation applications requiring high-speed and point-to-points function. With pulse type commands, AXE-5904 supports pulse output rate and encoder input up to 4MHz in 4 xAB phase mode and build-in dedicated I/O points for servo control and mechanism to facilitate building up whole machines.

Specifications
Pulse Type Motion Control
- Number of axes: 4
- Pulse output rate: up to 4Mpps
- Pulse command output: CW/CCW, OUT/DIR
- Committed I/O signal: LS±/CMP±/HS/SVON/RDY/INP/ALM/ARST/DCLR for each axis

Encoder Input
- Encoder input type: incremental, 32-bit
- Encoder signal: CW/CCW, AB/Z
- Positioning range: -2,147,483,648 through 2,147,483,647 pulse (32-bit)
- Max. input frequency: 4MHz

General I/O
- General-purpose input: 3 channel per axis
- Input type: photo-coupler input (corresponding to current sink output)
- Response time of DI (Max.): 100 μsec
- General-purpose output: 2 channel per axis
- Response time of DO (Max.): 100 μsec

Power Requirements
- DC input range: DC 24V ±10% with over-voltage and reversed-voltage protection

Common Section
- Data transfer medium: Ethernet cable (min CAT 5), shield
- Bus interface: 2 x RJ-45
- Data transfer rate: 100M baud
- Protocol: EtherCAT
- Device profile: CiA 402
- Operating temperature: 0°C~50°C
- Relative humidity:
  - 35~85%, non-condensation, operating
  - 10~90%, non-condensation, non-operating
- Shock: IEC 60068-2-27
- Vibration: IEC 60068-2-6, IEC 60068-2-64
- Enclosure type rating: IP00
- Mounting type: din-rail
- Dimension (mm): 120.1 x 188 x 55.6 (W x L x H)

Certifications
- CE
- FCC Class A
Ordering Information

- AXE-5904 (P/N: 10J40590400X0)
  Point-to-point 4-axis pulse type motion EtherCAT slave module
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