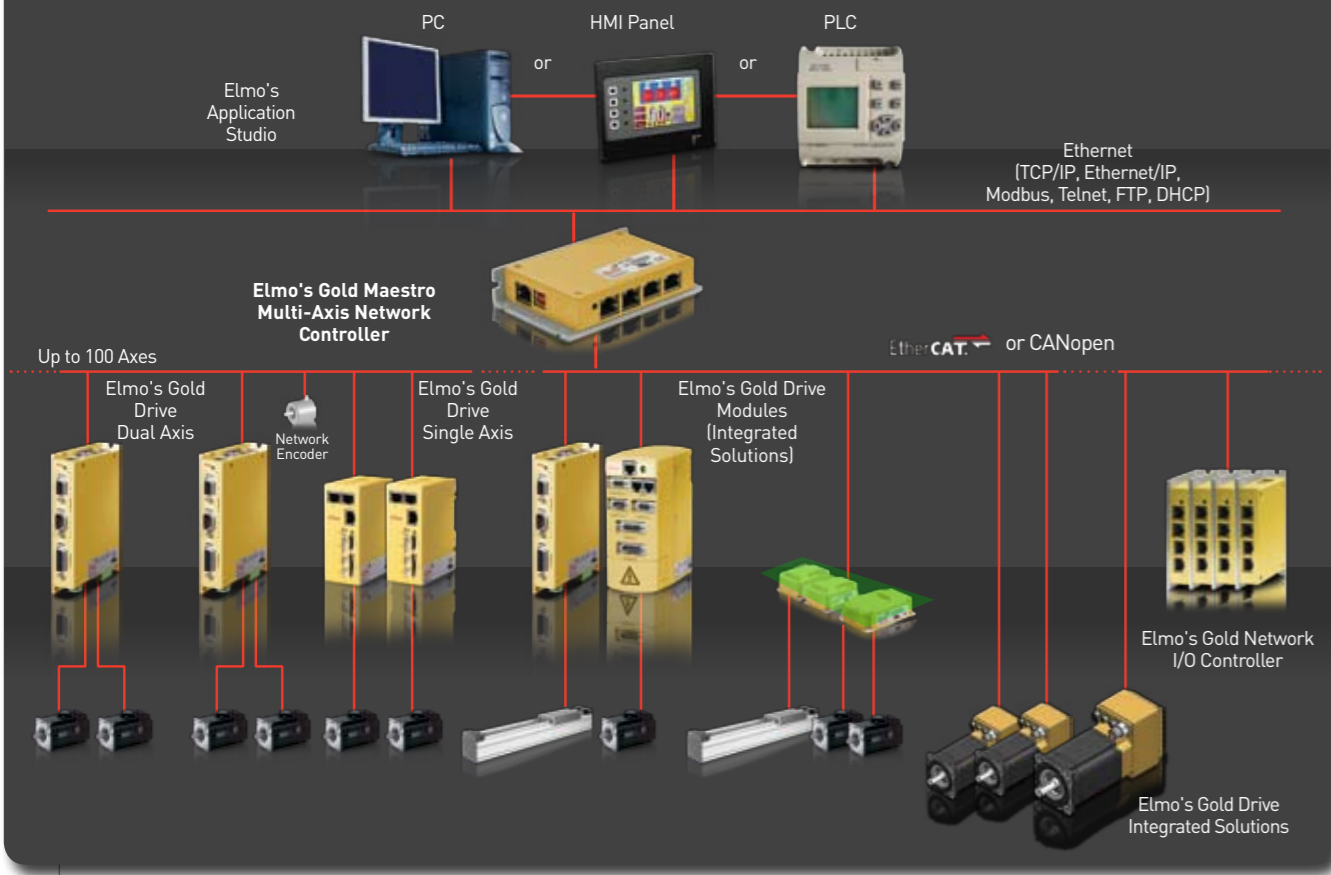


The Gold Distributed Network Elmo's Motion Control System Solutions



Elmo Application Studio

Get the Most Out of Your Application

The Elmo Application Studio (EAS) is a user-friendly application that was designed to meet the fundamental and uncompromising need for simple installation, setup and operation of the motion system and its components, each having many configurations, operational modes and parameters.

The software is designed for three user levels: Quick, Experienced and Expert, providing a trade-off between simplicity (Quick) and optimization (Expert). However, even for the Quick user level, which requires minimal involvement to configure and setup the system, the resulting performance is excellent.

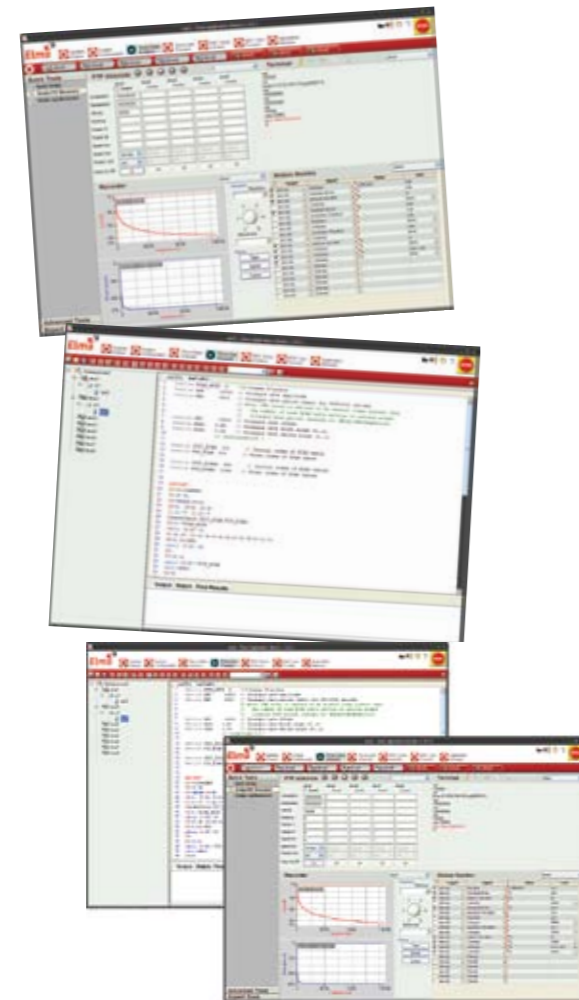
Benefit From Our Intuitive Software

The EAS provides a unified and intuitive user interface for all the tasks that are carried out during system development and operation. This includes system configuration, drive setup and tuning, drive and multi-axis programming, and handling of the overall application files.

Access the Tools You Need

Over two decades of experience in motion control systems were merged into the design of each screen, ensuring that each task is performed as easily and intuitively as possible. The interface design also incorporates access to all relevant controls and statuses, as well as relevant data recording and other tools.

The EAS is supplied with templates for common applications, ensuring rapid development time and optimal implementation of even the most complex applications.



Studio Gold

For more information on Elmo:

Head Office

Elmo Motion Control Ltd.
64 Gisin St., P.O. Box 463
Petach Tikva 49103
Israel
Tel: +972 (3) 929-2300
Fax: +972 (3) 929-2322
info-il@elmomc.com

North America

Elmo Motion Control Inc.
42 Technology Way, Nashua
NH 03060
USA
Tel: +1 (603) 821-9979
Fax: +1 (603) 821-9943
info-us@elmomc.com

Europe

Elmo Motion Control GmbH
Steinkirchring 1
D-78056,
Villingen-Schwenningen
Germany
Tel: +49 (0) 7720-85 77 60
Fax: +49 (0) 7720-85 77 70
info-de@elmomc.com

Asia

Elmo Motion Control Asia APAC
#807, Kofomo Building, 16-3
Sunae-dong, Bundang-gu,
Sungnam-si, Kyunggido,
South Korea
Tel: +82-31-698-2010
Fax: +82-31-698-2013
info-asia@elmomc.com

Elmo
Motion Control

www.elmomc.com

Elmo's Gold Line

Our Best Ever Motion Solutions



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Elmo
Motion Control

Motion Control Solutions Made Small, Smart & Simple

Elmo's Gold Line

Our Best Ever Motion Solutions



We used our golden touch to improve the best motion control solutions

As motion control applications grow in complexity, presenting new challenges and demands, the solutions that are developed must show a corresponding increase in intelligence and performance. Such solutions must be based on simplicity and ease of implementation so as to maintain a minimal learning curve and a short time-to-market. The Gold Line is Elmo's best ever response to the multi-level challenges posed by the marketplace.

Cutting Edge Motion Control Technology

The Gold Line is the result of more than 20 years of Elmo Motion Control's expertise and proven leadership in servo drive technology. After carrying out market research analysis and investing in intensive R&D efforts we can provide engineers and machine designers with the latest in cutting edge motion control

technology. Each Gold Line component has been carefully specified and designed to seamlessly integrate within the overall Gold Line system. Seamless connectivity (communications, feedback and I/Os), high performance and ease of operation are the main characteristics of each member of the Gold Line.

- **One environment, one solution:** Develop your solution in one, seamless motion control environment.
- **One solution, any application:** Our motion control solutions can be applied to any application or machinery.
- The most comprehensive motion control solutions.
- The only complete networking motion solution that is "ready to use". Our package of essential motion control elements work in harmony and include a sophisticated multi-axis controller, a full line of advanced servo drives and a network I/O controller.
- **The Gold Maestro:** A high performance multi-axis motion controller for networks with a distributed motion control architecture that enables the motion processing tasks to be shared with the servo drives. This creates a faster and more efficient motion control environment.
- **Elmo Application Studio (EAS):** User-friendly software that allows your motion control system to be implemented quickly and easily.
- **Small, Smart & Simple:** The Gold Line of servo drives significantly enhances the on-board intelligence and they operate at higher speeds with higher accuracy to provide better performance and results. All this while remaining true to Elmo's motto of Small, Smart & Simple.
- **Distributed Intelligence with Smart Nodes:** These characteristics enable Elmo to offer the best Load-Motor-Drive performance while lowering the load of communications traffic.



Gold Line Motion Control System Characteristics

Answering Your Needs

One solution, any application: with Elmo's Gold Line we have the solution for your system challenges. The Gold Line components' synergy, distributed intelligence and variety of features are easily harnessed to create your system and to answer your needs. The built-in operational simplicity of each component and the entire system, combined with an innovative single software environment to interface and control all units, ensure the fastest time-to-market and the highest performances.

Applications

The Gold Line delivers optimal results for a wide range of motor control applications in a variety of challenging industries where precision and deterministic operation are paramount.

Industrial Applications

- Robotics
- Semiconductor production
- Lab automation
- Electronic assembly
- Entertainment
- Avionics
- Machine tools
- Packaging
- Wood processing
- Textiles
- Medical and pharmaceutical instruments
- Printing
- Sorting
- Material handling

For Extreme Environmental Conditions

- Military ground mobile
- Naval
- Nautical
- Aviation
- Aerospace
- Missile Weaponry
- Oil Refining
- Unmanned Vehicles
- Satellite Communications

- regulations.
- High current isolated and grouped I/Os.
- Isolated and fast I/Os
- High bandwidth communications channels to the host: Ethernet (with variety of standard protocols), USB
- Standard communications channels: CoE, EoE, Modbus, Ethernet/IP

Your Safety is our Priority

As a result of the increased usage of complex control systems in the automation industry, the demand for safety features integrated within the power drives' systems plays an increasing role. Elmo's Gold Line Servo Drives are designed to meet the most exacting safety standards. With dedicated hardware implementation,

combining two full redundant paths, each of the Gold Line Drives complies with:

- IEC 61800-5-2, Safe Torque Off (STO)
- UL 508c
- UL 60950
- CE EMC Directive.

A variety of additional hardware and software features enhance the axis level safety by verifying and ensuring that the various feedbacks and the drive's operating conditions are within both the driver's and the motor's specifications.

Ensuring Optimal Performance

The Gold Line is designed to enable the easy implementation of system-wide solutions, even for the most demanding applications. However, for all applications the motor and its load must always be taken into account to ensure optimal performance in various types of motion and requirements (constant speed, settling time, tracking, stability, etc.) The Gold Line Servo Drives are designed to answer these needs using a very powerful computation core with state-of-the-art control algorithms, most of them with automatic tuning.

- Sampling time as low as 80 µs for the position and velocity loops and as low as 40 µs for vector control.
- Gain scheduling (control filter parameters) as a function of speed and position.
- 1/T velocity sensing for ultra-accurate velocity measurement (used by the velocity control loop).
- Advanced position and velocity control filter, including multiple second order and B-Quad filters.
- Vector current control.
- Cogging, BEMF and friction compensation.
- Phase advance.
- Proprietary power switching technology.

Synchronized Motion

The Gold Maestro, the Gold Line multi-axis motion controller, supports the PLCopen motion library. Up to 16 axes can be synchronized, with a cycle time as low as 500 µs (EtherCAT).

Communications and Standard Protocols

Speed and Reliability

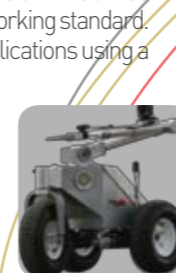
The Gold Line supports EtherCAT for highly demanding applications, enabling fast, reliable and deterministic communication for up to 100 drives, with built-in distributed clock implementation (jitter of less than 1µs) and optional communication redundancy. The Gold Line uses the standard CoE protocol for the EtherCAT channel. CAN (CANopen version 3.0) is supported by the Gold Line products. The Gold Maestro also supports CANopen 2.0 to enable compatibility with Elmo's SimplIQ family of products.

Ethernet, with a variety of standard protocols, is used to connect the Gold Maestro to the machine's host computer, PLC or HMI.

EtherCAT & CANopen Networking

The Gold Maestro network controller and Gold Line of Elmo drives support EtherCAT, the industry's emerging networking standard. This allows fast, real-time multi-axis control applications using a distributed control topology.

EtherCAT Technology Group or CANopen



Gold Line Products

Gold Maestro

Features

- Distributed Multi-Axis Network Controller
- High performance multi-axis controller.
- Controls up to 100 axes with a high level of synchronization and accuracy.
- EtherCAT real-time device networking (CoE).
- CANopen DS-301, DS-305, DS-401 (I/O device profile), DS-402 (Drives and motion control device profile)
- Fast and efficient program execution with a large amount of memory:
 - Native application "C" programming on the target
 - IEC 61131-3, PLCopen
- PLCopen motion API
- Isolated communications:
 - Ethernet/EtherCAT
 - CAN bus
- Large variety of host communication protocols:
 - Ethernet, TCP/IP, UDP (fast binary protocols, Modbus, Ethernet/IP, Telnet, FTP, HTTP)
 - USB 2.0
- Real-time extension for the Linux operating system.
- Application templates for common applications.
- Very compact, space saving package.
- Mounting options: panel mount, board mount and embedded core (soldering)
- Cost effective.
- DC powered: 12 V to 196 V



Gold Maestro
115 x 25 x 75 mm
(4.53" x 1" x 2.95")



Gold Trombone
110 x 75 x 30 mm
(4.33" x 2.95" x 1.18")



Gold Guitar
80 x 61 x 31 mm
(3.15" x 2.4" x 1.22")



Gold Duo
105 x 150 x 25.4 mm
(4.13" x 5.91" x 1")

Gold Servo Drives

Features

- Many enhancements to Elmo's current range of small, smart and simple servo drives.
- Better servo performance with wider and more stable bandwidth, as a result of improved processing capabilities.
- Advanced linear and non-linear control schemes for reliably handling mechanical load limitations.
- Very fast control loop sampling time: current loop as low as 40 µs, position and velocity loops as low as 80 µs.
- 1:2:2 (current/velocity/position) control topology for wider position bandwidth.
- More efficient and user friendly tuning.
- Three levels of tuning scenarios for simplicity and optimal results.
- Full EtherCAT implementation.
- CANopen DS-301, DS-305, DS-402 (v3.0)
- Any feedback sensor:
 - Quad encoders, Analog Sin/Cos Encoders, Digital Halls, Analog Halls, Resolver, Absolute Serial Encoders [EnDAT 2.2, BiSS/SSI, Panasonic, Tamagawa, Mitutoyo, Hiperface]
- 3 sensor ports, 2 sensor inputs and a third port for output (emulation) and/or input
- Enhanced dual loop capabilities.
- New programming environment: faster with 64 KB STD program memory
- More sophisticated protection to ensure long lasting reliability.
- High current, high voltage IEC 61131-2 outputs for dedicated and generic functionality.
- Safety:
 - IEC 61800-5-2, Safe Torque Off (STO)
 - UL 508c recognition
 - UL 60950 compliance
 - Compliance with the CE EMC Directive

Gold Network I/O Controller

Features

- Stand-alone networking I/O module
- Supports EtherCAT and CANopen
- DS-301, DS-305, DS-401
- 16 digital inputs:
 - Divided into 2 groups.
 - Optically isolated.
 - PLC compatible.
- 10 digital outputs, IEC 61131-2 compatible:
 - 2 high current outputs of up to 2 A
 - 8 high current outputs of up to 250 mA
 - Short and overload protection.
- 4 analog inputs:
 - 2 high resolution [14 bits] ±10 V
 - 2 high resolution PLC 4-20 mA inputs
 - Option for temperature sensor inputs.
- Any feedback sensor:
 - Quad encoders, Analog Sin/Cos Encoders, Analog Halls, Resolver, Absolute Serial Encoders [EnDAT 2.2, BiSS/SSI, Panasonic, Tamagawa, Mitutoyo, Hiperface]
- Encoder to network communication conversion.
- Compact size.
- Very cost effective.