Selection Guide

copley
controls
Analogic Motion Control

Copley Controls

About Copley

Copley Controls delivers high performance motion solutions to a wide range of industries including semiconductor, life sciences, test and measurement automated assembly, and COTS military. An ISO 9001:2008 company, Copley produces products of the highest quality in state-of-the-art manufacturing facilities in the US and China. Copley drives carry a full 2-year warranty.

With over 25 years of experience in OEM partnerships, Copley's application team combines with R&D to deliver world-class, highly responsive support. Our global commitment is backed with sales offices and local technical resources in the US, Europe and Asia.

As part of Analogic Corporation, Copley Controls has the buying power and resources to compete long term in the global marketplace. Our OEM commitment has stood the test of time with many models in production for well over a decade.

Servo & Stepper Drives

From networked servo and stepper drives to traditional torque amplifiers, Copley has the solution for your system architecture. Both AC- and DC-powered drives with flexible packaging options are offered in the 100W - 6kW power range. A comprehensive range of motor feedback interfaces is provided. Advanced tuning and commutation algorithms maximize motor performance.

Ruggedized versions of select servo drives are available for COTS military applications. Built to withstand extremes of temperature and vibration with conformal coating for humidity tolerance, the Copley R-Series delivers reliable performance in the harshest environments.

Configuration & Control Software

Copley drive configuration software is highly intuitive and incorporates powerful diagnostic tools. An easy-to-use Indexer is built in. For more complex applications, a flexible high-level language is provided with powerful editing and debugging capabilities.

Network software tools make multi-axis control system commissioning fast and simple. Proven Copley source code for the control and management of both EtherCAT and CANopen networks facilitates application implementation. Migration from CANopen to EtherCAT is straightforward and seamless.
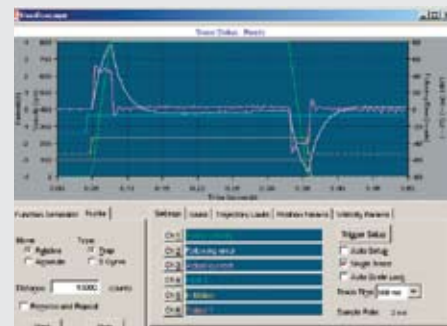
Custom Drives and Motion Subsystems

Copley provides competitive advantage to the OEM by tailoring designs to precisely fit the application. Copley development engineers and application team will work closely with you to define your requirements and deliver a just-right solution.

Customization can be as simple as special I/O functions or as complex as a multi-axis drive package. Software customization includes application-specific indexer functions, control filters and specialized analysis and diagnostic tools.

In addition to customized drives, Copley's motion subsystem design and manufacturing capability can significantly reduce time to market while freeing-up key OEM resources to focus on core design issues. Copley's expertise in power and thermal management as well as experience in the accelerated life test of complex subsystems guarantee lowered cost of ownership. Optimized motion subsystem design ensures the highest level of performance in the smallest footprint.

System Connectivity

CONTROL

PC Architecture

Copley drives connect seamlessly to both CANopen and EtherCAT - the networks of choice for PC-based systems. Copley drives are also integrated into third-party software tools such as CoDeSys SoftMotion, enabling complete PC-based multi-axis motion control solutions.

Motion Controllers

Both the traditional ±10 V and PWM current/velocity command interfaces are built-in on all drives. For Delta Tau motion controllers, MACRO drives enable an optimal motion control system solution.

PLC Systems

Control via PLCs is facilitated by a step/direction interface as well as I/O selection and execution of predefined indexer programs. An ASCII command interface is also available.

FEEDBACK

Incremental Encoders

Digital incremental encoder and Halls are the standard interface on all drives with position mode capability. Xenus and Accelnet feature an analog encoder option and incorporate a wake-and-wiggle algorithm for commutation without Halls.

Absolute Encoders

Select Copley drives are available with a range of open standard absolute encoder interfaces including BiSS, SSI, Absolute A and EnDat.

Resolvers

Resolvers are the feedback of choice for rugged environments. Available as an option on Xenus and Accelnet, Copley's proprietary interface delivers 14-bit resolution up to 10,000 RPM.

NETWORKS

CANopen

CANopen is a highly cost-effective implementation of distributed control. In PVT mode, the drive accepts tightly synchronized position/velocity/time points. In profile mode, the drive executes a move based on pretransmitted parameters. CANopen also accomodates velocity and torque modes.

Copley provides comprehensive hardware and software tools for CANopen. Single and dual channel PCIe CAN cards and USB-CAN converters are available. An I/O Processor Module enables OEMs to design optimal system interfaces and integrate them seamlessly into a CANopen network.

EtherCAT

EtherCAT is an open, real-time Ethernet network. Fast and deterministic, EtherCAT supports a variety of network topologies including line, tree and star. EtherCAT leverages standard CANopen device profiles, facilitating migration to an Ethernet based system. Copley drives are conformance tested to be fully EtherCAT compliant and can be easily integrated into any EtherCAT network. Cyclic Syncnchronous position, velocity and torque modes with distributed clocks deliver sub-µsec drive synchronization.
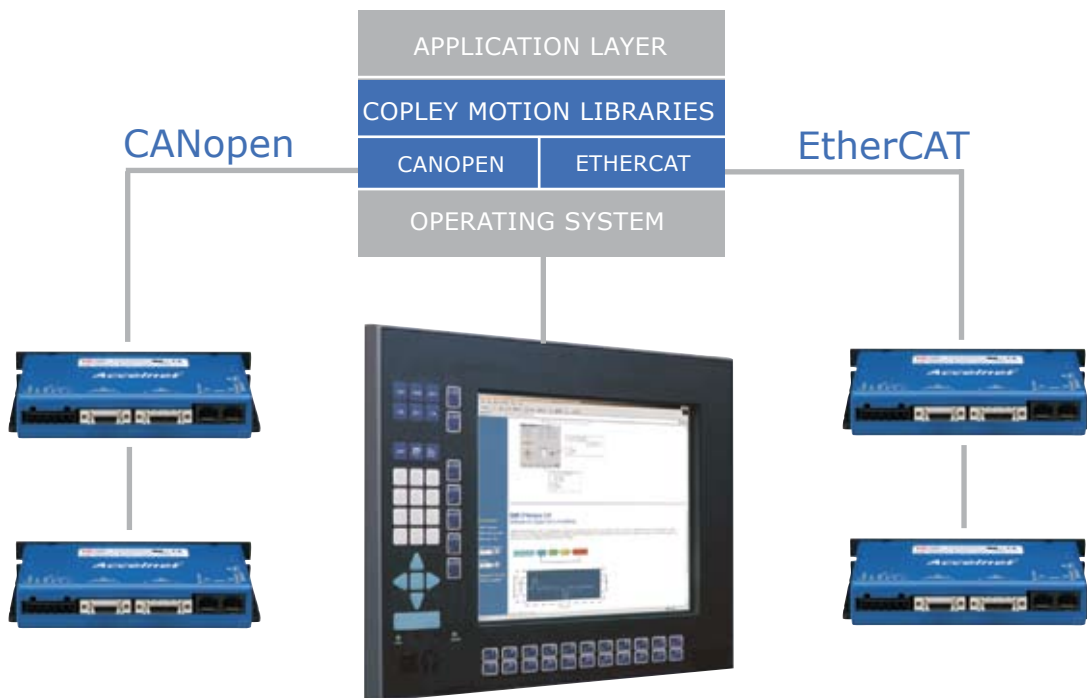
MACRO

Designed for Delta Tau controllers, MACRO is Ethernet based and available with a fiber optic physical layer for optimal noise immunity. MACRO is typically used in a centralized control architecture with position and velocity loops closed in the motion card.

RS-232 ASCII and Serial Binary

RS-232 is used for point-to-point motion in both PLC and PC-based systems. Drives operate as Indexers or execute moves based on pretransmitted parameters. Multiple axes can be addressed via a transparent CANopen connection between drives.

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Software Tools

APPLICATION LAYER

COPLEY MOTION LIBRARIES

CANopen   CANOPEN | ETHERCAT   EtherCAT

OPERATING SYSTEM

Networking Software

Copley distributed control software makes system commissioning fast and simple. The development of low-level code to control a CANopen or EtherCAT network is eliminated. All network management is accomplished with a few simple commands linked into your application program.

The application program interacts with amplifier "objects." Amplifier objects are in turn connected to EtherCAT or CANopen objects. This means that a program written for one network can easily be ported to another network without changing the basic program.

Copley supports two development environments. Copley Motion Libraries (CML) source code can be compiled with a C++ application program. Copley Motion Objects (CMO) is a .NET® assembly that can be used by Visual Studio® or any program supporting the .NET® framework.

Network Management
• Configuration and startup
• Synchronization
• Node guarding
• Message generation
• Heartbeat
• Error management

Motion Control
• Path planning
• PVT generation
• Profile execution
• PVT buffer management

General
• Parameter set/get
• Setup file download
• Drive fault handling
• I/O interfacing

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High Level Language

Copley Programming Language (CPL) is a powerful, flexible OEM programming environment for PLUS versions of Copley drives. Combining the best features of BASIC, C, and Java, CPL incorporates a rich set of motion system calls. Data types are extensive and include arrays and structures. The availability of both local and global variables enables well-structured code development.

CPL is based on the Netbeans Platform IDE, featuring an intuitive source code editor and powerful debugger. Project templates are provided for easy startup along with a comprehensive collection of example code. For real-time analysis, CME 2 diagnostic tools can run simultaneously.

Configuration

Java based CME 2 configuration software is powerful and intuitive. Comprehensive diagnostics, auto-tuning, frequency response analysis and advanced oscilloscope tools simplify system commissioning.

Auto-phasing eliminates the time-consuming rewire-and-try procedure for encoder/Halls/motor connections. CME 2 automatically compensates for crossed wires - the most common cause of startup headaches.
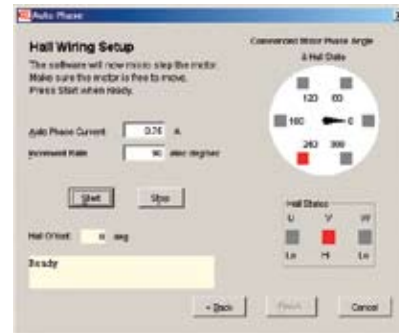
Easy-to-Use Indexer

For simpler applications, Copley provides a very easy-to-use indexer. Just point-and-click to define up to 32 indexes or index sequences. Index sequences can include parameter changes, dwell times and I/O control. Simply select the index/sequence and command GO.

Any parameter (e.g., move distance) can be assigned to a register for efficient adjustment by a PLC. For further simplification, Copley can also provide custom functions. Just install and fill in the blanks.

Cam Tables

Camming is an effective way to produce repetitive motion synchronized to an external device. A predefined cam table of slave positions is typically cycled through by a master encoder connected to the drive. The drive performs linear interpolation between points to minimize cam table size.

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Digital Drive Overview

The **PLUS** Advantage

Copley offers a complete range of AC- and DC-powered digital drives for servo and stepper motors. DC-powered drives can be panel or PCB mounted. Xenus, Accelnet and Stepnet feature CANopen for distributed control. **PLUS** versions incorporate EtherCAT as well as CANopen and offer expanded feedback options. Metal enclosures ensure the highest level of noise immunity. Multi-axis versions deliver the lowest cost per node. **PLUS** drives feature high resolution A/D converters for optimal current control as well as fast, hardware-based position capture and setpoint trigger output. M-Series modules have the flexibility to control both servo and stepper motors.

Feature	Xenus	Accelnet	Stepnet	M-Series	Accelus	Junus
Motor	Servo	Servo	Stepper	Servo/Stepper	Servo	Brush Servo
Input Power	100-240 VAC	20-180 VDC	VAC, VDC	14-90 VDC	20-180 VDC	20-180 VDC
Continuous Current	1-20 A	1-30 A	2-10 A	3-5 A	3-12 A	5-15 A
Incremental Encoder	•	•	•	•	•	
Absolute Encoder	PLUS	PLUS	PLUS	M3		
Analog Encoder	•	•		M3		
Resolver	•	•				
Ruggedized Version	•	•	•			
CANopen	•	•	•	•		
EtherCAT	PLUS	PLUS	PLUS	•		
MACRO	PLUS	•				
Safe Torque Off	PLUS	PLUS Panels	PLUS Panels			
CPL Programming	PLUS	PLUS	PLUS	•		
Indexer	•	•	•	•		
Gearing/Camming	•	•	•	•	•	
Step/Direction	•	•	•	•	•	
PWM velocity/current	•	•	•	•	•	•
±10V velocity/current	•	•	•	•	•	•

Custom Drive Designs

A broad spectrum of technology expertise enables Copley to respond rapidly and cost-effectively to OEM needs. Custom capabilities include:

- Optimized Packaging: connectors and form factor
- Power Ratings: custom current and voltage
- Multi-Axis: 2-4 axis packages
- Java Beans: custom indexer functions
- Feedback: special encoders
- Enhanced Firmware: custom compensation filters
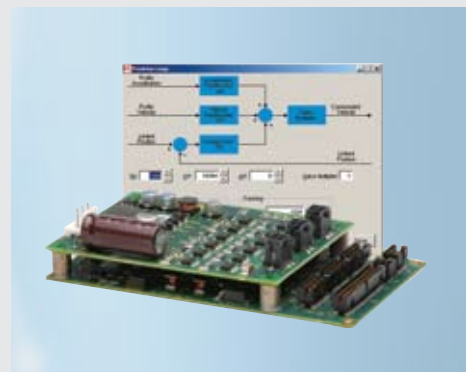
Safe Torque Off

The Safe Torque Off capability of **PLUS** Panel drives eliminates the expensive contactors and complex wiring traditionally used in safety critical applications. Safe Torque Off provides two drive enable inputs facilitating system conformance to SIL 3 (IEC 61800-5-2) and Category 3 PLd (ISO 13849-1).

Technology Edge

Field Oriented Control
• Optimal orientation of magnetic field
• Motors run faster and cooler

Servo & PWM Performance
• High-bandwidth nested loops
• Biquad filter for notch or low pass flters
• High-efficiency dynamic PWM
• Edge filter accessories for low emissions

Stepper Technology
• Smooth, low audible noise
• Precision microstepping, low resonance
• Servo mode for closed loop control
• Detent torque compensation

AC Powered

DC Powered

Ruggedized Drives

R-Series drives are ruggedized versions of Xenus and Accelnet. Designed to endure temperature extremes, high humidity, vibration and shock, the R-Series finds application in COTS military, nautical, aviation, oil refining and vehicle-based systems.

Ambient Temp.	-40ºC to 70ºC
Thermal Shock	-40ºC to 70ºC in 1 minute
Relative Humidity	95% non-condensing at 60ºC
Vibration	5 Hz to 500 Hz, up to 3.85 $g$rms
Altitude	-400 m to 5,000 - 16,000 m
Shock	40 g peak acceleration
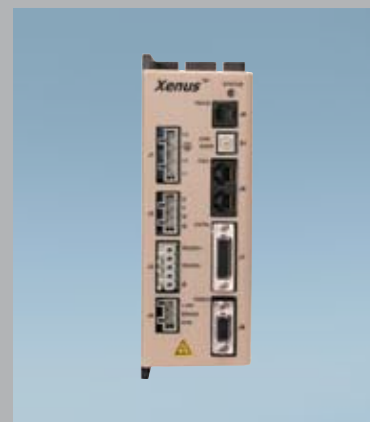
Xenus^{PLUS} Panel - *Servo*

XEC, XPC Panel

Model	VAC	Ic	Ip
X*C-230-09	100-240	3	9
X*C-230-12	100-240	6	12
X*C-230-15	100-240	7.5	15

XEL, XPL Panel

Model	VAC	Ic	Ip
X*L-230-18	100-240	6	18
X*L-230-36	100-240	12	36
X*L-230-40	100-240	20	40

XE2, XP2 Panel 2-Axis

Model	VAC	Ic	Ip
X*2-230-20	100-240	10	20

Xenus^{PLUS} AC-powered drives are available in both EtherCAT and CANopen versions. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including EnDat, BiSS, Absolute A and SSI. Safe Torque Off functionality reduces system cost in safety critical applications.

Control Modes
• CPL, Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• EtherCAT CoE DS-402 [XEC, XEL, XE2]
• CANopen DS-402 [XPC, XPL, XP2]
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• BiSS, SSI, Absolute A, EnDat encoders
• Panasonic, Tamagawa, Sanyo Denki
• Analog sin/cos encoder
• Resolver [-R option]
• Aux. encoder / encoder out

Functional Safety
• Safe Torque Off [see datasheet for certifications]

I/O
• Digital X*C: 11 inputs, 5 outputs
• Digital X*L: 15 inputs, 6 outputs
• Digital X*2: 22 inputs, 7 outputs
• Analog X*C: 1 12-bit input
• Analog X*L: 2, 16-bit inputs; 1, 12-bit output
• Analog X*2 2, 14-bit inputs

Regen
• X*C, X*2: built-in regen resisitor
• X*L: external regen resistor accessory

Dimensions: mm [in]
• X*C: 191 x 120 x 54 [7.5 x 4.7 x 2.1]
• X*L: 201 x 145 x 59 [7.9 x 5.7 x 2.3]
• X*2: 235 x 143 x 91 [9.3 x 5.6 x 3.6]

Xenus Panel - *Servo*

XTL Panel*

Model	VAC	Ic	Ip
XTL-230-18	100-240	6	18
XTL-230-36	100-240	12	36
XTL-230-40	100-240	20	40

XSJ Micro Panel*

Model	VAC	Ic	Ip
XSJ-230-02	100-240	1	2
XSJ-230-06	100-240	3	6
XSJ-230-10	100-240	5	10

Xenus is available in two AC line operated compact packages delivering power up to 6 kW. A +24Vdc input powers control circuits, ensuring keep-alive operation. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with optional resolver and analog encoder interfaces.

Control Modes
• Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• CANopen DS-402
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• Analog sin/cos encoder [-S option]
• Resolver [-R option]
• Aux. encoder / encoder out

I/O - Digital
• XTL: 12 inputs, 4 outputs
• XSJ: 14 inputs, 4 outputs

Regen
• XTL: internal transistor, external resistor
• XSJ: internal dissipation

Accessories
• External regen resistors
• External edge filter

Dimensions: mm [in]
• XTL: 191 x 146 x 65 [7.5 x 5.7 x 2.5]
• XSJ: 126 x 89 x 53 [5.0 x 3.5 x 2.1]

*Available ruggedized

Accelnet^{PLUS} Panel - *Servo*

BEL, BPL 1-Axis

Model	VDC	Ic	Ip
B*L-090-06	14-90	3	6
B*L-090-14	14-90	7	14
B*L-090-30	14-90	15	30

BE2, BP2 2-Axis

Model	VDC	Ic	Ip
B*2-090-06	14-90	3	6
B*2-090-14	14-90	7	14
B*2-090-20	14-90	10	20

Accelnet^{PLUS} sets new levels of performance and is available in both EtherCAT and CANopen versions. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including BiSS, SSI, Absolute A and EnDat. Higher-resolution current loops enable Accelnet^{PLUS} to meet the needs of the most demanding applications. Safe Torque Off functionality reduces system cost in safety critical applications.

Control Modes
- CPL, Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

Command & Communications
- EtherCAT CoE DS-402 [BEL, BE2]
- CANopen DS-402 [BPL, BP2]
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10V position/velocity/torque
- PWM velocity/torque
- Master encoder

Feedback
- Incremental encoder & digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Resolver [-R option]
- Aux. encoder / encoder out

Functional Safety
- Safe Torque Off [see datasheet for certifications]

I/O
- Digital B*L: 11 inputs, 4 outputs
- Digital B*2: 18 inputs, 7 outputs
- Analog: one 12-bit input per axis

Dimensions: mm [in]
- B*L: 129 x 92 x 51 [5.1 x 3.6 x 2.0]
- B*2: 172 x 124 x 44 [6.8 x 4.9 x 1.7]

Accelnet^{PLUS} Module - *Servo*

AEM, APM 1-Axis

Model	VDC	Ic	Ip
A*M-090-06	14-90	3	6
A*M-090-14	14-90	7	14
A*M-090-30	14-90	15	30
AEM-180-20	40-180	10	20

AE2, AP2 2-Axis

Model	VDC	Ic	Ip
A*2-090-06	14-90	3	6
A*2-090-14	14-90	7	14
A*2-090-30	14-90	15	30

Accelnet^{PLUS} Modules deliver high performance in two compact PCB-mounted packages. EtherCAT and CANopen versions are available. Multi-axis models deliver optimal cost per node. A wide range of absolute encoder interfaces are built-in, including BiSS, SSI, Absolute A and EnDat. Higher-resolution current loops enable Accelnet^{PLUS} to meet the needs of the most demanding applications.

Control Modes
• CPL, Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• EtherCAT CoE DS-402 [AEM, AE2]
• CANopen DS-402 [APM, AP2]
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• BiSS, SSI, Absolute A, EnDat encoders
• Panasonic, Tamagawa, Sanyo Denki
• Analog sin/cos encoder
• Aux. encoder / encoder out

I/O
• Digital A*M: 11 inputs, 6 outputs
• Digital A*2: 20 inputs, 7 outputs
• Analog: one 12-bit input per axis

Dimensions: mm [in]
• A*M: 77 x 59 x 20 [3.0 x 2.3 x 0.8]
• A*2: 114 x 73 x 20 [4.5 x 2.9 x 0.8]

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Accelnet Panel - *Servo*

ADP Panel*

Model	VDC	Ic	Ip
ADP-055-18	20-55	6	18
ADP-090-09	20-90	3	9
ADP-090-18	20-90	6	18
ADP-090-36	20-90	12	36
ADP-180-09	20-180	3	9
ADP-180-18	20-180	6	18
ADP-180-30	20-180	15	30

ACJ Micro Panel*

Model	VDC	Ic	Ip
ACJ-055-09	20-55	3	9
ACJ-055-18	20-55	6	18
ACJ-090-03	20-90	1	3
ACJ-090-09	20-90	3	9
ACJ-090-12	20-90	6	12

Accelnet is available in two DC-powered panel-mounted packages. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with optional resolver and analog encoder interfaces.

Control Modes
• Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• CANopen DS-402
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• Analog sin/cos encoder [-S option]
• Resolver [-R option]
• Aux. encoder / encoder out

I/O - Digital
• ADP: 12 inputs, 3 outputs
• ACJ: 9 inputs, 4 outputs

Dimensions: mm [in]
• ADP: 168 x 104 x 30 [6.6 x 4.1 x 1.2]
• ACJ: 97 x 63 x 33 [3.8 x 2.5 x 1.3]

*Available ruggedized

Accelnet Module - *Servo*

ACM Module*

Model	VDC	Ic	Ip
ACM-055-18	20-55	6	18
ACM-090-09	20-90	3	9
ACM-090-24	20-90	12	24
ACM-090-60	20-90	30	60
ACM-180-09	20-180	3	9
ACM-180-18	20-180	6	18
ACM-180-20	20-180	10	20

ACK Micro Module*

Model	VDC	Ic	Ip
ACK-055-06	14-55	3	6
ACK-055-10	20-55	5	10
ACK-090-04	14-90	2	4
ACK-090-08	20-90	4	8
ACK-090-30	14-90	15	30

Accelnet Modules are available in two compact DC-powered PCB-mounted packages for optimal OEM flexibility. Control interfaces include CANopen as well as traditional analog commands. Incremental encoder feedback is standard with an optional resolver interface.

Control Modes
• Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• CANopen DS-402
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• Resolver [-R option]

I/O - Digital
• ACM: 10 inputs, 2 outputs
• ACK: 10 inputs, 3 outputs

Dimensions: mm [in]
• ACM: 102 x 71 x 25 [4.0 x 2.8 x 1.0]
• ACK: 64 x 41 x 21 [2.5 x 1.6 x 0.8]

*Available ruggedized

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Stepnet^{PLUS} Panel - *Stepper*

TEL 1-Axis

Model	VDC	Ic	Ip
TEL-090-07	14-90	5	7
TEL-090-10	14-90	10	10

TE2, TP2 2-Axis

Model	VDC	Ic	Ip
T*2-090-07	14-90	5	7
T*2-090-10	14-90	10	10

Stepnet^{PLUS} sets new levels of performance and is available in both EtherCAT and CANopen versions. Multi-axis models provide optimal cost per node. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling. A wide range of absolute encoder interfaces are built-in, including BiSS, SSI, Absolute A and EnDat.

Control Modes
• CPL, Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque [Servo Mode]
• Position [Microstepping]

Command & Communications
• EtherCAT CoE DS-402 [TEL, TE2]
• CANopen DS-402 [TP2]
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder [Servo Mode]
• BiSS, SSI, Absolute A, EnDat encoders
• Analog sin/cos encoder

Functional Safety
• Safe Torque Off [see datasheet for certifications]

I/O
• Digital TEL: 11 inputs, 4 outputs
• Digital T*2: 24 inputs, 7 outputs
• Analog: one 12-bit input per axis

Dimensions: mm [in]
• TEL: 129 x 92 x 51 [5.1 x 3.6 x 2.0]
• T*2: 172 x 124 x 44 [6.8 x 4.9 x 1.7]

Stepnet^{PLUS} Module - *Stepper*

SEM, SPM 1-Axis

Model	VDC	Ic	Ip
S*M-090-07	14-90	5	7
S*M-090-10	14-90	10	10

SE2, SP2 2-Axis

Model	VDC	Ic	Ip
S*2-090-07	14-90	5	7
S*2-090-10	14-90	10	10

SE4, SP4 4-Axis

Model	VDC	Ic	Ip
S*4-055-03	14-55	3	3

Stepnet^{PLUS} Modules deliver high performance in two compact PCB-mounted packages. EtherCAT and CANopen versions are available. Multi-axis models provide optimal cost per node. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling. A wide range of absolute encoder interfaces are built-in, including BiSS, SSI, Absolute A and EnDat.

Control Modes
• CPL, Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque [Servo Mode]
• Position [Microstepping]

Command & Communications
• EtherCAT CoE DS-402 [SEM, SE2, SE4]
• CANopen DS-402 [SPM, SP2, SP4]
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder [Servo Mode]
• BiSS, SSI, Absolute A, EnDat encoders [S*M, S*2]

I/O
• Digital S*M: 11 inputs, 6 outputs
• Digital S*2: 26 inputs, 7 outputs
• Digital S*4: 24 inputs, 8 outputs
• Analog: one 12-bit input per axis [S*M, S*2]

Dimensions: mm [in]
• S*M: 77 x 59 x 20 [3.0 x 2.3 x 0.8]
• S*2: 114 x 73 x 20 [4.5 x 2.9 x 0.8]
• S*4: 102 x 76 x 21 [4.0 x 3.0 x 0.8]

Stepnet Panel

STX Panel

Model	VAC	Ic	Ip
STX-115-07	100-120	5	7
STX-230-07	200-240	5	7

STP Panel

Model	VDC	Ic	Ip
STP-075-07	20-75	5	7
STP-075-10	20-75	10	10

The Stepnet Panel family comprises both AC- and DC-powered versions. Control interfaces include CANopen as well as traditional Step/Direction inputs. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling.

Control Modes
• Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque [Servo Mode]
• Position [Microstepping]

Command & Communications
• CANopen DS-402
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque [STX]
• PWM velocity/torque [Servo Mode]
• Master encoder

Feedback
• Incremental encoder [Servo Mode]

I/O - Digital
• 12 inputs, 4 outputs

Dimensions: mm [in]
• STX: 146 x 119 x 55 [5.7 x 4.7 x 2.2]
• STP: 136 x 89 x 42 [5.4 x 3.5 x 1.7]

Stepnet Module

STM Module

Model	VDC	Ic	Ip
STM-075-07	20-75	5	7

STL Micro Module

Model	VDC	Ic	Ip
STL-055-04	20-55	3	4.5
STL-075-03	20-75	2	3

The Stepnet Modules provide optimal OEM installation flexibility. Control interfaces include CANopen as well as traditional Step/Direction inputs. Microstepping delivers smooth, low-resonance performance. In Servo Mode, with encoder feedback, stepper motors run quietly and can operate at higher speeds without stalling.

Control Modes
- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque [Servo Mode]
- Position [Microstepping]

Command & Communications
- CANopen DS-402
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10V position/velocity/torque [STM]
- PWM velocity/torque
- Master encoder

Feedback
- Incremental encoder [Servo Mode]

I/O - Digital
- STM, STL: 12 inputs, 4 outputs

Dimensions: mm [in]
- STM: 102 x 70 x 25 [4.0 x 2.8 x 1.0]
- STL: 64 x 41 x 16 [2.5 x 1.6 x 0.6]

M Series - *Servo/Stepper*

ME3, MP3 3-Axis

Model	VDC	Ic	Ip
M*3-090-10	14-90	5	10

ME4, MP4 4-Axis

Model	VDC	Ic	Ip
M*4-055-03	14-55	3	3

M-Series PCB-mounted modules have the flexibility to drive both servo and stepper motors. EtherCAT and CANopen versions are available. The 3-axis M3 and 4-axis M4 deliver extremely low cost per node. Incremental encoder feedback is standard. The M3 also incorporates a wide range of absolute encoder interfaces, including BiSS, SSI, Absolute A, EnDat.

Control Modes
• CPL, Indexer, Point-to-Point, PVT, PT
• Camming, Gearing
• Position, Velocity, Torque

Command & Communications
• EtherCAT CoE DS-402 [ME3, ME4]
• CANopen DS-402 [MP3, MP4]
• RS-232 ASCII & Serial Binary
• Step/Direction, Step Up / Step Down
• ±10V position/velocity/torque
• PWM velocity/torque
• Master encoder

Feedback
• Incremental encoder & digital Halls
• BiSS, SSI, Absolute A, EnDat encoders [M*3]
• Panasonic, Tamagawa, Sanyo Denki [M*3]
• Analog sin/cos encoder [M*3]
• Aux. encoder / encoder out

I/O
• Digital M*3: 19 inputs, 6 outputs
• Digital M*4: 20 inputs, 7 outputs
• Analog M*3: one 12-bit input per axis

Dimensions: mm [in]
• M*3: 102 x 85 x 21 [4.0 x 3.4 x 0.8]
• M*4: 102 x 76 x 21 [4.0 x 3.0 x 0.8]

MACRO Drives - *Servo*

XML, XM2 Panel

Model	VAC	Ic	Ip
XML-230-18	100-240	6	18
XML-230-36	100-240	12	36
XML-230-40	100-240	20	40
XM2-230-20	100-240	10	20

BML Panel

Model	VDC	Ic	Ip
BML-090-06	14-90	3	6
BML-090-14	14-90	7	14
BML-090-30	14-90	15	30

AMP Panel

Model	VDC	Ic	Ip
AMP-180-09	20-180	3	9
AMP-180-18	20-180	6	18

MACRO facilitates the powerful combination of Delta Tau controllers and Copley drives. Both AC-powered Xenus^{PLUS} (1 & 2-axis) and DC-powered Accelnet^{PLUS} drives are available. High resolution A/D converters ensure optimal current loop performance. MACRO drives incorporate Safe Torque Off capability and interface to a comprehensive range of encoders.

Control Modes
- Indexer, Point-to-Point, PVT, PT
- Camming, Gearing
- Position, Velocity, Torque

Command & Communications
- MACRO [fiber optic]
- RS-232 ASCII & Serial Binary
- Step/Direction, Step Up / Step Down
- ±10V position/velocity/torque
- PWM velocity/torque
- Master encoder

Feedback
- Incremental encoder, digital Halls
- BiSS, SSI, Absolute A, EnDat encoders
- Panasonic, Tamagawa, Sanyo Denki
- Analog sin/cos encoder
- Resolver [XML -R option]
- Aux. encoder / encoder out

Functional Safety [XML, XM2, BML]
- Safe Torque Off [see datasheet for certifications]

I/O
- Digital XML: 15 inputs, 6 outputs
- Digital XM2: 22 inputs, 7 outputs
- Digital BML: 11 inputs, 4 outputs
- Digital AMP: 11 inputs, 4 outputs
- Analog XML: 2, 16-bit input; 1, 12-bit output
- Analog XM2: 2, 14-bit inputs
- Analog BML: 1, 12-bit input
- Analog AMP: 2, 12-bit inputs

Regen
- XML: external regen resistor accessory
- XM2: built-in regen resistor

Dimensions: mm [in]
- XML: 201 x 145 x 59 [7.9 x 5.7 x 2.3]
- XM2: 235 x 143 x 91 [9.3 x 5.6 x 3.6]
- BML: 129 x 92 x 51 [5.1 x 3.6 x 2.0]
- AMP: 196 x 104 x 30 [7.7 x 4.1 x 1.2]

Junus & Accelus - *Servo*

JSP Panel

Model	VDC	Ic	Ip
JSP-090-10	20-90	5	10
JSP-090-20	20-90	10	20
JSP-180-10	20-180	5	10
JSP-180-20	20-180	10	20
JSP-180-30	20-180	15	30

ASC Card

Model	VDC	Ic	Ip
ASC-O55-18	20-55	6	18
ASC-090-09	20-90	3	9

Junus is a cost-effective solution for the control of brush motors. Operating in torque and velocity mode, Junus accepts both analog and PWM commands. Sensorless velocity feedback is derived from the motor back-EMF.

Accelus delivers high performance control of brushless and brush motors in a cost-effective card. A panel mounted version is also available. Torque and velocity modes are complemented by Step/Direction position mode. Feedback is incremental encoder and digital Halls.

Control Modes
• Velocity, Torque
• Gearing [ASC]
• Position [ASC]

Command & Communications
• RS-232
• ±10V velocity/torque
• ±10V position [ASC]
• Step & Direction [ASC]
• PWM velocity/torque
• Master encoder [ASC]

Feedback
• Back-EMF [JSP]
• Incremental encoder & digital Halls [ASC]

I/O
• Digital JSP: 5 inputs, 1 output
• Digital ASC: 6 inputs, 2 outputs
• Analog JSP: 1, 12-bit input
• Analog ASC: 1, 12-bit input

Dimensions: mm [in]
• JSP: 130 x 91 x 31 [5.1 x 3.6 x 1.2]
• ASC: 153 x 89 x 31 [6.0 x 3.5 x 1.2]

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Analog Amplifiers - *Servo*

7000 Series

Model	VAC	Ic	Ip
7225AC	100-120	10	20
7425AC	100-240	10	20

Free from quantization errors, 7000 Series amplifiers deliver high performance in precision applications. Accepting commutated current commands for both U and V motor windings, the amplifier synthesizes the W winding current. For the most sensitive applications an internal edge filter option is available to minimize radiated switching noise. AC-powered, the amplifier does not require transformer isolation.

Control Mode: Torque
Command Interface: UV
Commutation: Sinusoidal
Dimensions: 191 x 176 x 69 [7.5 x 6.9 x 2.7]

Digital In: Enable, Reset, Motemp
Digital Out: Amp OK, Current Limiting
Analog In: REF (UV)
Analog Out: Motor Current (UV)

BTM Module*

Model	VDC	Ic	Ip
BTM-055-20	12-55	10	20
BTM-090-10	12-90	5	10

The Bantam module is a highly cost-effective OEM solution for torque control of brushless and brush motors. PCB-mounted with solderless connectors, Bantam accepts a standard ±10V current command. Digital Hall feedback facilitates trapezoidal commutation of brushless motors. Analog control inputs set current limits and adjust balance.

Control Mode: Torque
Command Interface: ±10V
Commutation: Trapezoidal
Feedback: Digital Halls
Dimensions: 53 x 46 x 15 [2.1 x 1.8 x 0.6]

Digital In: Enable, Limits, Inductance Select
Digital Out: Amp OK, Regen, Brake
Analog In: REF, Balance, Ic/Ip/I^2t Limits
Analog Out: Motor Current, Ref. Current

* Available ruggedized

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