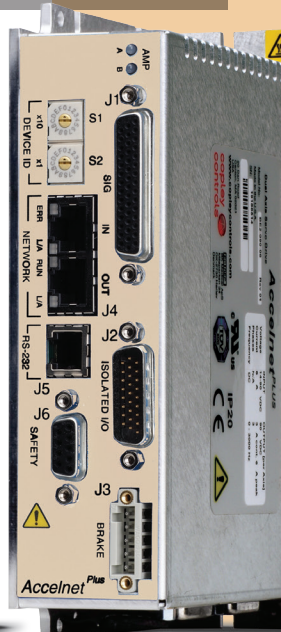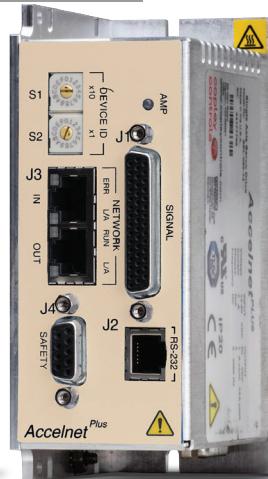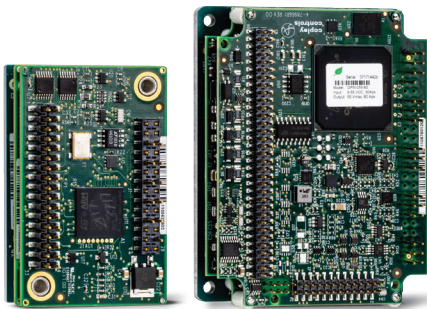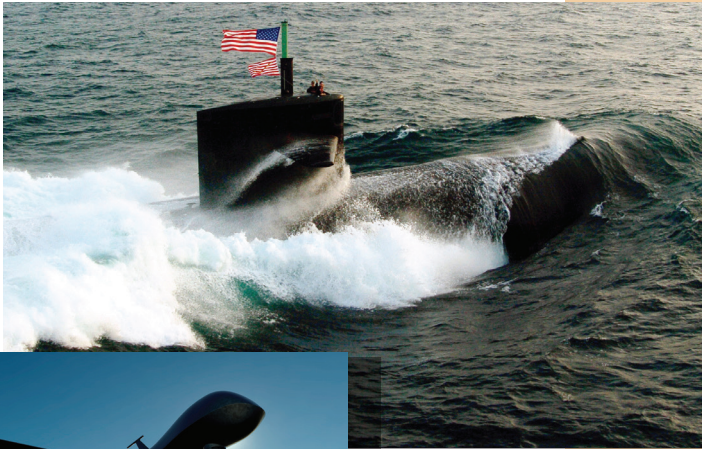# Ruggedized

SERVO DRIVES FOR EXTREME ENVIRONMENTS

2019 Rugged Products
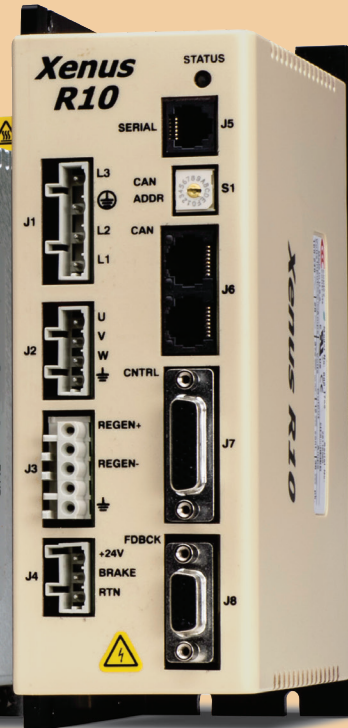
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Ruggedized

The Copley Edge

- **35 years of experience in servos and power systems**
- **Quality products designed and built in the U.S.A.**
- **Comprehensive range with custom capability**
- **ISO 9001:2015 certified**
- **RoHS Compliant**
- **Agile, responsive R&D and applications team**
- **Global sales offices and technical support**

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Why Ruggedized?

R-Series drives incorporate a range of command interfaces and communication channels for system integration flexibility. CANopen, an international standard for motion control, is proven in harsh environments. RS-232/422 interfaces enable control via ASCII or Serial binary commands. Step / direction and analog velocity / current command interfaces are ideal for integration into traditional architectures.

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Installation Flexibility

Copley offers a comprehensive range of digital drives for brush, brushless and stepper motors. High power density panel-mount and PCB-mount packages deliver installation flexibility. A complete set of feedback options are provided. Both AC and DC powered versions are available.

Ruggedized Drives

R-Series drives are ruggedized versions of Xenus, Accelnet, Stepnet and Plus drives. They deliver performance you can trust in the harshest environments. R-Series drives are designed to endure temperature extremes, high humidity, vibration and shock. Copley's proven drive technology finds application in COTS military, nautical, aviation, oil refining and vehicle-based systems.

- 150 W to 7 kW power range
- Indexing and trajectory tracking modes
- CANopen, RS-232 and RS-422
- Analog and digital command interfaces
- Encoder (Incremental, Sin/Cos, Absolute) and resolver versions
- Ambient Temperature: -40°C to 70°C
- Thermal Shock: -40°C to 70°C in 1 minute
- Relative Humidity: 95% non-condensing at 60°C
- Vibration: 5 Hz to 500 Hz, up to 3.85 grms
- Altitude: -400 m to 5,000 – 16,000 m
- Shock: 40 g peak acceleration

Design Standards

- MIL-STD-810 Environmental Engineering Considerations and Laboratory test
- MIL-STD-1275 Characteristics of 28 VDC Electrical Systems in Military Vehicles
- MIL-STD-704 Aircraft, Electric Power Characteristics
- MIL-STD-461 Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
- MIL-STD-1399 Interface Standard for Shipboard Systems
- IEC-60079 Electrical Apparatus for Explosive Gas Atmospheres
- IEC-60068 Environmental Testing
- UL/IEC 61010-1, 3rd Edition
- UL/IEC 61800-5-1
- UL/IEC 61800-5-2
- IEC 61800-3
- EN 55011
- EN 61000-6-1

Configuration

Java based CME configuration software is powerful and intuitive. Comprehensive diagnostics, auto tuning and advanced oscilloscope tools simplify system commissioning. Auto-phasing eliminates time consuming rewire-and-try for feedback connections. Advanced frequency analysis tools and multi-loop filters provide control solutions.

Network Software

Copley distributed control software for CANopen makes system commissioning fast and simple. All network management is taken care of by a few commands linked into your application program.

Copley supports two development environments. Copley Motion Libraries (CML) link into a C++ application program run on Windows, Linux and QNX. Copley Motion Objects (CMO) are .Net framework objects that can be used by VB and C#.

Ruggedized

Xenus - Servo
(R10, R11)

Xenus Panels are available in two AC line operated compact packages delivering power up to 6 kW. A +24 Vdc 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
- Camming, Gearing, Position, Velocity, Torque

Command Interface
- CANopen
- ASCII, Serial binary and discrete I/O
- Stepper commands
- ±10 V Position/Velocity/Torque command
- PWM Velocity/Torque command
- Master Encoder (Gearing/Camming)

Communications
- CANopen
- RS-232
- RS-422 (option)

Feedback
- Digital quad A/B encoder
- Digital Halls
- Aux. encoder / encoder out
- Analog Sin/Cos encoder (-S option)
- Resolver (-R option)
- Dual loop feedback

AFS Firmware Features (R10, R11)
- BiSS -C Unidirectional, SSI (Consult factory)
- 32-bit floating point multi loop filters
- Frequency analysis tools

I/O – Digital
- 11-14 inputs, 4 outputs

Accessories
- R10 External regen resistors XTL-RA-XX
- R10 External edge filter R10-FA-01
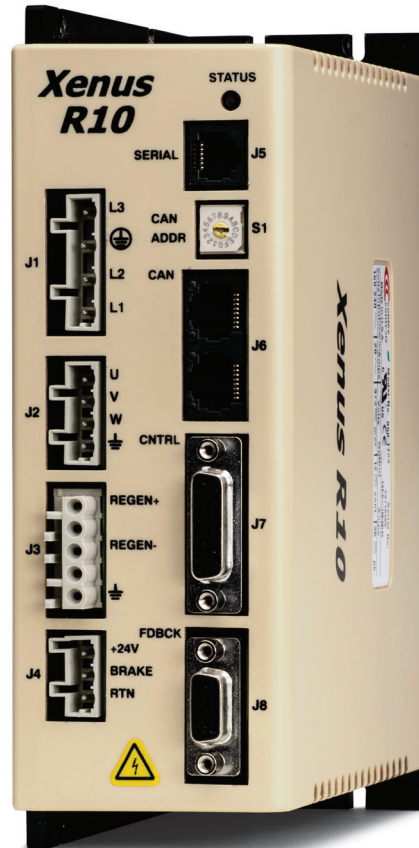
Dimensions: mm (in)
- **R10** 191 x 140 x 64 (7.5 x 5.5 x 2.5)
- **R11** 126 x 90 x 53 (5.0 x 3.5 x 2.1)

	Model	Vac	Ic	Ip
R10 Panel	R10-230-18	100-240	6	18
	R10-230-36	100-240	12	36
	R10-230-40	100-240	20	40
R11 Micro Panel	R11-230-02	100-240	1	2
	R11-230-06	100-240	3	6
	R11-230-10	100-240	5	10
	Analog encoder: -S; Resolver -R			

Xenus R11 AFS

Xenus R10 AFS

Accelnet
(R20, R21, R22, R23)

Accelnet Panels are available in two DC-powered panel mounted packages and Accelnet modules are available in three 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
- Camming, Gearing, Position, Velocity, Torque

Command Interface
- CANopen
- ASCII, Serial binary and discrete I/O
- Stepper commands
- ±10 V Position/Velocity/Torque command
- PWM Velocity/Torque command
- Master Encoder (Gearing/Camming)

Communications
- CANopen
- RS-232
- RS-422 (R20, R21, R22 option)

Feedback
- Digital quad A/B encoder
- Digital Halls
- Aux. encoder / encoder out (R20, R21)
- Analog Sin/Cos encoder (R20, R21 option)
- Resolver option (R20, R21, R22, R23)
- Dual loop feedback

AFS Firmware Features (R20, R23 HC)
- R20 BiSS -C Unidirectional, SSI (Consult factory)
- 32-bit floating point multi loop filters
- Frequency analysis tools

I/O – Digital
- 8–12 inputs, 2 outputs

Dimensions: mm (in)
- **R20** 168 x 99 x 31 (6.6 x 3.9 x 1.2)
- **R21** 97 x 64 x 33 (3.8 x 2.5 x 1.3)
- **R22** 102 x 69 x 25 (4.0 x 2.7 x 1.0)
- **R23** 64 x 41 x 16 (2.5 x 1.6 x 0.83)

|	Model	Vdc	Ic	Ip
R20 Panel	R20-055-18	20-55	6	18
	R20-090-09	20-90	3	9
	R20-090-18	20-90	6	18
	R20-090-36	20-90	12	36
	R20-180-09	20-180	3	9
	R20-180-18	20-180	6	18
	R20-180-30	20-180	15	30
	Analog encoder: -S; Resolver -R			
R21 Micro Panel	R21-055-09	20-55	3	9
	R21-055-18	20-55	6	18
	R21-090-03	20-90	1	3
	R21-090-09	20-90	3	9
	R21-090-12	20-90	6	12
	Analog encoder: -S; Resolver -R			
R22 Module	R22-055-18	20-55	6	18
	R22-090-09	20-90	3	9
	R22-180-09	20-180	3	9
	R22-180-18	20-80	6	18
	R22-180-20	20-180	10	20
	Resolver -R			
R23 Micro Module	R23-055-06	14-55	3	6
	R23-055-10	20-55	5	10
	R23-090-04	14-90	2	4
	R23-090-08	20-90	4	8
	Resolver -R			
R23 HC Micro Module	R23-090-20	14 - 90	10	20
	R23-090-30	14 - 90	15	30

Accelnet R20 AFS

Accelnet R21
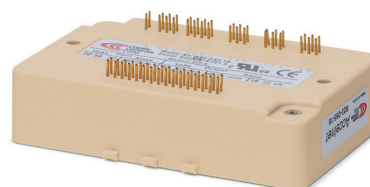
Accelnet R22
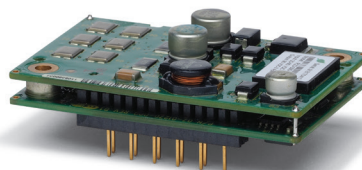
Accelnet R23

Accelnet R23 HC AFS

Accelnet^{PLUS}
(R40, R41, R42)

Accelnet^{PLUS} sets new levels of performance and is available in CANopen version. These modules deliver high performance in two compact PCB-mounted packages. A wide range of absolute encoder interfaces are built-in, including BiSS, SSI, Absolute A and EnDat. Higher-resolution current loops enable AccelnetPLUS to meet the needs of the most demanding applications.

Stepnet^{PLUS}
(R52)

Stepnet^{PLUS} modules deliver high performance stepper control in two compact PCB-mounted packages. These 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)
- Microstepping (Stepnet)

Command & Communications
- CANopen DS-402
- RS-232, ASCII & Serial binary
- Step/Direction, Step Up/Step Down
- ±10 V 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 (R40, R41, R42)
- Resolver (R40, R41)
- Aux. encoder / encoder out (R40, R41, R42)
- Dual loop feedback (R40, R41, R42)

FPGA Firmware Features (R40, R41, R42)
- 32-bit floating point multi loop filters
- Frequency analysis tools
- Hardware pulse at position
- High speed position capture
- Count divider

I/O
- 11-18 inputs, 4-6 outputs
- One 12-bit analog input

Dimensions: mm (in)
- **R40** 129 x 92 x 51 (5.1 x 3.6 x 2.0)
- **R41** 172 x 124 x 44 (6.8 x 4.9 x 1.7)
- **R42** 77 x 59 x 20 (3.0 x 2.3 x 0.8)
- **R52** 77 x 59 x 20 (3.0 x 2.3 x 0.8)

	Model	Vdc	Ic	Ip
R40 Panel	R40-090-06	14-90	3	6
	R40-090-14	14-90	7	14
	R40-090-30	14-90	15	30
	Resolver -R			
R41 (2 Axis) Panel	R41-090-06	14-90	3	6
	R41-090-14	14-90	7	14
	R41-090-20	14-90	10	20
	Resolver -R			
R42 Module	R42-090-06	14-90	3	6
	R42-090-14	14-90	7	14
	R42-090-30	14-90	15	30
	R42-180-20	40-180	10	20
R52 Module	R52-090-07	14-90	5	7
	R52-090-10	14-90	10	10
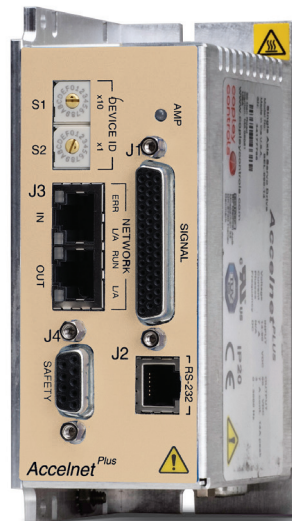
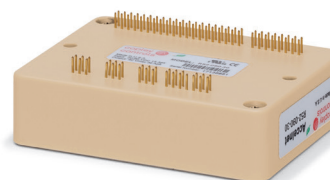Accelnet^{PLUS} R40
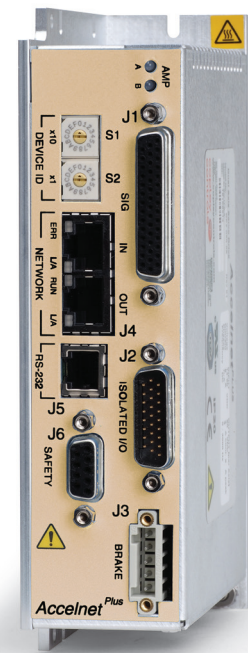
Accelnet^{PLUS} R41

Accelnet^{PLUS} R42

Stepnet^{PLUS} R52

Argus^{PLUS}
(R70)

ArgusPLUS modules set new levels of performance, connectivity, and flexibility. It operates as a CAN node using the CANopen protocol of DSP-402 for motion control devices. A wide range of absolute encoders are supported. Both isolated and high-speed non-isolated I/O are provided.

ArgusPLUS R70

Control Modes
- Profile Position-Velocity-Torque, Interpolated Position, Homing
- Indexer, Point-to-Point, PVT
- Camming, Gearing

Command Interface
- CANopen
- ASCII, Serial binary and discrete I/O
- Stepper commands
- ±10 V Position/Velocity/Torque
- PWM Velocity/Torque command
- Master encoder (Gearing/Camming)

Communications
- CANopen
- RS-232
- RS-422

Feedback

Incremental
- Digital quad A/B encoder
- Analog Sin/Cos encoder
- Panasonic Incremental A
- Aux. encoder / encoder out

Absolute
- SSI
- EnDAT 2.1 & 2.2
- Absolute A
- BiSS (B&C)
- Dual Absolute

Other
- Digital Halls
- Resolver (-R model)

FPGA Firmware Features
- 32-bit floating point multi loop filters
- Frequency analysis tools
- Hardware pulse at position
- High speed position capture
- Count divider

I/O Digital
- 11 inputs, 9 outputs
- One 12-bit analog input

Dimensions: mm (in)
- 78.7 x 60.1 x 23.4 (3.10 x 2.40 x 0.92)

	Model	Vdc	Ic	Ip
R70	R70-055-60	9-55	30	60
Module	R70-090-60	14-90	30	60
	Resolver -R			

Bantam- Analog Servo
(R30)

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.
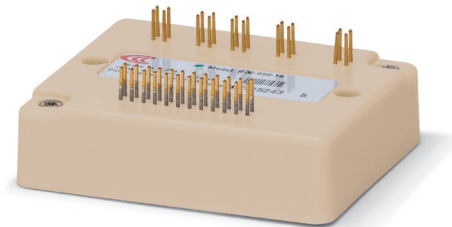
Bantam R30

Control Mode
- Torque

Command Interface
- ±10 V

Commutation
- Trapezoidal

Feedback
- Digital Halls

Digital In (4)
- Enable, Limits Forward, Limits Reverse, Inductance Select

Digital Out (3)
- Amp Ok, Regen, Brake

Analog In (3)
- REF, Balance, PWM Limit

Analog Out (2)
- Current monitor ±3 V
- Current Reference

Dimensions: mm (in)
- 53 x 46 x 15 (2.1 x 1.8 x 0.6)

	Model	Vdc	Ic	Ip
R30	R30-055-20	12-55	10	20
Module	R30-090-10	20-90	5	10

Custom Drives

Copley Controls 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.

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