

**Connect.
Command.
Control.**



ECMdx

1 or 2 Axis All-In-One Motion Controller With Integrated AC Input Drives

The **ECMdx** is a member of the Economical Control Modules (ECM) series of compact, highly integrated all-in-one motion controller and drives solutions designed to meet the needs of OEMs with cost-sensitive motion control applications. Its unique multiprocessor architecture leverages powerful control algorithms to achieve best-in-class performance, while its universal servo drive technology enables the system designer to easily control most any type of motor or stage.

Product Highlights

- > Compact Industrial Package for Streamlined OEM Integration
- > Comprehensive Software Tools for Reducing Time to Market
- > Universal Motor Support for Maximum Motor/Stage Flexibility
- > High Power Output Range for power stages
- > Max Drive Current: 15/30 A at 100-240 VAC, 15/30 A at 400 VAC
- > Drive Supply Input: 100-240 VAC (single or three phase) or 400 VAC (three phase)
- > Feedback Channels: 4 (AqB, SinCos, or Absolute)
- > Analog I/O: 4/2
- > Digital I/O: 8/14
 - Any can be used for general purpose
 - 4 High-Speed Position Capture (MARK) Inputs
 - 4 High-Speed Position Event Generation (PEG) Outputs
 - 4 Limit Sensor Inputs (2 per axis)
 - 2 Mechanical Brake Outputs
 - 8 General Purpose Digital Outputs
- > Functional Safety: STO, SS1

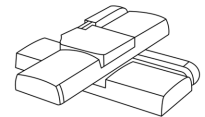
Host PC/PLC



ECMdx



Up to 2 Axis Motion System



VALUE

Achieve excellent performance
at an economical price



FLEXIBILITY

Control various motion
stage technologies



INTEGRATION

Minimize design effort
with all-in-one industrially
packaged solution

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ACS
MOTION CONTROL

Specifications

Logic Supply Input

- Voltage range: 24 VDC $\pm 5\%$
- Maximum Input Current: 4A @ 21.6 VDC
- Protections: Reverse Polarity

Drive Supply Input

- Voltage Range: 100-240 (+10% / -15%) VAC (single or three phase) or 400 ($\pm 10\%$) VAC (three phase)
- Maximum Input Current:
 - for 240V 28/41A (continuous/peak) (single phase)
 - for 240V 29/50A (continuous/peak) (three phase)
 - for 400V 25/49A (continuous/peak) (three phase)

Amplifiers

- Number of Axes: 1 or 2
- Type: PWM 3-phase power bridge
- Motor Support
 - DC brush
 - 2 and 3 phase DC Brushless
 - 2 and 3 phase stepper: Open or closed loop
- Output current Continuous / Peak Per Axis (Sine Amplitude):
 - 15/30 A for 100-240 VAC (continuous/peak, sine amplitude)
 - 15/30 A for 400 VAC
- Peak Current Time: 1 second
- Minimum Load Inductance:
 - • 100 μ H phase-to-phase for 240 VAC configuration
 - • 200 μ H phase-to-phase for 400 VAC configuration
- Max Output Voltage:
 - 92% of VIN for 240 VAC
 - 88% of VIN for 400 VAC
- Max Output Continuous / Peak Power Per Axis:
 - For 240 VAC Single Phase:
 - 3799/6790 W (continuous/peak) for 15/30 A
 - For 240 VAC Three Phase:
 - 4069/7868 W (continuous/peak) for 15/30 A
 - For 400 VAC Single Phase:
 - 5917/11331 W (continuous/peak) for 15/30 A
- Protections: short circuit, overcurrent, overtemperature, under voltage, over voltage , phase lost, power down, drive not ready, saturation.

Communication Interfaces

- SPI:
 - Clock frequency up to 4 MHz
 - Can operate as master or slave
 - Up to 8 X SPI words per MPU cycle
- Ethernet: 100/100 Mbps TCP/IP, Modbus, Ethernet/IP
- RS-232: Up to 115200 bps

Real-Time Programming

- Language: ACSPL+ object-oriented multi-threading
- Number of User-Programmable Buffers (Threads): 6
- Max Program (MPU) Cycle Rate: 1 kHz
- Max Data Collection Rate: 20 kHz up to 4 variables
- RAM: 256MB
- Flash: 1GB

Servo Control Algorithms

- Standard
 - Cascaded PIVFF with loop shaping filters
 - Advanced feedforward
 - Dual loop
 - Disturbance rejection
 - Gain Scheduling
 - Field-oriented control
 - Space vector modulation
- Optional
 - Custom algorithms to meet demands of unique applications (contact ACS)
- Loop Sampling and Update Rate: 20 kHz position, 20 kHz velocity, 20 kHz current

Feedback

- Total Number of Channels: 4
- Incremental
 - AqB Encoders (Default type)
 - Max Frequency: 50 MHz
 - Electrical Interface: RS-422
 - Error Detection: encoder not connected, encoder error
 - SinCos Encoders (Optional)
 - Max Frequency: 500 kHz for 240VAC , 250 kHz for 400VAC
 - Electrical Interface: 1 V peak to peak $\pm 10\%$
 - Max Multiplication: 65,535 (per full signal period)
 - Error Detection: Not connected, encoder error
 - Compensations: Phase, Gain, Offset
 - Note: The drive automatically generates a digital quadrature echo of the SinCos encoder signal and sends it as an output to the AqB encoder pins
 - Digital Hall Sensor Inputs
 - Qty: 1 set per axis
 - Electrical Interface: 5V, single-ended, source, opto-isolated
 - Note: Used for initial commutation, not for position servo feedback
- Absolute (Optional)
 - Types: BiSS-C, EnDat 2.1 & 2.2, Smart-Abs, SSI, Sanyo ABS, Panasonic
 - Max Frequency: EnDat - 2 MHz, Smart-Abs - 2.5 MHz, Biss-C - 10 MHz, Panasonic - 2.5 MHz, Sanyo - 2.5 MHz
 - Electrical Interface: RS-485
 - Error Detection: CRC, timeout, encoder not ready
- Supply Output: 5.1 V. Total available current 1.5 A for all analog encoders and 1.5 A for all digital encoders
- ID Chip Interface: : 1 per axis, for identification of compatible stages' configuration parameters.

Specifications Continued

Digital I/O (All are useable as general purpose)

- Total Quantity: 8/14
- High-Speed Position Capture (MARK) Inputs
 - Qty: 4 (can also be used as general purpose digital inputs)
 - Electrical Interface: 5/24 V $\pm 20\%$, opto-isolated, two terminals
 - Max Capture Frequency: 1 per 2 MPU cycles
- Limit Sensor Inputs
 - Qty: 2 per axis (Can also be used as general purpose digital inputs)
 - Electrical Interface: 5/24V $\pm 20\%$, opto-isolated, sink or source (jumper selectable)
- High-Speed Position Event Generation (PEG) Outputs
 - Qty: 4
 - Electrical Interface: differential, RS-422 compatible
 - Max Pulse Frequency: 10 MHz
 - Pulse Width Range: 26.6 ns to 1.745 ms
- Mechanical Brake Outputs
 - Qty: 1 per axis
 - Electrical Interface: 5-30 V, opto-isolated, source
 - Output Current: 1 A per output
- General Purpose Outputs
 - Qty: 8
 - Max Update Frequency: 1 per MPU cycle
 - Electrical Interface: 5/24 V $\pm 20\%$, opto-isolated, sink or source (jumper selectable).
 - Output current: 0.1 A per output

Analog I/O (All are useable as general purpose)

- Analog Inputs
 - Qty: 4
 - Electrical Interface: ± 10 V differential or 0-10V single ended
 - Resolution: 16 bits
 - Maximum Input Frequency: 5 KHz
 - Sampling Rate: 20 kHz
- Analog Outputs
 - Quantity: 2
 - Electrical Interface: ± 10 V differential or 0-5 V single-ended
 - Resolution: 10 bits
 - Max Ripple: <25 mV
 - Max Load: 10 k Ω
 - Max Update Frequency: 1 per MPU cycle

Functional Safety I/O (Optional)

- Safe Torque Off (STO) Input
 - Electrical Interface: Dual-channel 24V isolated
 - Safety Standards: See Standards and Certifications Section
- Safe Stop 1 (SS1) Feature
 - Exact deceleration time value is fixed and depends on product configuration (see Safety Manual for more details).

Standards and Certifications (Pending)

- CE
 - Self Declaration: Yes
 - Electrical Safety: IEC61800-5-1
 - EMC: IEC 613263-1, IEC 61800-3, IEC 61500-5-2
- UL
 - Electrical Safety: UL 61800-5-1
- TUV
 - STO & SS1 Functional Safety: IEC 61508, IEC 61800-5-2, ISO 13849

Physical

- Dimensions: 275 x 250 x 96 mm
- Weight: 4.4 kg
- Environmental
 - Rated Operational Temperature: 0 °C to 40 °C.
 - Humidity: 5% to 90% non-condensing humidity
 - Storage and Transportation Temperature Range: -25 °C to 60 °C
 - Shock: 50 m/s² (5 G)
 - Vibration: 10 m/s² (1 G)

Optional Accessory Products

- XDMdx-ACC1: Mating Connector Kit
- STO-ACC1: STO Breakout Cable
- SPI-ACC1: SPI Breakout Cable
- RS232-ACC1: RS232 Adapter Cable

Ordering Options

	Field	Example selection by user	Optional Values
Number of Axes	1	2	1, 2
Current Rating (Amps peak of sine)	2	B	A =Reserved B = 15/30 A @ 100-240 VAC C = Reserved D = 15/30 A @ 400 VAC
Number of 500 kHz SinCos Encoders ¹	3	2	0, 1, 2, 3, 4
Number of Absolute Encoders Channels	4	0	0, 1, 2, 3, 4
Functional Safety	5	T	N=None, T=STO & SS1
Reserved	6	N	N = N/A
Reserved	7	N	N = N/A
Reserved	8	N	N = N/A
Reserved	9	N	N = N/A
Reserved	10	N	N = N/A

¹The 400VAC version supports a maximum 250kHz SinCos Encoder

Example: ECMdx-2B20T-NNNNN **Description:** 2 axis 15/30A @100-240VAC, 2 SinCos 500 kHz encoders, STO & SS1

Field	1	2	3	4	5	6	7	8	9	10
PN ECMdx	2	B	2	0	T	N	N	N	N	N

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