

UDMma

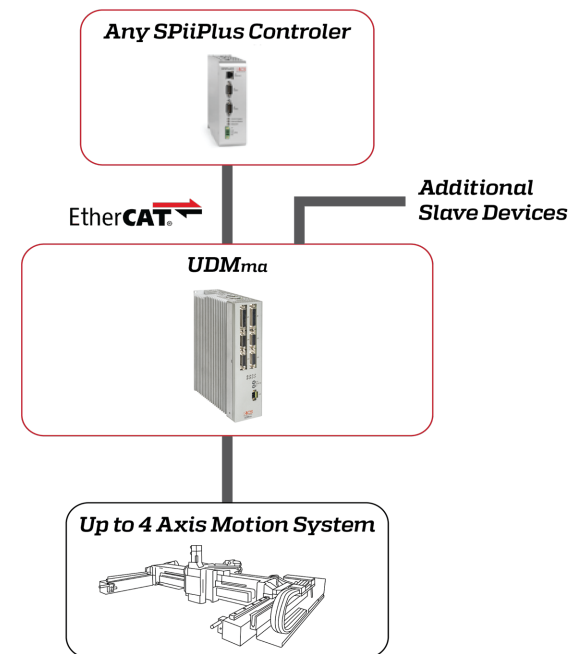


2 or 4 Axis EtherCAT® Universal Drive Module

The **UDMma** is a member of the Universal Drive Module (UDM) series of EtherCAT-based drives designed to meet the needs of OEMs with demanding multi-axis motion control applications. Controllable by any ACS SPiiPlus Platform EtherCAT master, it leverages powerful servo control algorithms to maximize motion system performance, while its universal servo drive technology provides the system designer flexibility to control most any type of motor or stage.

Product Highlights

- > Advanced Servo Control Algorithms for Maximum Motion Performance
 - > *ServoBoost™*
 - > Cascaded Dual Loop Control
 - > Non-Linear Control
 - > Customized Algorithms
 - > Gantry Control
 - > Many more
- > Universal Motor and Encoder Support for Maximum Motor/Stage Flexibility
- > Seamless Integration with any SPiiPlus Platform EtherCAT Master Controller
- > Simple Configuration and Tuning with SPiiPlus MMI Application Studio
- > Max Drive Current: 10/20A at 150VDC, 15/30A at 100VDC
- > Drive Supply Input: 24-150VDC
- > Feedback Channels: 4 (AqB, SinCos, or Absolute)
- > SPI Interface for Integrating Sensor Data into Custom Servo Algorithms
- > Analog I/O: 4/2
- > Digital I/O: 12/12
 - > Any can be used for general purpose
 - > 4 High-Speed Position Capture (MARK) Input
 - > 8 Limit Sensor Inputs (2 per axis)
 - > 4 Mechanical Brake Outputs
 - > 4 High-Speed Position Event Generation (PEG) Outputs
 - > 4 General Purpose Digital Outputs
- > Functional Safety: STO, SS1



Specifications

Logic Supply Input

- > Voltage Range: 24 VDC \pm 5%
- > Maximum Input Current: 2A @ 22.8VDC
- > Protections: Reverse polarity

Drive Supply Input

- > Voltage Range: 24-150 VDC
- > Maximum Input Current: Load dependent
- > Regeneration Resistor: Not included

Amplifiers

- > Number of Axes: 2 or 4
- > 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, up to 1024 microsteps per step, dynamic current adjustment
- > Output current:
 - > 5/10A, 10/20A up to 150VDC
 - > 15/30A up to 100VDC (continuous/peak, sine amplitude)
- > Peak Current Time: 1 second
- > PWM Switching Frequency: 20 kHz
- > Minimum Load Inductance: 150 μ H per phase at 150VDC bus (contact ACS to discuss applications with lower phase inductance motors)
- > Max Output Voltage: 94% of Drive Supply input voltage
- > Max Output Continuous / Peak Power Per Axis:
 - > 633/1258W (continuous/peak) for 5/10A
 - > 1266/2517W (continuous/peak) for 10/20A
 - > 1208/2393W (continuous/peak) for 15/30A
- > Protections: Short Circuit, Overcurrent, Overtemperature, Drive Overtemperature, Overvoltage, Undervoltage

EtherCAT

- > Interface: Dual RJ-45, 100BASE-TX
- > Communication Profile: SPIPlus Platform Proprietary Telegram Protocol
- > Max Cycle Rate: 5 kHz

Communication Interfaces

- > SPI:
 - > Clock frequency up to 4 MHz
 - > Can operate as Master or Slave
 - > Up to 8 X SPI words per EtherCAT Cycle
 - > SPI word length is user configurable up to 16 bits

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

Total Quantity: 12/12

- > High-Speed Position Capture (MARK) Input
 - > Qty: 4 (can be used as general purpose digital inputs)
 - > Electrical Interface: 5/24V \pm 20%, Opto-isolated, two terminals
 - > Max Capture Frequency: 1 per 2 EtherCAT cycles
- > Limit Sensor Inputs
 - > Qty: 2 per axis ((can be used as general purpose digital inputs)
- > High-Speed Position Event Generation (PEG) Output
 - > Qty: 1 per axis (can be used as general purpose digital inputs)
 - > Electrical Interface: RS-422
 - > Max Pulse Frequency: 10 MHz
 - > Pulse Width Range: 40 ns to 671 ms
- > Mechanical Brake Output
 - > Qty: 1 per axis
 - > Electrical Interface: 5/24V \pm 20%, opto-isolated, sink or source (jumper selectable)
 - > Output Current: 100 mA (2 of the 4 support 0.5A)
- > General Purpose Outputs
 - > Qty: 4
 - > Max Update Frequency: 1 kHz
 - > Propagation Delay: 1ms
 - > Electrical Interface: 5/24V \pm 20%, opto-isolated, sink or source (jumper selectable).
 - > Output current: 100mA

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
 - > **ServoBoost**
 - > Non-Linear Control
 - > Custom algorithms to meet demands of unique applications (contact ACS)
- > Servo 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, illegal transition
 - > SinCos Encoders (Optional)
 - Max Frequency: 500 kHz
 - Electrical Interface: 1 V peak to peak \pm 10%
 - Max Multiplication: 4,096 (per full signal period)
 - Error Detection: Encoder not connected, encoder error
 - Compensation: 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
 - > Limit Sensor Inputs (Usable as general purpose)
 - Qty: 2 per axis (8 total)
 - Electrical Interface: 5/24V \pm 20%, optoisolated, sink or source (jumper selectable)
- > Absolute (Optional)
 - > Types: BISS-C, EnDat 2.1 & 2.2, Smart-Abs, SSI, Sanyo Denki, Panasonic A6
 - > Max Frequency: EnDat- 8MHz, Smart-Abs- 2.5MHz, Biss-C- 10MHz, Panasonic- 2.5MHz, Sanyo- 2.5MHz
 - > Electrical Interface: RS-485
 - > Error Detection: CRC, timeout, encoder not ready
- > Supply Output: 5.1V. Total available current 1.5A for all analog encoders and 1.5A for all digital encoders
- > ID Chip Interface: 1 per axis. For identification of compatible stages' configuration parameters.

Functional Safety I/O (Optional)

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

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

- > Analog Inputs
 - > Qty: 4
 - > Electrical Interface: \pm 10V differential or 0-10V single ended
 - > Resolution: 12 bit
 - > Max Sampling Frequency: 5 kHz
- > Analog Output
 - > Qty: 2
 - > Electrical Interface: \pm 10V differential or 0-5V single ended
 - > Resolution: 10 bit
 - > Max Ripple: <25 mV
 - > Max Load: 10 k Ω
 - > Max Update Frequency: per EtherCAT cycle

Standards and Certifications (Pending)

- > CE
 - > Self Declaration: Yes
 - > Electrical Safety: IEC61800-5-1
 - > EMC: IEC 61326-3-1, IEC 61800-3, IEC 61500-5-2
- > UL
 - > Electrical Safety: UL 61800-5-1
- > TUV
 - > STO & SS1 Functional Safety: IEC 61508, ISO13849, IEC 61800-5-2

Physical

- > Dimensions: 246x177x 55 mm
- > Weight: 2kg
- > Environmental
 - > Operational Temperature: 0 to 50C° See user manual for more details
 - > Humidity: 5 to 90% non-condensing humidity
 - > Storage and Transportation Temperature: -25°C to 60°C
 - > Shock: 50 m/s² (5 G)
 - > Vibration: 10 m/s² (1 G)

Optional Accessory Products

- > XDMma-ACC1: Mating Connector Kit
- > STO-ACC1: STO Breakout Cable
- > SPI-ACC1: SPI Breakout Cable

Ordering Options

	Field	Example selection by user	Optional Values
Number of Axes	1	4	2,4
Current Rating (Amps peak of sine)	2	B	A = (Reserved) B = All axes 5/10A up to 150Vdc C = All axes 10/20A up to 150Vdc D = All axes 15/30A up to 100Vdc
Number of 500 kHz SinCos Encoders	3	1	0,1,2,3,4
Reserved	4	0	0
Number of Absolute Encoders Channels	5	1	0,1,2,3,4
Functional Safety	6	T	N=None, T=STO & SS1
Reserved	7	N	N = N/A
Reserved	8	N	N = N/A
Reserved	9	N	N = N/A
Reserved	10	N	N = N/A

Example: **UDMma-4B101-TNNNN** Description: **4 axis 10/20A, 1x SinCos 500kHz encoder, 1x Absolute encoder , STO & SS1**

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