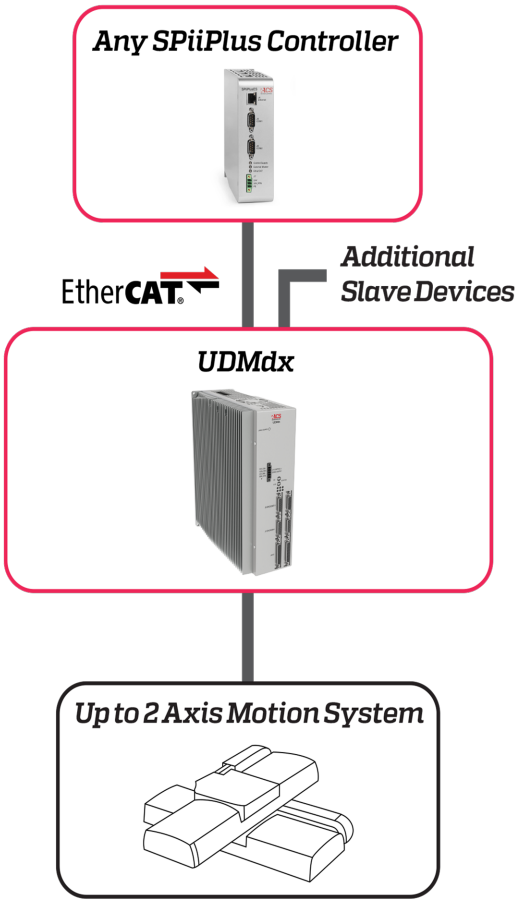
UDMdx

1 or 2 Axis EtherCAT® AC Input Universal Drive Module

The **UDMdx** 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
  - ***Servo**Boost*
  - Cascaded Dual Loop Control
  - Non-Linear Control
  - Customized Algorithms (Contact ACS)
  - 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
- 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)
- SPI Interface for Integrating Sensor Data into Custom Servo Algorithms
- Analog I/O: 4/2
- Digital I/O: 8/14
  - Any can be used for general purpose
  - 4 High-Speed Position Capture (MARK) Input
  - 4 Limit Sensor Inputs (2 per axis)
  - 2 Mechanical Brake Outputs
  - 4 High-Speed Position Event Generation (PEG) Outputs
  - 8 General Purpose Digital Outputs
- Functional Safety: STO, SS1



ACS MOTION CONTROL

Specifications

Logic Supply Input
- Voltage Range: 24 VDC ±5%
- Maximum Input Current: 4A @ 21.6VDC
- Protection: Reverse polarity

Drive Supply Input
- Voltage Range:
  - 100-240 (+10% / -15%) VAC (single or three phase) or 400 (± 10%) VAC (three phase)
- Maximum Input Current:
  - for 240V 28/41 A (continuous/peak) (single phase)
  - for 240V 29/50 A (continuous/peak) (three phase)
  - for 400V 25/49 A (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:
  - 15/30A for 100-240 VAC
  - 15/30A for 400 VAC
- Peak Current Time: 1 second
- Minimum Load Inductance:
  - 100 µH phase-to-phase for 240 VAC configuration
  - 200 µH 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, over current, over temperature, under voltage, over voltage , phase lost, power down, drive not ready.

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

Communication Interfaces
- SPI: 8 word (16 bits per word) 4 MHz bi-directional master/slave interface for data input to / output from custom servo algorithms

Digital I/O (All are usable as general purpose)
Total Quantity: 8/14
- High-Speed Position Capture (MARK) Input
  - Qty: 4 (can be used as general purpose digital inputs)
  - Electrical Interface: 5/24V ±20%, optoisolated, two terminals
  - Max Event Frequency: 1 per 2 MPU cycles
- Limit Sensor Inputs
  - Qty: 2 per axis (can be used as general purpose digital inputs)
  - Electrical Interface: 5/24V ±20%, optoisolated, sink or source (jumper selectable)
- High-Speed Position Event Generation (PEG) Output
  - Qty: 4 (can be used as general purpose digital outputs)
  - Electrical Interface: differential, RS-422 compatible
  - Max Pulse Frequency: 10 MHz
  - Pulse Width Range: 26.6 ns to 1.745 ms
- Mechanical Brake Output
  - Qty: 1 per axis
  - Electrical Interface: 5-30 V, optoisolated, source
  - Output Current: 1A per output
- General Purpose Outputs
  - Qty: 8
  - Max Update Frequency: 1 kHz
  - Electrical Interface: 5/24V ±20%, optoisolated, 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
  - ***Servo****Boost* (Optional, licensed on controller)
  - Non-Linear Control (Optional, licensed on controller)
  - 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
  - SinCos Encoders (Optional)
    - Max Frequency: 500 kHz for 240VAC, 250 kHz for 400VAC
    - Electrical Interface: 1 V peak to peak ±10%
    - Max Multiplication: 65,536 (per full signal period)
    - Error Detection: Encoder 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, optoisolated
    - Note: Used for initial commutation, not for position servo feedback
  - Limit Sensor Inputs (Usable as general purpose)
    - Qty: 2 per axis (4 total)
    - Electrical Interface: 5/24V ±20%, optoisolated, sink or source (jumper selectable)
- Absolute (Optional)
  - Types: BiSS-C, EnDat 2.1 & 2.2, Smart-Abs, SSI, Sanyo ABS, Panasonic, Hiperface DSL
  - 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: 5.1V. 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: ±10V differential or 0-10V single ended
  - Resolution: 16 bit
  - Maximum Input Frequency: 5 Khz
  - Sampling Rate: 20 kHz
- Analog Output
  - Qty: 2
  - Electrical Interface: ±10V differential or 0-5V single ended
  - Resolution: 10 bit
  - Max Ripple: <25 mV
  - Max Load: 10 kΩ
  - Max Update Frequency: 1 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: 275 x 250 x 96 mm
- Weight: 4.4 kg
- Environmental
  - Operational Temperature: 0 °C to 50 °C. See user manual for external fan cooling requirements above 35 °C ambient temperature.
  - Humidity: 5% to 90% non-condensing humidity
  - Storage and Transportation Temperature: -25 °C to 60 °C
  - Shock: 50 m/s^2 (5 G)
  - Vibration: 10 m/s^2 (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 = 15/30A @ 100-240VAC C = Reserved D = 15/30A @ 400VAC
Number of 500 kHz SinCos Encoders[1]	3	1	0, 1, 2
Reserved	4	0	N = N/A
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

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

Example: UDMdx-2B101T-NNNN **Description:** 2 axis 15/30A @ 100-240VAC, 1 SinCos 500 kHz encoders, 1 Absolute encoder, STO & SS1

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