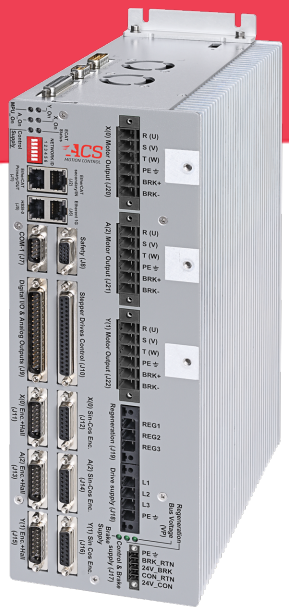
UDMxa



EtherCAT® Drive Module with 1, 2, or 3 Integrated Universal Motor Drives

- Advanced Servo Control Algorithms for Maximum Motion Performance
  - ***Servo****Boost*
  - MIMO Gantry Control
  - Cascaded Dual Loop Control
  - Customized Algorithms (Contact ACS)
- Universal Motor and Encoder Support for Maximum Flexibility
- Max Drive Current: 15/30A Per Axis
- Drive Supply Input: 85-265Vac
- Functional Safety: STO, SS1
- 12 or 16 bit SinCos and Analog Input Resolution
- Feedback Channels: 4 (AqB, SinCos, or Absolute)
- Digital I/O
  - 4 High-Speed Position Capture (MARK) Inputs
  - 8 Limit Sensor Inputs
  - 3 Brake Outputs
  - 3 High-Speed Position Event Generation (PEG) Engines with up to 10 Configurable Outputs
  - 8 General Purpose Digital Inputs
  - 8 General Purpose Digital Outputs
- Analog I/O
  - 6 General Purpose Analog Inputs (shared with SinCos)
  - 2 General Purpose Analog Outputs

The UDMxa is a member of ACS Motion Control's SPiiPlus series of products and is designed to meet the needs of OEMs with demanding multi-axis motion control applications. Controllable by any SPiiPlus series EtherCAT master, it leverages powerful servo control algorithms to maximize motion performance, while its universal motor and encoder technology provides system designers the flexibility to control most any type of motor or stage. The UDMxa is highly configurable and supported by many advanced servo tuning and application development tools available in MMI Application Studio. Configure the UDMxa to include 1, 2, or 3 built in drives with one of three current levels: 5/10A, 10/20A, or 15/30A.

The UDMxa is a drop-in replacement for the UDMba or UDMhp offering improved jitter and noise performance and STO and SS1 functional safety features.

ACS MOTION CONTROL

Communication
EtherCAT Ports: Two, In & Out

Servo
A standard comprehensive set of powerful algorithms to enhance accuracy, move & settle time, smooth velocity, stability and robustness.
- **Servo Sampling and Update Rate:** 20 kHz position, 20 kHz velocity, 20 kHz current
- Advanced PIV cascaded structure
- Loop shaping filters
- Gain Scheduling
- Gantry MIMO control
- Dual feedback / loop control
- Disturbance rejection control

Servo*Boost* algorithm

Motor Types
Two- and three-phase permanent magnet synchronous (DC brushless/AC servo), DC brush, Voice coil, Two- and three-phase stepper (micro-stepping open or closed loop, AC induction*.
* Consult ACS.

Drives
Type: digital current control with field oriented control and space vector modulation.
Current ripple frequency: 40 kHz
Current loop sampling rate: 20 kHz
Programmable Current loop bandwidth:
up to 5 kHz
Commutation type: sinusoidal. Initiation with and without hall sensors
Switching method: advanced unipolar PWM
Protection: Over voltage, Phase-to-phase short circuit, Short to ground, Over current, Over temperature, motor over temperature

Feedback
Incremental Digital Encoder: Four, A&B,I; Clk/Dir,I; Electrical Interface: RS-422. Max. rate: 50 million encoder counts/sec., Protection:
Encoder error
Not connected
Sin-Cos Analog Encoder (optional): Three.1Vptp, differential.
Max. Multiplication factor: x4096 (12 bit), x65536 (16 bit)
Maximum frequency: 500kHz
Automatic compensation of Offset, Phase and Amplitude
Protection:
Encoder error
Not connected.
Hall inputs: Three sets of three per axis.
Single-ended, 5V, source, opto-isolated.
Input current: <7mA.
Absolute encoders (optional): Three, EnDat 2.1(Digital)/2.2, Smart-ABS, Panasonic, Biss-A/B/C, SSI.
5V feedback supply: Total current available for feedback devices: 1A

Digital I/O
Limit Inputs: Eight. Left + right limit per axis
E-stop Inputs: One, software-level input
Registration Mark inputs: Four. RS422
Motor Brake Outputs: Three. 24V, 1A,optoisolated. Powered by the 24V Brake Supply.
General Purpose Outputs: Eight. Single-ended, 5VDC (±10%) or 24Vdc (±20%), opto-isolated, sink/source, 100mA
General Purpose Inputs: 8 Single-ended, 5Vdc (±10%) or 24Vdc (±20%), opto-isolated, sink/source
Position Event Generator outputs (PEG): 10, RS-422, max rate 10 MHz (incremental). Outputs are configurable for up to 3 PEG engines.

Analog I/O
Inputs: Six ±10V, differential, 20kHz sampling rate. 2 inputs are consumed per connected SinCos encoder. If all 3 SinCos encoders are connected, no analog inputs are available.
Resolution: 12 bit, 16 bit optional
Outputs: Two, Single-end, ±10 V ±5%, 10 bit resolution

Functional Safety I/O
Safe Torque Off (STO) Input
Electrical Interface: Dual-channel 24V isolated

Safe Stop 1 (SS1) Feature
Deceleration time till STO activation: 110-230ms.
Exact deceleration time value is fixed (SS1-t functionality) and depends on product configuration (see user manual for more details)

Power Supplies
The module is fed by three power sources.
A motor AC supply, a 24VDC control supply and 24VDC motor brake supply.
During emergency conditions there is no need to remove the 24VDC control supply.
Drive Supply: 85 to 265VAC, single or three phase, or 120-375 VDC
Control Supply: 24Vdc ± 10%, 4A
Motor Brake Supply: 24Vdc ± 20%, 3A

Physical Environment
Operating: 0 to +40°C. Storage : -25 to +60°C Humidity: 5% to 90% non-condensing

Standards and Certifications (Pending)
CE Electrical Safety: IEC 61800-5-1
CE EMC: IEC 61326-3-1, IEC 61800-3, EN 61500-5-2
UL Electrical Safety: UL 61800-5-1
TUV STO & SS1 Functional Safety: IEC 61800-5-1, IEC 61800-5-2

Accessory Products
CMUDMxa-ACC1: Mating connector kit
STO-ACC1: STO Breakout Cable

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Specifications

Product (y - number of Axes)	UDMxayA...	UDMxayB...	UDMxayC...
Number of built-in drives	1, 2, 3		
Drive voltage input [V]	85 - 265VAC, single or 3 phase, or 120-375VDC		
Control voltage input [Vdc]	24 ± 10%		
Phase current Cont./Peak Sine amplitude [A]	5/10	10/20	15/30
Phase current Cont./Peak RMS [A]	3.6/7.1	7/14	10.6/21.2
Peak current time [sec]	1		
Max. output voltage [Vdc]	(Vac in) x1.41 x 97%		
Max. RMS input current 1-phase supply [A]	18	18	24
3-phase supply[A]	13	18	24
Min. load Inductance, at max. motor voltage [mH]	1		
Max. Heat dissipation per axis [W]	33	67	102
Weight [gram]	5750		
Dimensions [mm^3]	324x249x120		

Ordering Options

Ordering Options	Field	Example User Selection	Values
Drive Axes	1	1	1,2,3
Current Rating	2	A	A- 5/10A B- 10/20A C- 15/30A
500 kHz SinCos Encoder Channels	3	0	0,1,2,3
Absolute Encoder Channels	4	1	0, 1, 2, 3
Functional Safety	5	T	N=None, T=STO & SS1
16-bit SinCos and Analog Inputs	6	N	N=No (12-bit), Y=Yes
Reserved for Future Use	7	N	N
Reserved for Future Use	8	N	N
Reserved for Future Use	9	N	N
Reserved for Future Use	10	N	N

Example: UDMxa1A01TNNNNN

Field		1	2	3	4	5	6	7	8	9	10
PN	UDMxA	1	A	0	1	T	N	N	N	N	N

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