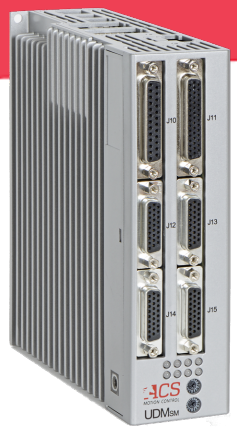
UDMSM



2 or 4 Axis EtherCAT® Universal Drive Module

Product Highlights

- Advanced Servo Control Algorithms for Maximum Motion Performance
  - *ServoBoost*™ (optional)
  - MIMO Gantry Control
  - Cascaded Dual Loop Control
  - Customized Algorithms (contact ACS)
- Universal Motor and Encoder Support for Maximum Flexibility
- Seamless Integration with any SPiiPlus Platform EtherCAT Master Controller
- Straightforward Configuration and Tuning with SPiiPlus MMI Application Studio
- Max Drive Current: 5/10A Per Axis
- Drive Supply Input: 12-48Vdc
- Feedback Channels: 4 (AqB, SinCos, or Absolute)
- Analog I/O: 2/2
- SPI Interface for Integrating Sensor Data into Custom Servo Algorithms
- Digital I/O: 12/16
  - Dedicated general purpose and user-programmable I/O
  - 4 High-Speed Position Capture (MARK) Inputs
  - 8 Limit Sensor Inputs (2 per axis)
  - 4 Brake Outputs
  - 4 High-Speed Position Event Generation (PEG) Outputs
  - 8 General Purpose Outputs
- Functional Safety: STO, SS1

The UDMSM 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.

ACS MOTION CONTROL

Specifications

Logic Supply Input
Voltage Range: 24 Vdc ±5%
Maximum Input Current: 2A @ 22.8Vdc
Protections: Reverse polarity

Drive Supply Input
Voltage Range: 12-48 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
- Voice coil
- 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 Continuous / Peak Per Axis (Sine Amplitude): 1.25/2.5 A, 2.5/5 A, 5/10 A
Peak Current Time: 1 second
PWM Switching Frequency: 20 kHz
Minimum Load Inductance: 25 uH per phase at 48Vdc bus (contact ACS to discuss applications with lower phase inductance motors)
Max Output Voltage: 92% of Drive Supply input voltage
Max Output Continuous / Peak Power Per Axis: 187/364 W
Protections: Short Circuit, Overcurrent, Drive Overtemperature, Motor Overtemperature, Overvoltage, Undervoltage

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

Other 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

Servo Control Algorithms
- Servo Sampling and Update Rate: 20 kHz position, 20 kHz velocity, 20 kHz current

Standard
- Cascaded PIVFF with loop shaping filters
- Advanced feedforward
- Multi-input multi-output (MIMO) gantry
- Dual loop
- Disturbance rejection
- Gain scheduling
- Field-oriented control
- Space vector modulation

Optional
- *ServoBoost™*
- Custom algorithms to meet demands of unique applications (contact ACS)

Digital I/O (All are usable as general purpose)
Total Quantity: 12/16
High-Speed Position Capture (MARK) Inputs
- Qty: 4
- Electrical Interface: 5/24V ±20%, Opto-isolated, two terminals
- Max Capture Frequency: 2 kHz

Limit Sensor Inputs
- Qty: 8 (See Feedback section for more details)

High-Speed Position Event Generation (PEG) Outputs
- Qty: 4
- Electrical Interface: RS-422
- Max Pulse Frequency: 10 MHz
- Pulse Width Range: 27 ns to 1.745 ms

Brake Outputs
- Qty: 4 Electrical Interface: 5/24V ±20%, opto-isolated, sink or source (jumper selectable)
- Max Update Frequency: 5 kHz (equal to EtherCAT network cycle rate)
- Output Current: 100 mA

General Purpose Outputs
- Qty: 8
- Max Update Frequency: 5 kHz (equal to EtherCAT network cycle rate)
- Electrical Interface: RS-422

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 or 10 MHz, according to ordering option
  - Electrical Interface: 1 V peak to peak +/-10%
  - Max Multiplication: 4096 (per full signal period)
  - Error Detection: Not connected
  - 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: 3 per axis (12 total)
  - 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 ±20%, opto-isolated, sink or source (jumper selectable)

Absolute (Optional)
- Types: BiSS-C, EnDat 2.1 & 2.2, Smart-Abs, SSI, Sanyo-Denki, Panasonic A4
- Max Frequency: EnDat- 16MHz, 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
  - 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)

Analog I/O (All are usable as general purpose)
Analog Inputs
- Qty: 2
- Electrical Interface: ±10V differential or ±5V single ended
- Resolution: 12 bit
- Input Frequency: 4 kHz

Analog Outputs
- Qty: 2
- Electrical Interface: ±10V differential or ±5V single ended
- Resolution: 10 bit
- Max Ripple: 25 mV
- Max Load: 10 kOhm
- Max Update Frequency: 1 kHz

Standards and Certifications (Pending)

- CE Self Declaration: Yes
- CE Electrical Safety: IEC61800-5-1
- CE EMC: EN 61800-3
- UL Electrical Safety: UL 61800-5-1
- STO Functional Safety: IEC 61800-5-1, IEC 61800-5-2
- SS1 Functional Safety: IEC 61800-5-1, IEC 61800-5-2

Physical

Dimensions: 168 x 158 x 48.3 mm
Weight: 800g
Environmental

- Operational Temperature: 0 to 50C°. See user manual for external fan cooling requirements above 40C° 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

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

Ordering Options

Ordering Options	Field	Example User Selection	Values
Number of axes	1	4	2, 4
Current Rating (Amps Peak of Sine)	2	C	A=1.25/2.5A, B=2.5/5A, C=5/10A
Number of 500 kHz SinCos Encoder Channels[1]	3	2	0, 1, 2, 3, 4
Number of 10 Mz SinCos Encoder Channels[1]	4	0	0, 1, 2, 3, 4
Number of absolute encoder channels[1]	5	1	0, 1, 2, 3, 4
Functional Safety	6	T	N=None, T=STO & SS1
Reserved for Future	7	N	N=N/A
Reserved for Future	8	N	N=N/A
Reserved for Future	9	N	N=N/A
Reserved for Future	10	N	N=N/A

[1] The total number of encoder channels ordered may not exceed 4.

Example: UDMsm 4C201-TNNNN

Description: 4 axis 5/10A, 2x SinCos 500 kHz encoder, 1x Absolute encoder, STO & SS1

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