

# UDM<sub>MC</sub>

## EtherCAT® Dual & Quad Axis Drive Module



- > Universal dual/quad motor drive modules for EtherCAT networks
- > 12Vdc to 80Vdc, up to 20A continuous and 40A peak current
- > Outstanding servo performance
  - > 20kHz sampling rate
  - > Advanced algorithms including **ServoBoost™** (optional)
  - > Gantry MIMO Control
  - > Dual feedback
- > Digital control for easy setup and diagnostics
- > Supports the following type of motors by software settings:
  - > 2, 3 phase AC Servo / DC brushless with sinusoidal commutation, DC brush, voice coils, closed and open loop step motors
- > Feedback
  - > 4 digital incremental encoders
  - > 4 absolute encoders (optional)
- > Digital I/O (can be used as general purpose I/O)
  - > Inputs: 4 Registration MARK (High Speed Position Capture)
  - > Outputs: 1 PEG (Position Event Generator), 4 motor brake (24V, 0.5A)
- > Safe Torque Off (optional)
- > Four axis units can be ordered also with mix current levels:
  - > 2 x 5A & 2 x 10A
  - > 2 x 5A & 2 x 20A
  - > 2 x 10A & 2 x 20A
- > Compact footprint: 152 x 138 x 48 mm<sup>3</sup>

The UDM<sub>MC</sub> is a line of compact EtherCAT modules of two and four universal drives with rating of 12 to 80Vdc and 2.5A (5A peak) to 20A (40A peak) per drive. Each drive is programmable to control a 3 & 2 phase servo motor, a DC brush motor, a voice coil motor and a 2 & 3 phase step motor.

The UDM<sub>MC</sub> addresses the needs of demanding multi-axis motion applications with limited space, such as wafer-handling robots, wire bonders, die bonders, electronics packaging, small manipulators, and table-top motion stages.

With the optional powerful **ServoBoost™** algorithm (ordered with the controller), demanding positioning systems can achieve ultimate performance levels, such as speeds of meters per seconds and Nanometers of jitter, minimal settling time, and uncompromising system robustness with minimal sensitivity to disturbances and changes.

Optional Safe Torque Off (STO) cuts the power to the motor without removal of the power source for applications that are required to comply with SIL-3 and PLe safety levels.

The UDM<sub>MC</sub> is a slave that runs under any ACS' EtherCAT masters.

The 4-axis UDM<sub>MC</sub> can be ordered with mixed current specifications. See Ordering Options.

A comprehensive set of software support tools are provided for configuration, setup, tuning and diagnostics.

## Specifications

Per Drive	2.5A	5A	10A	20A
Continuous/peak current Sine amplitude [A]	2.5/5	5/10	10/20	20/40
Continuous current RMS [A]	1.75/3.5	3.5/7	7/14	14/28
Heat dissipation [W]	1	1.2	3	8
Maximum cont./peak output power @ 80Vdc [W]	155/310	313/625	625/1250	1250/2500
Maximum cont Input current [A]	2	4	8	16
Peak current time [sec]	1			
Minimum load inductance @80Vdc [mH]. Can be derated linearly for lower voltages	0.05			

Per module	
Maximum cont input current per module [A]	40
Maximum motor voltage [Vdc]	(Vin motor) x 92%

### Example: UDMmc2B4N0YNA

Field		1	2	3	4	5	6	7	8
PN	UDMmc	2	B	4	N	0	Y	N	A

### Servo

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 & under voltage, Phase to phase and phase to ground short, Over current, Over temperature

### Supply

The drive must be supplied by two power sources  
 A motor supply and a 24Vdc control & logic supply.  
 During emergency conditions there is no need to remove the 24Vdc control supply.  
 Motor Supply: Range: 12Vdc to 80Vdc  
 Current rating should be calculated based on actual load.

External shunt power resistor, activated at 83V, should be added in parallel to motor supply, which must not exceed 85V under any operating conditions.

Mating connector is not supplied.  
 Control Supply Control supply input voltage: 24Vdc  $\pm$  20%  
 Maximum input power:  
 Without motor brakes: 19W (0.8A @ 24Vdc)  
 With 4 motor brakes: 67W (2.8A @ 24Vdc)  
 Mating connector supplied.

### 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), Five-phase stepper\*.

\* Consult ACS..

### Feedback

Types: incremental digital encoders, optional: absolute encoders  
 Incremental Digital Encoder: Four, one per axis. A&B, and Clk/Dir, Type: Differential RS-422 or single-ended  
 Max. rate: RS-422 - 50M quad counts/sec, Single-ended: 2M quad counts/sec.  
 Protection: Encoder error, not connected  
 Absolute encoders (optional): Up to four.  
 EnDat 2.1(Digital)/2.2, Panasonic, Smart-Abs, BiSS-A/B/C, and SSI  
 Hall inputs: Four, a set of three per axis.  
 Type: single-ended, 5V, source, opto-isolated Input current: <7mA  
 5V feedback supply: Feedback devices are fed by a 5V $\pm$ 5% supply.  
 Total current provided by the internal supply: 0.5A.  
 If more current is needed, an external supply should be used, using the dedicated connector

### Digital I/O

Axis' Limit inputs: Eight, Two per axis.  
 Type: Single-ended, 5/24V $\pm$ 20%, opto isolated, sink/source. 4-14mA per input  
 Unused limit inputs can be used as general purpose inputs  
 STO: Two inputs. Current per input <50mA  
 All drives are disabled within 50ms to 200ms  
**Registration MARK** (High Speed Position Capture)  
 Inputs: Four, 24V $\pm$ 20%, opto-isolated, two terminals. Can be configured as 'sink' or 'source'.  
 Input current 4-14mA. Can be used as general purpose inputs.  
 Motor Brake Outputs: Four, opto-isolated, source, 24V $\pm$ 20%, 0.5A. Can be used as general purpose outputs.  
 Position Event Generator (PEG): One, RS422.  
 Can be used as general purpose output. Pulse width 26nSec to 1.75mSec. Maximum rate: 10MHz

## Ordering Options

Ordering Options	Field	Example User Selection	Values
Number of axes	1	2	2, 4
Continuous Current (Peak is double)	2	B	K - 2x2.5A, A - 2x5A, B - 2x10A, C - 2x20A J - 4x2.5A, D - 4x5A, E - 4x10A, F - 4x20A, G - 2x5A & 2x10A, H - 2x5A & 2x20A, I - 2x10A & 2x20A
Total number of digital incremental encoders	3	4	2, 4 (For 4 axis unit select 4)
Absolute encoders type	4	N	N - None, U - User selectable E - Digital EnDat 2.1(digital only)/2.2, S - Smart Abs, P - Panasonic, B - BiSS-A/B/C, I - SSI
Number of absolute encoders interface	5	0	0, 1, 2, 3, 4
STO	6	Y	Y - Yes, N - No
I/O configuration	7	N	N - Inputs & limits: 24V, SOURCE (PNP), Outputs: 24V, SOURCE (PNP). S - Inputs & limits: 24V, SINK (NPN). Outputs: 24V, SOURCE (PNP). A - Inputs & limits: 5V, SOURCE (PNP). Outputs: 24V, SOURCE (PNP). B - Inputs & limits: 5V, SINK (NPN). Outputs: 24V, SOURCE (PNP).
5V feedback supply	8	A	A - Internal, B - External

### Drive Protection

- > Over & under Voltage
- > Short circuit: Phase-to-phase, Short to ground
- > Over current
- > Over temperature

### Environment

Operation: 0 to +50°C  
 Storage and transportation: -25 to +60°C  
 Humidity (operating range): 5% to 90% non-condensing

### Communication

Two EtherCAT ports, In and Out, RJ45 connector

### Dimensions

152x138x48 mm<sup>3</sup>

### Weight

1,000 [gram]

### Accessories

UDMmc-ACC1: Mating connectors kit for drives, encoders and I/Os  
 UDMmc&NPXpm-ACC2: (J1) mating 2m flying lead cable  
 STO-ACC1: Cable for STO with mating connector

### Certifications

CE: Yes  
 Electrical Safety: IEC 61010-1, IEC 61800-5-1  
 EMC: EN 61800-3  
 UL Certification: UL508C  
 Functional Safety: IEC 61800-5-1, IEC 61800-5-2 pending