

# UDM<sub>LC</sub>



## EtherCAT<sup>®</sup> Dual/Quad Axis Drive Module

- Universal dual/quad axis Drive Modules for EtherCAT networks
- 12Vdc to 48Vdc, up to 5A continuous and 10A peak current
- Digital control for easy setup and diagnostics
- Universal drive, supporting any of the following type of motors by software settings only: 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
  - 2 absolute encoders (optional)
- Digital I/O (all can be used as general purpose I/O):
  - Inputs: 4 Registration Mark
  - Outputs: 1 PEG, 4 motor brake (24V, 0.5A)
- SPI interface for special feedback devices
- Compact footprint: 100x75x48 mm<sup>3</sup>

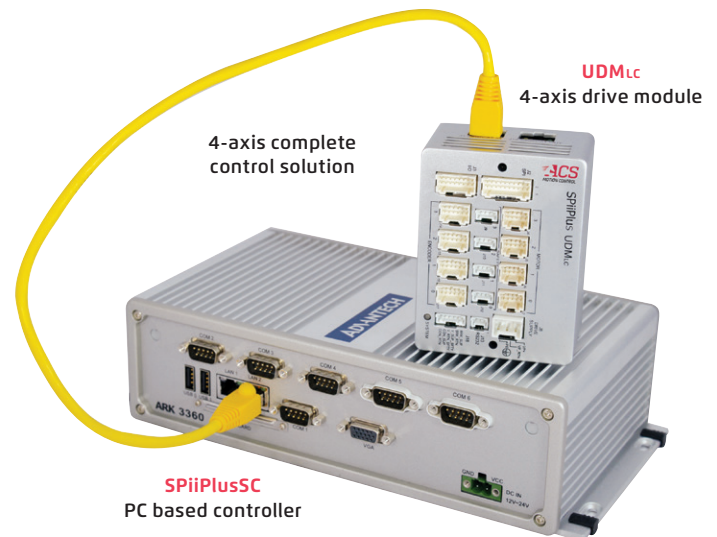
The UDM<sub>LC</sub> is a series of small footprint EtherCAT modules with dual/quad-axis universal drives for servo, stepper, and voice coil motors with a power range of 10W to 200W. The type of motor is selected by the user and can be set differently for each drive.

This product addresses the needs of demanding multi-axis motion applications with limited space, such as moving inspection heads, small manipulators, and table-top motion stages. The miniature size, low weight, and minimal cable interface makes the UDM<sub>LC</sub> ideal for mounting remotely on moving axes. It is available in three current levels (cont./peak per axis): 1.25/2.5A, 2.5/5A or 5/10A (dual axis version only), and has inputs for four digital incremental and two absolute encoders.

The unit is powered by a 12 to 48Vdc drive supply voltage and by a separate 15 to 48Vdc control supply that keeps all logic signals alive during emergency conditions. The UDM<sub>LC</sub> is panel or din rail mountable.

### CE, UL

EtherCAT<sup>®</sup> is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany



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**In-Position  
Technologies**  
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MOTION CONTROL

Product (x – number of axes) (yyy – additional options)	UDM <sub>LC</sub> x001yyy	UDM <sub>LC</sub> x002yyy	UDM <sub>LC</sub> x005yyy
Number of axes	2,4	2,4	2
Motor voltage input range [Vdc]	12-48		
Control voltage input [Vdc]	15-48		
Phase current (Cont./ Peak) Sine amplitude [A]	1.25/2.5	2.5/5	5/10
Phase current (Cont./ Peak) RMS [A]	0.9/1.8	1.8/3.6	3.6/7.2
Peak current time [sec]	1		
Max. output voltage to motor [Vdc]	(Drive supply) x 93%		
Max. RMS input current at 80Vdc [W]	4.3	8.6	8.6
Min. load Inductance, at maximum motor voltage [mH]	0.050		
Max. Heat dissipation per axis [W]	0.7	2	6
Weight [gram]	250		
Dimensions [mm <sup>3</sup> ]	100x75x48		
Standards	CE, UL (pending)		

## Servo

A standard comprehensive set of powerful algorithms to enhance accuracy, move & settle time, smooth velocity, stability and robustness

- Advanced PIV cascaded structure
- Loop shaping filters
- Gain Scheduling
- Gantry MIMO control (2.5/5model only)
- Dual feedback / loop control
- Disturbance rejection control

**Optional Servoboost™** algorithm that provides better, more consistent servo performance, insensitive to noise and large changes in the system

## 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, motor phase-to-phase short circuit, motor phase to ground short circuit, over-current, over-temperature

## Supplies

The module is fed by two power sources. A motor supply and control supply. During emergency conditions there is no need to remove the control supply

### Drive Supply

Range: 12Vdc to 48Vdc

Current rating should be calculated based on actual load

### Control Supply

Range: 15Vdc to 48Vdc

Maximum input power: 15W

Input current: < 1A

## 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.

## Accessories

UDM<sub>LC</sub>-ACC1 – A set of mating connectors

UDM<sub>LC</sub>-ACC2 – A set of 50cm cables with assembled mating connectors

UDM<sub>LC</sub>-ACC3 – Din-rail mounting kit

## Feedback

Types: incremental digital encoders, optional: absolute encoders

**Incremental Digital Encoder:** Four, one per axis. A&B,I 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): Total of two. EnDat 2.1(Digital)/2.2,

Panasonic, SmartABS, 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±5% supply.

Total available current to all encoders is 1A

## Digital I/O

**Safety Inputs:** Left and right limit inputs per axis

Type: Single-ended, 24V±20%,opto isolated, source E-Stop: 24V, Max., opto isolated, two terminal, input current 4-14mA Unused safety inputs can be used as general purpose inputs

**Registration MARK:** Four. Fast, 24V±5%, opto-isolated, two terminals. Can be configured as 'sink' or 'source'. 4-10mA max. input current.

can be used as general purpose fast inputs

**Motor Brake Outputs:** Four, opto-isolated, 24V±20%, 0.5A per output. 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 with RS422 outputs: 10MHz

**SPI Interface** Two. requires customized software to activate.

Consult ACS representative

## Environment

Operating range: 0 to + 50°C

Storage and transportation range: -25 to +70°C

Humidity (operating range): 5% to 90% non-condensing

## Communication

Two EtherCAT ports, In and Out

## Ordering Options

Ordering options	Field	Example	Values
Number of axes	1	4	2,4
Continuous Current (Peak is double)	2	002	001-1.25A, 002-2.5A, 005-5A (5A only dual axis version)
Total number of digital incremental encoders(1)	3	4	2, 4. 4-axis unit requires 4
Absolute encoders type	4	N	N- None, E- EnDat 2.1(Digital)/2.2, S- Smart Abs, P- Panasonic, B- BiSS-A/B/C, I- SSI
Number of Absolute encoders interface	5	0	0,1,2
EtherCAT Master	6	1	Any (1)
Type of motors	7	0	Any (0)
I/O configuration	8	N	<b>N- Inputs &amp; limits:</b> 24V/SOURCE (PNP), <b>outputs:</b> 24V/SOURCE (PNP). <b>D-</b> Identical to (N), For compatibility reasons. <b>S- Inputs &amp; limits:</b> 24V/SINK (NPN). <b>Outputs:</b> 24V/SOURCE (PNP). <b>R- Inputs &amp; limits:</b> 5V/SOURCE (PNP). <b>Outputs:</b> 5V/SOURCE (PNP). <b>T- Inputs &amp; limits:</b> 5V/SINK (NPN). <b>Outputs:</b> 5V/SOURCE (PNP)

**Example: UDM<sub>LC</sub>40024N010N**

Field	1	2	3	4	5	6	7	8
PN UDM <sub>LC</sub>	4	002	4	N	0	1	0	N