

UDM_{CB}



Economical 100V/40A, Dual & Single Axis PCB Mounted EtherCAT® Drive Module

Powerful and Compact

- > Two drives per module for gantry control
- > Voltage: 12-60Vdc or 12-100Vdc
- > Current: from 3.3/10 to 13.3A / 40A (cont./peak)
- > PCB mounted to enable customised connectivity

Outstanding Speed and Resolution

- > 2 Analog Sin-Cos 1Vptp encoders with frequency up to 500KHz
- > Encoder multiplication of 4 to 4,096
- > Automatic encoder offsets and gain compensation and error detection
- > Dual feedback support (in single axis configuration)
- > Relays control outputs for motor dynamic braking

Smart Motion Related I/O

- > 4 encoder registration MARK inputs
- > 2 Position Event Generator (PEG) outputs
- > 2 motor brake / relay outputs
- > 2 analog inputs, 12 bit resolution, $\pm 10V$ or 0-10V
- > 2 analog outputs, 10 bit resolution, $\pm 10V$
- > Safe Torque Off (STO)



The UDM_{CB} is a line of economical and compact PCB mounted EtherCAT drive modules.

The UDM_{CB} is specifically designed to complement the highest performance NPM **NanoPWM™** and address the needs for a more economical drives. It has the same form factor as the NPM_{PC} and same connectivity.

One customized carrier board can be used for both modules. Such a carrier board design enables customization of connectors, I/O configuration, STO, and other safety related functions.

For prototype testing and carrier board design reference it is recommended to use the UDM_{PA}.

The UDM_{CB} is a slave that runs under any ACS EtherCAT masters.

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

Specifications

Per Drive	A	B	C	D
Cont./peak output current Sine amplitude [A]	3.3/10	6.6/20	10/30	13.3/40
Cont./peak output current [Arms]	2.3/7	4.6/ 14.1	7/ 21.2	9.4/ 28.2
Maximum cont. input current [Arms]	2.6	5.3	8	10.6
Maximum cont./peak output power @ 60Vdc [W]	150/ 460	310/ 920	470/ 1380	610/ 1850
Maximum cont./peak output power @ 100Vdc [W]	260/ 780	520/ 1560	790/ 2340	1050/ 3120
Peak current time [sec]	1			
Minimum load inductance @100Vdc [mH] Can be derated linearly for lower voltages	0.05			
Per Module				
Control voltage input [Vdc]	24 ± 10%			
Drive voltage input range [Vdc]	12-60Vdc (56 recommended) 12-100Vdc (96 recommended)			
Maximum drive output voltage [Vdc]	(Vin motor) x 92%			
Maximum cont. input current Arms]	5.2	10.6	16	21.2
Maximum heat dissipation @ 60V dc [W] (i = no. of drives)	6 + 0.7 x i	6 + 1.7 x i	6 + 2.9 x i	6 + 4.1 x i
Maximum heat dissipation @ 100 Vdc [W] (i = no. of drives)	6 + 0.9 x i	6 + 2.1 x i	6 + 3.7 x i	6 + 5.6 x i

Drives

Type: digital current control with field oriented control and space vector modulation.
Current ripple frequency: 40 kHz.
Current loop sampling rate: 20 kHz.
Current dynamic range: 1,500:1.
Programmable Current loop bandwidth: up to 5 kHz.
Commutation type: sinusoidal. Initialization with or without Hall sensors.
Switching method: advanced unipolar PWM.
Protection: Over and under voltage, Over current, Over-temperature, Phase to phase and phase to ground short (short circuit on one of the motor phases might damage the drive).

Supplies

The module is fed by two power sources. A motor supply and a 24Vdc control supply. During emergency conditions there is no need to remove the 24Vdc control supply. (If STO is used, then there is also no need to remove the motor supply).
Motor Drive Supply:
Range: 12Vdc to 60Vdc or 12Vdc to 100Vdc,
Recommended range: 12-56Vdc for 60Vdc version, 12-96Vdc for 100Vdc version.
Current rating should be calculated based on actual load.
If regeneration resistor is required, it should be added in parallel to motor supply with activation at 62V for 60V version or 102V for the 100V version.
Control Supply:
Range: 24Vdc ± 10%.
Maximum input current / power: 1A @ 21.6V/ 20W.
Protection: reverse polarity. A 2A external fuse must be used.

Feedback

Types: Incremental digital encoders (AqB), Hall inputs, analog Sin-Cos (optional).
Incremental Digital Encoder: One per axis. A&B, I and Clk/Dir,
Type: Differential RS-422. Max. rate: 50M quad counts/sec.
Protection: Encoder error, not connected.
Sin-Cos Analog Encoder: One per axis
Type: 1Vptp, differential.
Programmable multiplication factor: x4 to 4096.
Maximum frequency: 500kHz.
Maximum acceleration with Sin-Cos encoder: 10⁸ sine periods/second².
Absolute Encoder (optional): Up to 2, EnDat 2.2 / 2.1(digital only), Biss-A/B/C, SSI.
In a single axis configuration, dual feedback consumes one network axis.
Hall inputs: A set of three per axis. Type: single-ended, 5V, source, open cathode.
Input current: <7mA.
Feedback supplies: For all digital feedback devices: 5V, 0.5A (DGND). For all analog feedback devices: 5V, 0.5A (AGND).
It is recommended to include a dedicated supply on the carrier board.

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).

Digital I/O

For different I/O configurations see ordering options.

Inputs

Safety: Left & right limit inputs per axis.

Type: 5/24V Sink/Source, single ended, opto-isolated. Input current 4-14mA.

Registration Mark: (High Speed Position Capture): Four, 5V/24V ±20%

opto-isolated, two terminals. Input current 4-14mA.

All dedicated inputs can be used as general purpose inputs.

Dedicated motor over temperature protection: for each axis.

Outputs

Motor Mechanical Brake: Two, 5/24V Sink/Source, single ended, opto-isolated, 0.1A.

PEG (Position Event Generator): Two, Pulse or State, Differential, RS422.

Pulse width: 26nSec to 1.75mSec. Maximum rate: 10MHz.

All dedicated outputs can be used as general purpose outputs.

Analog I/O

Analog Inputs: Two, 0-10V or ±10V, differential, 12 bit resolution.

Max. input frequency: 1kHz. Offset: <100mV.

Analog Outputs: Two, ±10V, differential, 10 bit resolution.

Offset: ±100mV, Bandwidth: 5 kHz. Max. output load: 10KΩ, Noise/Ripple: <40mV.

EtherCAT Communication

In and Out.

Environment

Operating range: 0 to +40°C.

Storage and transportation range: -25 to +60°C.

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

Dimensions

155 x 85 x 30 mm³.

Weight

320 gr.

Certifications

CE: Yes

Electrical Safety: IEC 61800-5-1

EMC: EN 61800-3

UL Certification: UL 61800-5-1

Functional Safety: IEC 61800-5-1, IEC 61800-5-2 (optional)

Ordering Options

Ordering Options	Field	Example User Selection	Values
Number of axes/drives	1	2	1, 2
Current	2	A	A – 3.3/10A B – 6.6/20A C – 10/30A D – 13.3/40A
Maximum Voltage	3	A	A – 60V B – 100V
500kHz Sin-Cos encoder interface	4	0	0, 1, 2
Absolute encoders type	5	N	None - N, U- User selectable E- EnDat 2.2/ 2.1 (digital only), B - Biss-A/B/C, I - SSI
Number of absolute encoders interface	6	0	0, 1, 2
Limit Switches	7	C	A – 5V, Source/PNP, B – 5V, Sink/NPN, C – 24V, Source/PNP, D – 24V, Sink/NPN
Digital Inputs	8	B	A – 5V, two-terminal B – 24V, two-terminal
Digital Outputs	9	A	A – 5V & 24V, Source/PNP B – 5V & 24V, Sink/NPN
Special Options	10	N	N - None

Example: UDMcb2AAON0CBAN

Field	1	2	3	4	5	6	7	8	9	10	
PN	UDMcb	2	A	A	0	N	0	C	B	A	N