

# UDM<sub>PA</sub>



## EtherCAT<sup>®</sup> Dual & Single Axis Module

### Powerful & Smart EtherCAT Drive Module

- Two drives per module for Gantry control
- Voltage: 12-60Vdc or 12-100Vdc
- Current: Up to 13.3A / 40A (cont./peak)

### Uncompromised speed and resolution

- Up to 3 Analog Sin-Cos 1Vptp encoders with frequency up to 500KHz
- Encoder multiplication of 4 to 4,096
- Automatic encoder offsets, gain compensation and error detection
- Dual feedback support
- Optional internal relays for dynamic braking (shorting motor phases)

### 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)

**In-Position  
Technologies**  
[www.iptech1.com](http://www.iptech1.com)

The UDM<sub>PA</sub> is a line of economical and compact EtherCAT drive modules.

The UDM<sub>PA</sub> is specifically designed to complement the highest performance NPM<sub>PM</sub> **NanoPWM**<sup>™</sup> drives and address the needs for a more economical drives. It has the same form factor as the NPM<sub>PM</sub> and same connectivity.

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

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

**CE, UL** (Recognized), **STO**

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**ACS**  
MOTION CONTROL

# Specifications

Per Drive	A	B	C	D
Cont./peak current Sine amplitude [A]	3.3/10	6.6/20	10/30	13.3/40
Cont./peak 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 @ 60Vdc [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 @ 100Vdc [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

Programmable Current loop bandwidth: up to 5 kHz

Commutation type: sinusoidal. Initialization with or without Hall sensors

Switching method: advanced unipolar PWM

Built-in relays short motor phases upon disable (16A nominal, for dynamic braking).

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

## 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, than 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: 0.9A @21.6V/ 20W Without motor brakes.

With 2 motor brakes: 1.9A @ 21.6Vdc / 42W

Built-in motor phases shortening relays.

**Protection:** reverse polarity. A 3A external fuse must be used.

## 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).

## 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 + one (see ordering options).

Type: 1Vptp, differential.

Programmable multiplication factor: x4 to 4096.

Maximum frequency: 500kHz.

Maximum acceleration with Sin-Cos encoder: 10<sup>8</sup> sine periods/second<sup>2</sup>.

**Absolute Encoder (optional):** Contact ACS.

**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.

For all analog feedback devices: 5V, 1.5A.

## Digital I/O

For different I/O configurations see ordering options

**Safety Inputs:** Left & right limit inputs per axis.

Type: 24V/ source (default), single ended, opto-isolated, input current 4-14mA.

**STO:** Two inputs, 24V ±20%. Input current: <50mA

All drives are disabled within 200ms

**Registration Mark Inputs:** (High Speed Position Capture): Four, 24V±20%, opto-isolated, two terminals. Input current 4-14mA.

Can be used as general purpose inputs.

**General purpose output:** Motor Mechanical Brake output: Two, 5/24V±20%, opto-isolated, single-ended, sink/source, 0.1A.

**External Motor relay control:** Two, 24V ±20%, source, 0.5A.

These outputs are used to shorten the phases of the motors by external relays (if the optional internal relays are not present).

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

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

Can be used as general purpose output.

## Analog I/O

**Analog Inputs:** Two, ±10V, differential, 12 bit resolution.

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

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

Offset: ±100mV, Bandwidth: 5KHz. Max. output load: 10KΩ,

Noise / Ripple: < 25mV.

## EtherCAT Communication

Two ports, In and Out, RJ45 connector

## Environment

Operating range: 0 to + 40°C

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

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

## Dimensions

257x154.9x50.9 mm<sup>3</sup>

## Weight

1.6 Kg.

## Accessories

UDMpa-ACC1: Mating Connector Kit

UDMpa-ACC2: UDMpa (J1) mating 2m flying lead cable

STO-ACC1: 2 meter cable with flying leads

## Ordering Options

Ordering options	Field	Example user selection	Optional 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	B	A - 60V B - 100V
500kHz SIN-COS encoder interface	4	0	0, 1, 2
Absolute encoders type*	5	N	N - None
Number of Absolute encoders interface*	6	0	0 - 0
Limit switches	7	D	A - 5V, Source/PNP B - 5V, Sink/NPN C - 24V, Source/PNP D - 24V, Sink/NPN
Digital Inputs	8	A	A - 5V, Two-terminal B - 24V, Two-terminal
Digital Outputs	9	B	A - Source/PNP, 5V & 24V B - Sink/NPN, 5V & 24V
Special options	10	N	N - None A - 3rd SIN-COS encoder, replacing the two analog inputs.
STO	11	N	Y - Yes, N - No
Motor relays	12	N	Y - Yes, N - No

\* Absolute encoders are currently not supported.

### Example: UDMpa2ABON0DABNBN

Field	1	2	3	4	5	6	7	8	9	10	11	12
PN	UDMpa	2	A	B	0	N	0	D	A	B	N	N