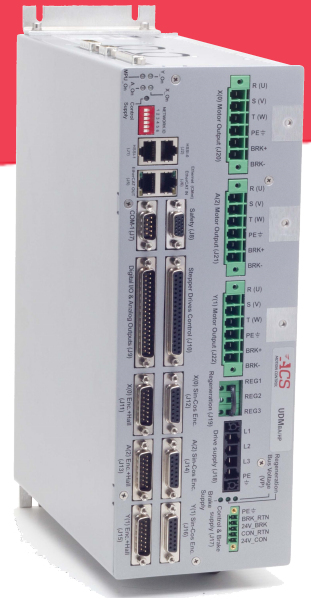


# UDM<sub>HP/BA</sub>

## EtherCAT<sup>®</sup> Drive Module with Three Built-in Drives



- > EtherCAT Universal Drive Modules with up to 3 built-in drives
- > Two versions: Economical (BA) and High Performance (HP)
- > Three built-in drives
  - > 85 to 265Vac, up to 15A continuous and 30A peak current
  - > 4 encoders
  - > 20kHz sampling and update rate of all control loops
- > Digital I/O
  - > 8/8 general purpose inputs / outputs
  - > 4 Registration MARK inputs, 2/8 PEG outputs
  - > (Pulse/States)
  - > 3 motor brake outputs 24V/1A
- > Analog I/O: 8/2

The UDM<sub>HP/BA</sub> is a state of the art series of EtherCAT drive modules with three built-in universal drives. It addresses the needs of modern machinery for both economical and for high performance, scalable and distributed control for motion centric applications.

The UDM<sub>HP/BA</sub> operates as an EtherCAT node under any SPiiPlus EtherCAT master Controller including the PC based SPiiPlusSC Soft Controller.

The UDM<sub>HP/BA</sub> addresses high accuracy demanding applications, while the UDM<sub>HP/BA</sub> econo version addresses more price sensitive applications. The UDM<sub>HP/BA</sub> are complemented by the SPiiPlusNT suite of software tools that minimizes network configuration and drive set up efforts and time to market. The built-in drives are offered with three current levels: 5/10A, 10/20A and 15/30A (cont./peak).

The modules are powered by a single or three-phase AC from 24 to 265Vac (rectified internally to generate a Vac x 1.4 motor voltage) and by a separate 24Vdc control supply that keeps all low voltage signals alive during emergency conditions. It supports a wide range of position feedback devices: incremental digital, analog Sin-Cos, and absolute encoders.



## Specifications

Product (xx - HP or BA) (y - number of Axes)	UDMxxxA...	UDMxxxB...	UDMxxxC...
Number of built-in drives	1, 2, 3		
Motor voltage AC input [Vac]	85 - 265, single and 3 phase		
Control voltage input [Vdc]	24 ± 10%		
Phase current Cont./Peak Sine amplitude [A]	5/10	10/20	15/30
Phase current Cont./Peak RMS [A]	3.6/7.1	7/14	10.6/21.2
Peak current time [sec]	1		
Max. output voltage [Vdc]	(Vac in) x1.41 x 97%		
Max. RMS input current 1-phase supply [A]	18	18	24
3-phase supply[A]	13	18	24
Min. load Inductance, at max. motor voltage [mH]	1		
Max. Heat dissipation per axis [W]	30	48	79
Weight [gram]	5750		
Dimensions [mm <sup>3</sup> ]	324x249x120		
Standards	CE, UL (Pending)		

Note: For cooling use fan with airflow of 25CFM

## 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
- > Dual feedback / loop control
- > Disturbance rejection control

**Optional** \_ algorithm that provides better, more consistent servo performance, insensitive to noise and large changes in the system (hp version only).

## 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, Phase-to-phase short circuit, Short to ground, Over current, Over temperature, motor over temperature  
 Current sensing: CMba: 12b ADC, CMhp: 16b ADC

## Power Supplies

The module is fed by three power sources. A motor AC supply, a 24Vdc control supply and 24Vdc motor brake supply.  
 During emergency conditions there is no need to remove the 24Vdc control supply.

**Motor Supply:** Range: 85 to 265Vac Optional Low Voltage operation (17-85 Vac or 24-120 Vdc)

**Control Supply:** 24Vdc ± 10%, 4A

**Motor Brake Supply:** 24Vdc ± 20%, 3A

## 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, AC induction\*.  
 \* Consult ACS.

## Feedback

**Incremental Digital Encoder:** Four, A&B,I; Clk/Dir,I; RS-422. Max. rate: 40 million encoder counts/sec., Protection: Encoder error, not connected

**Sin-Cos Analog Encoder (optional):** Three. 1Vptp, differential.

Multiplication factor: From x4, to-BA: x4,096 HP-x65,536

Maximum frequency: 250kHz

Automatic compensation of Offset, Phase and Amplitude

ADC used: UDMBA: 12b, UDMHP: 16b low S/N

Maximum acceleration: 108 million sine periods/sec<sup>2</sup>.

Protection: Encoder error, not connected.

**Hall inputs:** Three sets of three per axis.

Single-ended, 5V, source, opto-isolated.

Input current: <7mA.

**Absolute encoders (optional):** Three, EnDat 2.1

(Digital)/2.2, Smart-ABS, Panasonic, Biss-A/B/C, SSI.

5V feedback supply: Total current available for

feedback devices: 1A

## Ordering Options

Ordering Options	Field	Example User Selection	Values
Type, Basic or High Performance	1	ba	ba-economical, hp-high performance
Number of built-in drives (85Vac - 265Vac)	2	3	1, 2, 3
Continuous Current (Cont/Peak)	3	C	A - 5/10A,B - 10/20A,C - 15/30A
Number of 250kHz SIN-COS encoder interface	4	0	0, 1, 2, 3
Total number of feedback channels	5	4	4
Absolute encoders type	P	P	N - None,U - User selectable, E - EnDAT 2.2 & 2.1 digital only, S - Smart Abs, P - Panasonic, B - BiSS-A/B/C,I - SSI.
Number of Absolute encoders interface	7	3	0, 1, 2, 3
STO	8	N	N - No
EtherCAT Master	9	1	1 - Any ACS EtherCAT master
Low Voltage (17Vdc-85Vdc) operation	10	Y	Y - Yes, N -No

**Example: UDMba3C04P3N1Y**

Field	1	2	3	4	5	6	7	8	9	10	
PN	UDM	ba	3	C	0	4	P	3	N	1	Y

## Digital I/O

Safety Inputs: Left + right limit per axis, E-stop, General Purpose Inputs: 8 Single-ended, 5Vdc (±10%) or 24Vdc (±20%), opto-isolated, sink/source, Input current: 4-14mA

**Registration Mark inputs:** Four. RS422

**Motor Brake Outputs:** Three. 24V, 1A, optoisolated. Powered by the 24V Brake Supply.

**General Purpose Outputs:** Eight. Single-ended, 5Vdc (±10%) or 24Vdc (±20%), opto-isolated, sink/source, 100mA

**Position Event Generator outputs (PEG):** Two PEG\_Pulse and eight PEG\_State, RS422 Can be used as general purpose outputs.

**HSSI channels:** Two. RS422

## Analog I/O

**Inputs:** Six ±10V, differential, 20kHz sampling rate. The inputs can be used as feedback to the servo loops.

Resolution: CMba - 12b, CMhp - 16b. Joystick

inputs: two single-end, ±10V, 12b resolution

**Outputs:** Two, Single-end, ±10 V ±5%, 10 bit resolution

## Communication

EtherCAT: Two, In & Out, 100 Mbit/sec, RJ45 connectors

## Environment

Operating: 0 to +40°C. Storage: -25 to +60°C Humidity: 5% to 90% non-condensing

## Certifications

CE: Yes

Electrical Safety: EN 60204

EMC: EN 61326-1

UL Certification: 5/10A and 10/20A only (CSA Certification)

CSA standard C22.2 No 0, CSA standard C22.2 No 14,

ANSI/UL508C

Functional Safety: IEC 61800-5-1, IEC 61800-5-2 Pending