UDMHV

EtherCAT® Single & Dual Axis 480VAC Drive Module

- Universal single and dual axis EtherCAT Drive Modules
- 230 - 480Vac with up to 15/30A continuous / peak current
- 230Vac with up to 20/60A continuous / peak current
- Exceptional Servo Performance
- Two feedback inputs per axis
- Supports incremental digital & analog encoders, absolute encoders & resolver
- Digital I/O: 8 inputs, 8 outputs
- Analog I/O: 4 inputs, 2 outputs, 12 bit resolution
- Safe Torque Off (STO)

The UDMHV is a line of EtherCAT universal single & dual axis economical drives for AC servo / DC brushless, AC induction*, and DC brush motors. The UDMHV operates as an EtherCAT node under any SPiiPlus EtherCAT master controller including the PC based SPiiPlusSC Soft Controller. It is designed to address cost sensitive applications requiring high dynamics and large loads.

The UDMHV is offered with the following current levels (cont./peak): 5A/10A, 10A/20A, 15A/30A, 20A/20A + 5A/10A with 230-480Vac, and 10A/30A, 15A/45A, 20A/60A with 230Vac.

The module is powered by 3 phase 230 to 480Vac. In addition to the AC supply, the UDMHV is supplied by a separate 24Vdc control supply that keeps all low voltage signals alive during emergency conditions.

When a 230Vac - 480Vac module is operated below 400Vac, the output cont./peak current levels increase by 25%.

The optional Safe Torque Off (STO) module cuts the power to the motor without removal of the power source to comply with SIL-3 and PLe safety levels.

* Consult ACS.

CE (Pending), ***UL***

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ACS MOTION CONTROL

Specifications

Product X - number of Axes YY - Other configuration options	UDMHV X-A-YY	UDMHV X-B-YY	UDMHV X-C-YY	UDMHV X-D-YY	UDMHV X-E-YY	UDMHV X-F-YY	UDMHV X-G-YY	UDMHV X-H-YY
Number of axes	1 or 2							
Control voltage input [Vdc]	24 ±10%							
Motor voltage input range [Vac]	3 phase, 230 – 480				3 phase, 230			
PWM frequency [KHz]	10				20			
Phase Current per axis Cont./Peak sine amplitude at Vmax 480V [A]	5/10	10/20	15/30	20/20 + 5/10	-	-	-	-
Phase Current per axis (Cont./Peak) sine amplitude at Vmax 400V [A]	6.25/12.5	12.5/25	18.75/37.5	25/25 + 6.25/12.5	-	-	-	-
Phase Current per axis (Cont./Peak) sine amplitude at Vmax 230V [A]	6.25/12.5	12.5/25	18.75/37.5	25/25 + 6.25/12.5	5/15	10/30	15/45	20/60
Peak current time [sec]	1							
Max. output voltage to motor phase-to-phase [Vrms]	(Vac in) x 95%				(Vac in) x 88%			
Max. input continuous power @ 480 Vac [kVA]	7.6	15.1	22.7*	19	-	-	-	-
Max. input continuous power @ 400 Vac [kVA]	7.7	15.4	19.3*	19.3*	-	-	-	-
Max. input continuous power @ 230 Vac [kVA]	4.3	8.8	11.1*	10.9*	3.5	6.7	10.2	13.4
Min. load Inductance, at maximum motor voltage [mH]	1							
Max. output power (cont./peak) per axis @ 480 Vac [KW]	2.6/4.9	5.1/9.9	7.7/14.8	10.4+2.6/ 10.3+5.1	-	-	-	-
Max. output power (cont./peak) per axis @ 400 Vac [KW]	2.6/5	5.2/10	7.9/15.2	10.6+2.6/ 10.4+5.2	-	-	-	-
Max. output power (cont./peak) per axis @ 230 Vac [KW]	1.5/2.8	2.9/5.7	4.4/8.5	5.8+1.5/ 5.8+2.9	1.2/3.3	2.2/6.3	3.5/9.7	4.5/12.7
Max. Heat dissipation per axis @ 480 Vac [W]	50	102	156	211+50	-	-	-	-
Max. Heat dissipation per axis @ 400 Vac [W]	54	111	172	235+54	-	-	-	-
Max. Heat dissipation per axis @ 230 Vac [W]	36	75	117	162+36	48	98	84	114
Weight [Kg]	5.3							
Dimensions [mm³]	260 x 246 x 120							
Standards	CE, UL (Pending)							

* Phase input current is limited to 27.8Arms

Servo

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

Supplies

The module is fed by two power sources. A drive 3 phase AC supply and a 24Vdc control supply.
During emergency conditions there is no need to remove the 24VDC control supply

Drive Supply
Range: 230 to 480Vac, or 230Vac, 3 Phase.
See 'ordering options' for the different configurations.
Current rating should be calculated based on actual load
Mating connector supplied.

Control Supply
Range: 24Vdc ± 10% Maximum input current / power: 4A / 100W
Note: The module consumes 2A (50W) Additional 2A are needed when the motor brake feature is used.
Mating connector supplied.
Regeneration
Internal and external options
Internal: 150Ω/300W for 230 - 480Vac modules
50Ω/300W for 230Vac modules
External: 50Ω/300W for 230Vac, 150Ω/300W for 480Vac
(see ordering options field 16)

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

Drives

Type: digital current control with field oriented control and space vector modulation
Current ripple frequency: 20 kHz for A, B, C, D drivers and 40KHz for E, F, G, H drivers
Current loop sampling rate: 20 kHz
Programmable current loop bandwidth: up to 4kHz, will vary with tuning & load parameters.
Commutation type: sinusoidal. Initiation with and without hall sensors Switching method: advanced unipolar PWM
Protection: Short current (phase-to-phase or phase to ground), Over current, Over temperature

Feedback

Up to 4 feedback devices. The following are supported:

Incremental Digital Encoder
Up to four, two per axis, AqB,I; Clk/Dir,I RS-422. Max. rate: 50 million encoder counts/sec.
Protection: Encoder error, not connected

Sin-Cos Analog Encoder (optional)
Up to two, one per axis.1Vptp, differential
Multiplication factor: From x4, to- x4,096, frequency: 250kHz.
Automatic compensation of Offset, Phase and Amplitude. Squared Sin-Cos output option
Maximum acceleration: 108 million sine periods/sec².
Protection: Encoder error, not connected

Absolute Encoder (optional)
Up to two, EnDat 2.1(Digital)/2.2, Smart-Abs, Panasonic, Hiperface, Biss-C, SSI

Resolver
Two, 12b resolution (4,096 counts/rev)

Hall inputs for initial commutation
One set of three per axis, Single-ended, 5V, source, opto-isolated.
Input current: <7mA

Specifications

Digital I/O

General Purpose Inputs
Eight, Single-ended, 24V±20%, opto-isolated, source.
(optional 5V & sink configuration upon order) Input current: 4-14mA
Safety Inputs
Left + right limit per axis, Single-ended, 24V±20%, opto-isolated, source.
optional 5V & sink configuration upon order, Input current: 4-14mA.
E-Stop: Opto-isolated, floating two-terminal
MARK (High Speed Position Capture
Four. Two are RS422 with dedicated inputs and can be used as GP inputs.
Two share General Purpose Inputs 6,7
General Purpose Outputs
Eight, Single-ended, 24V±20%, opto-isolated, source. 0.5A per output with up to 3A for all outputs
Motor Brake outputs
One per axis, 24V, 1A, opto-isolated.
Powered by the 24V Control Supply
PEG (Position Event Generator)
Two PEG Pulse and two PEG State, RS422.
Flexible axis assignment. Can be used as GP outputs.
Two general purpose opto-isolated outputs can be programmed to be used as the PEG Pulse outputs. Pulse width with RS422 outputs:
26nSec to 1.75mSec.
Maximum rate with RS422 outputs: 10MHz
Pulse width with GP outputs: 0.75mSec to 1.75mSec.
Maximum rate with GP outputs: 1kHz
HSSI
One channel, RS422, Flexible assignment to both axes
STO
Two pairs of inputs

Analog I/O

Analog Inputs
Four, ±10V, differential, 12 bit resolution. 20kHz sampling rate.
Can be used as feedback to the servo loops
Analog Outputs
Two, ±10V, differential, 10 bit resolution. Sampled at the servo sampling rate

Host Communication Ports

Serial: One, Modbus protocol as slave
EtherCAT ports: Two, In & Out, 100 Mbit/sec, CoE and FoE protocols

Environment

Operating range: 0 to +40°C
Storage and transportation range: -25 to +60°C
Humidity (operating range): 5% to 90% non-condensing

Accessories

Mating Connectors Kit: PN CMhvUDMhv-ACC1
J11 mating connector +2m cable, flying leads: PN CMhvUDMhv-ACC2
Clamping Yoke: PN CMhvUDMhv-ACC3
Cover fan kit: PN HV COVER FAN ACC1
Heatsink fan kit: PN HV HEATSINK FAN ACC1
STO kit, 2 meter cable with flying leads for STO: PN STO-ACC1
STO kit, Connector Kit for STO card: PN STO-ACC2

Ordering Options

Ordering Options	Field	Example User Selection	Values
Number of built-in drives	1	1	1, 2
Voltage & current rating of built-in drives (cont/peak)	2	2	A - 230-480V, 5/10A, B - 230-480V, 10/20A, C - 230-480V,15/30A, D - 230-480V, 20/20A+5/10A, E - 230V, 5/15A, F - 230V, 10/30A, G - 230V, 15/45A, H - 230V, 20/60A
250kHz Sin-Cos encoder interface	3	3	0, 1, 2
Total number of feedback channels***	4	4	2, 4
Absolute encoders type	5	5	N - None, E - EnDAT 2.1(digital)/2.2, S - Smart Abs, P - Panasonic (P), B - BiSS-A/B/C, H - Hiperface, R - Resolver, I - SSI
Number of absolute encoder channels	6	6	0, 1, 2
STO	7	7	Y - Yes, N- No
I/O configuration	8	8	**N - Inputs & limits:** 24V/SOURCE (PNP), **Outputs:** 24V/SOURCE (PNP). **D** - Identical to N. For compatibility reasons. **S - Inputs & limits:** 24V/SINK (NPN), **Outputs:** 24V/SOURCE (PNP). **U - Inputs:** 24V/SOURCE (PNP), Limits 24V/SINK (NPN), **Outputs:** 24V/SOURCE (PNP).
Built-in Shunt Resistor	9	9	None (N), 50Ω/300W for 230Vac (A)*, 150Ω/300W for 480Vac (B)**
NanoPWM	10	10	N - No

*Available selection for "Voltage and Current Rating" (field 2) E,F,G,H
**Available selection for "Voltage and Current Rating" (field 2) A,B,C,D
***To use a 5Vdc external supply for the encoders consult ACS.

Example: UDMhv2A12B1YSAN

Field		1	2	3	4	5	6	7	8	9	10
PN	UDMHV	2	A	1	2	B	1	Y	S	A	N

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