



EtherCAT[®] dual/quad Motor Drive interface with $\pm 10V$ commands

- > Commanding Motor Drives with $\pm 10V$ Interface, such as linear drives and piezo motor drives
- > Outstanding performance
ServoBoost, powerful control algorithms
20kHz sampling and update rate Sinusoidal commutation
- > Feedback
Two or Four channels Standard:
Digital incremental
Optional: Absolute (up to two), Sin-Cos (up to four)
- > Digital I/O: 4 Registration MARK inputs,
1 PEG and 4 motor brake (24V, 0.2A) outputs
4 dedicated general purpose inputs
- > Analog I/O: 2 inputs, 1 output
- > Compact footprint: 121x100x48 mm3

The UDI (UDI - Universal Drive Interface) is a compact EtherCAT module that controls up to 4 motor drives with industry standard $\pm 10V$ interface. Now you can also use piezo-ceramic motor drives and linear drives when using any of ACS EtherCAT motion controllers, to achieve the ultimate position and velocity accuracy as required by demanding applications, such as wafer inspection. It supports both single torque command and two sinusoidal commutation current commands.

It includes up to 4 incremental encoders (digital or Sin-Cos), and up to 2 absolute encoders, four registration inputs, four 24Vdc/0.2A motor brake outputs and one PEG (Position Event Generator) output.

The UDI is available in two versions: UDI_{HP} a high performance version and UDI_{LT} economical version.

The UDI_{LT} utilizes a 10 bit DAC to generate the $\pm 10V$ commands and supports digital encoders only, incremental and absolute.

The UDI_{HP} utilizes a 16 bit DAC supports also Sin-Cos encoders with raw frequencies up to 10MHz.

This enables controlling positioning stages using high resolution laser encoders with sub-nanometer resolution at more than 1 meter/second.

For PC based systems that utilize motor drives with analog $\pm 10V$ commands, the combination of the SPiPlusSC and the UDI is a superior solution when compared to solutions that are based on a PC plug-in controller.

It is simpler, more powerful, scalable, and provides better performance at a lower cost.

The UDI is panel or din rail mountable.



Specifications

Drive Interface

Commands
 Four, +/-10V differential (or +/-5V single ended).
 For torque command drives, one command is used per axis. For commutated current command drives, two commands are used per axis (maximum of 2 drive axes).
 UDILT: 10-bit resolution, UDIHP: 16-bit resolution
 Unused drive commands can be used as general purpose analog outputs
 Enable
 Opto-isolated, two-terminal output, up to 24V
 Drive Fault
 Two-terminal, opto-isolated input, 24V

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

Feedback

Digital Incremental Encoder
 Two/four, A&B,I; Clk/Dir,I, RS-422 or single ended
 TTL level, max. rate (RS-422): 50 million encoder counts/sec., (Single-ended): 2 million encoder counts/sec
 Protection: Encoder error, not connected
 On-board supply: 5.1-5.25V, 1A total

Sin-Cos Incremental Analog Encoder (Optional)

Up to four
 Type: 1Vptp, differential
 Programmable multiplication factor:
 x4 to x4096
 Maximum frequency: 500kHz or 10MHz
 Maximum acceleration with Sin-Cos encoder:
 10⁸ sine periods/second²

Absolute Encoder (Optional)

Two, EnDat 2.1(Digital)/2.2, Smart-ABS, Panasonic, BiSS-A/B/C

Digital I/O

General Purpose Inputs
 Four, Single ended, opto-isolated. Default configuration is 24V (+/-20%) Source type. Other optional configuration (5V, Sink) can be specified in ordering options field 9

Safety Inputs / Limits

Dedicated left and right limit inputs for each axis.
 Single ended, opto-isolated. Default configuration is 24V (+/-20%) Source type. Other optional configuration (5V, Sink) can be specified in ordering options field 9.
 E-Stop: 24V±20%,opto isolated, two-terminal. Unused safety inputs can be used as general purpose inputs

Registration MARK

Four, Two-terminal, 24V±20%, fast opto-isolation.
 Flexible assignment to any incremental encoder axis. Can be used as general purpose inputs

Motor Brake Outputs

Four, single ended, opto-isolated, 0.2A per output.
 Default configuration is 24V (+/-20%) Source type.
 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 Flexible assignment to any incremental encoder axis

Analog I/O

Inputs
 UDILT: None, UDIHP: Two, ±10V differential, 12 bit resolution, sharing the inputs of a Sin-Cos encoder feedback

Outputs

One, ±10V differential, 10 bit resolution
 Unused drive commands can be used as general purpose analog outputs

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

Dimensions

121x100x48 mm³

Weight

250 gr

Accessories

UDI-ACC1 Mating connectors for drives, encoders and I/Os
 UDI-ACC2 Din-rail mounting kit

Certifications

CE: Yes
 EMC: EN 61326-1

Ordering Options

Ordering Options	Field	Example User Selection	Values
LiTe or High Performance	1	HP	LT, HP
Number of axes (See notes below*)	2	4	2, 4
Total number of encoder channels	3	4	2, 4
500KHz Sin-Cos encoder interfaces	4	2	0,1,2,3,4 for HP version only
10MHz Sin-Cos encoder interfaces	5	1	0,1,2,3,4 for HP version only
Absolute encoders type	6	5	U- All, N- None, E- EnDat 2.1(digital)/2.2, S- Smart Abs, P- Panasonic, B- BiSS-A/B/C
Number of Absolute encoders interface	7	1	0, 1, 2
EtherCAT Master	8	1	1- Any
I/O Configuration	9	N	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/SINK (NPN) R- Inputs & limits: 5V/SOURCE (PNP). Outputs: 5V/SOURCE (PNP) T- Inputs & limits: 5V/SINK (NPN). Outputs: 5V/SOURCE (PNP) U- Outputs & Inputs: 24V/SOURCE (PNP), limits: 24V/SINK (NPN)

* When dual commutation outputs are needed, the 4 axis version of the product must be ordered, it consumes 4 network axes and the unit supports 2 axes of dual commutation outputs. There is no unit available with a single axis of dual commutation outputs.

Example: UDHP4421S1N

Field	1	2	3	4	5	6	7	8	9
PN UDI	HP	4	4	2	1	S	1	1	N