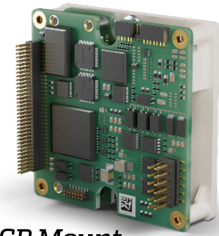


MDMst

Compact Single-Axis EtherCAT® Mini Drive Module

The **MDMst** is the first member of the Mini-universal Drive Module (MDM) series of EtherCAT-based drives. Its small form factor allows OEMs with demanding motion control applications to develop compact machines. Controllable by any ACS SPiiPlus™ Platform EtherCAT master, it leverages powerful servo control algorithms to maximize motion system performance, while its universal servo drive technology provides the system designer flexibility to control most types of motors or stages.



PCB Mount



Panel or
DIN Rail Mount

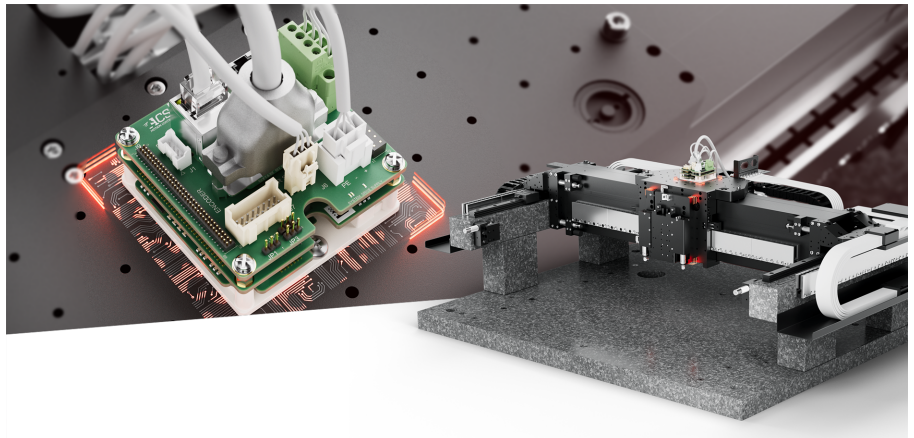
Product Highlights

- > PCB mount or non-enclosed panel mount options
- > Advanced servo control algorithms for maximum motion performance†
 - > **ServoBoost**
 - > **ServoBoost Plus**
 - > Customized algorithms (contact ACS)
 - > And many more
- > Universal Motor and Encoder Support for Maximum Motor/Stage Flexibility
- > Seamless Integration with any SPiiPlus Platform EtherCAT Master Controller
- > Maximum Drive Current: 5 A continuous, 10 A peak
- > Drive Supply Input: 12–48 VDC
- > Feedback Channels: 1 (AqB, SinCos, or Absolute)
- > Analog I/O: 2/0
- > Digital I/O: 3/1
- > Functional Safety: STO input (pending certification)

† Advanced servo control algorithms are orderable through order options for motion controllers.

Example use case:

With its small size the MDMst can be mounted close to the Z-axis actuator to minimize cabling and stage drag from too many cables. Only requiring power and EtherCAT cables, there is no encoder or I/O cables routed through X- and Y-axis.



Specifications

Logic Supply Input

- > Voltage range: 24 VDC $\pm 5\%$
- > Maximum Input Current: 1A @ 22.8 VDC
- > Protections: Reverse polarity, short circuit

Drive Supply Input

- > Voltage Range: 12-48 VDC
- > Maximum Input Current: 4.3/8.6 A

Motor Drive

- > Number of Axis: 1
- > Type: PWM 3-Phase Power Bridge
- > Motors Supported:
 - > DC Brush
 - > 2 and 3-phase DC Brushless
 - > 2 and 3-phase stepper
 - > Voice Coil
- > Output Current: 5/10 A (*continuous/peak, sine amplitude*)
- > Peak Current Time: 1 second
- > PWM Switching Frequency: 20 kHz
- > Current Loop Bandwidth: 5 kHz
- > Min Load Inductance: $> 12 \mu\text{H}$ Phase @ 24 V (*Contact ACS to discuss applications with lower phase inductance motor*)
- > Max Output Voltage: 97% of Drive Supply Input Voltage
- > Max Output Power: 196/386 W (*continuous/peak*)
- > Protections: Short Circuit, Overcurrent, Drive Overtemperature, Motor Overtemperature, Overvoltage, Undervoltage

EtherCAT

- > Interface: Dual RJ-45, 100BASE-TX
- > Communication Profiles: SPiiPlus Platform Proprietary Telegram Protocol
- > Max Cycle Rate: 5 kHz

Digital I/O (all can be used as general purpose)

- > Total Quantity: 3/1
- > **Position Capture (MARK) Inputs**
 - > Quantity: 1
 - > Electrical Interface: Differential, RS-422 compatible
 - > Max Capture Frequency: 250 Hz with 5 kHz Controller Cycle
- > **Limit Sensors Inputs** (Usable as general purpose)
 - > Quantity: 2 Total
 - > Electrical Interface: 5 V $\pm 20\%$, opto-isolated, sink or source (*jumper selectable*)
- > **High-Speed Position Event Generation (PEG) Outputs**
 - > Quantity: 1
 - > Electrical Interface: Differential, RS-422 compatible
 - > Max Pulse Frequency: 10 MHz
 - > Pulse Width Range: 26.6 ns to 1.745 ms

Analog I/O (all can be used as general purpose)

- > Total Quantity: 2/0
- > **Analog Inputs** (Shared with SinCos)
 - > Quantity: 2
 - > Electrical Interface: $\pm 10 \text{ V} \pm 5\%$ differential or 0-5V $\pm 5\%$ single ended
 - > Resolution: 12-bit
 - > Maximum Input Frequency: 500 kHz
 - > Sampling Rate: 20 kHz

Servo Control

- > Servo Loop Sampling and Update Rate:
 - > 20 kHz position
 - > 20 kHz velocity
 - > 20 kHz current

Feedback

- > Total Number of Channels: 1 (*type order configurable*)
- > Supply Output: 5.1 V, total available current 0.5 A for all digital encoders and 0.5 A for all analog encoders.
- > Encoders Supported:
 - > AqB Encoders (*Default type*)
 - Max. Frequency: 50 MHz
 - Electrical Interface: RS-422
 - > SinCos Encoders / Analog Hall Sensors (*Optional*)
 - Max. Frequency: 500 kHz
 - Electrical Interface: 1 V peak to peak $\pm 10\%$
 - Max. Multiplication: 4096 (*per full signal period*)
 - Compensation: Phase, Gain, Offset
 - > Absolute Encoders (*Optional*)
 - Types: BiSS-C, EnDat 2.1 & 2.2, Smart-Abs, SSI, Panasonic A4
 - Max Freq.: EnDat - 2 MHz, Smart-Abs - 2.5MHz, BiSS-C - 10 MHz, Panasonic - 2.5 MHz
 - Electrical Interface: RS-485

Functional Safety

- > **Safe Torque Off (STO) Input** (*Jumper Configurable*) (*pending certification*)
 - > Electrical Interface: Dual-Channel, 5V non-isolated, two terminals per input

Standards and Certifications

- > CE, UL
- > UKCA, TUV (*pending*)

Environmental

- > Operational Temperature: 0°C to 50°C. See user manual for external fan cooling requirements above 40°C ambient temperature.
- > Humidity: 5 to 90% non-condensing humidity
- > Storage and Transportation Temperature: -25°C to 60°C
- > Shock: 50 m/s² (5 G)
- > Vibration: 10 m/s² (1 G)

Weight

- > <0.5 kg

Optional Accessories

- > Mating Connector Kit part number (only for panel mount version): MDMst-ACC
Includes:
 - STO Connector and Pins (J1)
 - Motor mating connector (J4)
 - Encoder mating connector (J5)
 - I/O mating connector (J7)
 - DIN Rail Bracket

Ordering Options

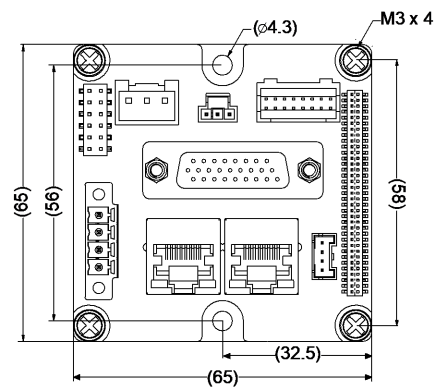
	Field	Example	Optional Values
Number of axes	1	1	1
Maximum voltage	2	048	048 = 12-48 VDC
Maximum continuous current	3	05	05 = 5A continuous / 10A peak
Number of 500 kHz SinCos encoders	4	1	0, 1
Reserved	5	0	0 = N/A
Number of Absolute Encoders Channels	6	0	0, 1
Mounting options	7	AN	N = Board level mount A = Panel mount with DIN rail option
Reserved	8	N	N = N/A
Reserved	9	N	N = N/A
Reserved	10	N	N = N/A

Example: MDMst-1-048-05-100ANNN

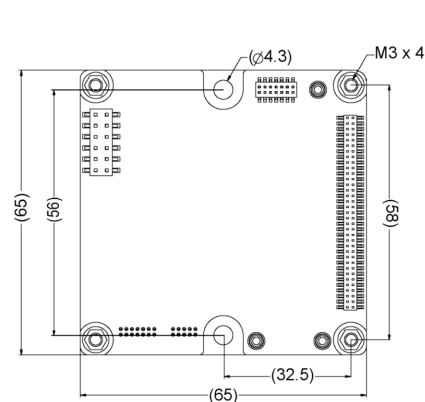
Description: Standard performance single axis, 12-48V, 5A/10A, 1 Sin/Cos 500 kHz encoder channel, no absolute encoder, and panel mount

Field	1	2	3	4	5	6	7	8	9	10
PN	MDMst	1	048	05	1	0	0	A	N	N

EtherCAT



MDMst Panel or DIN Rail Mount Dimensions (in mm)



MDMst PCB Mount Dimensions (in mm)

