

MMS Positioning Products

Miniature Long Travel Linear Stage

The MMS series of high power low profile linear stages are ideal when a compact size is needed for longer stroke applications. The MMS uses the same high power motor as our MMX stages which provides more force compared to similarly sized stages. The MMS miniature long travel linear stages can be stacked to each other in an XY configuration or combined with our shorter stroke MMX stages. It's non-contact motor and position feedback provide years of reliable operation.



DOVER 
MOTION

A division of Invetech

Overview

The Dover Motion MMS series miniature long travel linear stage is a high performance positioner designed into a small package ideal for keeping instrument size and cost down. It's overall height of 37mm keeps Abbe error effects to a minimum. The non-contact ironless servo motor provides high force and stable velocity with no cogging. Four recirculating ball bearing carriages are used to ensure smooth, stable, and accurate motion. The MMS series comes with a precision optical encoder for repeatable closed loop positioning. The stage is designed for fast speeds with no maintenance, making it ideal for use in high throughput applications.

Miniature linear stages can be stacked into XY multi-axis assemblies or combined with our MMX series for a stacked XY setup with the MMS being used for long travel load / unload and MMX as a shorter travel axis to reduce overall system footprint.

Benefits of the MMS series include:

- Ideal for accurate and repeatable sample positioning motion in imaging instruments
- Position resolution down to 1.25nm when paired with Dover Motion's DMCM controller
- Travel up to 400mm for long stroke applications
- Low profile, customizable, and stackable design ensures fit within unique applications



Dover Motion has implemented a Quality Management System in accordance with ISO 9001:2008 for the Design and Manufacture of Precision Positioning Products and Motion Systems

Specifications - MMS Stage

	Units	MMS-200	MMS-275	MMS-400
Travel	mm	200	275	400
Accuracy, slope corrected ¹	µm TIR	8	11	15
Feedback Device - Encoder ²		Analog 20 µm pitch, resolution down to 1.25nm		
Bi-directional repeatability	µm	2	2	2
Load Capacity ³	kg	12	12	12
Maximum Acceleration ⁴	m/s ²	30		
Maximum Velocity ^{4,5}	m/s	2		
Flatness & Straightness	µm TIR	10	20	32
Pitch & Yaw	arc-sec	40	50	60
Total Mass	kg	2.5	2.9	3.7
Moving Mass	kg	0.4		

¹ With 0.1 µm resolution interpolation; contact our Applications Engineers for higher accuracy applications

² Listed 1.25nm is based on Dover Motion's DMCM controller and may vary for other controllers

³ Please contact our Applications Engineers for loads exceeding 12kg.

⁴ The maximum acceleration and velocity is encoder and load dependent.

⁵ Travel Life greater than 1,000,000 km

Motor Specifications

Motor Type	3 phase, direct drive linear		
Rated Performance	Symbol	Units	Value
Peak Force ^{1,5}	F_p	N	42
Continuous Force	F_c	N	14
Motor constant	K_m	N / W ^{0.5}	2.9
Electrical Specifications	Symbol	Units	Value
Peak current	I_p	A	5.4
Continuous current ^{1,5}	I_c	A	1.8
Electrical Resistance ³	R	Ω	8.5
Inductance ⁴	L	mH	2.8
Back EMF (Sine RMS) ²	K_e	V / m / s	7.8
Force Constant ³	K_f	N / A _{RMS}	7.8
Max Allowable coil temp	T_{max}	°C	100
Max Voltage	V_{max}	V	160
Magnetic Pole Pitch	P	mm	25.4

¹ Motor winding temperature rise, ΔT=75°C, @ 25°C ambient

² Measured @ 25°C

³ Measured line-to-line ±10%

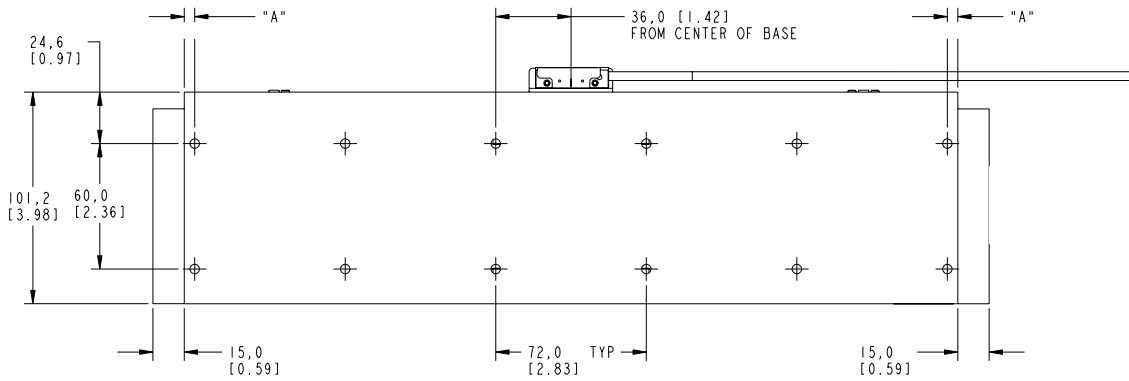
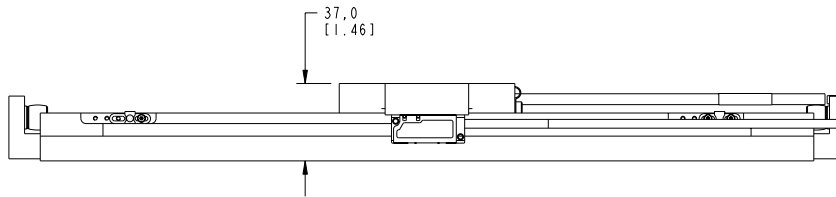
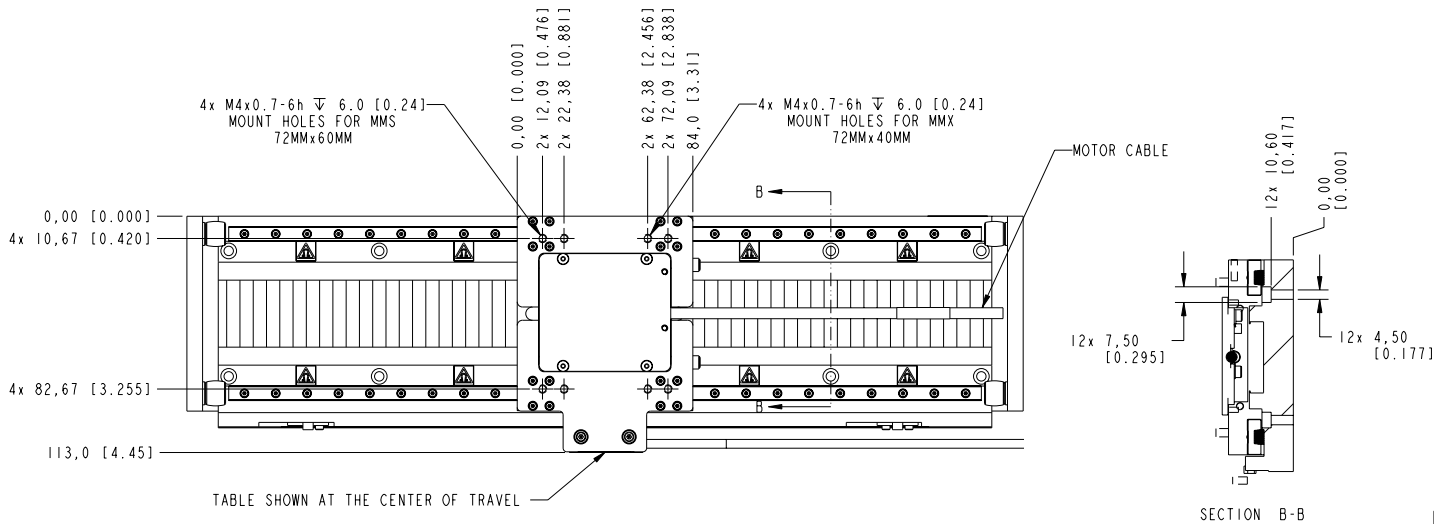
⁴ ±20% measured @1Khz

⁵ Stage mounted to a 10mm or thicker aluminum plate



MMS Dimensions

Dimension units: mm [inches]



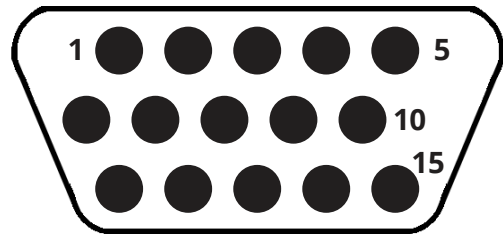
Stage Dimensions				
Stage	Travel (mm)	L (mm)	N	A (mm)
MMS-200	200	325	8	39.5
MMS-275	275	400	12	5
MMS-400	400	525	12	67.5

Connector Option D3

Compatible with Dover Motion's DMCM Controller

Encoder

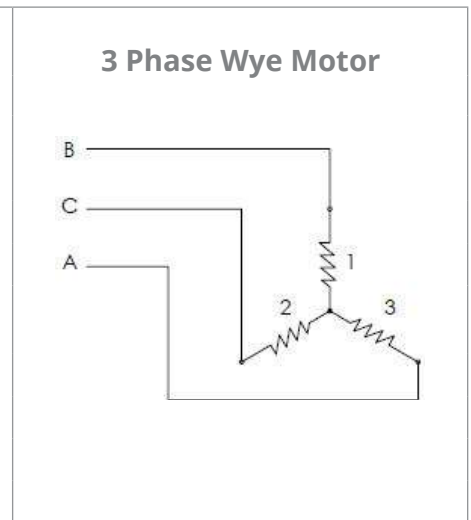
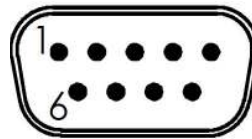
Digital & Analog Encoder Option Pinout DE-15 Pin Plug (Male) High Density Connector	
Pin	Description
1	Logic +5V
2	Limit+
3	Limit-
4	RTN
5	RTN
6	Logic +5V
7	Digital A+ / Analog Sin+
8	Digital A- / Analog Sin-
9	Digital B+ / Analog Cos+
10	Digital B- / Analog Cos-
11	Index+
12	Index-
13	RTN
14	EGND



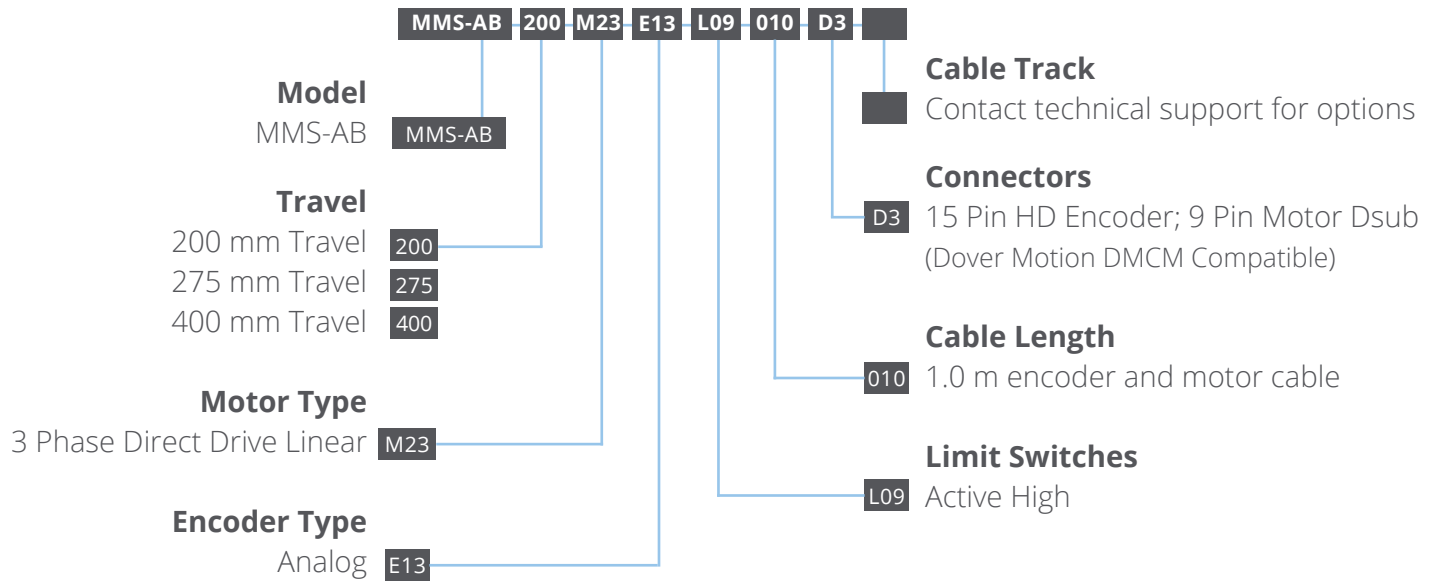
Motor

3 Phase motor is in WYE Coil Configuration

3 Phase WYE Motor Pinout 9 Pin Plug (Male) DSUB Connector		
Pin	Description	Wire Color
1	Motor Coil A	White
2	Motor Coil B	Green
6	Motor Coil C	Brown
Shell	Motor Ground	Shield



MMS Configurator



Accessory Options



Dover Motion Control Module (DMCM)

- Single Axis Drive & Controller
- Board only or with enclosure
- Graphical user interface for easy set-up and programming

Motor and Encoder Cables

- Cables for all standard products
- Shielded
- High Flex
- Standard connection to DMCM



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