

MMX Positioning Products

Miniature Linear Stage

The MMX line of high power miniature linear stages blends the ultimate in performance, reliability, and value, delivering nearly twice the accuracy at virtually the same cost as standard-grade options. The high power, MMX motor, has a higher force density to deliver *5 times the force* of similar sized stages. Short lead times and predictable deliveries can speed up your time to market and support your production schedule. Dover Motion miniature linear stages will help you build a better machine—faster.



A division of Invetech

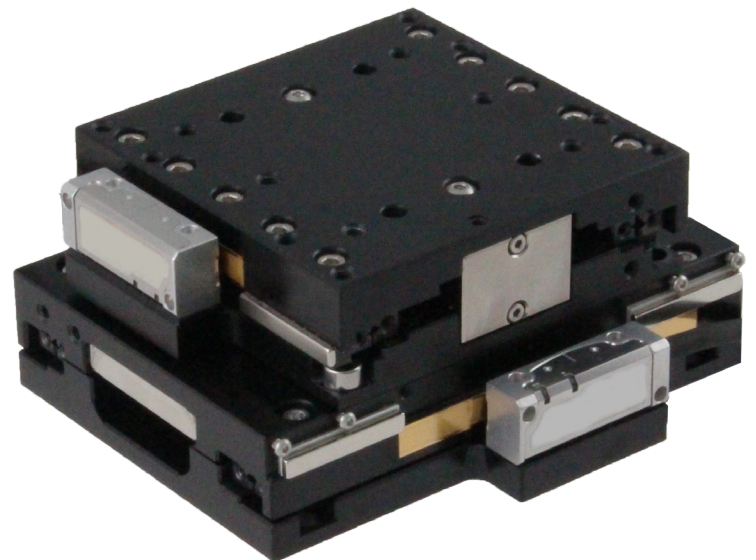
Overview

The Dover Motion MMX series miniature linear stage combines the ultimate in performance, reliability, and value. The high power MMX, has a higher force density to deliver *5 times the force* of similar competitive products. The stage design use high precision anti-creep crossed roller guideways for extremely smooth motion, high stiffness, and reliability in a low profile package. Its brushless linear servo motor allows for high speeds with no maintenance, making it ideal for use in high throughput applications.

Miniature linear stages can be combined into multi-axis assemblies including Z configurations with an integral constant force magnetic counterbalance. For the 25 mm travel version a single phase motor is available for reduced amplifier cost, reduced complexity, and a more compact size. The MMX has a completely ironless motor to deliver cog free smooth motion.

The miniature linear stage also provides externally adjustable limit sensors using a simple adjustable mount. The stages are available with a black anodized aluminum finish.

- Increase throughput time with the most powerful servo motor design in a small form factor
- Achieve stable scan motion with proprietary Dover Motion smooth motor design
- High accuracy from precision encoder feedback and servo control
- Best in class vertical load capacity of 500 g without a counterbalance
- Customizable and stackable design ensures fit within unique applications



50 x 25 mm Travel XY



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 - MMX Miniature Stage

| Travel (mm) | MMX-25 | MMX-50 | MMX-100 | MMX-150 |
|--|---|---------|---------|---------|
| Motor Type | 1 Phase | 3 Phase | 3 Phase | 3 Phase |
| Accuracy ($\mu\text{m TIR}$) ¹ | 6 | 10 | 12 | 12 |
| Feedback Device Options -Encoder Resolution | Analog or Digital 1 μm , 0.1 μm , 0.001 μm | | | |
| Bi-directional repeatability. ($\pm \mu\text{m}$) | 0.4 | 0.4 | 0.4 | 0.4 |
| Load Capacity (kg) ² | 10 | 10 | 10 | 10 |
| Maximum Acceleration (m/s^2) ³ | 55 | 115 | 100 | 65 |
| Maximum Velocity (m/s) ³ | 1.1 | 2.0 | 2.0 | 2.0 |
| Flatness & Straightness ($\mu\text{m TIR}$) | 3 | 3 | 6 | 6 |
| Moving Mass (kg) | 0.4 | 0.5 | 0.6 | 0.9 |
| Total Mass (kg) | 0.6 | 0.7 | 1.06 | 1.3 |

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

² Please contact our Applications Engineers for loads exceeding 10kg.

³ The maximum acceleration and velocity is encoder and load dependent.

⁴ Contact the factory if higher performance version required.

⁵ Travel Life greater than 1,000,000 km

| Motor Specifications for | MMX | | 1 Phase | 3 Phase |
|------------------------------------|------------------|------------------------------------|---------|---------|
| | Symbol | Units | Value | Value |
| Rated Performance | Symbol | Units | Value | Value |
| Peak Force ^{1 5} | F_p | N | 23 | 57 |
| Continuous Force | F_c | N | 7.7 | 19 |
| Motor constant | K_m | $\text{N} / \text{W}^{0.5}$ | 2.0 | 3.9 |
| Electrical Specifications | Symbol | Units | Value | Value |
| Peak current | I_p | A | 4.5 | 5.1 |
| Continuous current ^{1 5} | I_c | A | 1.5 | 1.7 |
| Electrical Resistance ³ | R | Ω | 7 | 8.4 |
| Inductance ⁴ | L | mH | 3.95 | 2.75 |
| Back EMF (Sine RMS) ² | K_e | $\text{V} / \text{m} / \text{s}$ | 5.1 | 11.2 |
| Force Constant ³ | K_f | $\text{N} / \text{A}_{\text{RMS}}$ | 5.1 | 11.2 |
| Max Allowable coil temp | T_{max} | $^{\circ}\text{C}$ | 100 | 100 |
| Max Voltage | V_{max} | V | 72 | 160 |
| Magnetic Pole Pitch | P | mm | - | 25.4 |

¹ Motor winding temperature rise, $\Delta T=75^{\circ}\text{C}$, @ 25°C ambient

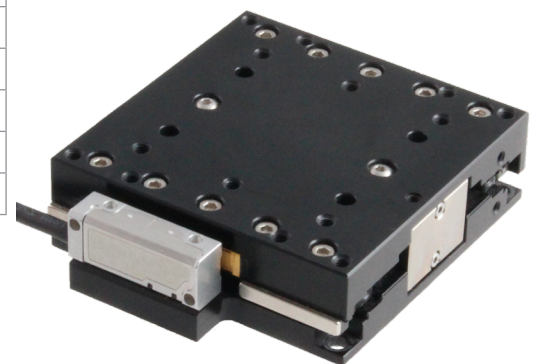
² Measured @ 25°C

³ Measured line-to-line $\pm 10\%$

⁴ $\pm 20\%$ measured @1Khz

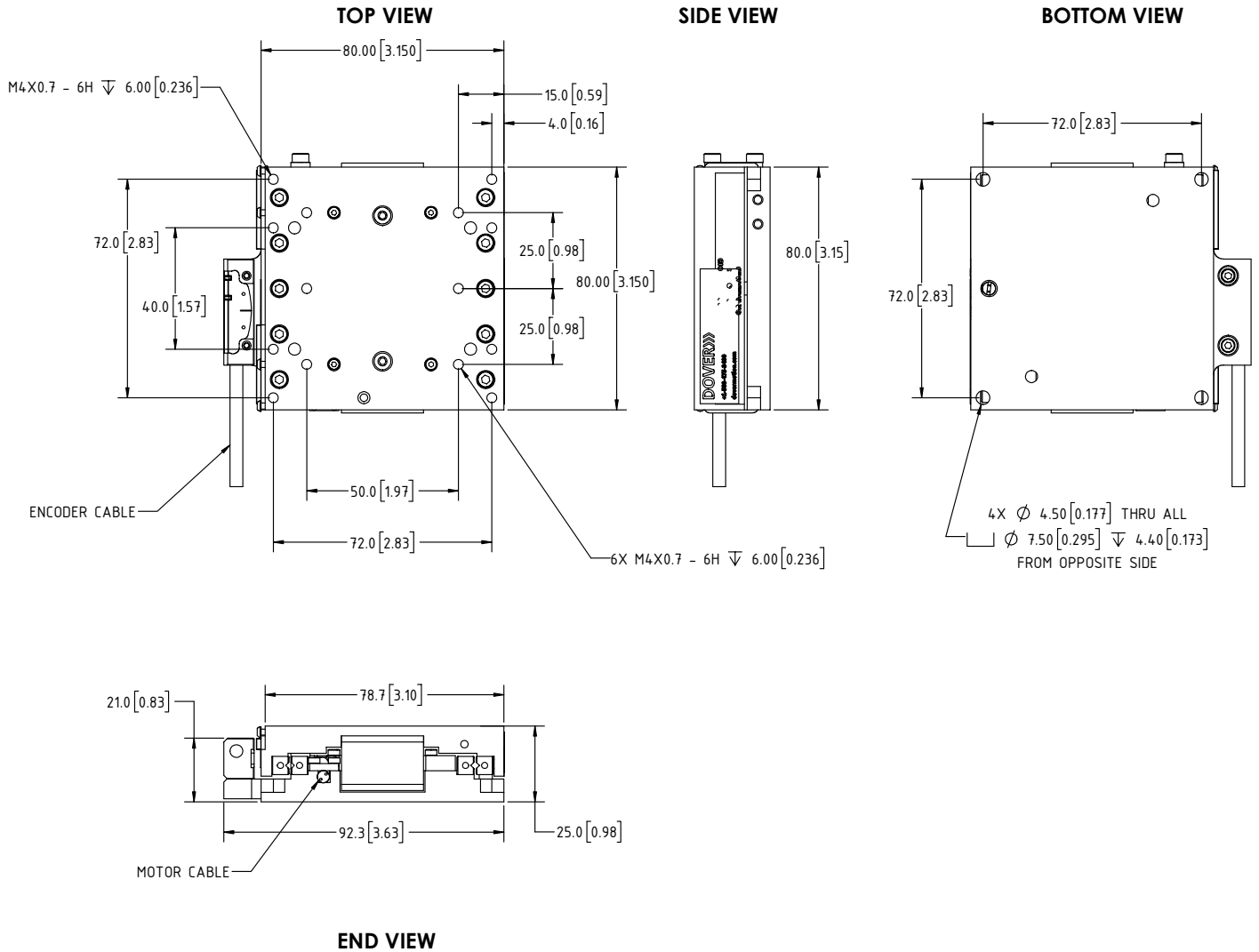
⁵ Stage mounted to a 200mmx200mmx10mm or larger aluminum plate

| MMX Maximum Vertical Payload (kg) | | |
|-----------------------------------|---------------------|----------|
| | Counterbalance Type | |
| Travel (mm) | None | Magnetic |
| 25 | 0.2 | |
| 50 | 0.5 | 1 |
| 100 | | 1 |
| 150 | | 1 |



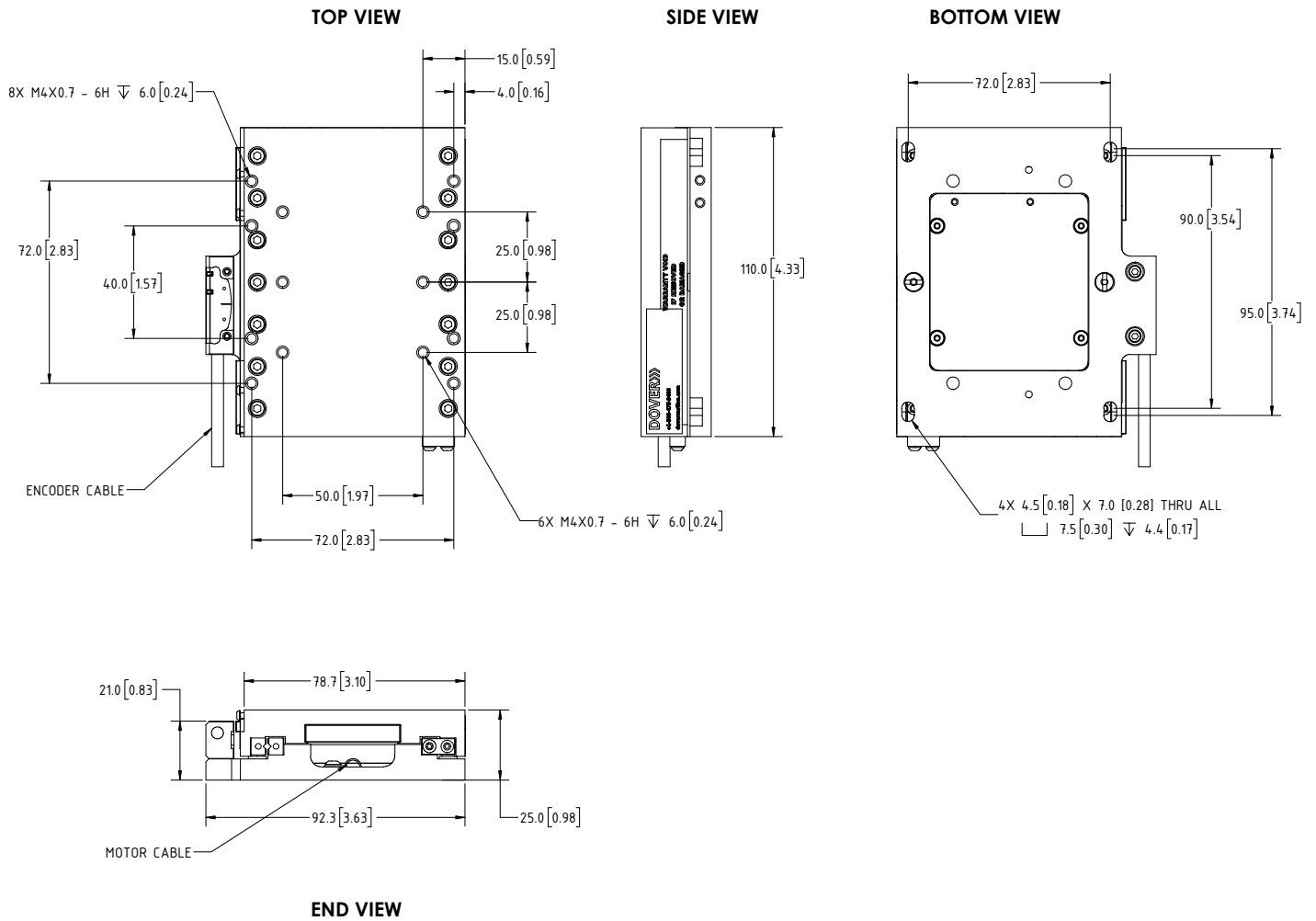
MMX-25 Dimensions

Dimension units: mm [inches]



MMX-50 Dimensions

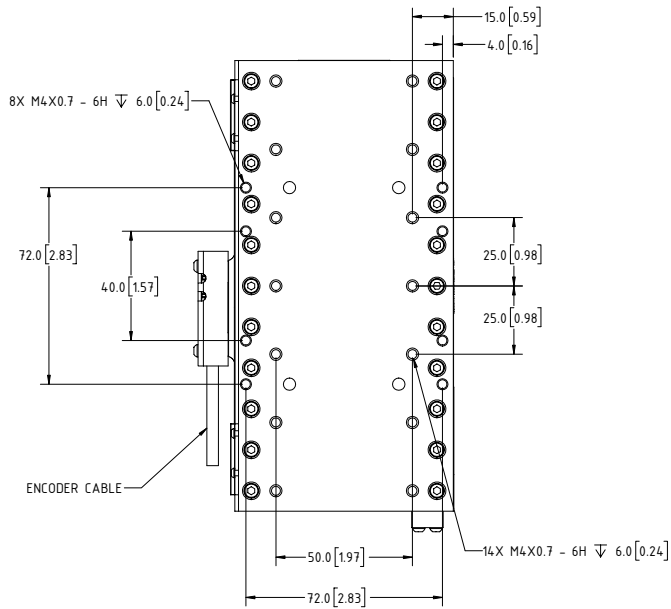
Dimension units: mm [inches]



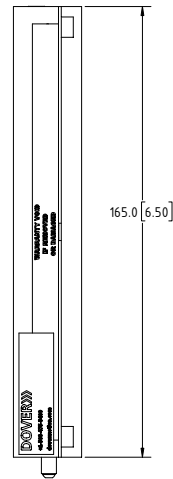
MMX-100 Dimensions

Dimension units: mm [inches]

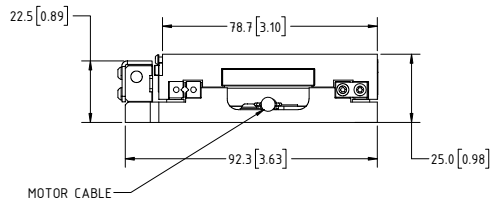
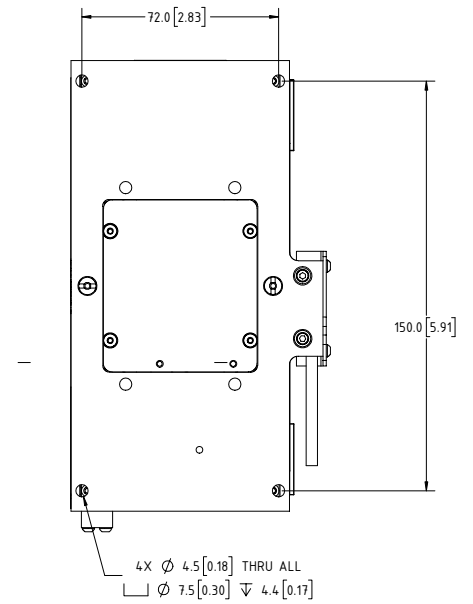
TOP VIEW



SIDE VIEW



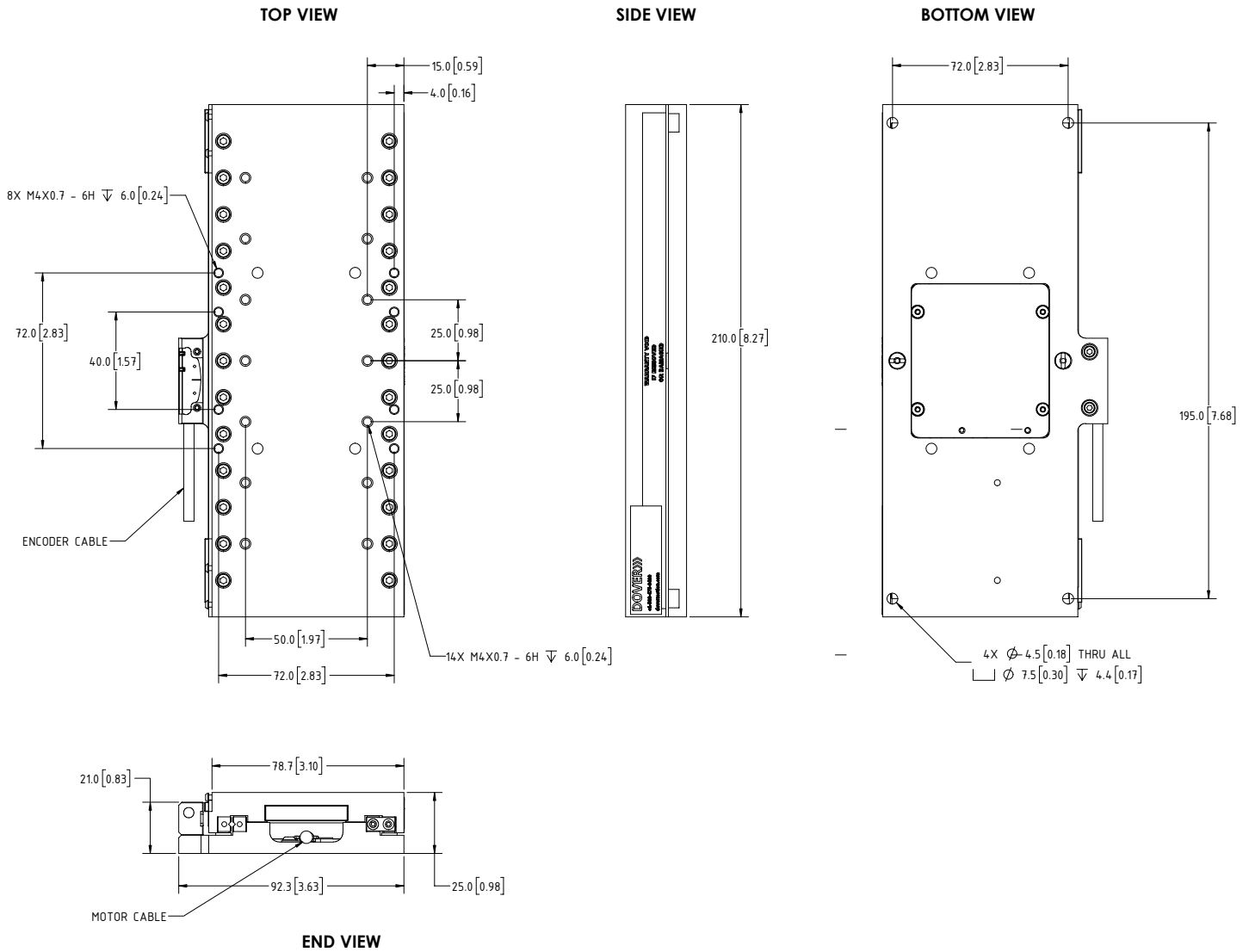
BOTTOM VIEW



END VIEW

MMX-150 Dimensions

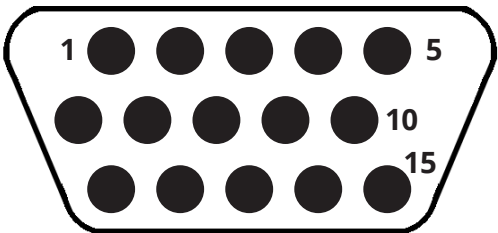
Dimension units: mm [inches]



Connector Option D3

Encoder

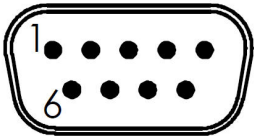
| Digital & Analog Encoder Option Pinout DE-15 Pin Plug (Male) High Density Connector | |
|--|--------------------------|
| Pin | Description |
| 1 | Logic +5V |
| 2 | Limit+ |
| 3 | Limit- |
| 4 | RTN |
| 5 | RTN |
| 6 | Logic +5V |
| 7 | Digital A+ / Analog Sin+ |
| 8 | Digital A- / Analog Sin- |
|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



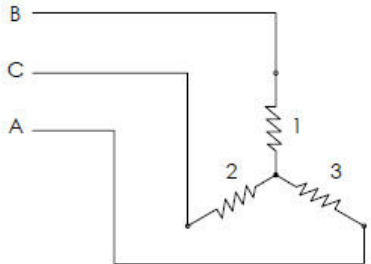
Motor

3 Phase motor is in WYE Coil Configuration

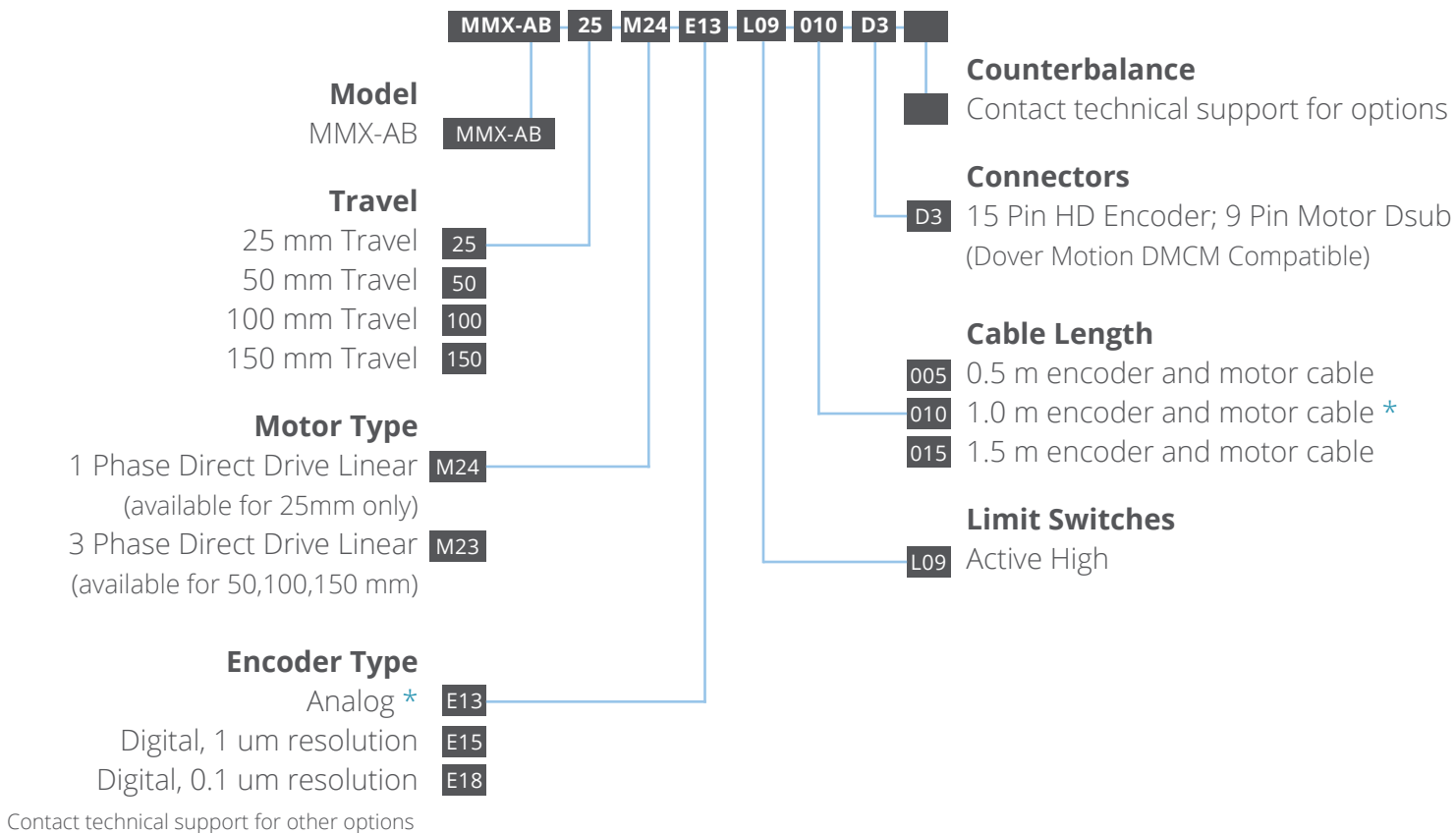
| 3 Phase WYE Motor Pinout 9 Pin Plug (Male) DSUB Connector | | |
|--|--------------|------------|
| Pin | Description | Wire Color |
| 1 | Motor Coil A | White |
| 2 | Motor Coil B | Green |
| 6 | Motor Coil C | Brown |
| Shell | Motor Ground | Shield |



| 1 Phase Motor Pinout 9 Pin Plug (Male) DSUB Connector | | |
|--|--------------|------------|
| Pin | Description | Wire Color |
| 1 | Motor Coil + | White |
| 6 | Motor Coil - | Black |
| Shell | Motor Ground | Shield |



Configurator



For fastest lead time and Dover DMCM compatibility choose the * Encoder type and Cable Length



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

