



## X-DMQ12P-DE52 Datasheet



- 12 mm travel and 15.5 N peak thrust with adjustable force control mode
- Up to 1400 mm/s speed, 25 Hz full-travel
- 4  $\mu\text{m}$  accuracy; < 0.5  $\mu\text{m}$  repeatability
- Built-in controller; daisy-chains with other Zaber products
- Integrated 200 nm resolution linear encoder provides closed-loop, high precision position control
- Technical Article - Linear Motors: Overview and Selection Process

## X-DMQ-DE Series Overview

Zaber's X-DMQ-DE Series devices are computer-controlled, direct-drive voice coil driven, linear stages with high acceleration and precision capabilities in a compact size. They are stand-alone units requiring only a standard 24 V or 48 V power supply.

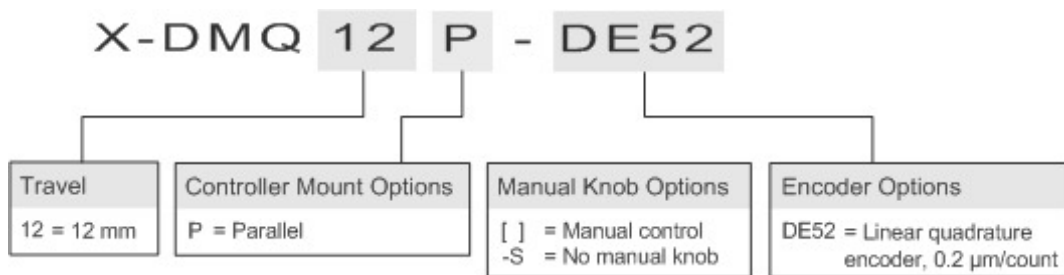
At only 30 mm high, these miniature stages are excellent for applications where a low profile is required. The X-DMQ-DE's innovative design allows speeds up to 1400 mm/s and loads up to 10 kg. Like all of Zaber's products, the X-DMQ-DE Series is designed to be 'plug and play' and very easy to set up and operate.

The built-in linear encoder with 200 nm resolution allows closed-loop servo control of position and velocity. Zaber's controller comes pre-tuned out of the box, while still allowing easy access to settings for users to fine tune the servo control to their application if desired. The DMQ's direct-drive actuator also allows it to operate in force-control mode with very high bandwidth. The innovative moving-coil actuator design has a very flat force-vs-position profile, a minimal moving mass for high acceleration, and no exposed moving cables.

An optional indexed knob provides convenient manual control for versatile operation even without a computer. These stages connect to the RS-232 port or USB port of any computer, and they can be daisy-chained with any other Zaber products. The daisy-chain also shares power, making it possible for multiple X-Series products to share a single power supply. Convenient locking, 4-pin, M8 connectors on the unit allow for secure connection between units.

For more information visit: <https://www.zaber.com/products/linear-stages/X-DMQ-DE>

## X-DMQ-DE Series Part Numbering



## X-DMQ12P-DE52 Bundle Options

*This device may be purchased stand-alone or bundled with one of the following accessory kits:*

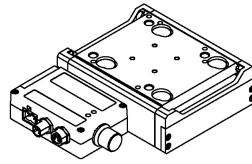
Products	Description
X-DMQ12P-DE52	Direct drive linear stage, 12 mm travel, integrated linear encoder and controller, plus manual control
with KX14A accessory kit Power supply: North America, 48 V. Powers multiple X-Series devices	<ul style="list-style-type: none"><li>• 1 x PS14S-48V37: Power Supply, 48 V 3.75 A, Compatible with X-Series Products</li><li>• 1 x X-DC02: Data Cable, 2 ft (0.6 m), for Use with all X-Series Products</li><li>• 1 x X-USBDC: USB to Serial Converter Cable with M8 Female Plug for X-Series Products</li></ul>
with PTB2 accessory Power Supply Not Included	<ul style="list-style-type: none"><li>• 1 x PTB2: Power Terminal Block, 2 Pin, 5 mm Pitch, for Use with X-Series Devices with Custom Power Supply</li></ul>

# X-DMQ12P-DE52 Drawings

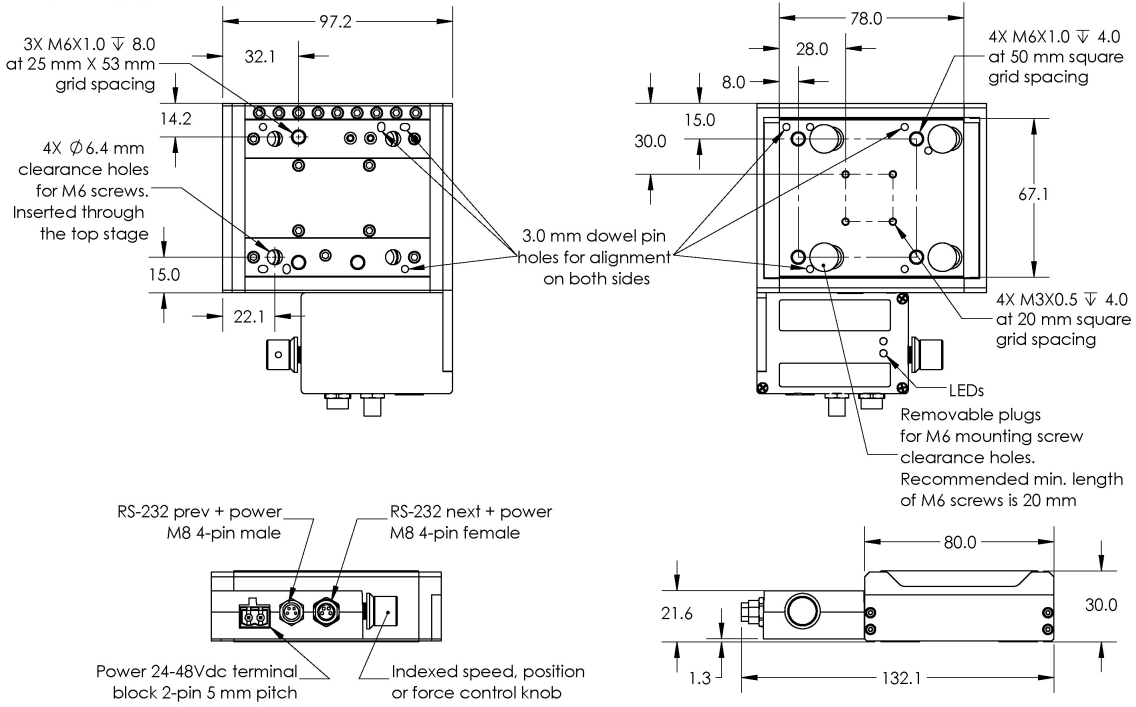
## ZABER

**X-DMQ-DE Voice Coil Linear Stage**

dimensions in mm



\*See product page for complete list of available models at [www.zaber.com](http://www.zaber.com)



DWG 1370 802

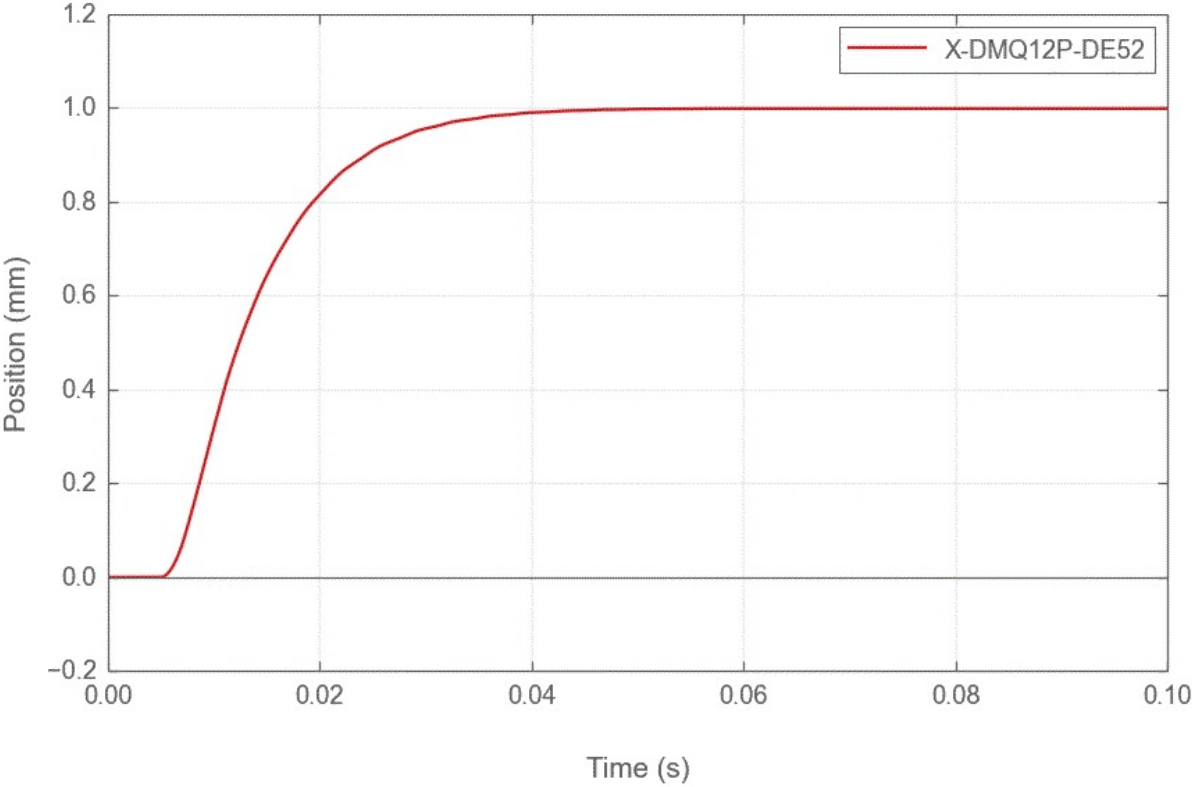
## X-DMQ12P-DE52 Specifications

Specification	Value	Alternate Unit
Built-in Controller	Yes	
Travel Range	12 mm	0.472"
Accuracy (unidirectional)	4.0 $\mu\text{m}$	0.000157"
Repeatability	< 0.5 $\mu\text{m}$	< 0.000020"
Maximum Speed	1400 mm/s	55.118"/s
Minimum Speed	0.000122 mm/s	0.000005"/s
Speed Resolution	0.000122 mm/s	0.000005"/s
Force Resolution	25 mN	0.09 oz
Encoder Type	Linear quadrature encoder	
Encoder Resolution	200 nm	
Peak Thrust	15.5 N	3.5 lb
Maximum Continuous Thrust	12 N	2.7 lb
Communication Interface	RS-232	
Communication Protocol	Zaber ASCII (Default), Zaber Binary	
Maximum Centered Load	100 N	22.4 lb
Maximum Cantilever Load	320 N-cm	453.2 oz-in
Guide Type	Crossed-Roller Bearing	
Vertical Runout	< 6 $\mu\text{m}$	< 0.000236"
Horizontal Runout	< 5 $\mu\text{m}$	< 0.000197"
Pitch	0.03°	0.523 mrad
Roll	0.03°	0.523 mrad
Yaw	0.03°	0.523 mrad
Stiffness in Pitch	50 N-m/°	349 $\mu\text{rad/N-m}$
Stiffness in Roll	70 N-m/°	249 $\mu\text{rad/N-m}$
Stiffness in Yaw	85 N-m/°	205 $\mu\text{rad/N-m}$
Maximum Current Draw	1500 mA	
Power Supply	24 - 48 VDC	
Power Plug	2-pin screw terminal	
Motor Type	Voice Coil Linear Actuator	
Force Constant	12.6 N/A	2.8 lbs/A

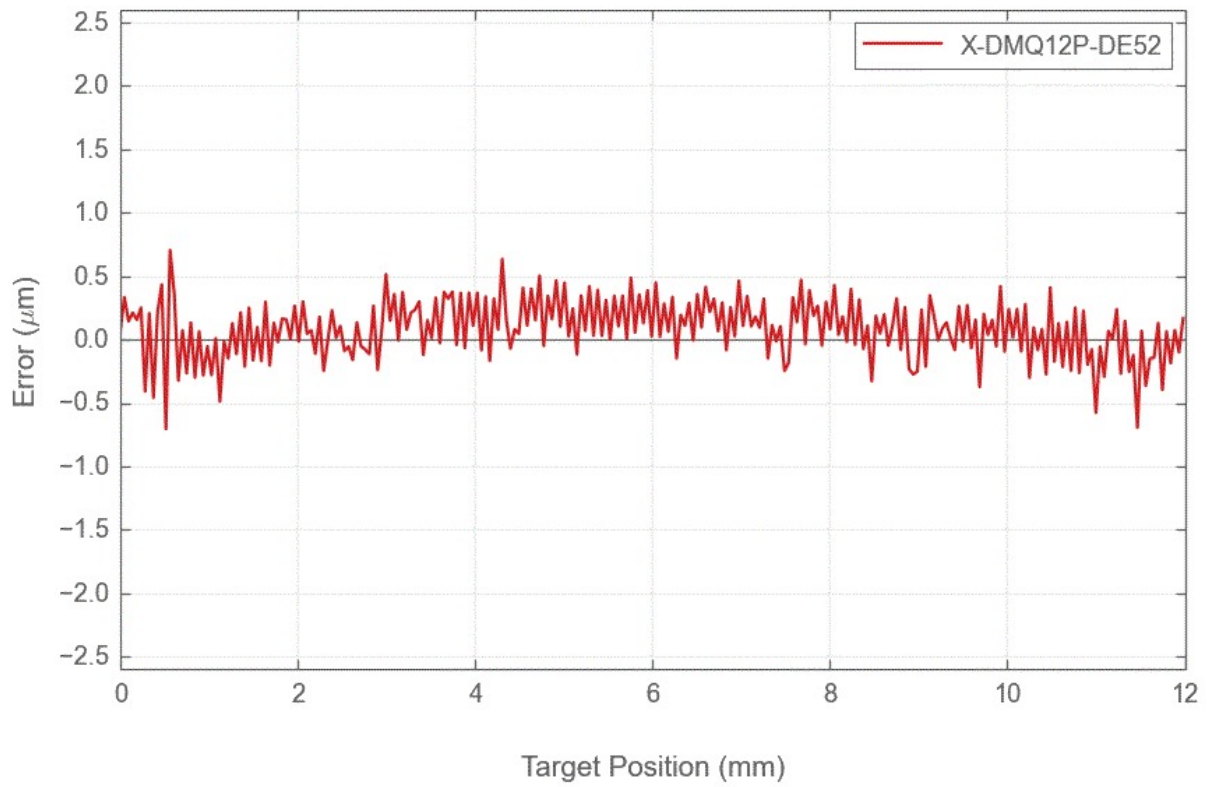
Specification	Value	Alternate Unit
Data Cable Connection	Locking 4-pin M8	
Mechanical Drive System	Moving Coil, Direct Drive	
Limit or Home Sensing	Optical Index Mark	
Axes of Motion	1	
LED Indicators	Yes	
Mounting Interface	M6 and M3 threaded holes	
Operating Temperature Range	0 - 50 °C	
Vacuum Compatible	No	
RoHS Compliant	Yes	
CE Compliant	Yes	
Moving Mass	0.095 kg	0.209 lbs
Weight	0.76 kg	1.676 lb

# X-DMQ-DE Series Charts

## Typical Step Response



## Typical Accuracy





## Typical Force vs Position

