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1-888-276-8033 *Toll Free*
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X-DMA-AE Series Datasheet



- 10mm travel
- High repeatability (50 nm), with 10 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Non-contact direct-drive motor for high precision, high dynamic performance & reliability
- Built-in controller; daisy-chains with other Zaber products
- Digital IO, analog input, and optional encoder output for interfacing with external systems

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X-DMA-AE Series Overview

Zaber's X-DMA-AE Series devices are computer-controlled, direct-drive linear stages delivering high speed, precision, and reliability in a compact size. A high resolution linear encoder results in repeatability less than 50 nm and consistent movement steps down to 10 nm. Low-friction high-rigidity crossed roller bearings allow for fast step and settle times and anti-creep bearing cages eliminate cage creep during vertical or high acceleration operation. Both the drive and encoder are non-contact, and have no moving cables, resulting in an extremely robust system.

X-DMA-AE are stand-alone units requiring only a standard 24 V or 48 V power supply. They connect to the RS-232 port or USB port of any computer, and 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. Like all of Zaber's products, the X-DMA-AE Series is designed to be 'plug and play' and very easy to set up and operate. X-DMA-AE devices also include two digital inputs, a digital output, and an analog input for interfacing with external systems. An event-driven trigger system allows devices to be programmed for stand-alone operation based on I/O, time, or movement stimuli.

For more information visit: https://www.zaber.com/products/linear-stages/X-DMA-AE

X-DMA-AE Series Part Numbering & Options

X-DMA 10 A - AE55 T17

Travel
10 — 10 mm

Forcer Size
A — Smallest

Encoder Options
AE55 — Analog encoder, measure down to 1 nm

I/O Options
T17 — Two digital inputs, one digital output, one analog input
T17Q — Interpolated RS422 encoder output, two digital inputs, one digital output, one analog input

X-DMA-AE Series Drawings

- X-DMA-AE (Drawing for the X-DMA-AE)
- View all drawings and documents at zaber.com

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X-DMA-AE Series Specifications

Overview

Specification	Value
Built-in Controller	Yes
Travel Range	10 mm (0.394 ")
Manual Control	No
Axes of Motion	1
LED Indicators	Yes
Weight	0.49 kg (1.08 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	8 µm (0.000315 ")
Repeatability	<0.05 µm (<0.000002 ")
Minimum Incremental Move	10 nm
Flatness of Travel	<3 µm (<0.000118 ")
Straightness of Travel	<3 µm (<0.000118 ")
Pitch Error	0.01 ° (0.174 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

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Load Performance

Specification	Value
Peak Thrust	15 N (3.4 lb)
Maximum Continuous Thrust	5 N (1.1 lb)
Maximum Centered Load	50 N (11.2 lb)
Maximum Moment (Pitch)	3 N·m (2.2 lb·ft)
Maximum Moment (Roll)	10 N·m (7.38 lb·ft)
Maximum Moment (Yaw)	3 N·m (2.214 lb·ft)
Stiffness (Pitch)	180 N·m/°
Stiffness (Roll)	320 N·m/°
Stiffness (Yaw)	135 N·m/°

Speed

Specification	Value
Maximum Acceleration	20 m/s2 (2.04 g)
Maximum Speed	365 mm/s (14.37 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Move and Settle Time (100 nm move, < 15 nm, 250 g load)	<15 ms
Typical Move and Settle Time (250 nm move, < 15 nm, 250 g load)	<15 ms

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Encoder & Sensing

Specification	Value
Encoder Type	Linear analog encoder
Encoder Count Size	1 nm
Limit or Home Sensing	Optical Index Mark

Motor

Specification	Value
Motor Type	Moving Magnet Voice Coil
Force Constant	2.26 N/A (0.5 lbs/A)

Power and Communication

Specification	Value
Communication Interface	RS-232
Communication Protocol	Zaber ASCII (Default)
Data Cable Connection	Locking 4-pin M8
Power Supply	48 VDC
Power Plug	2-pin screw terminal
Maximum Current Draw	3750 mA

Analog & Digital I/O

Specification	Value
Digital Input	2
Digital Output	1
Analog Input	1

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Mechanical

Specification	Value
Guide Type	Anti-Creep Crossed-Roller Bearing
Mounting Interface	M3 and M6 threaded holes
Moving Mass	0.17 kg (0.374 lbs)

Environmental & Compliance

Specification	Value
Operating Temperature Range	0-50 °C
CE Compliant	Yes
Vacuum Compatible	No

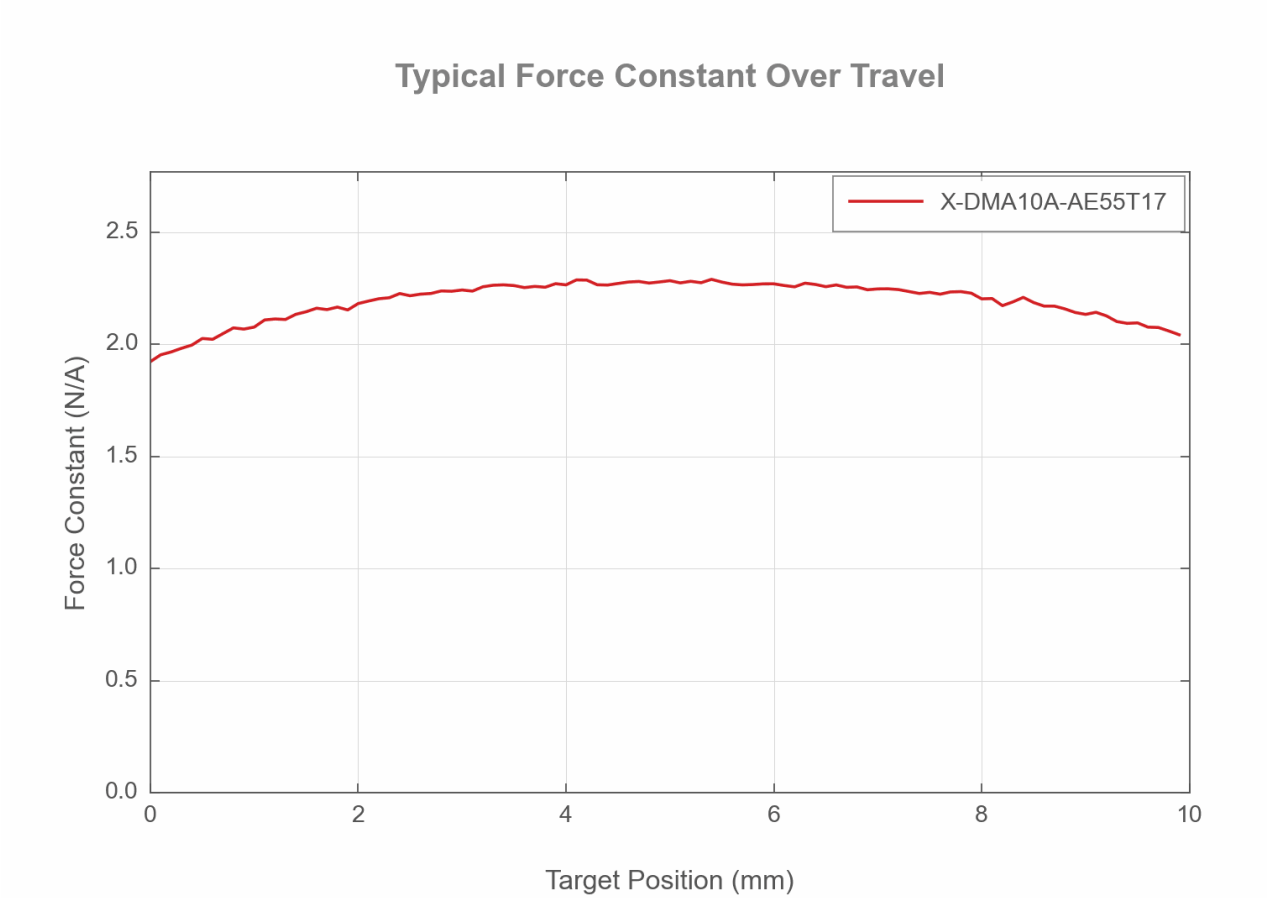
Part Number	Encoder Output Type
X-DMA10A-AE55T17	None
X-DMA10A-AE55T17Q	Interpolated relative quadrature signal with differential RS422 levels

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X-DMA-AE Series Charts

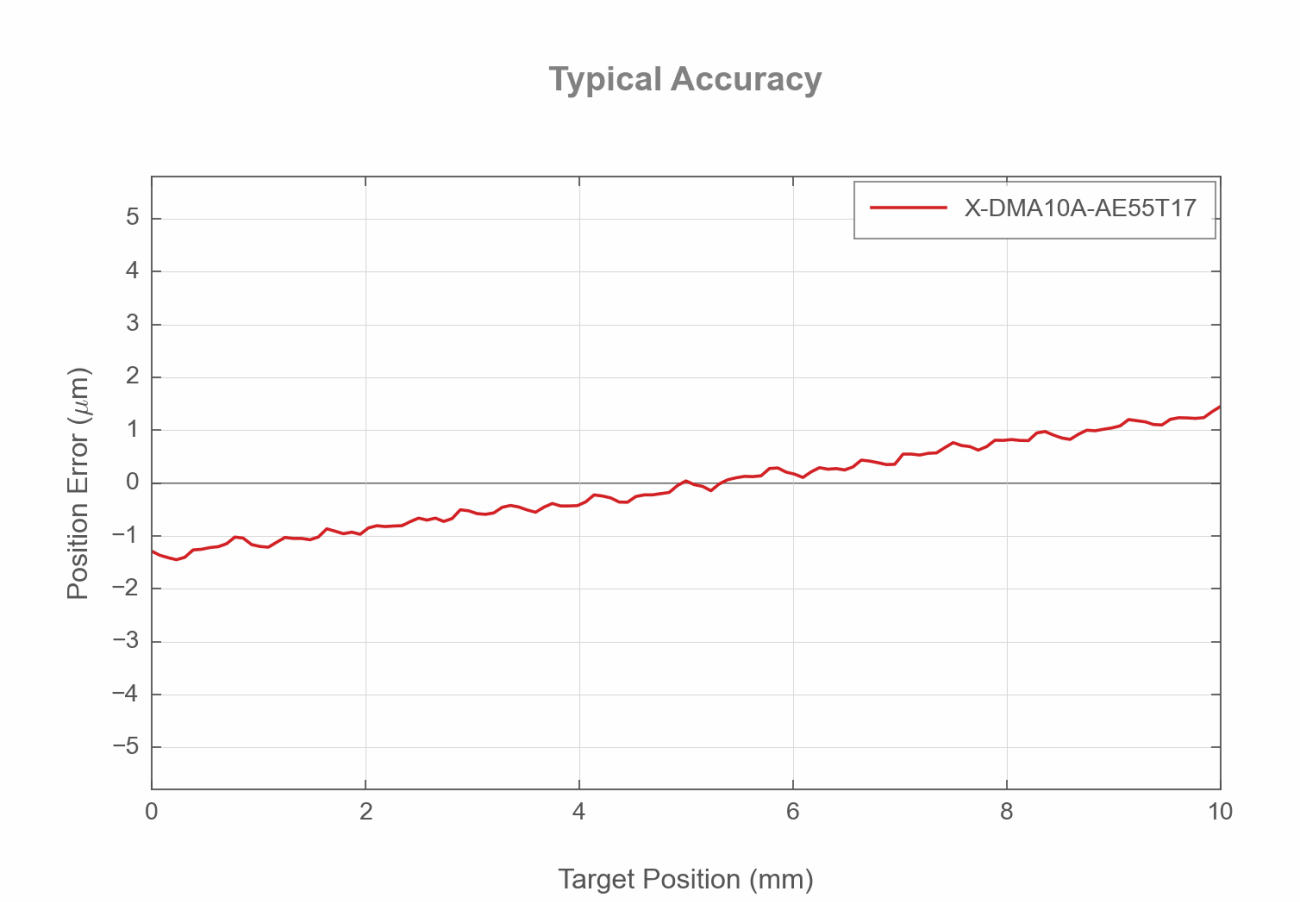
X DMA10A AE55T17 Typical Force Constant Over Travel



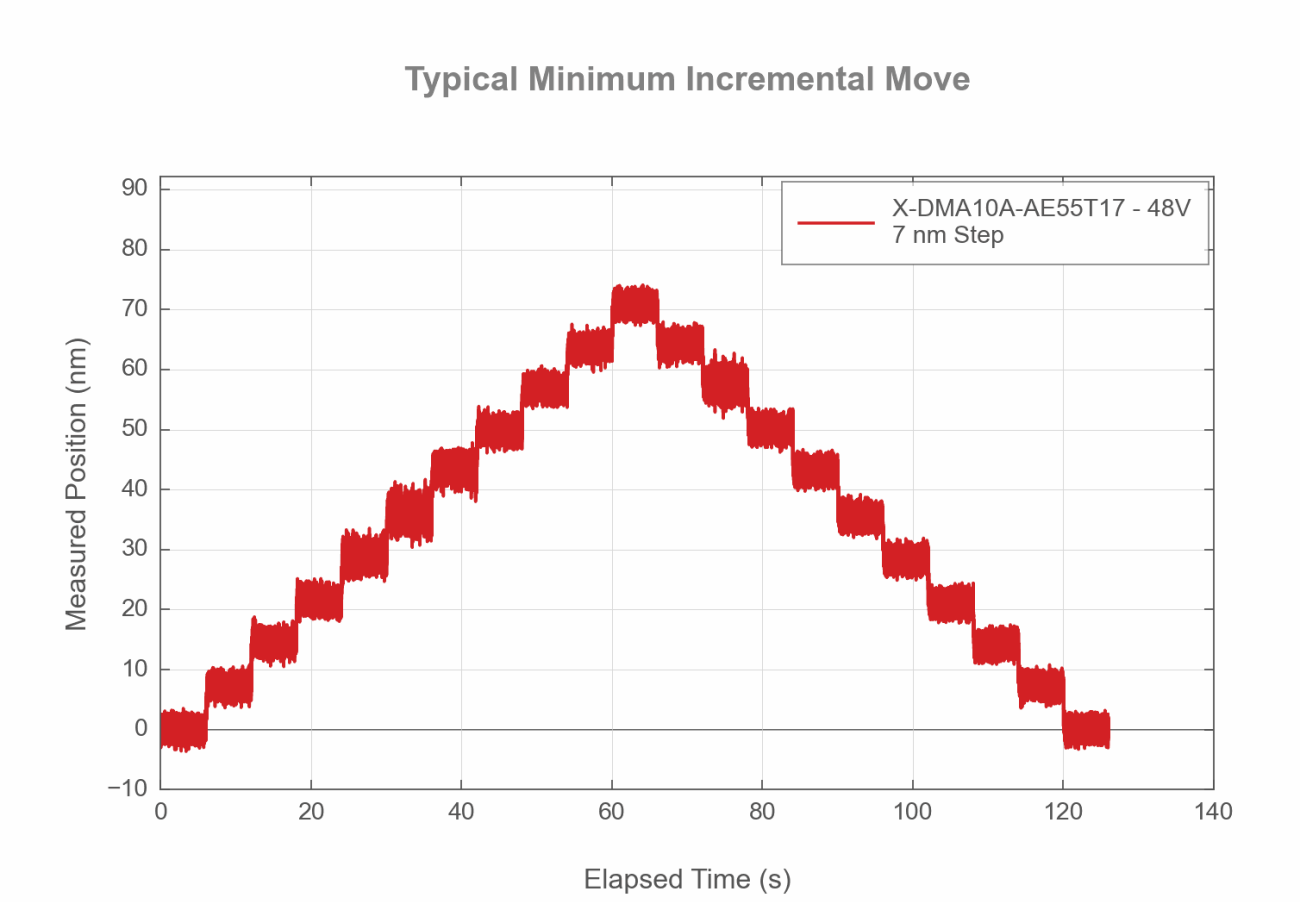
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X DMA10A AE55T17 Typical Accuracy



X DMA10A AE55T17 Typical Minimum Incremental Move



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DMA10A-AE55T10A Datasheet



- 10 mm travel
- High repeatability (50 nm), with 10 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Non-contact direct-drive motor for high precision, high dynamic performance & reliability
- Designed for use with MCC controllers for coordinated multi-axis motion
- With AutoDetect, Zaber controllers automatically configure settings for the connected peripheral

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DMA10A-AE55T10A Overview

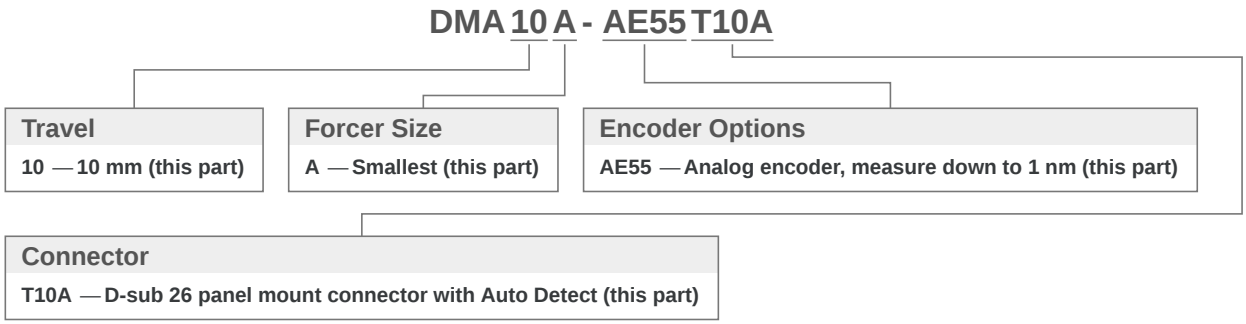
Zaber's DMA-AE Series devices are direct-drive linear stages delivering high speed, precision, and reliability in a compact size. A high resolution linear encoder results in repeatability less than 50 nm and consistent movement steps down to 10 nm. Low-friction high-rigidity crossed roller bearings allow for fast step and settle times and anti-creep bearing cages eliminate cage creep during vertical or high acceleration operation. Both the drive and encoder are non-contact, and have no moving cables, resulting in an extremely robust system.

The stages are designed to connect directly to our MCC controllers using a single cable. Set-up is easy with AutoDetect. Once connected, the controller will automatically detect and configure the DMA-AE.

For more information visit: https://www.zaber.com/products/linear-stages/DMA-AE?part=DMA10A-AE55T10A

DMA10A-AE55T10A Part Numbering & Options

Part number: DMA10A-AE55T10A



DMA10A-AE55T10A Drawings

- DMA-AE (Drawing for the DMA-AE)
- View all drawings and documents at zaber.com

DMA10A-AE55T10A Specifications

Overview

Specification	Value
Built-in Controller	No
Recommended Controller	MCC (48 V) Recommended
AutoDetect	Yes

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Travel Range	10 mm (0.394 ")
Axes of Motion	1
Weight	0.48 kg (1.058 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	8 µm (0.000315 ")
Repeatability	<0.05 µm (<0.000002 ")
Minimum Incremental Move	10 nm
Flatness of Travel	<3 µm (<0.000118 ")
Straightness of Travel	<3 µm (<0.000118 ")
Pitch Error	0.01 ° (0.174 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

Load Performance

Specification	Value
Peak Thrust	15 N (3.4 lb)
Maximum Continuous Thrust	5 N (1.1 lb)
Maximum Centered Load	50 N (11.2 lb)
Maximum Moment (Pitch)	3 N·m (2.2 lb·ft)
Maximum Moment (Roll)	10 N·m (7.38 lb·ft)
Maximum Moment (Yaw)	3 N·m (2.214 lb·ft)

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Stiffness (Pitch)	180 N·m/°
Stiffness (Roll)	320 N·m/°
Stiffness (Yaw)	135 N·m/°

Speed

Specification	Value
Maximum Acceleration	20 m/s2 (2.04 g)
Maximum Speed	365 mm/s (14.37 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Move and Settle Time (100 nm move, < 15 nm, 250 g load)	<15 ms
Typical Move and Settle Time (250 nm move, < 15 nm, 250 g load)	<15 ms

Encoder & Sensing

Specification	Value
Encoder Type	Linear analog encoder
Encoder Count Size	1 nm
Limit or Home Sensing	Optical Index Mark

Motor

Specification	Value
Motor Type	Moving Magnet Voice Coil
Motor Rated Current	2800 mA/phase
Motor Winding Resistance	1.67 ohms/phase
Motor Winding Inductance	0.28 mH/phase
Motor Connection	D-sub 26
Force Constant	2.26 N/A (0.5 lbs/A)

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Mechanical

Specification	Value
Guide Type	Anti-Creep Crossed-Roller Bearing
Mounting Interface	M3 and M6 threaded holes
Moving Mass	0.17 kg (0.374 lbs)

Environmental & Compliance

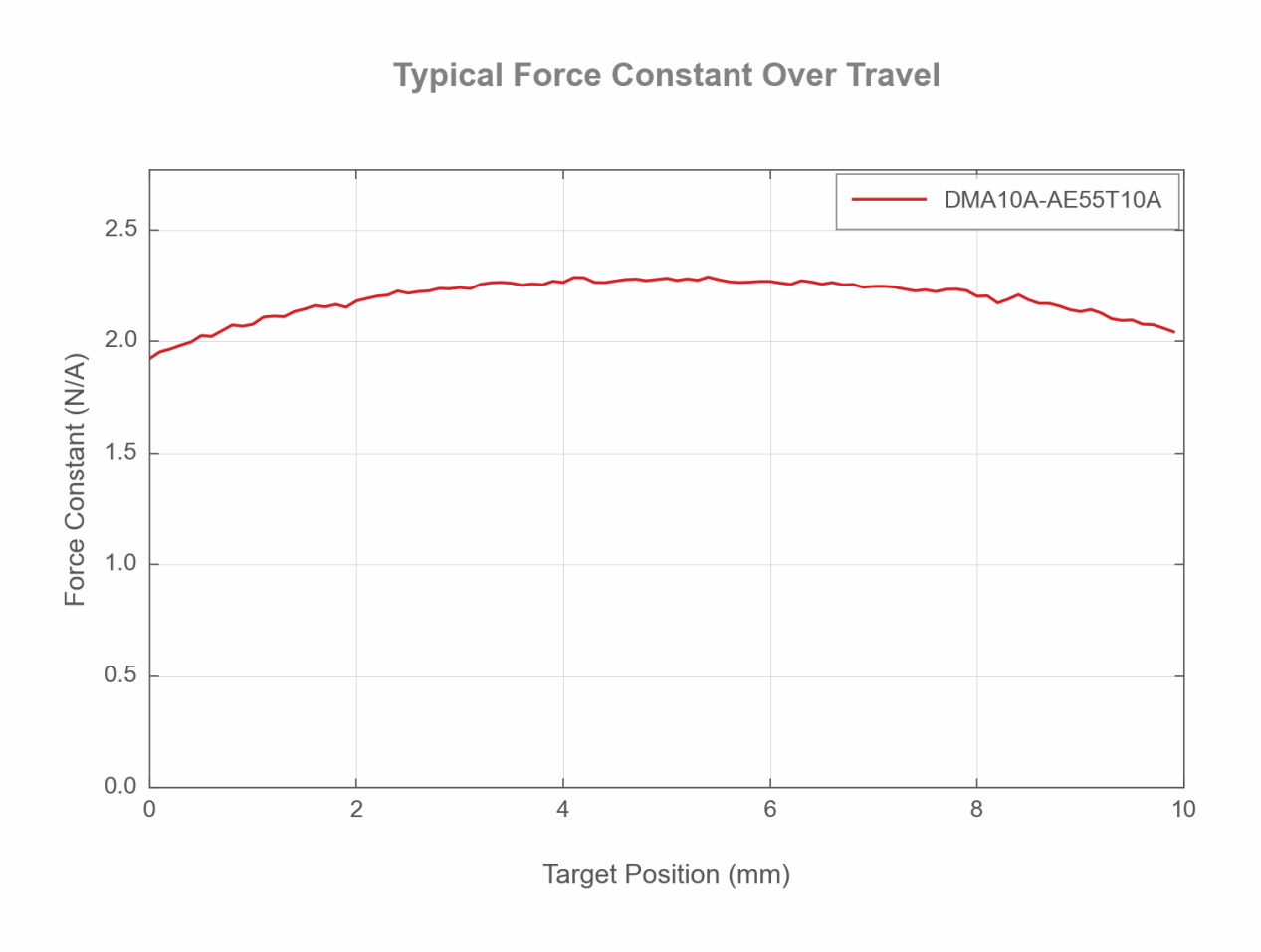
Specification	Value
Operating Temperature Range	0-50 °C
CE Compliant	Yes
Vacuum Compatible	No

DMA10A-AE55T10A Charts

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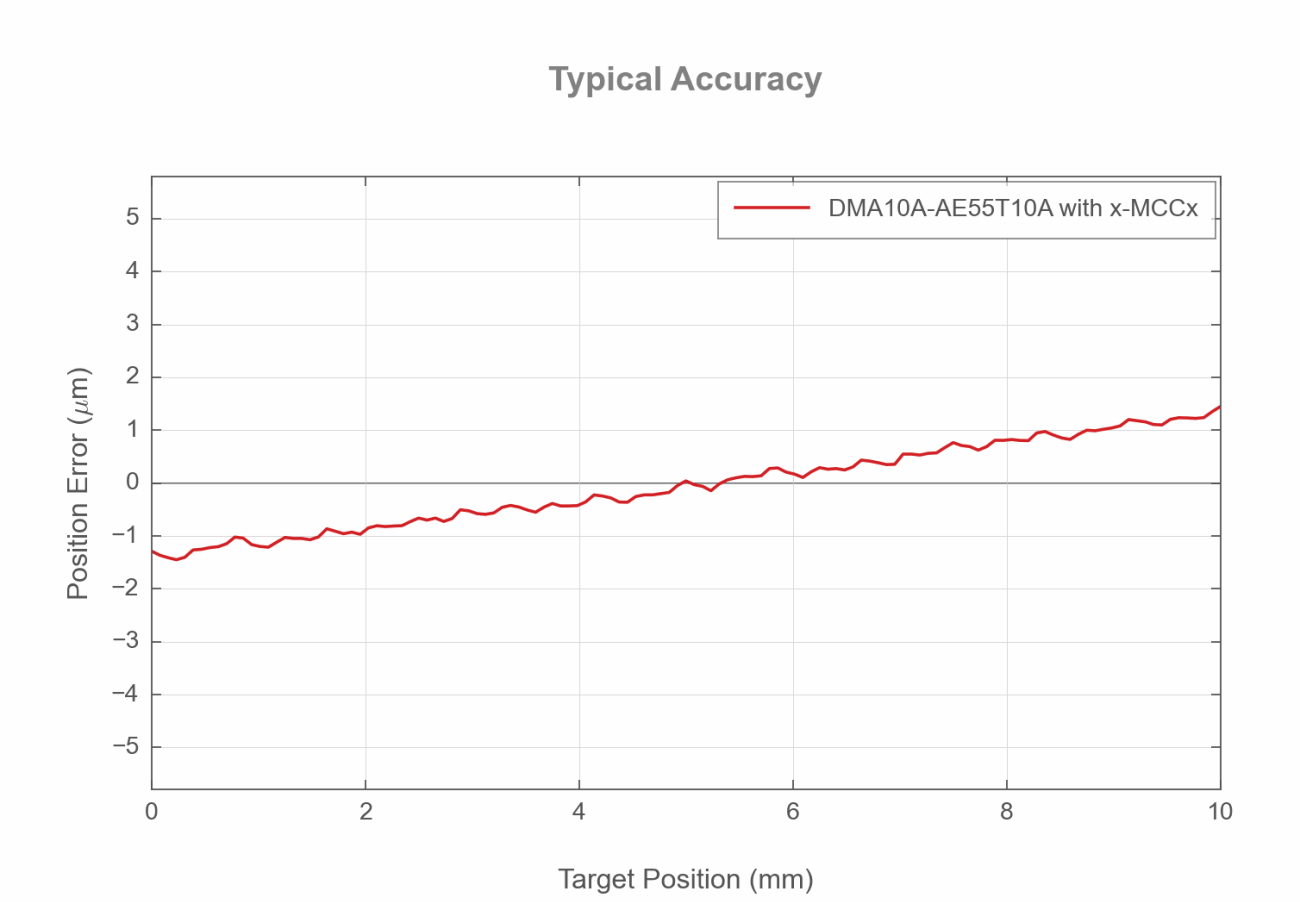
DMA10A AE55T10A Typical Force Constant Over Travel



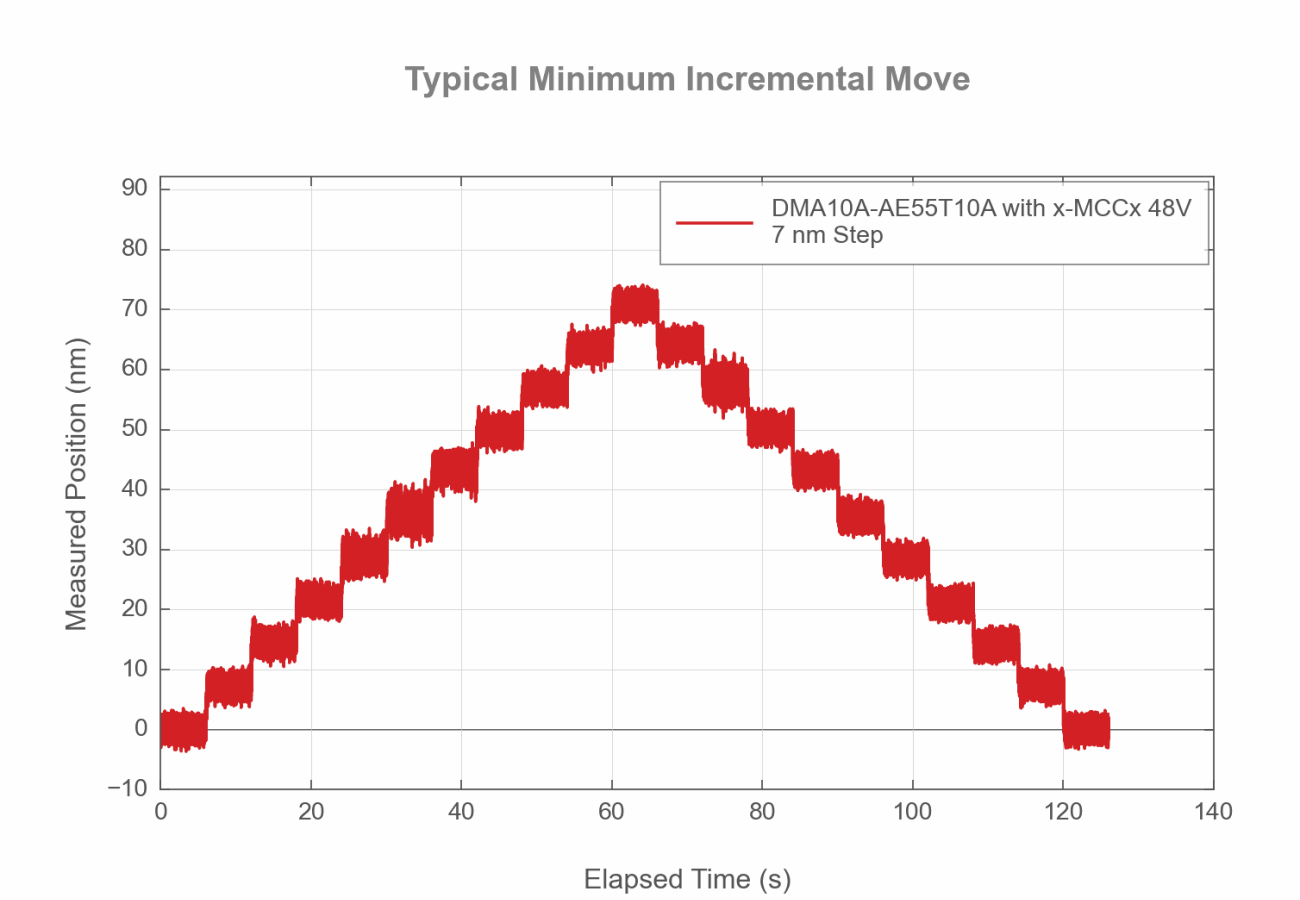
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DMA10A AE55T10A Typical Accuracy



DMA10A AE55T10A Typical Minimum Incremental Move



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X-DMA-AEZ Series Datasheet



• The DMA objective focus stage is a high-performance, direct-drive solution for microscope system builders and OEMs requiring rapid, accurate focus for high-magnification imaging.
• The DMA is ideal for demanding, high-accuracy imaging applications including:

Spatial Biology: Rapid Z-stacking for high-throughput spatial workflows.
Digital Pathology & Cell Morphology: High-speed tile scanning with fast objective focusing.
Drug Discovery: Reliable 24/7 operation for high content screening campaigns.
Optical Metrology & Semiconductor Inspection: Precision positioning with 1 nm resolution optical encoders.
• Technical Highlights:

Exceptional Precision: Achieve 50 nm repeatability and 10 nm minimum incremental moves at one-third the cost of piezo alternatives.
High Throughput: Maximize imaging efficiency with sub-15 ms move and settle times.
Reliable Performance: Ensure long-term reliability with a non-contact direct-drive motor and 1 nm resolution linear encoder.
Compact Footprint: Integrate easily into tight spaces with a 77 mm x 100 mm x 30.5 mm package, including the controller.
Extended Travel: Utilize 10 mm of travel, higher than industry standard for this class.
Adjustable Counterbalance: Accommodate payloads up to 1 kg with a user-tunable magnetic counterbalance.

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X-DMA-AEZ Series Overview

Features for streamlining initial prototyping to production:

Plug-and-Play Architecture: Start moving in minutes with a built-in controller and a simple two-cable setup.
No-Code Optimization: Use the Zaber Launcher Oscilloscope & Servo Tuning to maximize throughput without writing a single line of code.
Easy Synchronization: Connect with third-party hardware and sensors via integrated I/O and encoder outputs.
Developer-Friendly API: Integrate quickly using a modern, open-source API with sample code for Python, C#, C++, and more.
Simplified Topology: Daisy-chain with XY stages and other modules using a single data/power cable to eliminate the "cable nest."
Instant Availability: Accelerate timelines with transparent pricing, downloadable CAD files, and shipping in less than one week.
Rapid Support: Stay on schedule with one-business-day response times from our technical support team.

[For more information visit: https://www.zaber.com/products/vertical-stages/X-DMA-AEZ](https://www.zaber.com/products/vertical-stages/X-DMA-AEZ)

X-DMA-AEZ Series Part Numbering & Options

X-DMA 10 A - AE55 ZJ2 T17

Travel
10 — 10 mm

Forcer Size
A — Smallest

Encoder Options
AE55 — Analog encoder, measure down to 1 nm

Counterbalance Options
ZJ2 — Medium force adjustable magnetic counterbalance

I/O Options
T17 — Two digital inputs, one digital output, one analog input
T17Q — Interpolated RS422 encoder output, two digital inputs, one digital output, one analog input

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X-DMA-AEZ Series Drawings

- X-DMA-AEZ (Drawing for the X-DMA-AEZ)
- View all drawings and documents at zaber.com

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X-DMA-AEZ Series Specifications

Overview

Specification	Value
Built-in Controller	Yes
Travel Range	10 mm (0.394 ")
Manual Control	No
Axes of Motion	1
LED Indicators	Yes
Weight	0.53 kg (1.168 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	8 µm (0.000315 ")
Repeatability	<0.05 µm (<0.000002 ")
Minimum Incremental Move	10 nm
Flatness of Travel	<3 µm (<0.000118 ")
Straightness of Travel	<3 µm (<0.000118 ")
Pitch Error	0.01 ° (0.174 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

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Load Performance

Specification	Value
Peak Thrust	15 N (3.4 lb)
Maximum Continuous Thrust	5 N (1.1 lb)
Maximum Moment (Pitch)	3 N·m (2.2 lb·ft)
Maximum Moment (Roll)	10 N·m (7.38 lb·ft)
Maximum Moment (Yaw)	3 N·m (2.214 lb·ft)
Stiffness (Pitch)	180 N·m/°
Stiffness (Roll)	320 N·m/°
Stiffness (Yaw)	135 N·m/°
Counterbalance Payload Range	2.5-10 N

Speed

Specification	Value
Maximum Acceleration	20 m/s2 (2.04 g)
Maximum Speed	365 mm/s (14.37 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Move and Settle Time (100 nm move, < 15 nm, 250 g load)	<15 ms
Typical Move and Settle Time (250 nm move, < 15 nm, 250 g load)	<15 ms

Encoder & Sensing

Specification	Value
Encoder Type	Linear analog encoder
Encoder Count Size	1 nm
Limit or Home Sensing	Optical Index Mark

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Motor

Specification	Value
Motor Type	Moving Magnet Voice Coil
Force Constant	2.26 N/A (0.5 lbs/A)

Power and Communication

Specification	Value
Communication Interface	RS-232
Communication Protocol	Zaber ASCII (Default)
Data Cable Connection	Locking 4-pin M8
Power Supply	48 VDC
Power Plug	2-pin screw terminal
Maximum Current Draw	3750 mA

Analog & Digital I/O

Specification	Value
Digital Input	2
Digital Output	1
Analog Input	1

Mechanical

Specification	Value
Counterbalance Type	Adjustable Magnetic
Guide Type	Anti-Creep Crossed-Roller Bearing
Mounting Interface	M3 and M6 threaded holes
Moving Mass	0.175 kg (0.385 lbs)

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Environmental & Compliance

Specification	Value
Operating Temperature Range	0-50 °C
CE Compliant	Yes
Vacuum Compatible	No

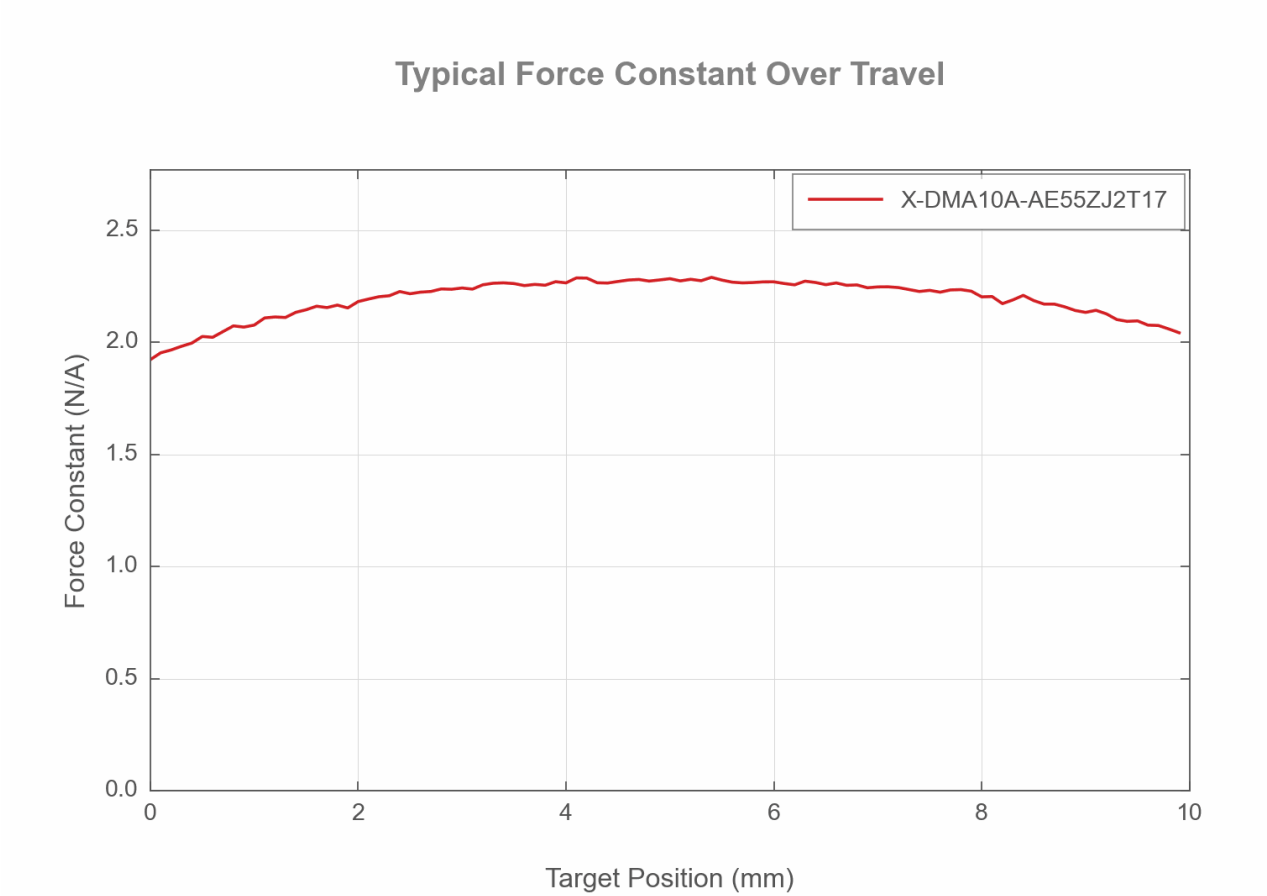
Part Number	Encoder Output Type
X-DMA10A-AE55ZJ2T17	None
X-DMA10A-AE55ZJ2T17Q	Interpolated relative quadrature signal with differential RS422 levels

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X-DMA-AEZ Series Charts

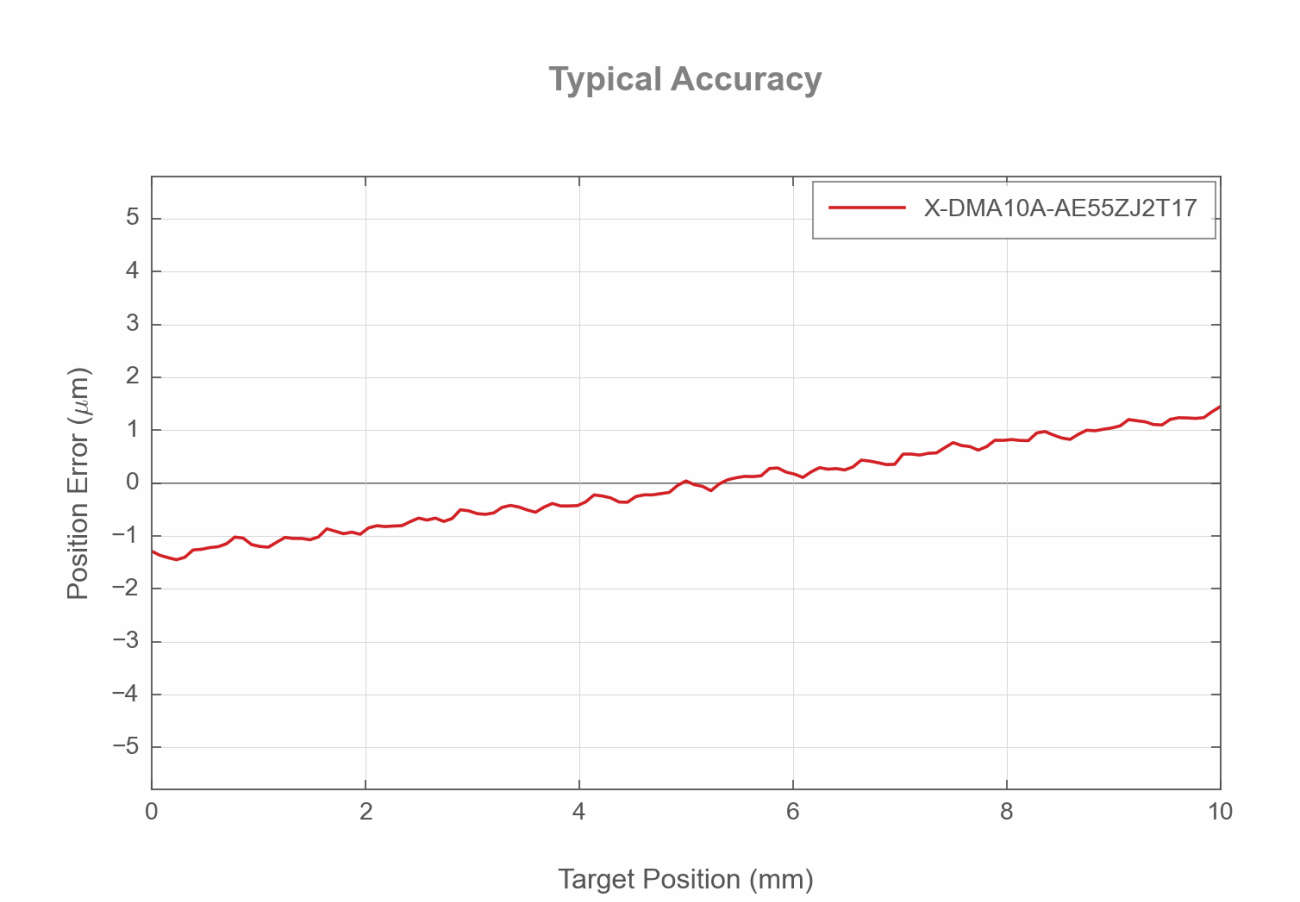
X DMA10A AE55ZJ2T17 Typical Force Constant Over Travel



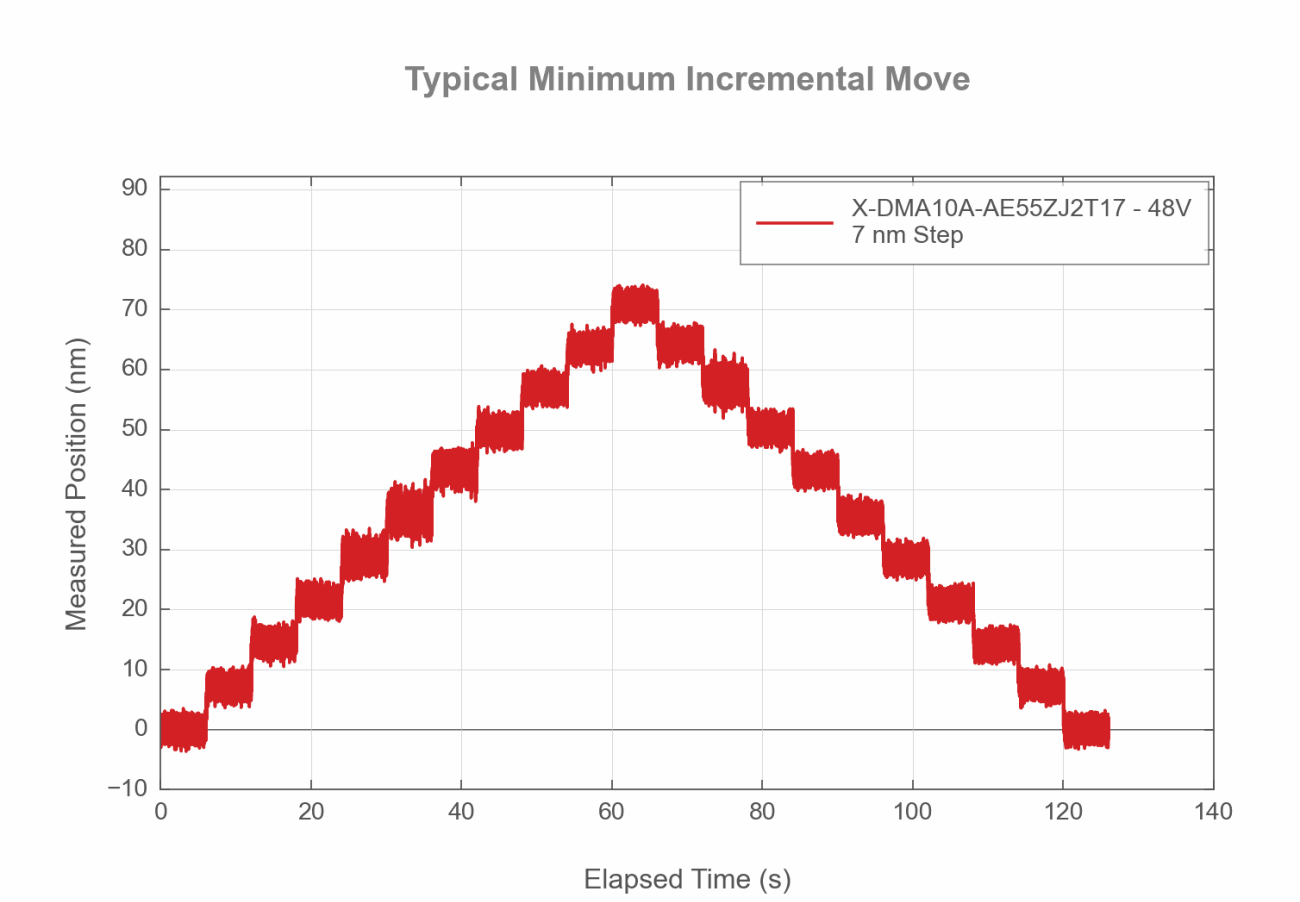
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X DMA10A AE55ZJ2T17 Typical Accuracy



X DMA10A AE55ZJ2T17 Typical Minimum Incremental Move



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DMA10A-AE55ZJ2T10A Datasheet



• The DMA objective focus stage is a high-performance, direct-drive solution for microscope system builders and OEMs requiring rapid, accurate focus for high-magnification imaging.
• Designed for use with MCC controllers for coordinated multi-axis motion
• With AutoDetect, Zaber controllers automatically configure settings for the connected peripheral
• The DMA is ideal for demanding, high-accuracy imaging applications including:

Spatial Biology: Rapid Z-stacking for high-throughput spatial workflows.
Digital Pathology & Cell Morphology: High-speed tile scanning with fast objective focusing.
Drug Discovery: Reliable 24/7 operation for high content screening campaigns.
Optical Metrology & Semiconductor Inspection: Precision positioning with 1 nm resolution optical encoders.
• Technical Highlights:

Exceptional Precision: Achieve 50 nm repeatability and 10 nm minimum incremental moves at one-third the cost of piezo alternatives.
High Throughput: Maximize imaging efficiency with sub-15 ms move and settle times.
Reliable Performance: Ensure long-term reliability with a non-contact direct-drive motor and 1 nm resolution linear encoder.
Compact Footprint: Integrate easily into tight spaces with a 77 mm x 100 mm x 30.5 mm package, including the controller.
Extended Travel: Utilize 10 mm of travel—higher than industry standard for this class.

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Adjustable Counterbalance: Accommodate payloads up to 1 kg with a user-tunable magnetic counterbalance.

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DMA10A-AE55ZJ2T10A Overview

Zaber's X-DMA-AEZ Series devices are direct-drive linear stages delivering high speed, precision, and reliability of the DMA-AE stages with an integrated magnetic counterbalance specifically designed for vertical applications. A high resolution linear encoder results in repeatability less than 50 nm and consistent movement steps down to 10 nm. Low-friction high-rigidity crossed roller bearings allow for fast step and settle times and anti-creep bearing cages eliminate cage creep during vertical or high acceleration operation. Both the drive and encoder are non-contact, and have no moving cables, resulting in an extremely robust system.

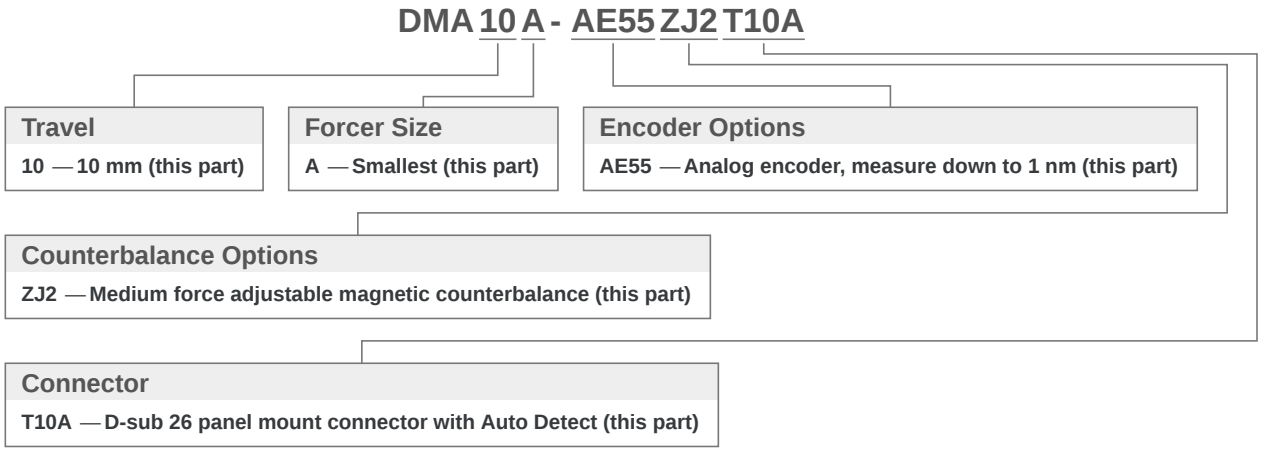
A passive frictionless magnetic counterbalance integrated directly into the stage compensates for payloads up to 1 kg, preventing unwanted motion during power loss. The counterbalance's force can be finely adjusted in seconds with a single screw.

The stages are designed to connect directly to our MCC controllers using a single cable. Set-up is easy with AutoDetect. Once connected, the controller will automatically detect and configure the DMA-AEZ.

For more information visit: https://www.zaber.com/products/vertical-stages/DMA-AEZ?part=DMA10A-AE55ZJ2T10A

DMA10A-AE55ZJ2T10A Part Numbering & Options

Part number: DMA10A-AE55ZJ2T10A



DMA10A-AE55ZJ2T10A Drawings

- DMA-AEZ (Drawing for the DMA-AEZ)
- View all drawings and documents at zaber.com

Zaber Technologies Inc.
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DMA10A-AE55ZJ2T10A Specifications

Overview

Specification	Value
Built-in Controller	No
Recommended Controller	MCC (48 V) Recommended
AutoDetect	Yes
Travel Range	10 mm (0.394 ")
Axes of Motion	1
Weight	0.52 kg (1.146 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	8 µm (0.000315 ")
Repeatability	<0.05 µm (<0.000002 ")
Minimum Incremental Move	10 nm
Flatness of Travel	<3 µm (<0.000118 ")
Straightness of Travel	<3 µm (<0.000118 ")
Pitch Error	0.01 ° (0.174 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

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Load Performance

Specification	Value
Peak Thrust	15 N (3.4 lb)
Maximum Continuous Thrust	5 N (1.1 lb)
Maximum Moment (Pitch)	3 N·m (2.2 lb·ft)
Maximum Moment (Roll)	10 N·m (7.38 lb·ft)
Maximum Moment (Yaw)	3 N·m (2.214 lb·ft)
Stiffness (Pitch)	180 N·m/°
Stiffness (Roll)	320 N·m/°
Stiffness (Yaw)	135 N·m/°
Counterbalance Payload Range	2.5-10 N

Speed

Specification	Value
Maximum Acceleration	20 m/s2 (2.04 g)
Maximum Speed	365 mm/s (14.37 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Move and Settle Time (100 nm move, < 15 nm, 250 g load)	<15 ms
Typical Move and Settle Time (250 nm move, < 15 nm, 250 g load)	<15 ms

Encoder & Sensing

Specification	Value
Encoder Type	Linear analog encoder
Encoder Count Size	1 nm
Limit or Home Sensing	Optical Index Mark

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Motor

Specification	Value
Motor Type	Moving Magnet Voice Coil
Motor Rated Current	2800 mA/phase
Motor Winding Resistance	1.67 ohms/phase
Motor Winding Inductance	0.28 mH/phase
Motor Connection	D-sub 26
Force Constant	2.26 N/A (0.5 lbs/A)

Mechanical

Specification	Value
Counterbalance Type	Adjustable Magnetic
Guide Type	Anti-Creep Crossed-Roller Bearing
Mounting Interface	M3 and M6 threaded holes
Moving Mass	0.175 kg (0.385 lbs)

Environmental & Compliance

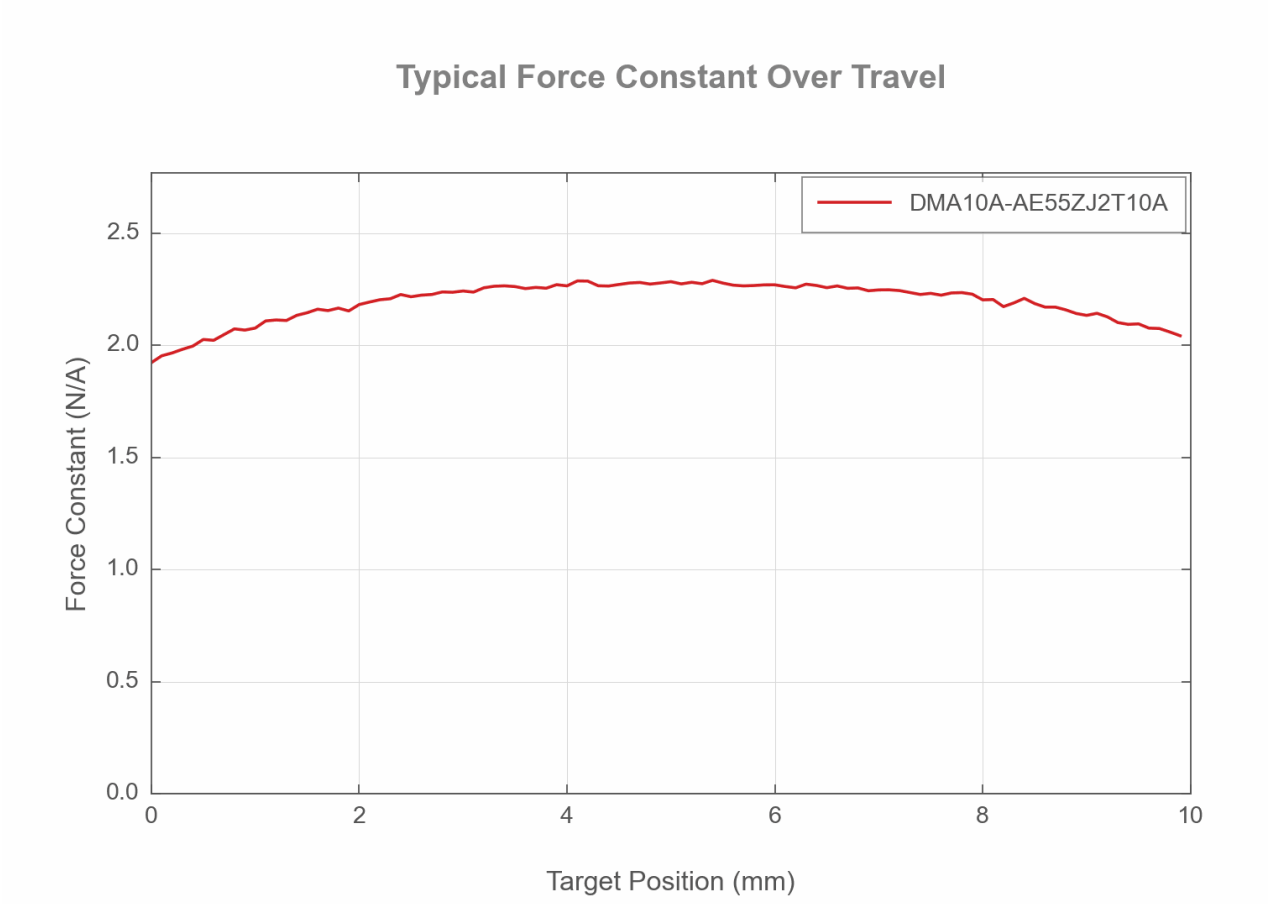
Specification	Value
Operating Temperature Range	0-50 °C
CE Compliant	Yes
Vacuum Compatible	No

DMA10A-AE55ZJ2T10A Charts

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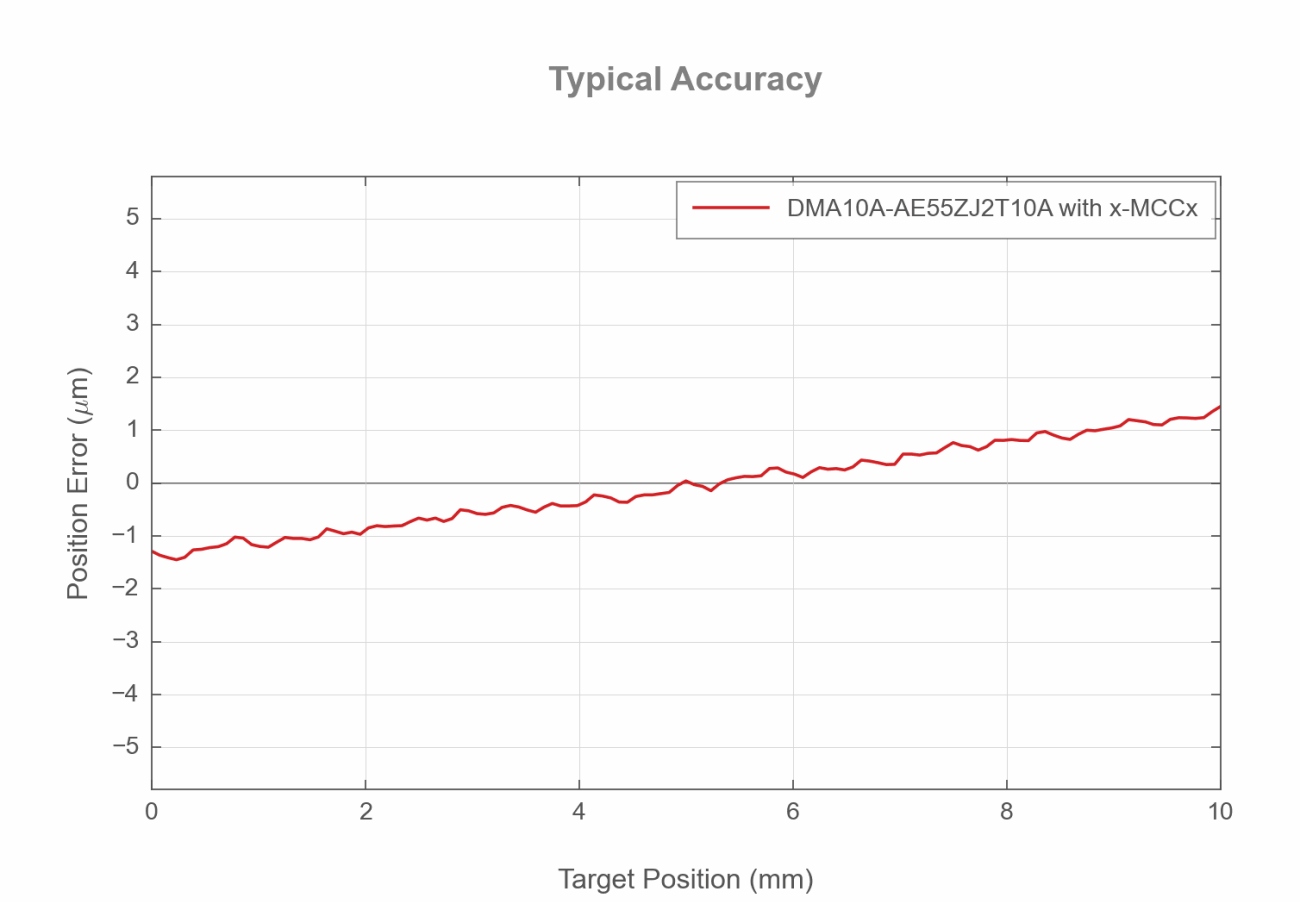
DMA10A AE55ZJ2T10A Typical Force Constant Over Travel



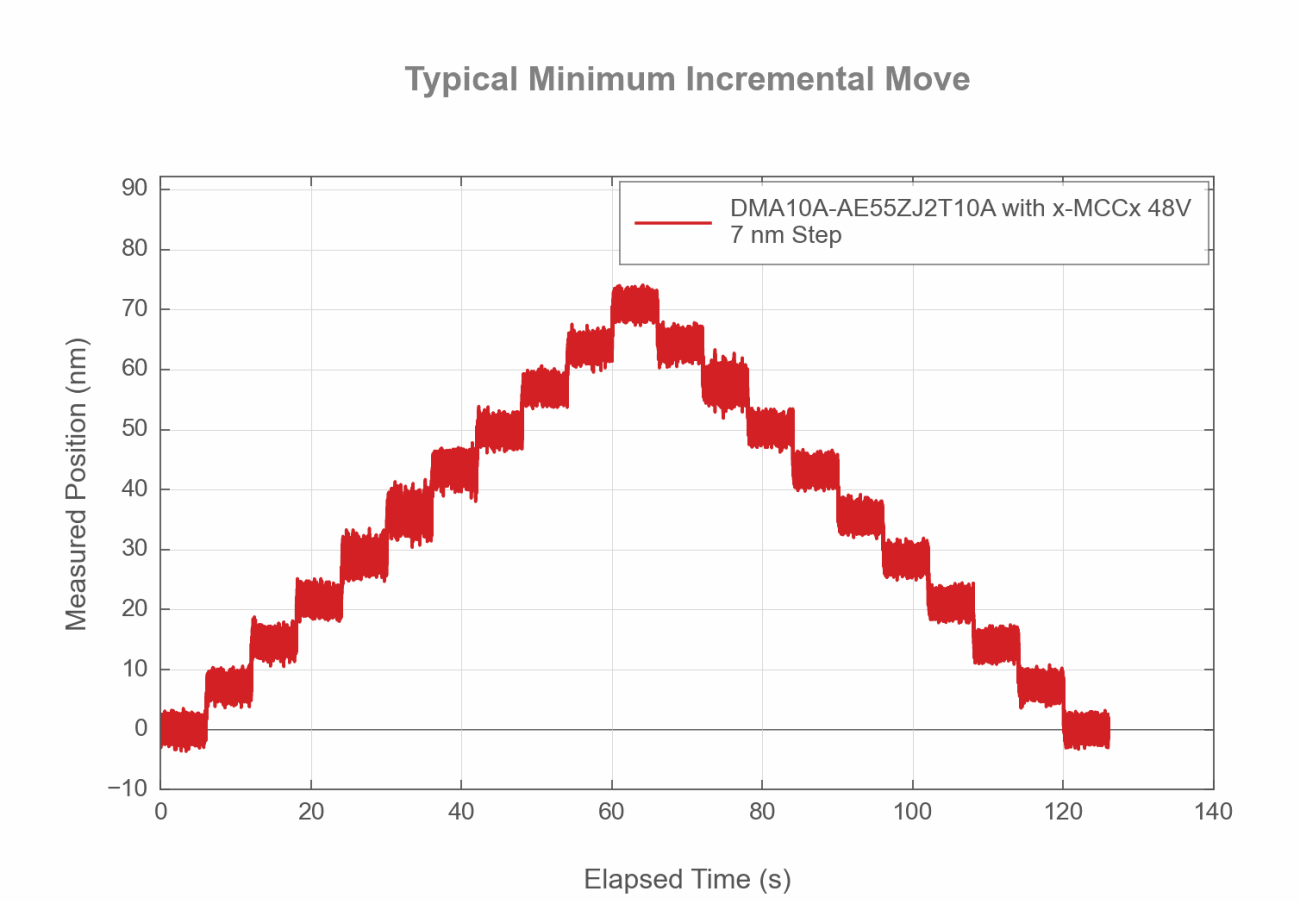
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DMA10A AE55ZJ2T10A Typical Accuracy



DMA10A AE55ZJ2T10A Typical Minimum Incremental Move



Contact

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