Zaber Technologies Inc.
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X-LDA-AE Series Datasheet



- 25, 75, 150 mm travel options
- High repeatability (200 nm) and accuracy (1.5 µm), with 20 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Up to 0.8 m/s speed and up to 4 g acceleration
- Non-contact ironless linear motor for high dynamic performance & reliability
- Built-in controller; daisy-chains with other Zaber products
- Digital IO for interfacing with external hardware

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X-LDA-AE Series Overview

Zaber's X-LDA-AE Series devices are computer-controlled, motorized linear stages delivering high speed, precision, and reliability in a compact package. A centrally mounted linear encoder results in up to 1.5 µm position accuracy and consistent movement steps down to 20 nm. X-LDA-AE devices feature non-cogging ironless linear motors, providing high speed and acceleration capabilities. Both the drive and encoder are non-contact, and have no moving cables, resulting in an extremely robust system.

X-LDA-AE devices are stand-alone units requiring only a standard 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-LDA-AE Series is designed to be 'plug and play' and very easy to set up and operate. X-LDA-AE devices also include a digital input and two digital outputs 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-LDA-AE

X-LDA-AE Series Part Numbering & Options

X-LDA 025 A - AE53 D12

Travel	Forcer Size	Encoder Options	I/O Options
025 — 25 mm **075** — 75 mm **150** — 150 mm	**A** — Smallest	**AE53** — Analog encoder, measure down to 1 nm	**D12** — One digital input, two digital outputs

X-LDA-AE Series Drawings

• dimensions-X-LDA-AE.png (Drawing for the Drawing for the X-LDA-AE)

• View all drawings and documents at zaber.com

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X-LDA-AE Series Specifications

Overview

Specification	Value
Built-in Controller	Yes
Manual Control	Indexed knob with push switch
Axes of Motion	1
LED Indicators	Yes

Positioning Performance

Specification	Value
Repeatability	<0.2 µm (<0.000008 ")
Minimum Incremental Move	20 nm
Yaw Error	0.005 ° (0.087 mrad)

Load Performance

Specification	Value
Peak Thrust	16 N (3.6 lb)
Maximum Continuous Thrust	6 N (1.3 lb)
Maximum Centered Load	100 N (22.4 lb)
Maximum Moment (Pitch)	5 N·m (3.7 lb·ft)
Maximum Moment (Roll)	5 N·m (3.69 lb·ft)
Maximum Moment (Yaw)	5 N·m (3.69 lb·ft)

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Speed

Specification	Value
Maximum Speed	800 mm/s (31.496 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Velocity Stability	± 0.33% at 100 mm/s with a 1.0 kg payload

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 Track Linear Motor (3 phase)
Force Constant	3.7 N/A (0.8 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	3000 mA

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Analog & Digital I/O

Specification	Value
Digital Input	1
Digital Output	2

Mechanical

Specification	Value
Guide Type	Crossed-Roller Bearing
Mounting Interface	M6 threaded holes

Environmental & Compliance

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

Part Number	Travel Range	Weight	Accuracy (unidirectional)	Flatness of Travel
X-LDA025A-AE53D12	25 mm (0.984 ")	0.91 kg (2.006 lb)	1.5 µm (0.000059 ")	<4 µm (<0.000157 ")
X-LDA075A-AE53D12	75 mm (2.953 ")	1.26 kg (2.778 lb)	1.5 µm (0.000059 ")	<8 µm (<0.000315 ")
X-LDA150A-AE53D12	150 mm (5.905 ")	1.81 kg (3.99 lb)	1.5 µm (0.000059 ")	<15 µm (<0.000591 ")

Part Number	Straightness of Travel	Pitch Error	Roll Error	Stiffness (Pitch)
X-LDA025A-AE53D12	<4 µm (<0.000157 ")	0.006 ° (0.105 mrad)	0.005 ° (0.087 mrad)	500 N·m/°
X-LDA075A-AE53D12	<6 µm (<0.000236 ")	0.016 ° (0.279 mrad)	0.007 ° (0.122 mrad)	1000 N·m/°

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X-LDA150A-AE53D12	<10 µm (<0.000394 ")	0.02 ° (0.349 mrad)	0.015 ° (0.262 mrad)	3000 N·m/°

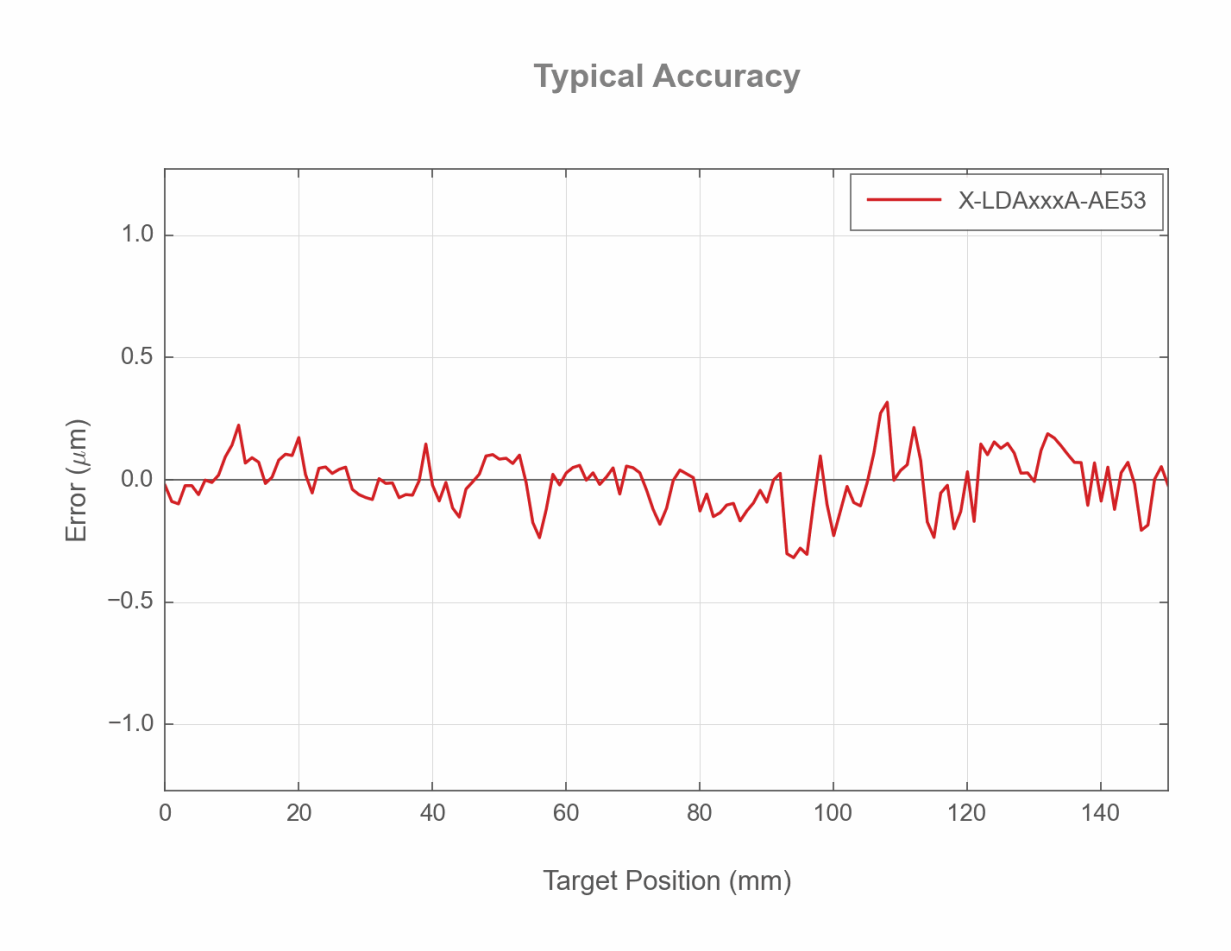
Part Number	Stiffness (Roll)	Stiffness (Yaw)	Maximum Acceleration	Moving Mass
X-LDA025A-AE53D12	500 N·m/°	400 N·m/°	78.5 m/s2 (8 g)	0.29 kg (0.638 lbs)
X-LDA075A-AE53D12	600 N·m/°	900 N·m/°	44.1 m/s2 (4.5 g)	0.43 kg (0.946 lbs)
X-LDA150A-AE53D12	700 N·m/°	1750 N·m/°	24.5 m/s2 (2.5 g)	0.67 kg (1.474 lbs)

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X-LDA-AE Series Charts

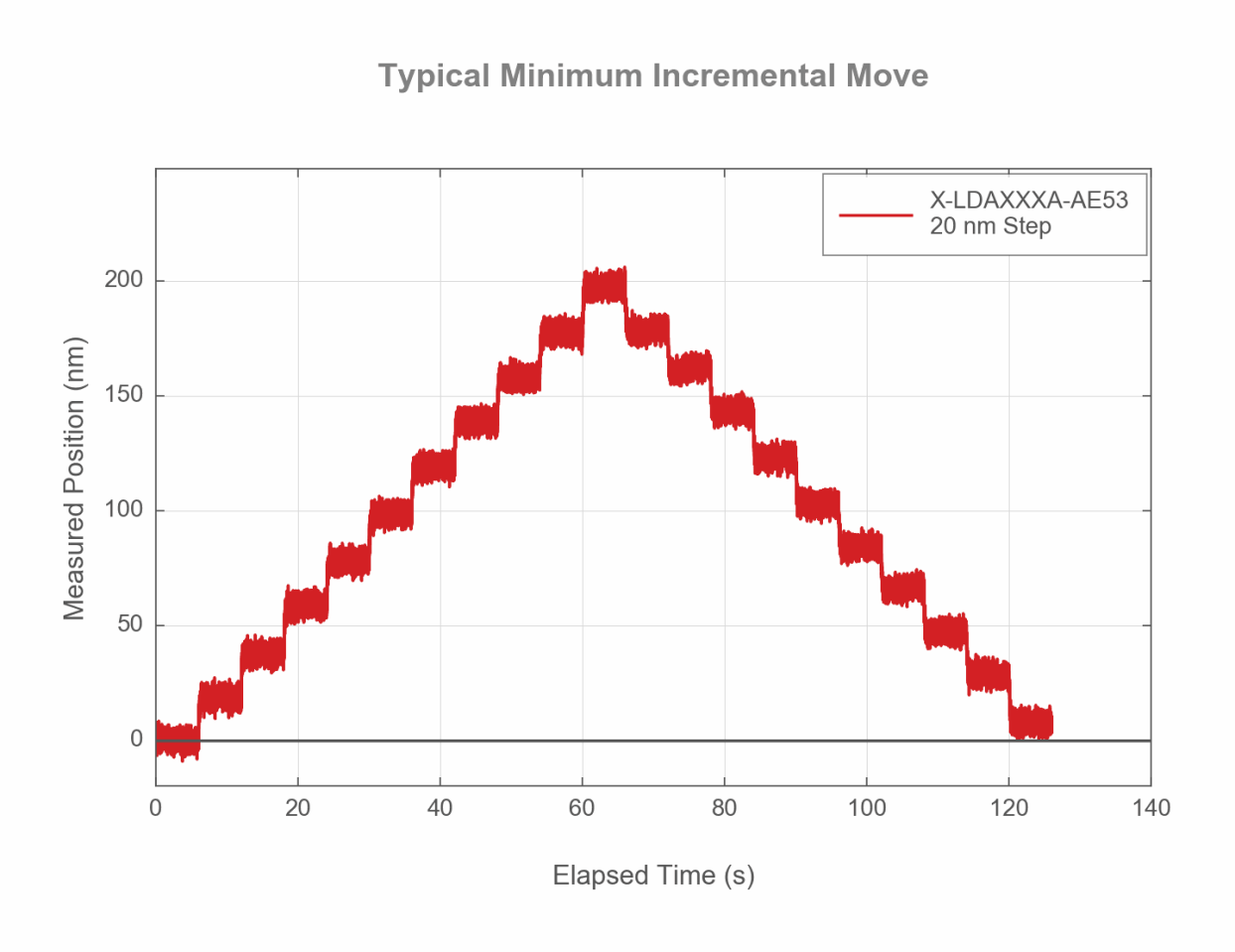
ERROR POSITION



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MIM



Velocity Stability And Following Error



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LDA-AE Series Datasheet



- 25, 75, 150 mm travel options
- High repeatability (200 nm) and accuracy (1.5 µm), with 12 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Up to 0.8 m/s speed and up to 4 g acceleration
- Non-contact ironless linear 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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LDA-AE Series Overview

Zaber's LDA-AE Series devices are motorized linear stages delivering high speed, precision, and reliability in a compact package. A centrally mounted linear encoder results in up to 1 µm position accuracy and consistent movement steps down to 12 nm. LDA-AE devices feature non-cogging ironless linear motors, providing high speed and acceleration capabilities. 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 LDA-AE.

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

LDA-AE Series Part Numbering & Options

LDA 025 A - AE53 T10A

Travel
025 — 25 mm
075 — 75 mm
150 — 150 mm

Forcer Size
A — Smallest

Encoder Options
AE53 — Analog encoder, measure down to 1 nm

Connector
T10A — D-sub 26 panel mount connector with Auto Detect

LDA-AE Series Drawings

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

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LDA-AE Series Specifications

Overview

Specification	Value
Built-in Controller	No
Recommended Controller	MCC (48 V) Recommended
AutoDetect	Yes
Axes of Motion	1

Positioning Performance

Specification	Value
Accuracy (unidirectional)	1.5 µm (0.000059 ")
Repeatability	<0.2 µm (<0.000008 ")
Minimum Incremental Move	12 nm
Yaw Error	0.005 ° (0.087 mrad)

Load Performance

Specification	Value
Peak Thrust	16 N (3.6 lb)
Maximum Continuous Thrust	6 N (1.3 lb)
Maximum Centered Load	100 N (22.4 lb)
Maximum Moment (Pitch)	5 N·m (3.7 lb·ft)
Maximum Moment (Roll)	5 N·m (3.69 lb·ft)
Maximum Moment (Yaw)	5 N·m (3.69 lb·ft)

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Speed

Specification	Value
Maximum Speed	800 mm/s (31.496 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Velocity Stability	± 0.33% at 100 mm/s with a 1.0 kg payload

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 Track Linear Motor (3 phase)
Motor Rated Current	1800 mA
Motor Winding Resistance	2.3 ohms line-to-line
Motor Winding Inductance	0.09 mH line-to-line
Motor Connection	D-sub 26
Force Constant	3.7 N/A (0.8 lbs/A)

Mechanical

Specification	Value
Guide Type	Crossed-Roller Bearing
Mounting Interface	M6 threaded holes

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Environmental & Compliance

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

Part Number	Travel Range	Weight	Flatness of Travel	Straightness of Travel
LDA025A-AE53T10A	25 mm (0.984 ")	0.88 kg (1.94 lb)	<4 µm (<0.000157 ")	<4 µm (<0.000157 ")
LDA075A-AE53T10A	75 mm (2.953 ")	1.23 kg (2.712 lb)	<8 µm (<0.000315 ")	<6 µm (<0.000236 ")
LDA150A-AE53T10A	150 mm (5.905 ")	1.78 kg (3.924 lb)	<15 µm (<0.000591 ")	<10 µm (<0.000394 ")

Part Number	Pitch Error	Roll Error	Stiffness (Pitch)	Stiffness (Roll)
LDA025A-AE53T10A	0.006 ° (0.105 mrad)	0.005 ° (0.087 mrad)	500 N·m/°	500 N·m/°
LDA075A-AE53T10A	0.016 ° (0.279 mrad)	0.007 ° (0.122 mrad)	1000 N·m/°	600 N·m/°
LDA150A-AE53T10A	0.02 ° (0.349 mrad)	0.015 ° (0.262 mrad)	3000 N·m/°	700 N·m/°

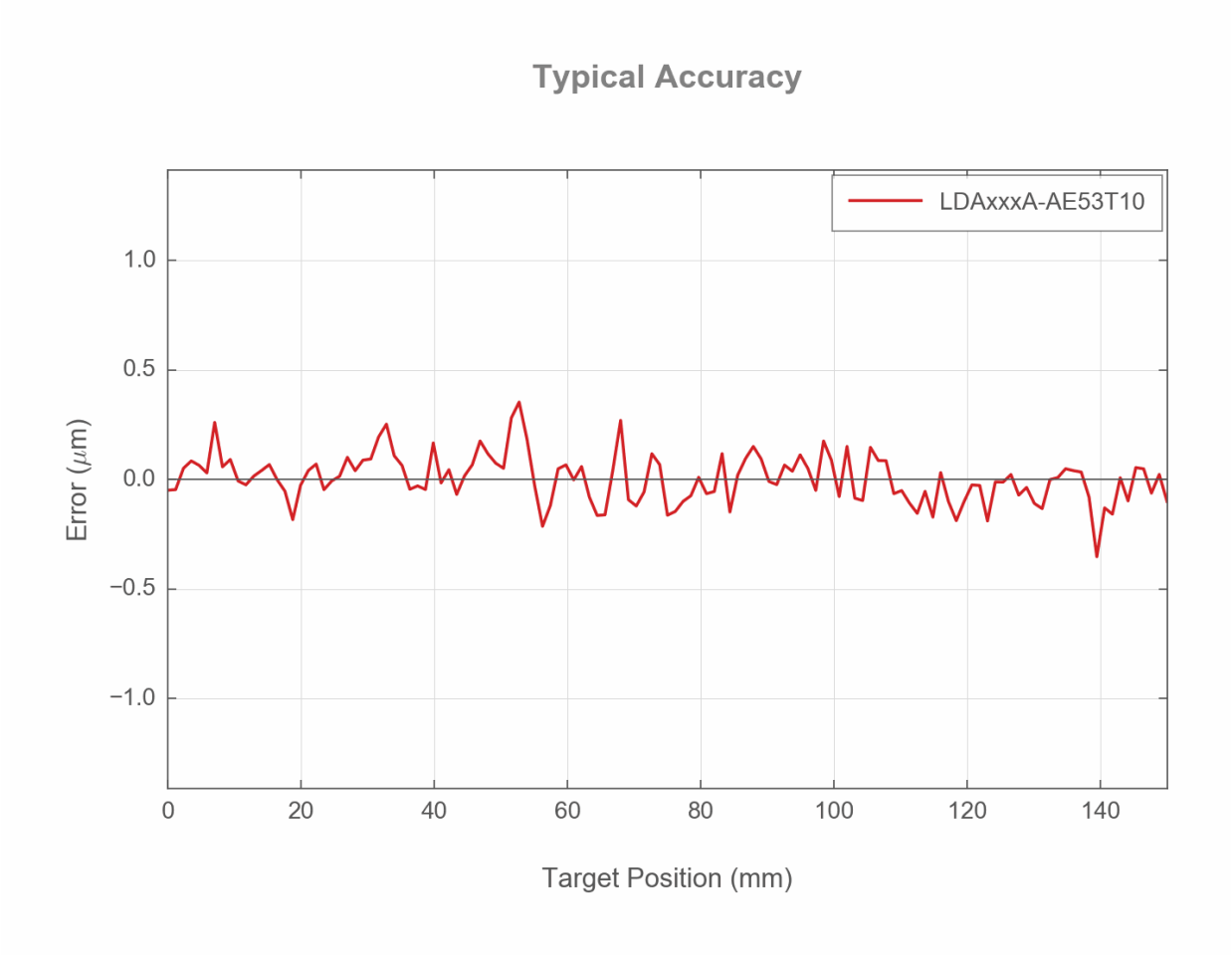
Part Number	Stiffness (Yaw)	Maximum Acceleration	Moving Mass
LDA025A-AE53T10A	400 N·m/°	78.5 m/s2 (8 g)	0.29 kg (0.638 lbs)
LDA075A-AE53T10A	900 N·m/°	44.1 m/s2 (4.5 g)	0.43 kg (0.946 lbs)
LDA150A-AE53T10A	1750 N·m/°	24.5 m/s2 (2.5 g)	0.67 kg (1.474 lbs)

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LDA-AE Series Charts

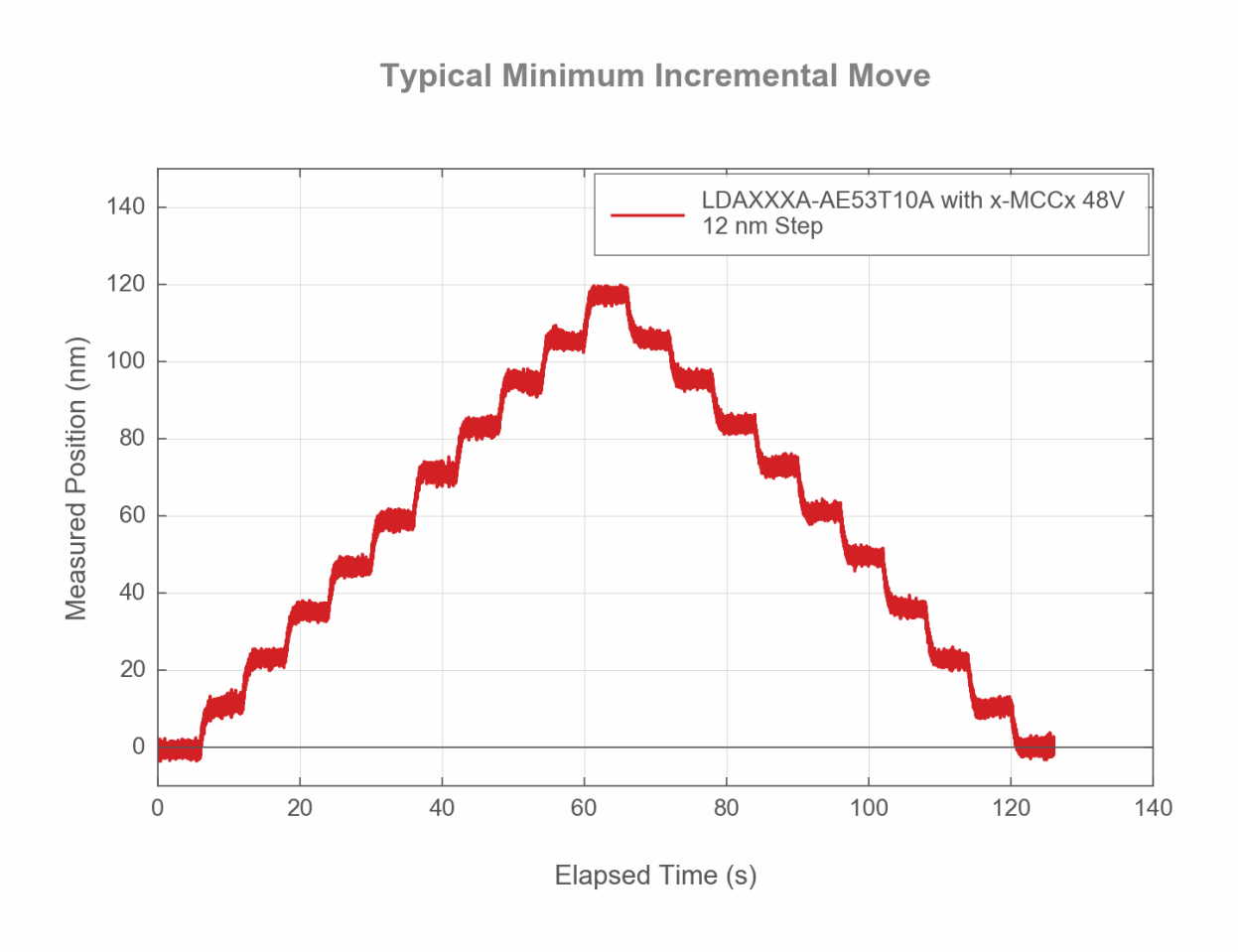
LDAxxxA AE53T10 ACCURACY



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LDAxxxA AE53 MIM



Velocity Stability And Following Error



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X-LDA-AEZ Series Datasheet



- 20 mm or 25 mm travel
- Passive, user adjustable magnetic counterbalance for payloads up to 16 N
- High repeatability (200 nm) and accuracy (1.5 µm), with 20 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Up to 0.7 m/s speed and up to 2.5 g acceleration
- Non-contact ironless linear motor for high dynamic performance & reliability
- Built-in controller; daisy-chains with other Zaber products
- Digital IO for interfacing with external hardware

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X-LDA-AEZ Series Overview

Zaber's X-LDA-AEZ Series devices are computer-controlled, motorized stages delivering the high precision, reliability, and speed of X-LDA-AE linear motor stages in a package for vertical applications. A passive magnetic counterbalance compensates for payloads up to 16N, preventing unwanted motion during power loss. The counterbalance's force can be finely adjusted in seconds with a single screw.

These stages are stand-alone units requiring only a standard 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-LDA-AEZ Series is designed to be 'plug and play' and very easy to set up and operate. X-LDA-AEZ devices also include a digital input and two digital outputs 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/vertical-stages/X-LDA-AEZ

X-LDA-AEZ Series Part Numbering & Options

X-LDA 020 A - AE53 ZJ2 D12

Travel
020 — 20 mm
025 — 25 mm

Forcer Size
A — Smallest

Encoder Options
AE53 — Analog encoder, measure down to 1 nm

Counterbalance Options
ZJ1 — Low force adjustable magnetic counterbalance
ZJ2 — Medium force adjustable magnetic counterbalance

I/O Options
D12 — One digital input, two digital outputs

X-LDA-AEZ Series Drawings

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

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X-LDA-AEZ Series Specifications

Overview

Specification	Value
Built-in Controller	Yes
Manual Control	Indexed knob with push switch
Axes of Motion	1
LED Indicators	Yes
Weight	1.29 kg (2.844 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	1.5 µm (0.000059 ")
Repeatability	<0.2 µm (<0.000008 ")
Minimum Incremental Move	20 nm
Straightness of Travel	<4 µm (<0.000157 ")
Pitch Error	0.006 ° (0.105 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

Load Performance

Specification	Value
Peak Thrust	16 N (3.6 lb)
Maximum Continuous Thrust	6 N (1.3 lb)
Maximum Moment (Pitch)	5 N·m (3.7 lb·ft)

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Maximum Moment (Roll)	5 N·m (3.69 lb·ft)
Maximum Moment (Yaw)	5 N·m (3.69 lb·ft)
Stiffness (Pitch)	500 N·m/°
Stiffness (Roll)	500 N·m/°
Stiffness (Yaw)	400 N·m/°

Speed

Specification	Value
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s

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 Track Linear Motor (3 phase)

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

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Maximum Current Draw	3000 mA

Analog & Digital I/O

Specification	Value
Digital Input	1
Digital Output	2

Mechanical

Specification	Value
Counterbalance Type	Adjustable Magnetic
Guide Type	Crossed-Roller Bearing
Mounting Interface	M6 threaded holes
Moving Mass	0.43 kg (0.946 lbs)

Environmental & Compliance

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

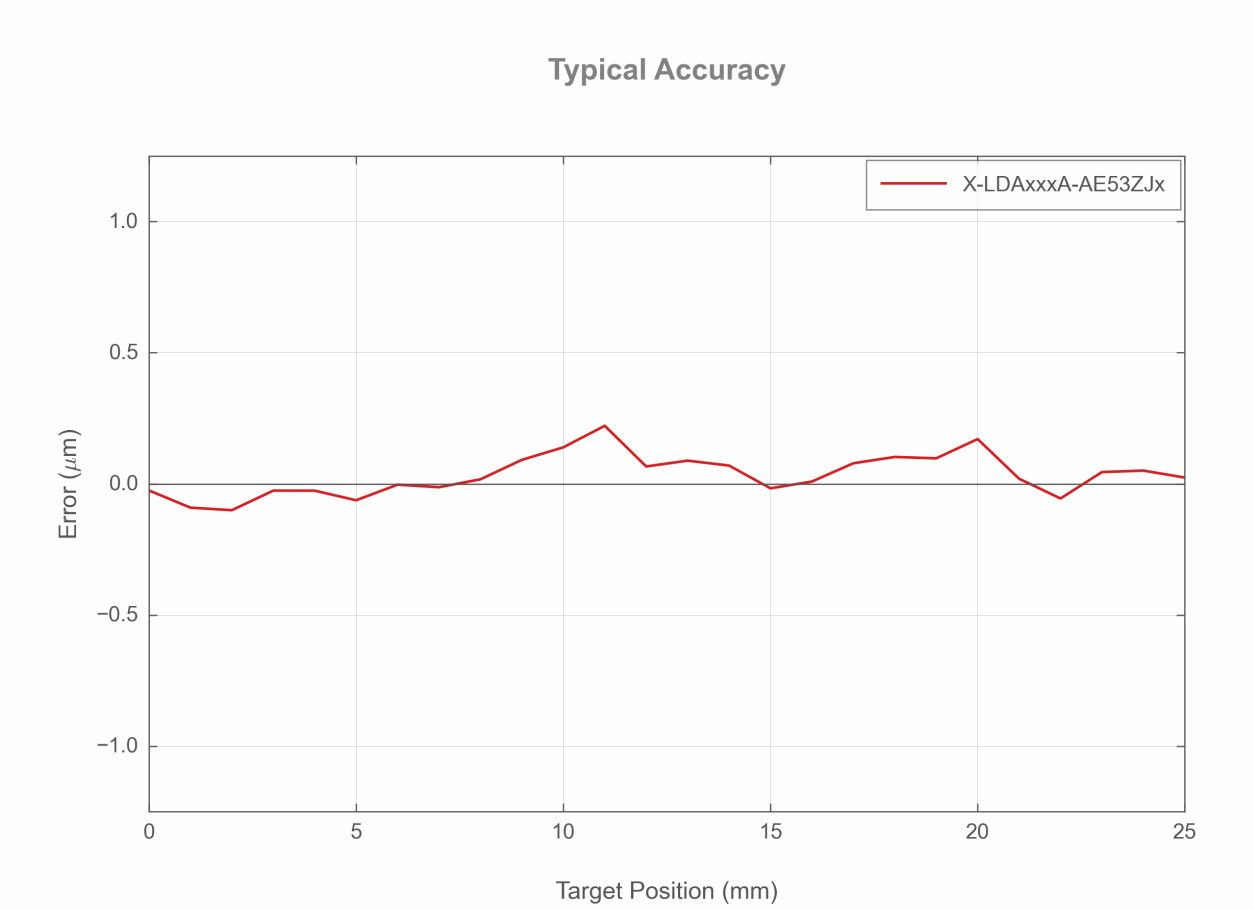
Part Number	Travel Range	Counterbalance Payload Range	Maximum Acceleration	Maximum Speed
X-LDA020A-AE53ZJ2D12	20 mm (0.787 ")	8-16 N	10 m/s2 (1.02 g)	400 mm/s (15.748 "/s)
X-LDA025A-AE53ZJ1D12	25 mm (0.984 ")	0-7 N	25 m/s2 (2.55 g)	700 mm/s (27.559 "/s)

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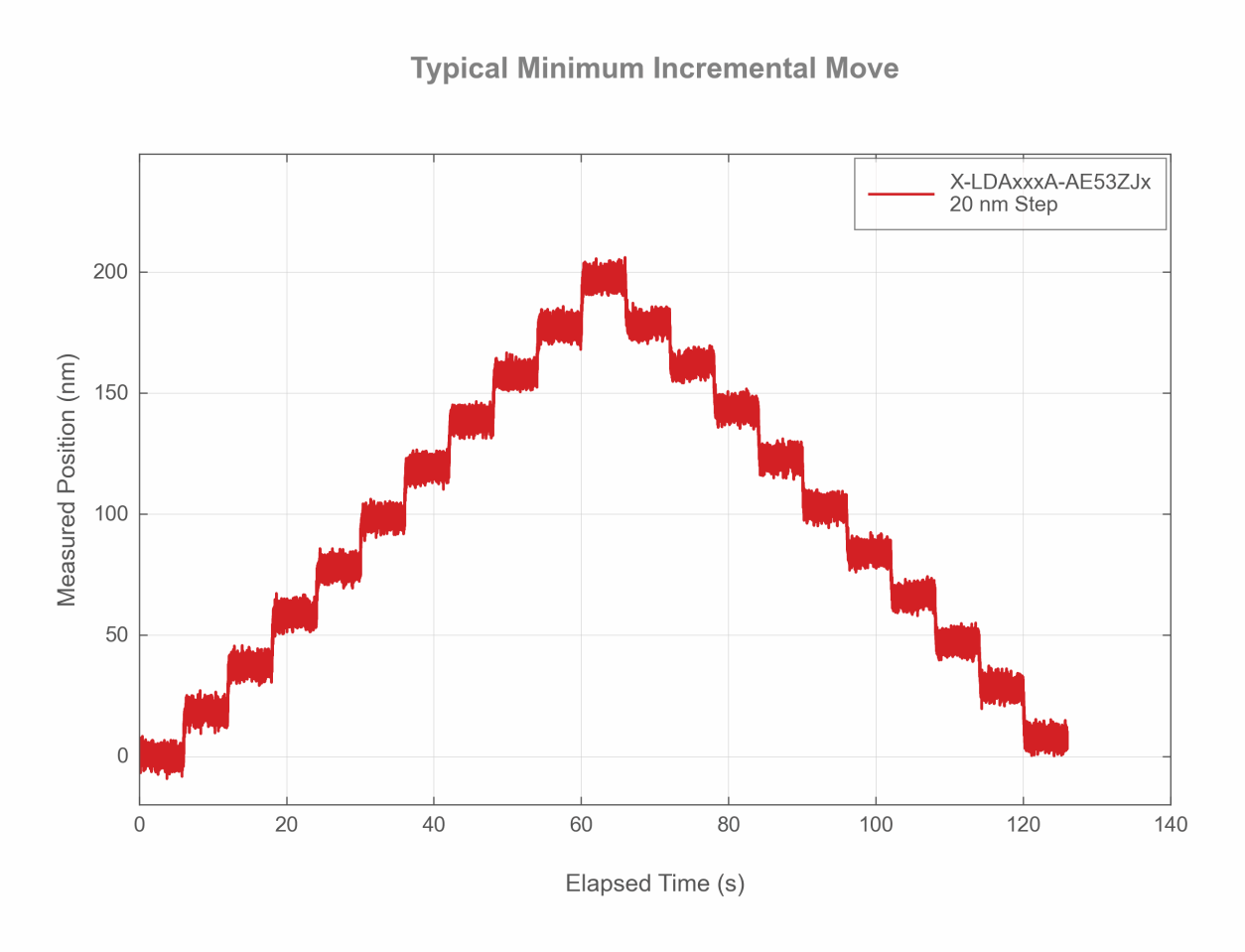
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X-LDA-AEZ Series Charts

Accuracy



MIM



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LDA-AEZ Series Datasheet



- 20 mm or 25 mm travel
- Passive, user adjustable magnetic counterbalance for payloads up to 16 N
- High repeatability (200 nm) and accuracy (1.5 µm), with 12 nm minimum incremental move
- Direct position measurement from 1 nm resolution linear encoder
- Up to 0.7 m/s speed and up to 2.5 g acceleration
- Non-contact ironless linear motor for 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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LDA-AEZ Series Overview

Zaber's LDA-AEZ Series devices are motorized stages delivering the high speed, precision, and reliability of LDA-AE linear motor stages in a package for vertical applications. A passive magnetic counterbalance compensates for payloads up to 16N, preventing unwanted motion during power loss. The counterbalance's force can be finely adjusted in seconds with a single screw.

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

For more information visit: https://www.zaber.com/products/vertical-stages/LDA-AEZ

LDA-AEZ Series Part Numbering & Options

LDA 020 A - AE53 ZJ2 T10A

Travel
020 — 20 mm
025 — 25 mm

Forcer Size
A — Smallest

Encoder Options
AE53 — Analog encoder, measure down to 1 nm

Counterbalance Options
ZJ1 — Low force adjustable magnetic counterbalance
ZJ2 — Medium force adjustable magnetic counterbalance

Connector
T10A — D-sub 26 panel mount connector with Auto Detect

LDA-AEZ Series Drawings

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

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LDA-AEZ Series Specifications

Overview

Specification	Value
Built-in Controller	No
Recommended Controller	MCC (48 V) Recommended
AutoDetect	Yes
Axes of Motion	1
Weight	1.26 kg (2.778 lb)

Positioning Performance

Specification	Value
Accuracy (unidirectional)	1.5 µm (0.000059 ")
Repeatability	<0.2 µm (<0.000008 ")
Minimum Incremental Move	12 nm
Straightness of Travel	<4 µm (<0.000157 ")
Pitch Error	0.006 ° (0.105 mrad)
Roll Error	0.005 ° (0.087 mrad)
Yaw Error	0.005 ° (0.087 mrad)

Load Performance

Specification	Value
Peak Thrust	16 N (3.6 lb)
Maximum Continuous Thrust	6 N (1.3 lb)
Maximum Moment (Pitch)	5 N·m (3.7 lb·ft)

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Maximum Moment (Roll)	5 N·m (3.69 lb·ft)
Maximum Moment (Yaw)	5 N·m (3.69 lb·ft)
Stiffness (Pitch)	500 N·m/°
Stiffness (Roll)	500 N·m/°
Stiffness (Yaw)	400 N·m/°

Speed

Specification	Value
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s

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 Track Linear Motor (3 phase)
Motor Rated Current	1800 mA
Motor Winding Resistance	2.3 ohms line-to-line
Motor Winding Inductance	0.09 mH line-to-line
Motor Connection	D-sub 26
Force Constant	3.7 N/A (0.8 lbs/A)

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Vancouver, BC

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Mechanical

Specification	Value
Counterbalance Type	Adjustable Magnetic
Guide Type	Crossed-Roller Bearing
Mounting Interface	M6 threaded holes

Environmental & Compliance

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

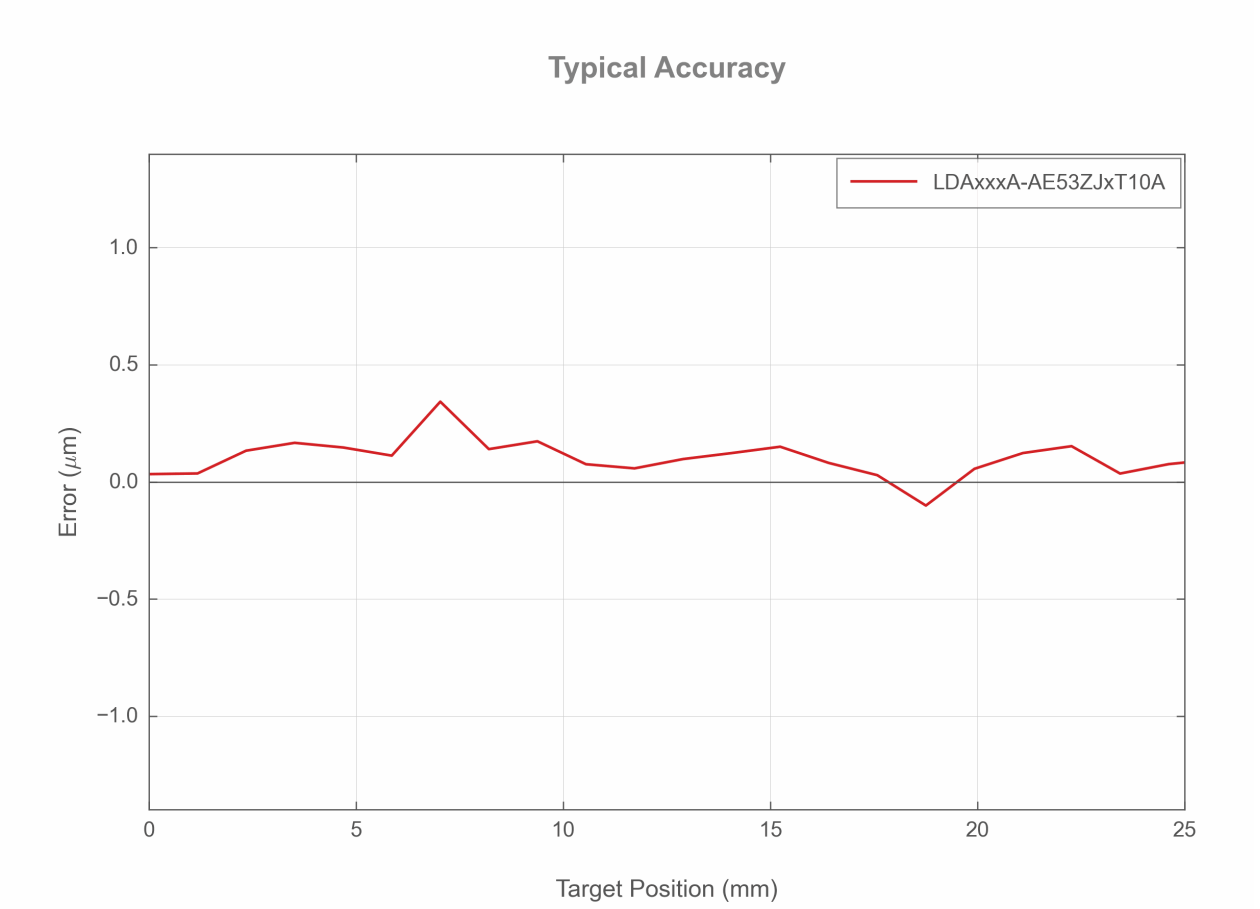
Part Number	Travel Range	Counterbalance Payload Range	Maximum Acceleration	Maximum Speed
LDA020A-AE53ZJ2T10A	20 mm (0.787 ")	8-16 N	10 m/s2 (1.02 g)	400 mm/s (15.748 "/s)
LDA025A-AE53ZJ1T10A	25 mm (0.984 ")	0-7 N	25 m/s2 (2.55 g)	700 mm/s (27.559 "/s)

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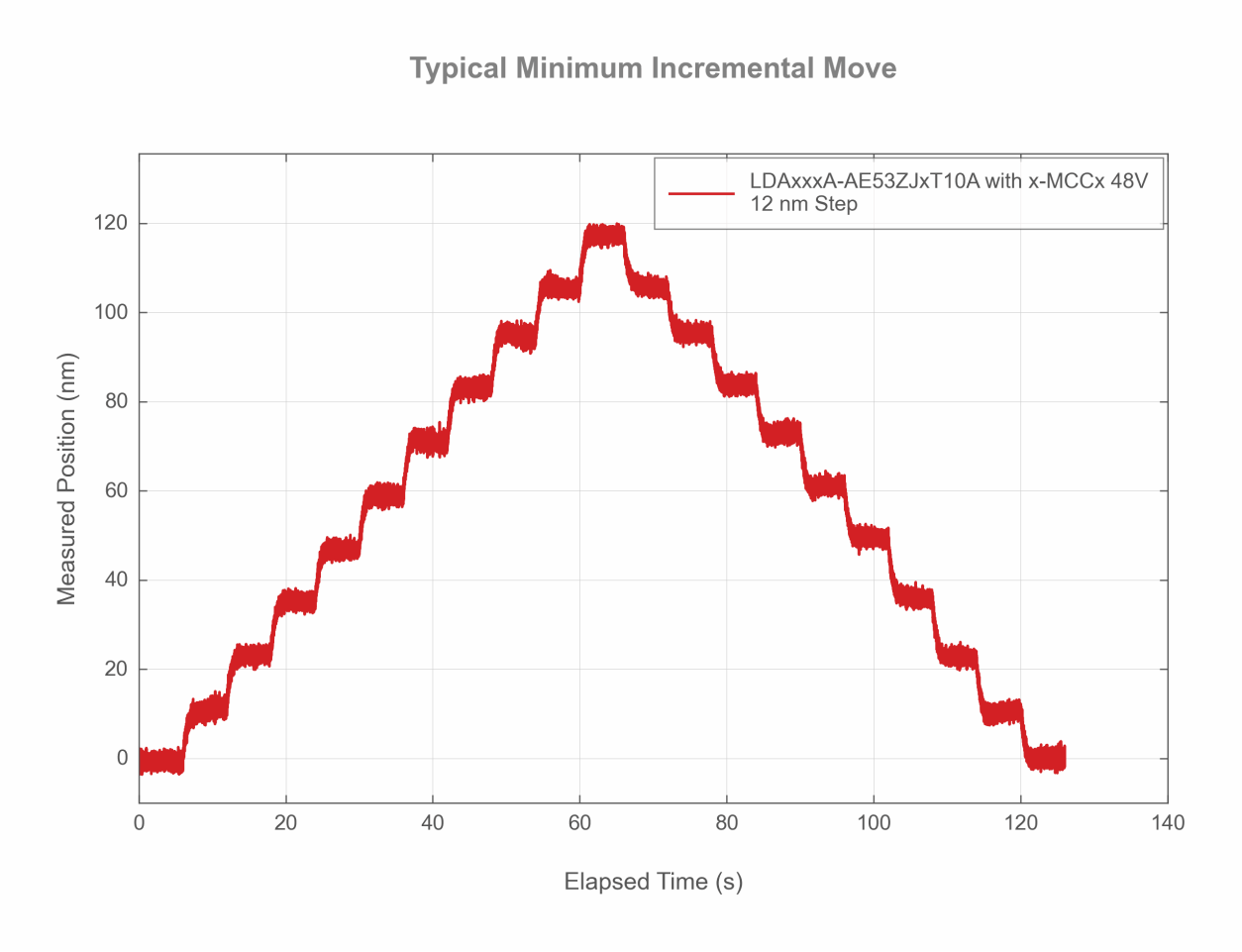
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LDA-AEZ Series Charts

LDAxxxC AE53ZJxT10A Accuracy



LDAxxxA AE53ZJxT10A MIM



Contact

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