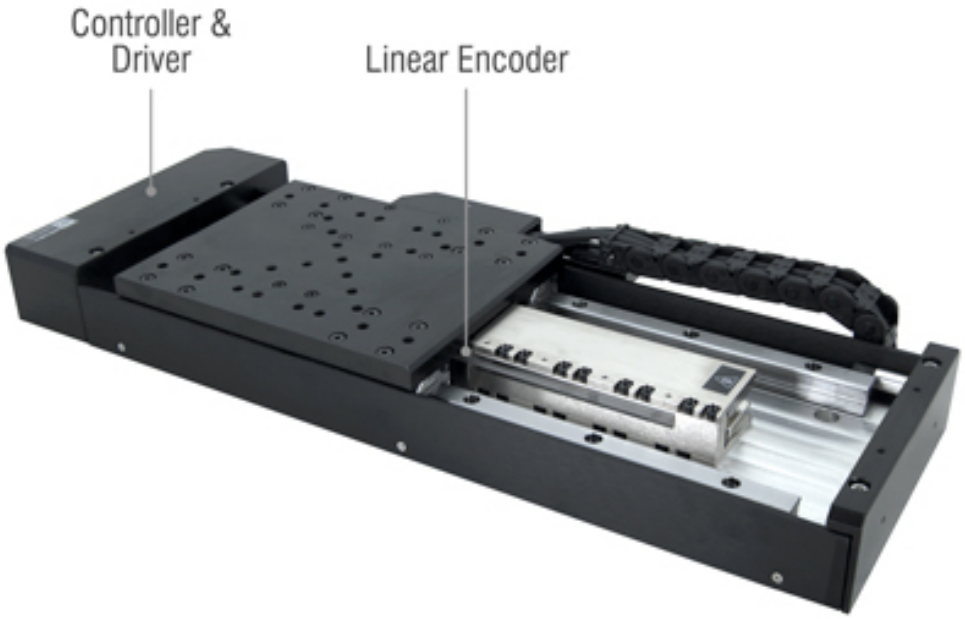
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X-LDQ-AE Series Datasheet



- 75, 150, 300, 450, 600 and 1000 mm travel
- Up to 1.5 m/s speed and up to 2 g acceleration
- Up to 2.5 µm accuracy over 1000 mm travel
- Minimum incremental move of 50 nm
- Zero backlash
- One digital input and two digital outputs
- Integrated linear encoder provides high accuracy closed loop servo positioning
- Built-in controller; daisy-chains with other Zaber products
- Technical Article - Linear Motors: Overview and Selection Process

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X-LDQ-AE Series Overview

Zaber's X-LDQ-AE Series devices are computer-controlled, motorized linear motor stages with high precision and speed capabilities. They are stand-alone units requiring only a standard 48 V power supply. The built-in controller and linear encoder allows pre-tuned closed-loop servo positioning with adjustable tuning parameters. 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. The X-LDQ-AE's innovative design allows speeds up to 1.5 m/s and minimum incremental move of 50 nm. Like all of Zaber's products, the X-LDQ-AE Series is designed to be 'plug and play' and very easy to set up and operate. X-LDQ-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-LDQ-AE

X-LDQ-AE Series Part Numbering & Options

X-LDQ 0075 C - AE53 D12

Travel
- **0075** — 75 mm
- **0150** — 150 mm
- **...**
- **0600** — 600 mm
- **1000** — 1000 mm

Forcer Size
- **C** — Medium

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

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

X-LDQ-AE Series Drawings

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

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X-LDQ-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
Accuracy (unidirectional)	2.5 µm (0.000098 ")
Repeatability	<0.3 µm (<0.000012 ")
Minimum Incremental Move	50 nm

Load Performance

Specification	Value
Peak Thrust	40 N (9 lb)
Maximum Continuous Thrust	35 N (7.8 lb)
Maximum Centered Load	200 N (44.9 lb)
Maximum Moment (Pitch)	30 N·m (22.1 lb·ft)
Maximum Moment (Roll)	30 N·m (22.14 lb·ft)
Maximum Moment (Yaw)	30 N·m (22.14 lb·ft)
Stiffness (Pitch)	8000 N·m/°
Stiffness (Roll)	3800 N·m/°
Stiffness (Yaw)	4000 N·m/°

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Speed

Specification	Value
Maximum Acceleration	39.24 m/s2 (4 g)
Maximum Speed	1500 mm/s (59.055 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Velocity Stability	± 0.54% at 100 mm/s with a 5 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 Coil Linear Motor (3 phase)
Force Constant	15.8 N/A (3.5 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	24-48 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	Recirculating Ball Linear Guide
Mounting Interface	M6 threaded holes
Moving Mass	1.5 kg (3.3 lbs)

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
X-LDQ0075C-AE53D12	75 mm (2.953 ")	6.4 kg (14.11 lb)	<20 µm (<0.000787 ")	<6 µm (<0.000236 ")
X-LDQ0150C-AE53D12	150 mm (5.905 ")	7.3 kg (16.094 lb)	<25 µm (<0.000984 ")	<12 µm (<0.000472 ")
X-LDQ0300C-AE53D12	300 mm (11.811 ")	9.4 kg (20.723 lb)	<35 µm (<0.001378 ")	<25 µm (<0.000984 ")
X-LDQ0450C-AE53D12	450 mm (17.716 ")	10.9 kg (24.03 lb)	<40 µm (<0.001575 ")	<30 µm (<0.001181 ")
X-LDQ0600C-AE53D12	600 mm (23.622 ")	13.2 kg (29.101 lb)	<60 µm (<0.002362 ")	<50 µm (<0.001968 ")
X-LDQ1000C-AE53D12	1000 mm (39.37 ")	18.6 kg (41.006 lb)	<70 µm (<0.002756 ")	<70 µm (<0.002756 ")

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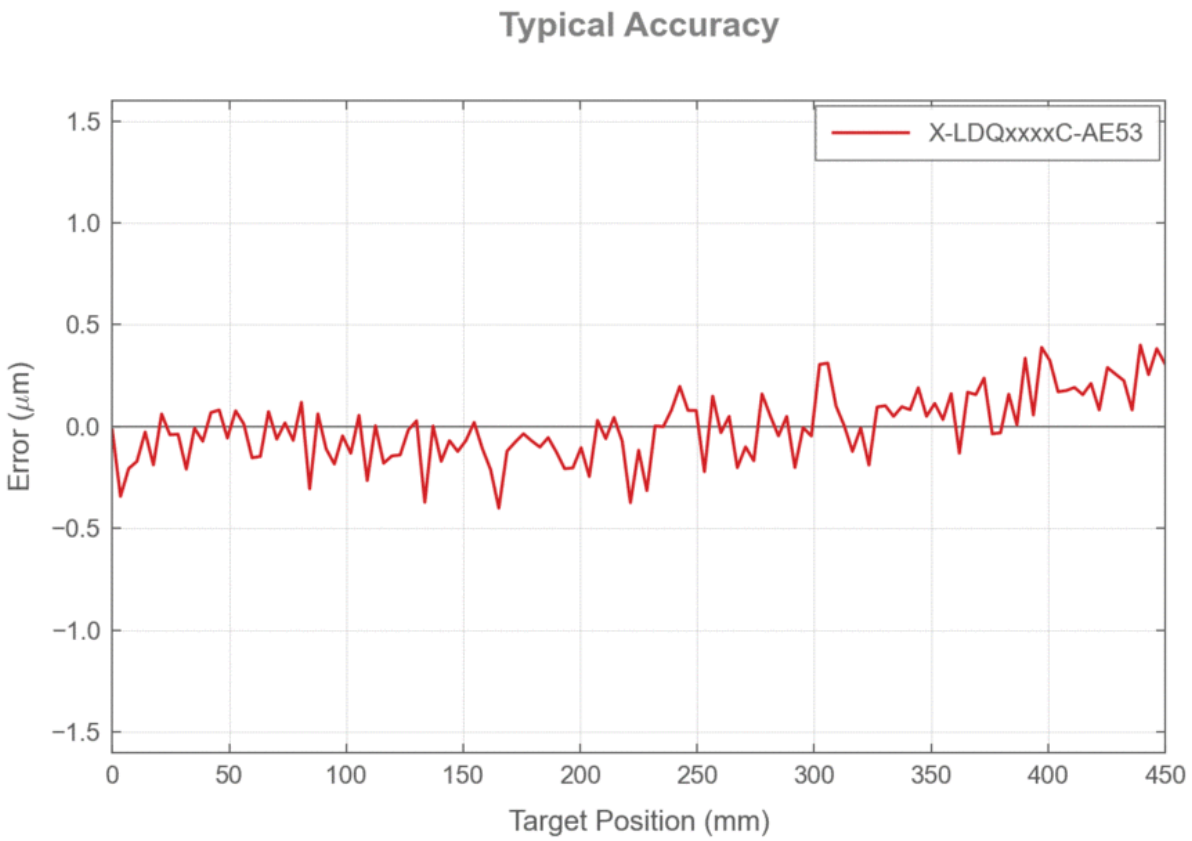
Part Number	Pitch Error	Roll Error	Yaw Error
X-LDQ0075C-AE53D12	0.008 ° (0.14 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LDQ0150C-AE53D12	0.015 ° (0.262 mrad)	0.008 ° (0.14 mrad)	0.025 ° (0.436 mrad)
X-LDQ0300C-AE53D12	0.03 ° (0.523 mrad)	0.015 ° (0.262 mrad)	0.03 ° (0.523 mrad)
X-LDQ0450C-AE53D12	0.05 ° (0.873 mrad)	0.02 ° (0.349 mrad)	0.035 ° (0.611 mrad)
X-LDQ0600C-AE53D12	0.05 ° (0.873 mrad)	0.04 ° (0.698 mrad)	0.04 ° (0.698 mrad)
X-LDQ1000C-AE53D12	0.06 ° (1.047 mrad)	0.06 ° (1.047 mrad)	0.06 ° (1.047 mrad)

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X-LDQ-AE Series Charts

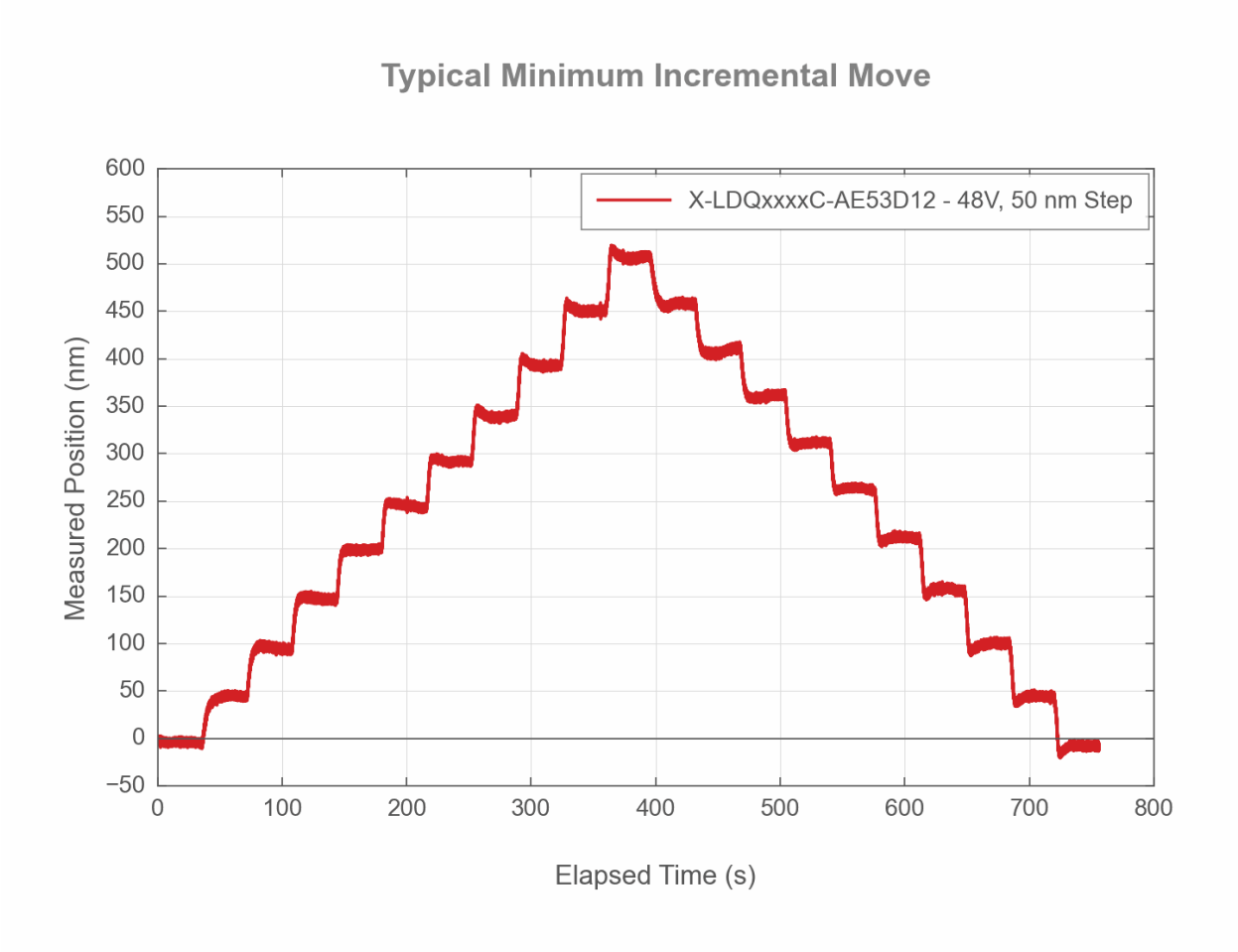
FULL TRAVEL ACCURACY



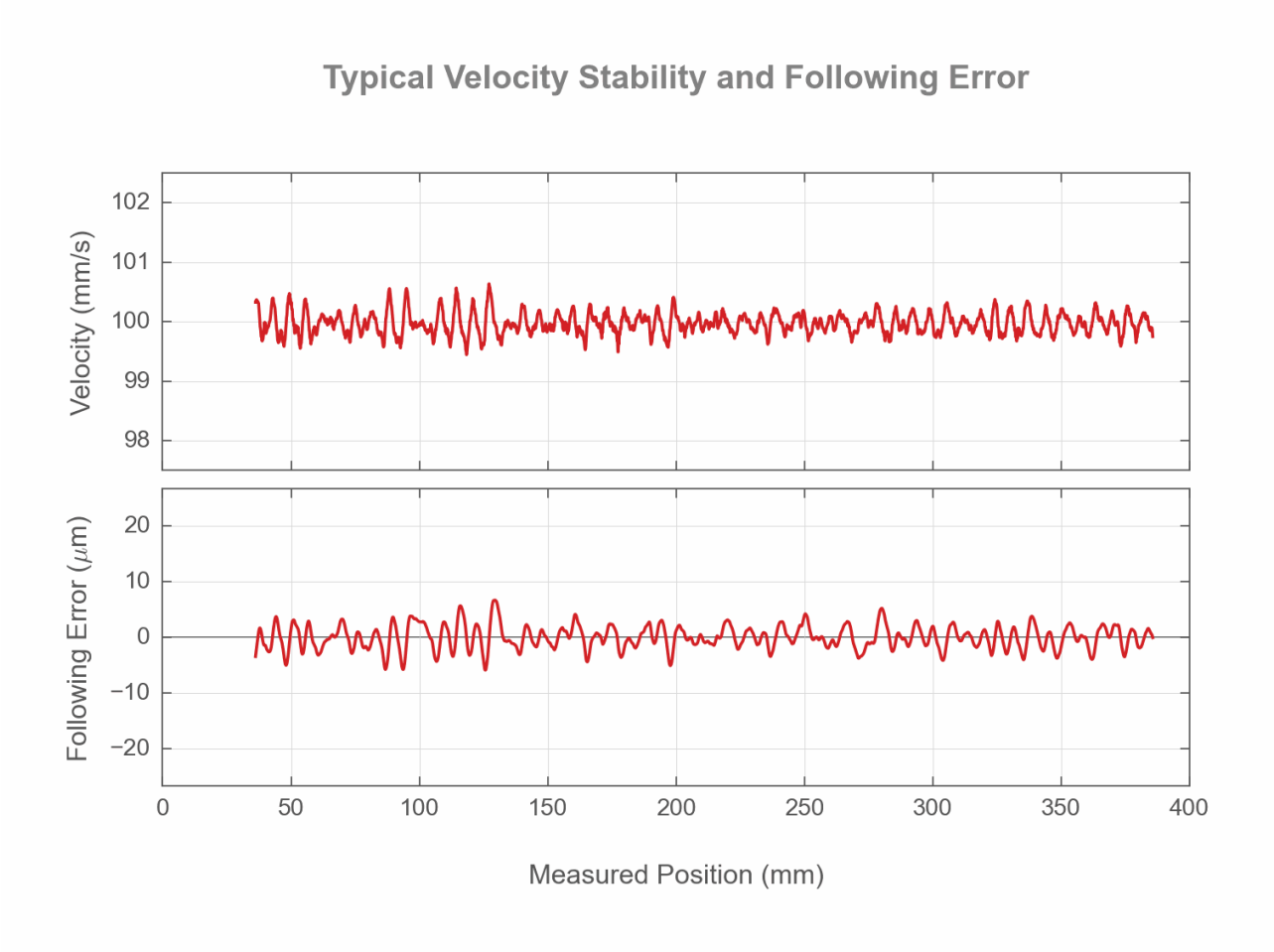
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MIM



Typical Velocity Stability And Following Error



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LDQ-AE Series Datasheet



- 75, 150, 300, 450, 600 and 1000 mm travel
- Up to 1.5 m/s speed, 35 N continuous thrust
- Minimum incremental move of 25 nm
- Integrated linear encoder provides high accuracy closed loop servo positioning
- Designed for use with MCC controllers for coordinated multi-axis motion
- Capable of providing peak thrust of 95 N when paired with MCC
- With AutoDetect, Zaber controllers automatically configure settings for the connected peripheral
- Technical Article - Linear Motors: Overview and Selection Process

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LDQ-AE Series Overview

Zaber's LDQ-AE Series devices are motorized linear motor stages with high precision and speed capabilities. The built-in linear encoder allows closed-loop servo positioning. The LDQ-AE's innovative design allows speeds up to 1.5 m/s and a minimum incremental move of 25 nm.

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 LDQ-AE.

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

LDQ-AE Series Part Numbering & Options

LDQ 0075 C - AE53 T10A

Travel
0075 — 75 mm
0150 — 150 mm
...
0600 — 600 mm
1000 — 1000 mm

Forcer Size
C — Medium

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

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

LDQ-AE Series Drawings

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

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LDQ-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)	2.5 µm (0.000098 ")
Repeatability	<0.3 µm (<0.000012 ")
Minimum Incremental Move	25 nm

Load Performance

Specification	Value
Peak Thrust	95 N (21.3 lb)
Maximum Continuous Thrust	35 N (7.8 lb)
Maximum Centered Load	200 N (44.9 lb)
Maximum Moment (Pitch)	30 N·m (22.1 lb·ft)
Maximum Moment (Roll)	30 N·m (22.14 lb·ft)
Maximum Moment (Yaw)	30 N·m (22.14 lb·ft)
Stiffness (Pitch)	8000 N·m/°
Stiffness (Roll)	3800 N·m/°
Stiffness (Yaw)	4000 N·m/°

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Speed

Specification	Value
Maximum Acceleration	39.24 m/s2 (4 g)
Maximum Speed	1500 mm/s (59.055 "/s)
Minimum Speed	0.61 nm/s
Speed Resolution	0.61 nm/s
Typical Velocity Stability	± 0.54% at 100 mm/s with a 5 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 Coil Linear Motor (3 phase)
Motor Rated Current	2400 mA
Motor Winding Resistance	6.4 ohms line-to-line
Motor Winding Inductance	1.24 mH line-to-line
Force Constant	15.8 N/A (3.5 lbs/A)

Mechanical

Specification	Value
Guide Type	Recirculating Ball Linear Guide
Mounting Interface	M6 threaded holes
Moving Mass	1.5 kg (3.3 lbs)

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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
LDQ0075C-AE53T10A	75 mm (2.953 ")	6.37 kg (14.043 lb)	<20 µm (<0.000787 ")	<6 µm (<0.000236 ")
LDQ0150C-AE53T10A	150 mm (5.905 ")	7.27 kg (16.028 lb)	<25 µm (<0.000984 ")	<12 µm (<0.000472 ")
LDQ0300C-AE53T10A	300 mm (11.811 ")	9.37 kg (20.657 lb)	<35 µm (<0.001378 ")	<25 µm (<0.000984 ")
LDQ0450C-AE53T10A	450 mm (17.716 ")	10.87 kg (23.964 lb)	<40 µm (<0.001575 ")	<30 µm (<0.001181 ")
LDQ0600C-AE53T10A	600 mm (23.622 ")	13.2 kg (29.101 lb)	<60 µm (<0.002362 ")	<50 µm (<0.001968 ")
LDQ1000C-AE53T10A	1000 mm (39.37 ")	18.6 kg (41.006 lb)	<70 µm (<0.002756 ")	<70 µm (<0.002756 ")

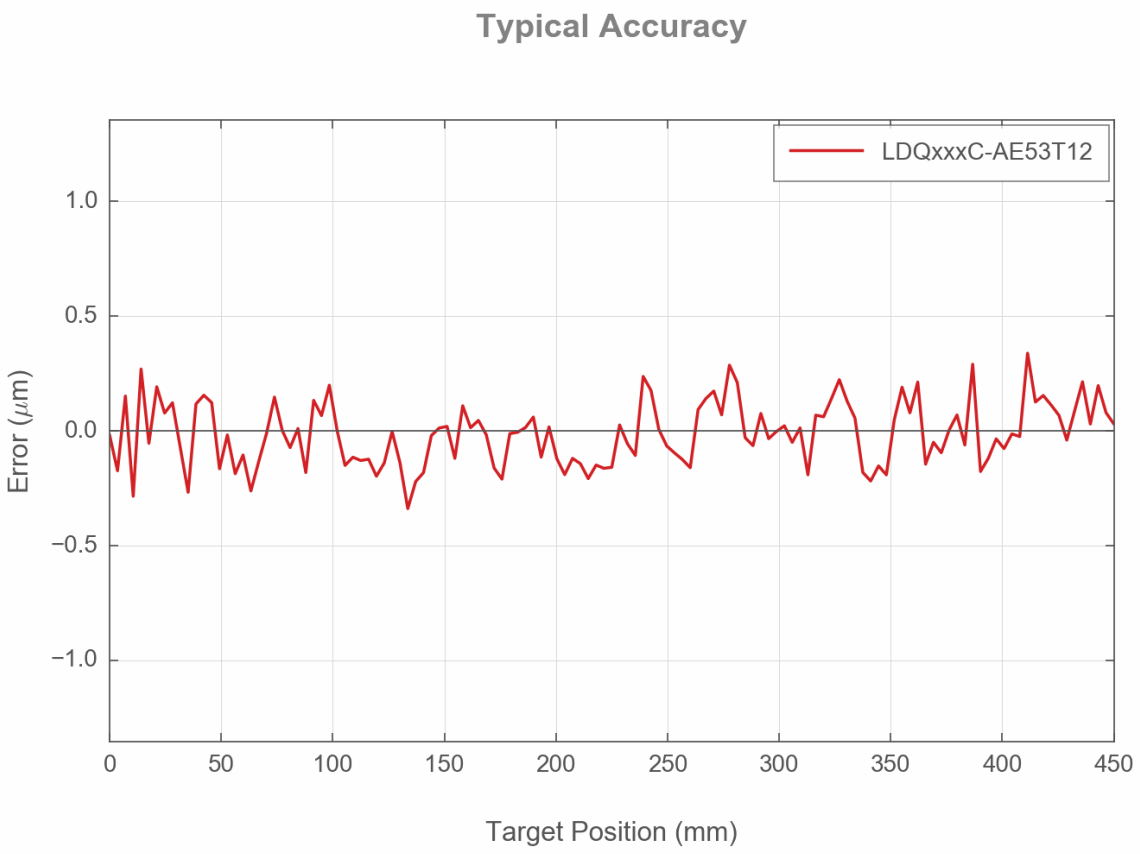
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LDQ0450C-AE53T10A	0.05 ° (0.873 mrad)	0.02 ° (0.349 mrad)	0.035 ° (0.611 mrad)
LDQ0600C-AE53T10A	0.05 ° (0.873 mrad)	0.04 ° (0.698 mrad)	0.04 ° (0.698 mrad)
LDQ1000C-AE53T10A	0.06 ° (1.047 mrad)	0.06 ° (1.047 mrad)	0.06 ° (1.047 mrad)

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LDQ-AE Series Charts

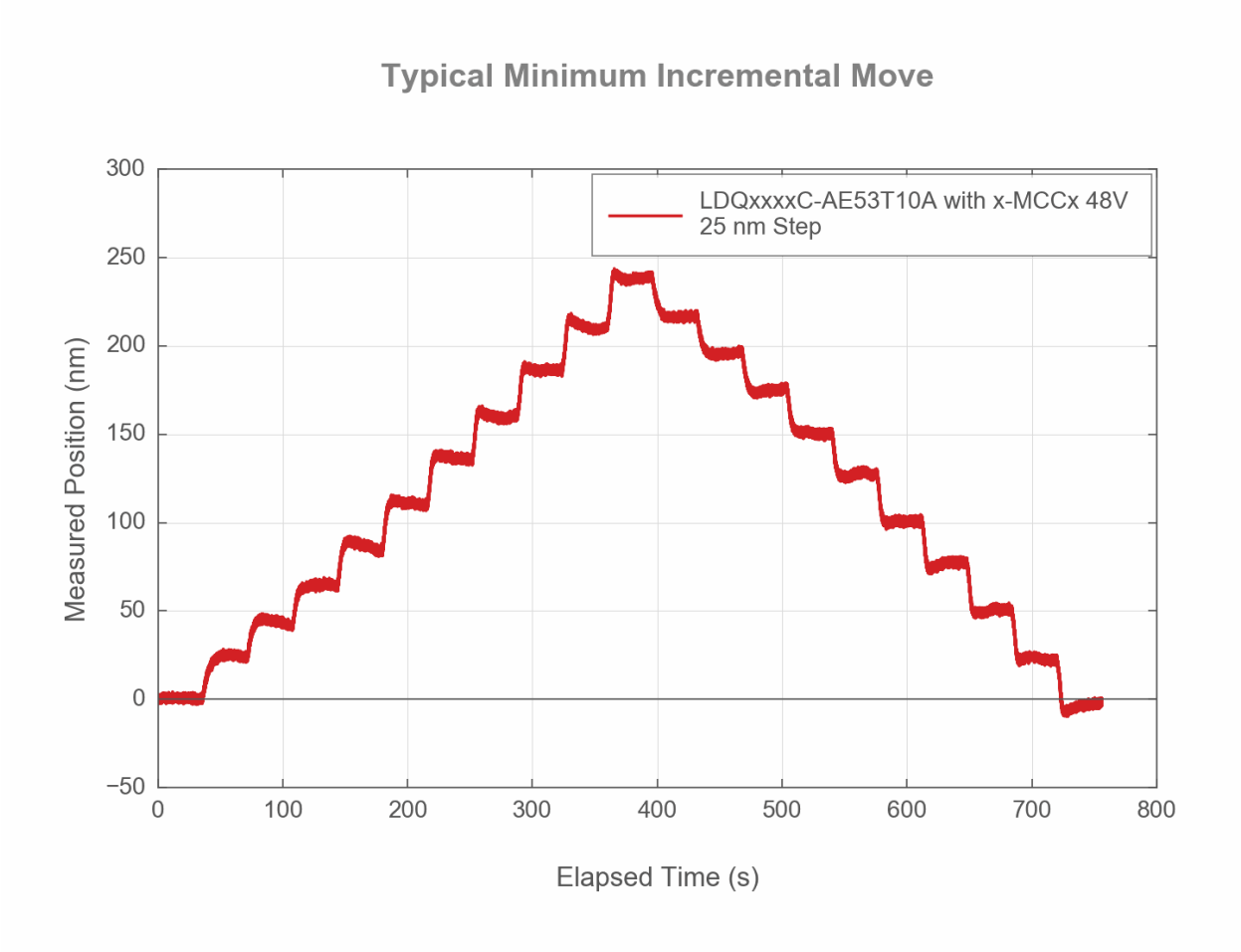
LDQxxxC AE53T12 ACCURACY



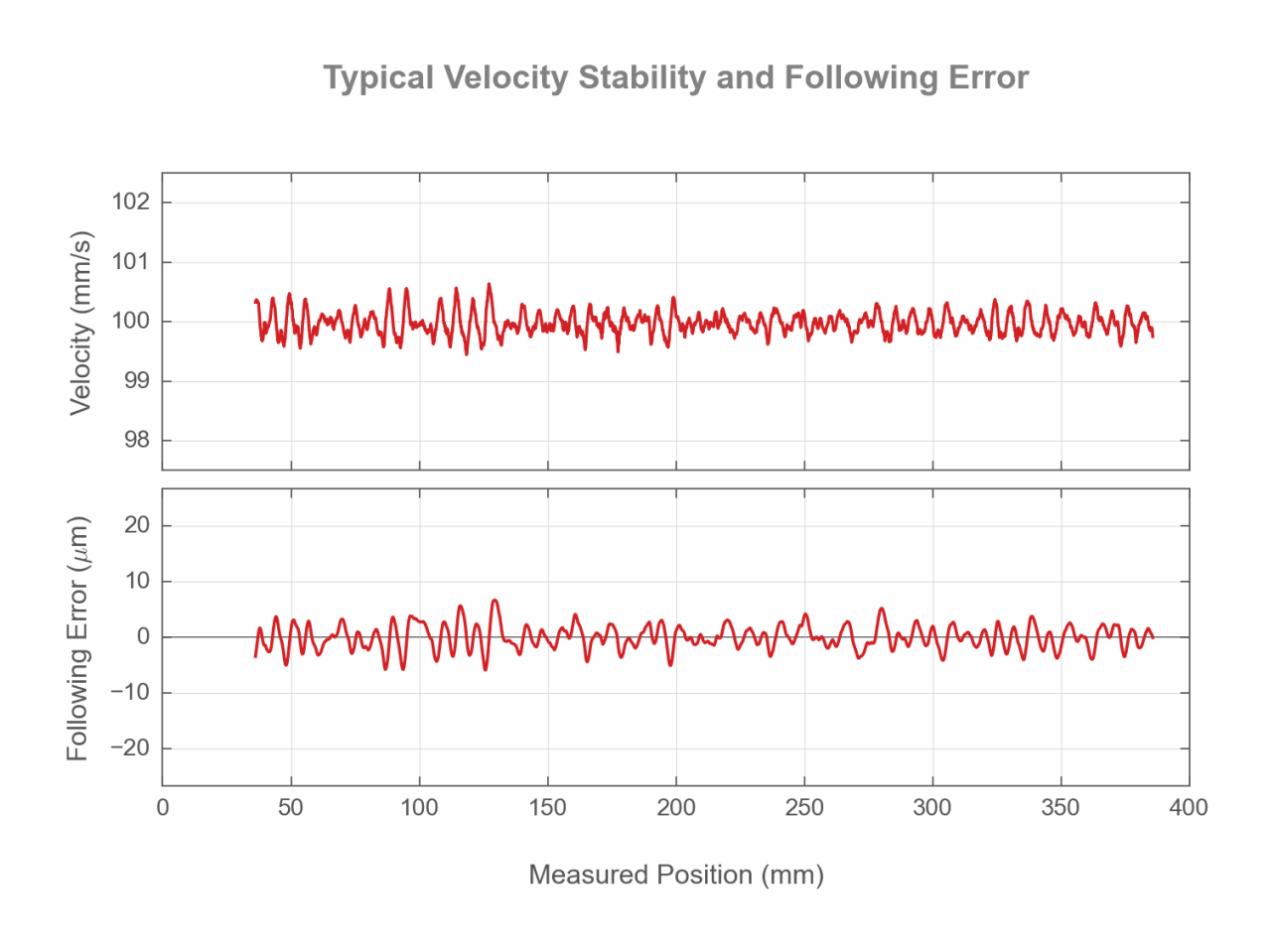
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LDQxxxxC AE53T10A MIM



Typical Velocity Stability And Following Error



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