newmark systems inc

NLS4 SERIES
LINEAR STAGE

The NLS4 have been designed for a variety of applications in research and other industrial areas requiring precision positioning such as in semiconductor processing, fiber optics manufacturing and biotech automation.

The design of the NLS4 series stages was optimized for maximum stability and performance with the use of FEA analysis and incorporates the best in materials and component selection.

For more reliability and durability, the ways and lead screws are protected with a strong machined cover and the encoder is mounted internally directly to the lead screw rather than being exposed to shock and contamination when mounted in the rear of the motor.

All NLS4 series stages are machined from 6061 aluminum alloy to provide a light yet stiff and stable linear stage.

The drive system utilizes a stainless steel ACME lead screw with internally lubricated plastic drive nut. The drive nut offers zero backlash operation that automatically adjusts for wear to insure zero backlash for the life of the stage.

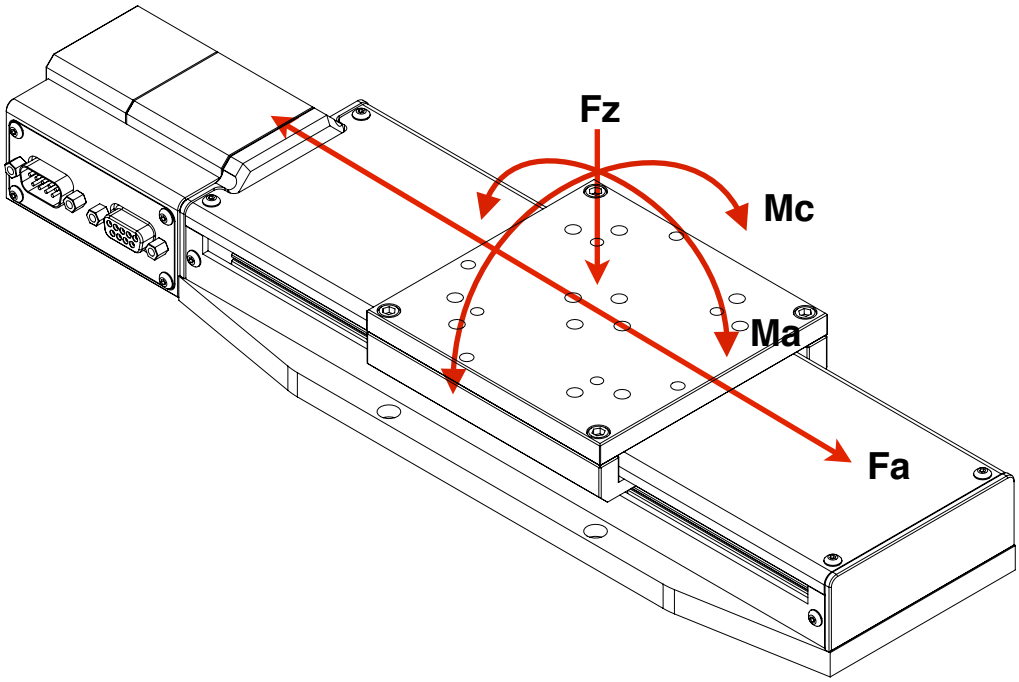
The use linear guide bearings provide a smooth motion with high load capacity and stiffness. Since the carriage is supported over the entire travel of the stage, a good cantilevered load capacity can be achieved.

Separate connectors for motor power and limit/encoder signals are provided for ease of operation. Integrated limit switches and a high torque size 17 stepper motor are supplied as standard items.

Specifications	
Travel Range	50 mm (2"), 100 mm (4"), 150 mm (6"), 200 mm (8"), 250 mm (10"), 300 mm (12"), 350 mm (14"), 400 mm (16"), 500 mm (20"), 600 mm (24")
Resolution	0.03 μm (1.5875 mm pitch lead screw) 0.13 μm (6.35 mm pitch lead screw)
Accuracy	0.0006 mm/mm
Max. Speed	12 mm/sec (1.5875 mm pitch lead screw) 50 mm/sec (6.35 mm pitch lead screw with stepper motor) 100 mm/sec (6.35 mm pitch lead screw with servo motor)
Unidirectional Repeatability	1 μm
Bidirectional Repeatability	10 μm
Pitch	± 12 arc-sec
Yaw	± 12 arc-sec
Flatness	± 5 μm
Max Load	22.6 kg (50 lbs)
Encoder	4000 CPR with index
Limit Switches	Mechanical, normally open
Lead Screw Pitch	1.5875 mm or 6.35 mm
Stage Weight	NLS4-2 = 3 lbs, NLS4-4 = 4.7 lbs, NLS4-6 = 5.3 lbs NLS4-8 = 5.7 lbs, NLS4-10 = 6.3 lbs, NLS4-12 = 6.9 lbs
Material	Aluminum
Finish	Black Anodize
Operating Temperature	0°C to 50°C

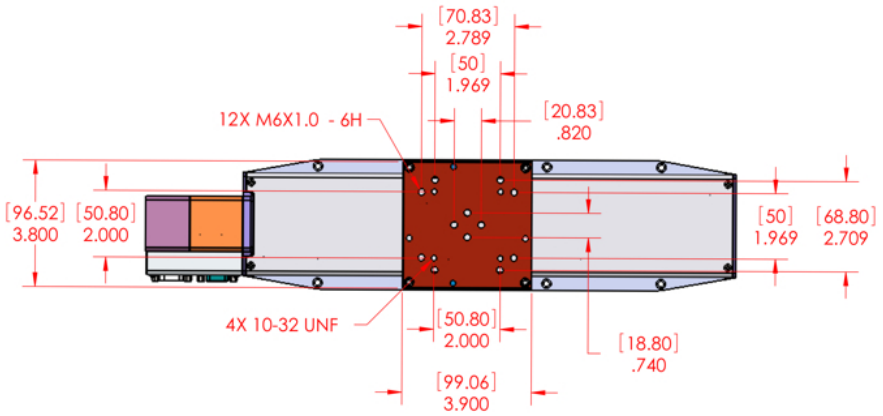
Load Characteristics

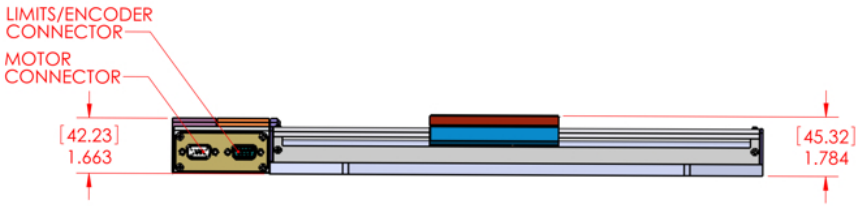
Axial Load Fa	11.3 kg (25 lbs)
Normal Load Fz	22.6 kg (50 lbs)
Moment Load Ma	20.3 Nm (15 lb-ft)
Moment Load Mc	20.3 Nm (15 lb-ft)

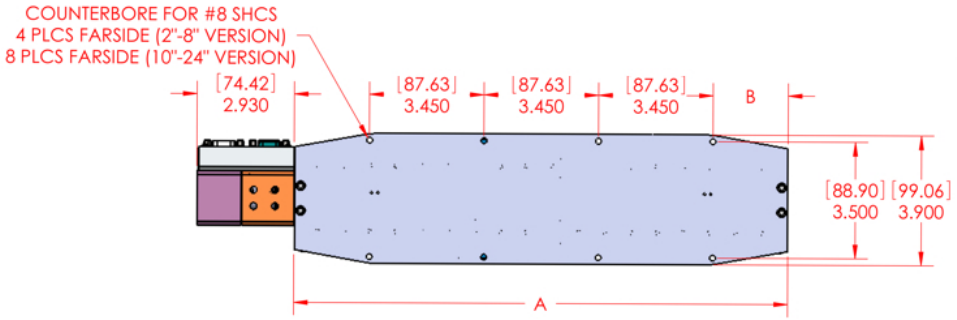


Dimensions

Stepper Motor Version



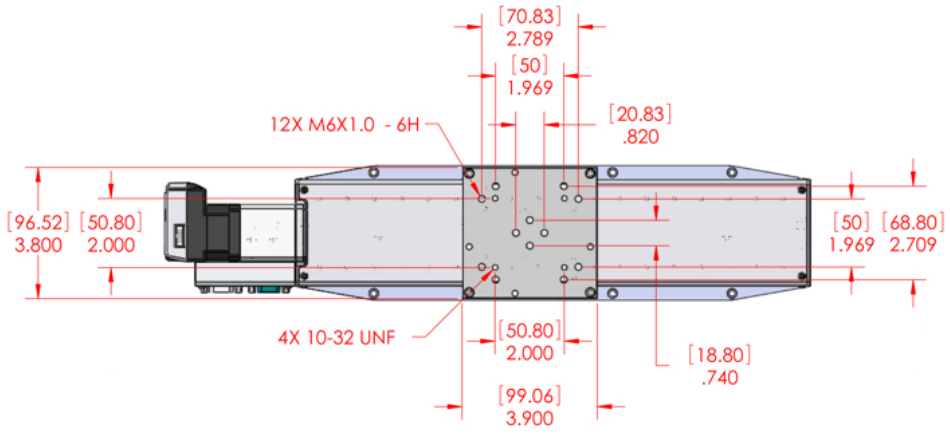


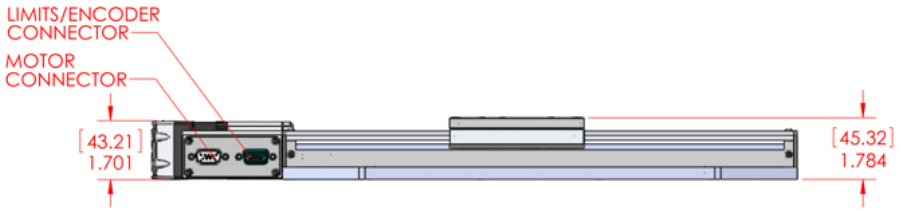


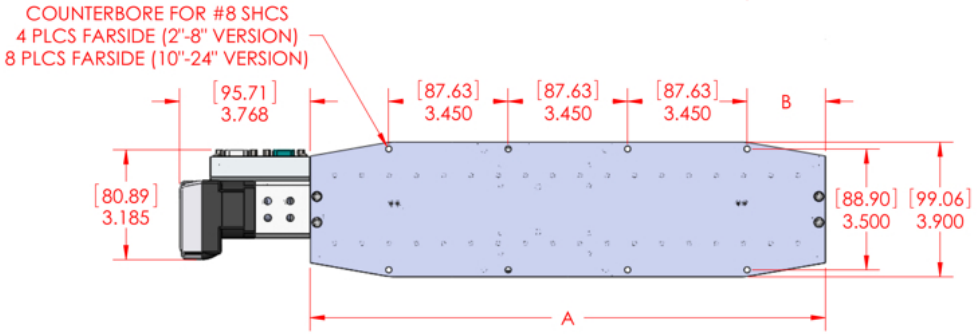
TRAVEL	DIM "A"	DIM "B"
2	[176] 6.950	[44.45] 1.750
4	[225.43] 8.875	[68.90] 2.713
6	[276.23] 10.875	[94.30] 3.713
8	[327.03] 12.875	[119.70] 4.713
10	[377.83] 14.875	[57.47] 2.263
12	[428.63] 16.875	[82.87] 3.263
14	[479.43] 18.875	[108.27] 4.263
16	[530.23] 20.875	[133.67] 5.263
20	[631.83] 24.875	[184.47] 7.263
24	[733.43] 28.875	[235.27] 9.263

Dimensions

MDrive Motor Version







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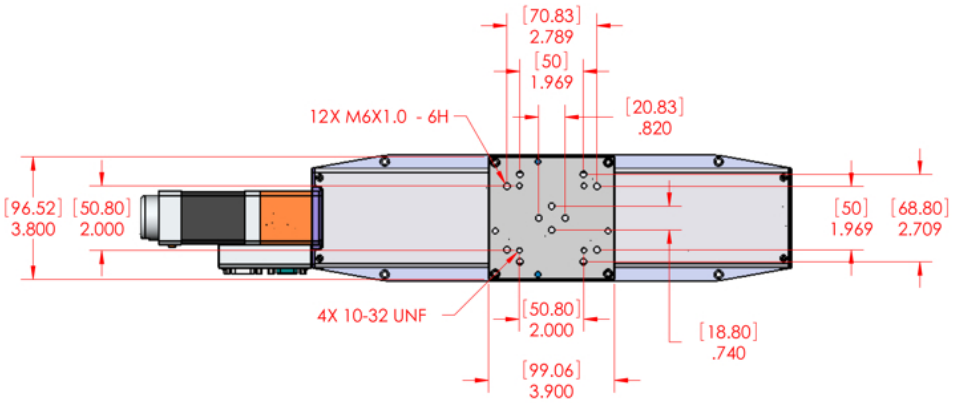
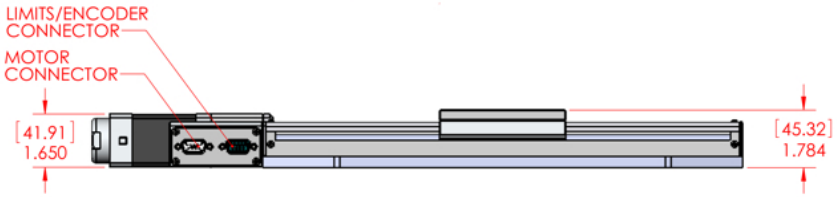
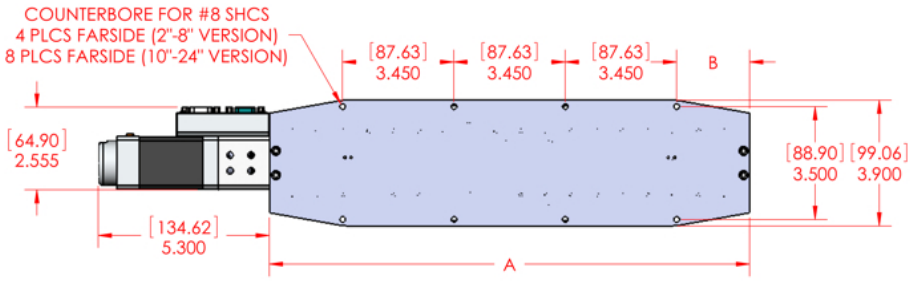
Dimensions

Servo Motor Version







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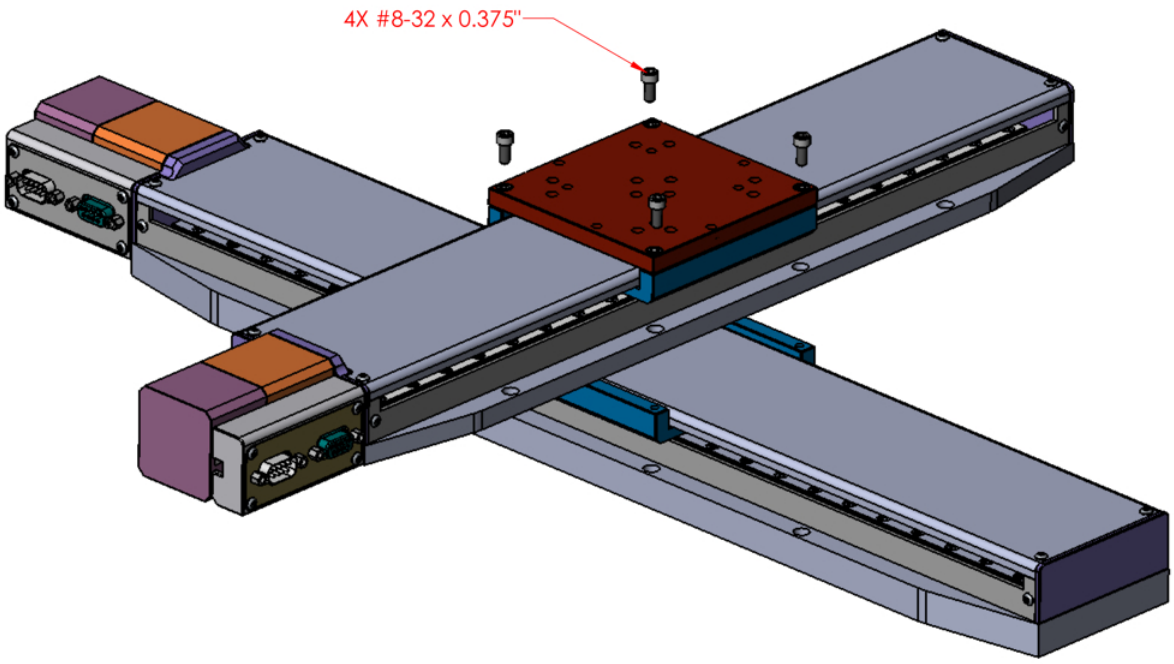
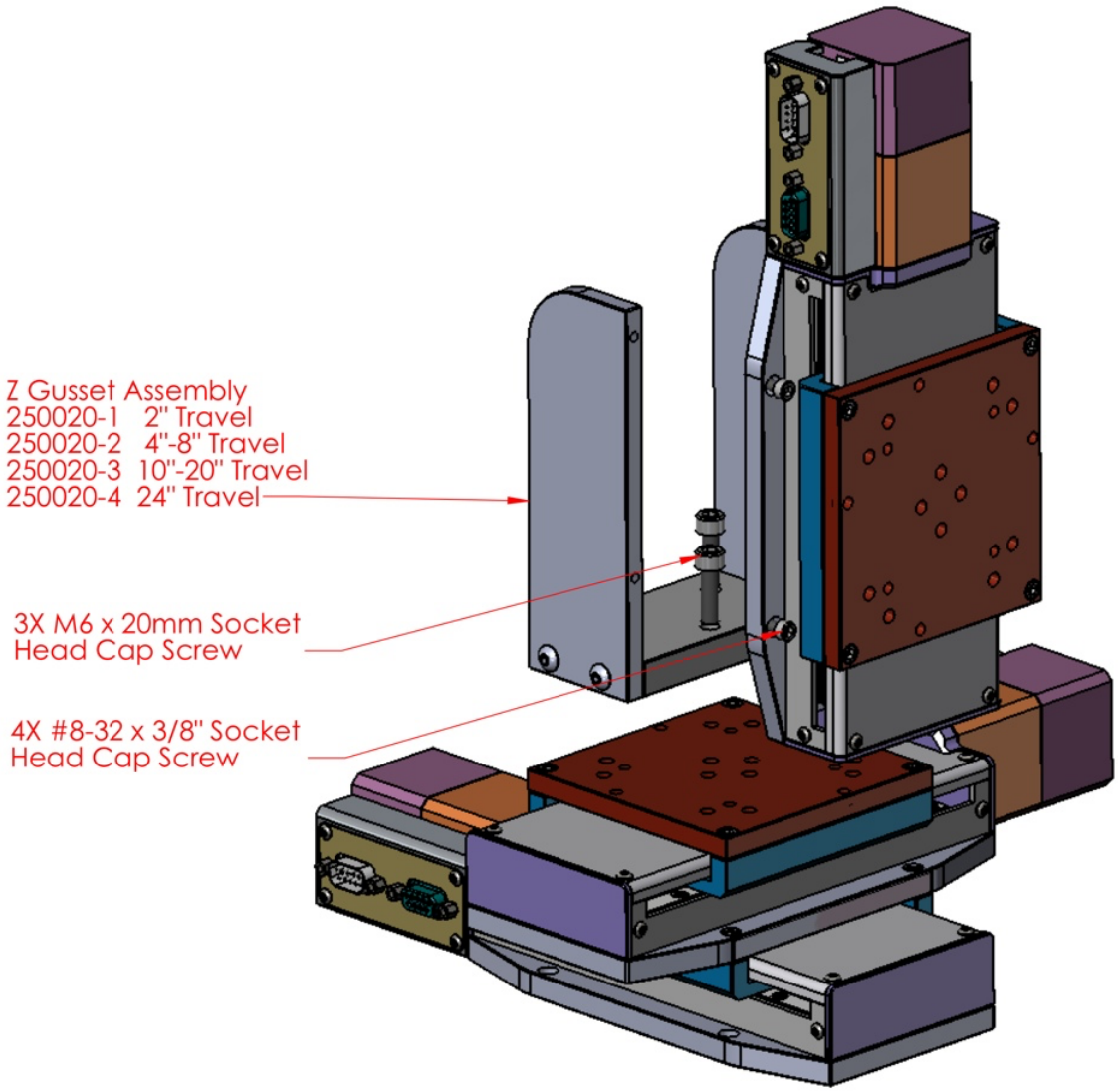
XY Configuration

To mount the NLS4 stages in XY, remove the top plate from the lower stage and bolt the upper stage to the carriage of the lower stage.



Z Configuration

The Z gussets assembly allows the NLS4 to be mounted in a vertical orientation.



Pin Assignment

Standard Stepper Motor Version

Motor Connector

DB-9 Male	Description
1.	Phase A
2.	Phase A’
3.	Phase B
4.	Phase B’
5.	Phase A Center
6.	Phase B Center

Motor Specifications

Step Size: 1.8°/step
Amps/Phase: 0.95
Resistance: 4.0 Ohm/Phase
Inductance: 3.1 mH/Phase

Signals Connector

DB-9 Female	Description
1.	+ Limit Switch
2.	- Limit Switch (motor side)
3.	Limit Switch Ground

Limit switch wired normally open

Signals Connector (Encoder Option)

HD-15 Female	Description
1.	+ Limit Switch
2.	- Limit Switch
3.	Limit Switch Ground
4.	Encoder Ground
5.	+5V Encoder Power
6.	Ch. A
7.	Ch. A-
8.	Ch. B
9.	Ch. B-
10.	Index +
11.	Index -

Limit switch wired normally open

Pin Assignment

Brushless Servo Motor Version

Motor

DB-9 Male	Description
1.	Phase A
2.	Phase B
3.	Phase C

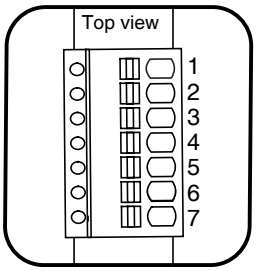
Signals

HD-15 Female	Description
1	Ch. A-
2	Ch. A+
3	Ch. B+
4	Ch. B-
5	Index +
6	Index -
7	Hall A
8	Hall B
9	Hall C
10	Ground
11	+5V
12	N.C.
13	Negative Limit
14	Positive Limit

Limit switch wired normally closed

Pin Assignment

MDrive Stepper Motor Version



7-Pin Pluggable Terminal

Power and I/O

7-Pin Terminal	Description
1	I/O 1
2	I/O 2
3	I/O 3
4	I/O 4
5	Analog Input
6	Power GND
7	+24V Motor Power

The forward limit switch is connected to I/O 1.
The reverse limit switch is connected to I/O 2.
Limit switches are wired normally closed.

RS-422 Communications

10-Pin IDC	Description
1	TX+
2	TX-
3	RX+
4	RX-
5	Aux-Logic
6	RX+
7	RX-
8	TX-
9	TX+
10	COMM GND

Connected to 7-Pin Terminal

DC Jack, 2.1mm	Description
Center	+24 VDC
Outside	Power Ground

Ordering Information

Part Number Configuration

NLS4-XX- X X

- XX — Travel Length
- X — Lead Pitch
- X — Motor Option

Travel Length

2 inch
4 inch
6 inch
8 inch
10 inch
12 inch
14 inch
16 inch
20 inch
24 inch

Lead Pitch

1 1.5875 mm Pitch
2 6.35 mm Pitch

Motor Options

1 Stepper Motor
2 Stepper Motor with Encoder
3 MDrive Motor with Encoder

Motion Controllers

The following Newmark Systems, Inc. controllers are compatible with the NLS4 Stage.

NCS-A1 Series | NSC-A2L Series | NSC-G Series