

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.

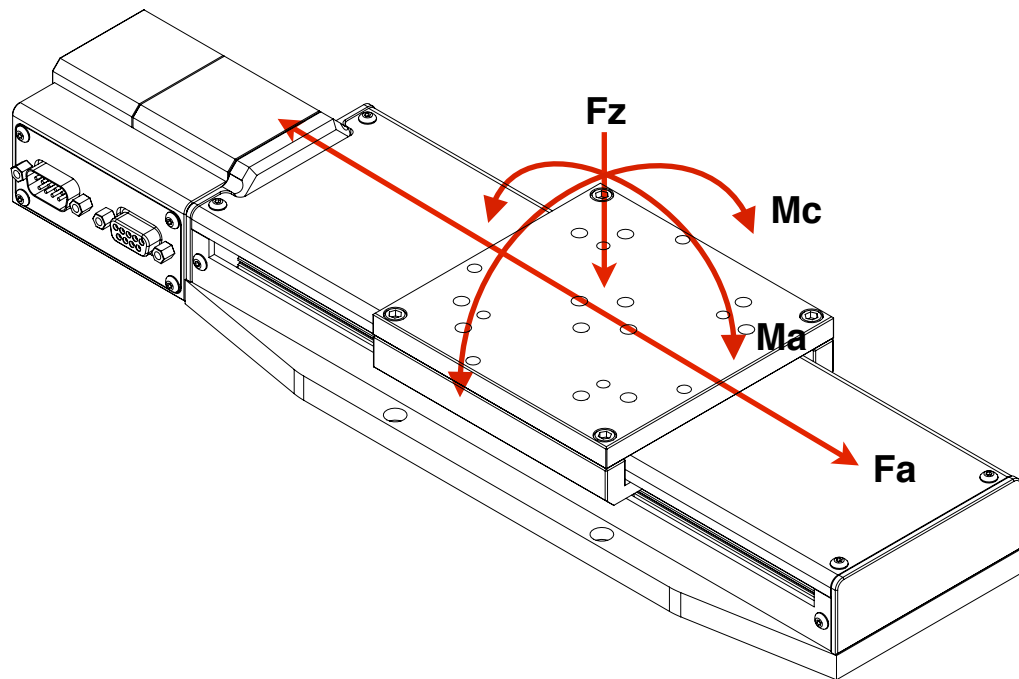
Separate connectors for motor power and limit/encoder signals are provided for ease of operation. Integrated limit switches and a high torque size 17 stepper motor are supplied as standard items.

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	15 μm
Pitch	± 12 arc-sec
Yaw	± 12 arc-sec
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

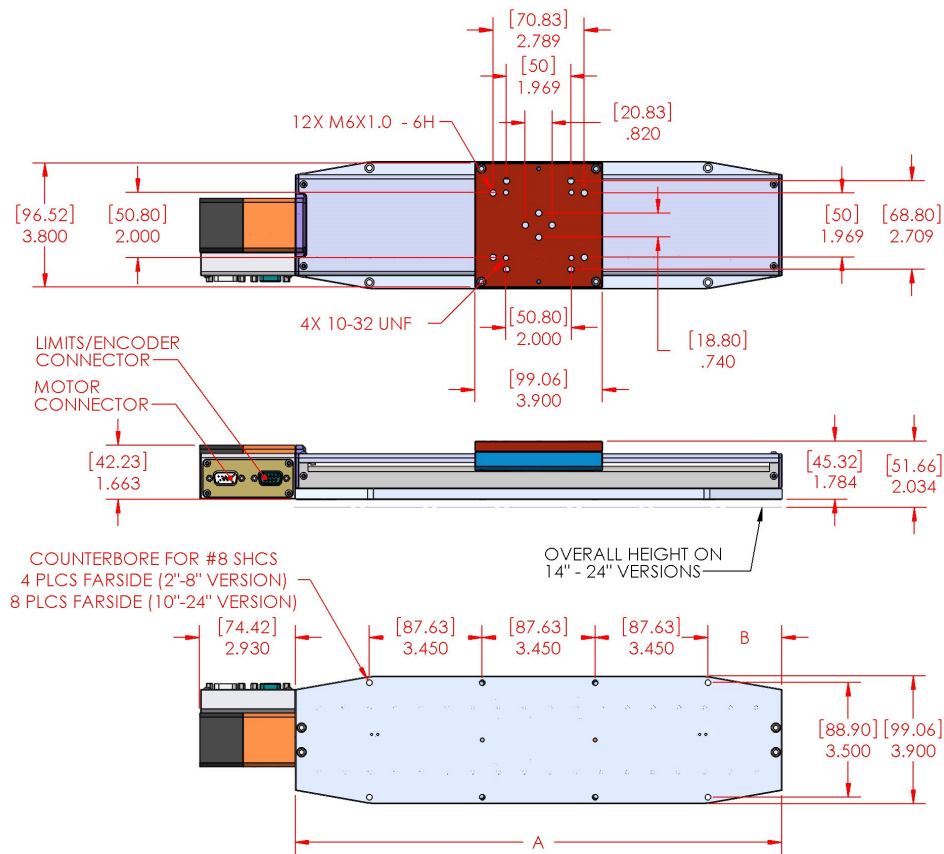
Load Characteristics

Axial Load F_a	11.3 kg (25 lbs)
Normal Load F_z	22.6 kg (50 lbs)
Moment Load M_a	20.3 Nm (15 lb-ft)
Moment Load M_c	20.3 Nm (15 lb-ft)



Dimensions

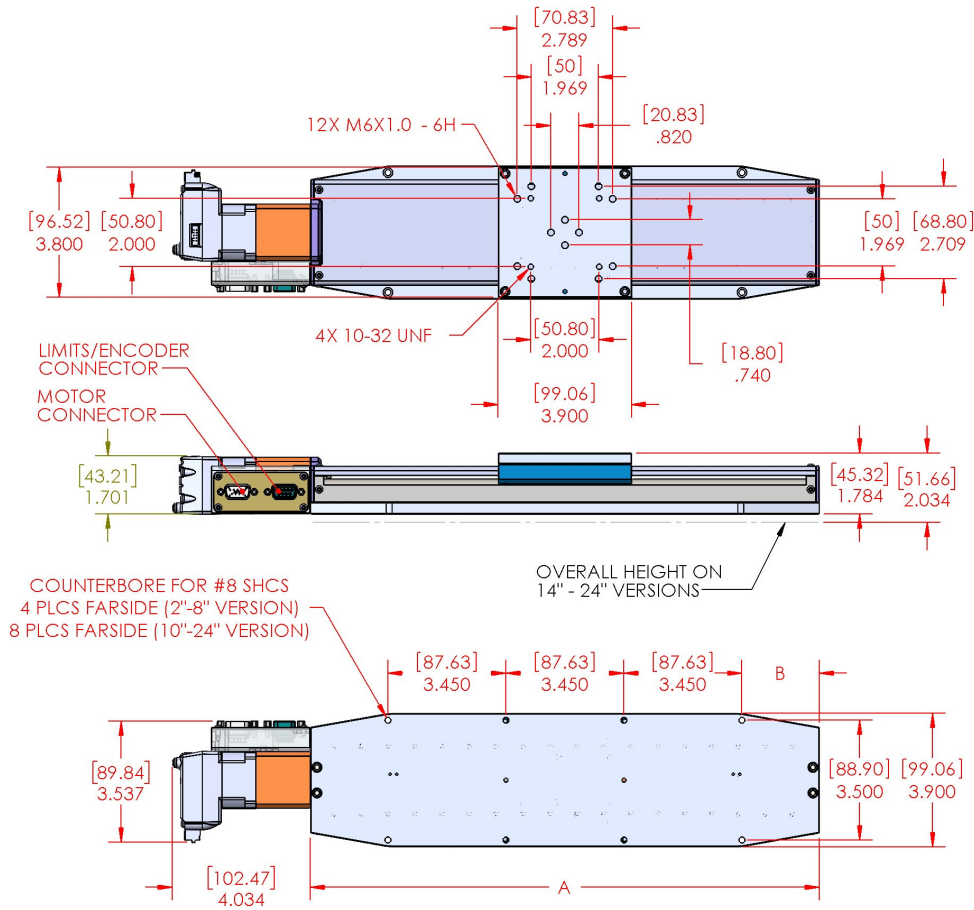
Stepper Motor Version



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

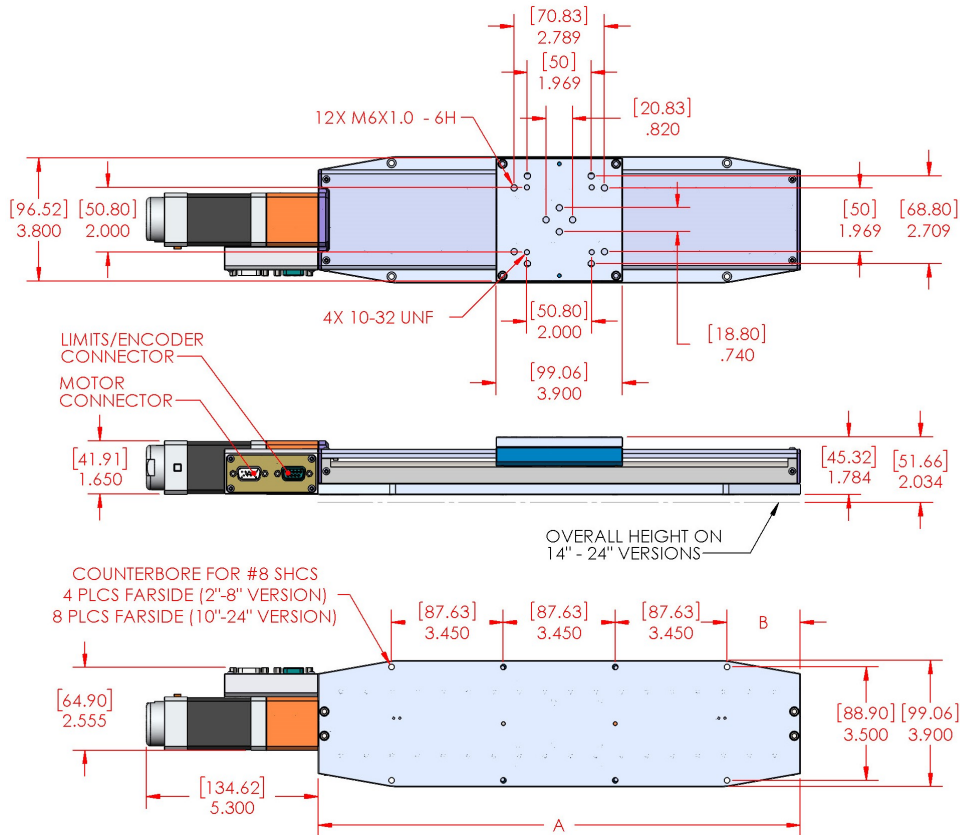
MDrive Motor Version



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
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Dimensions

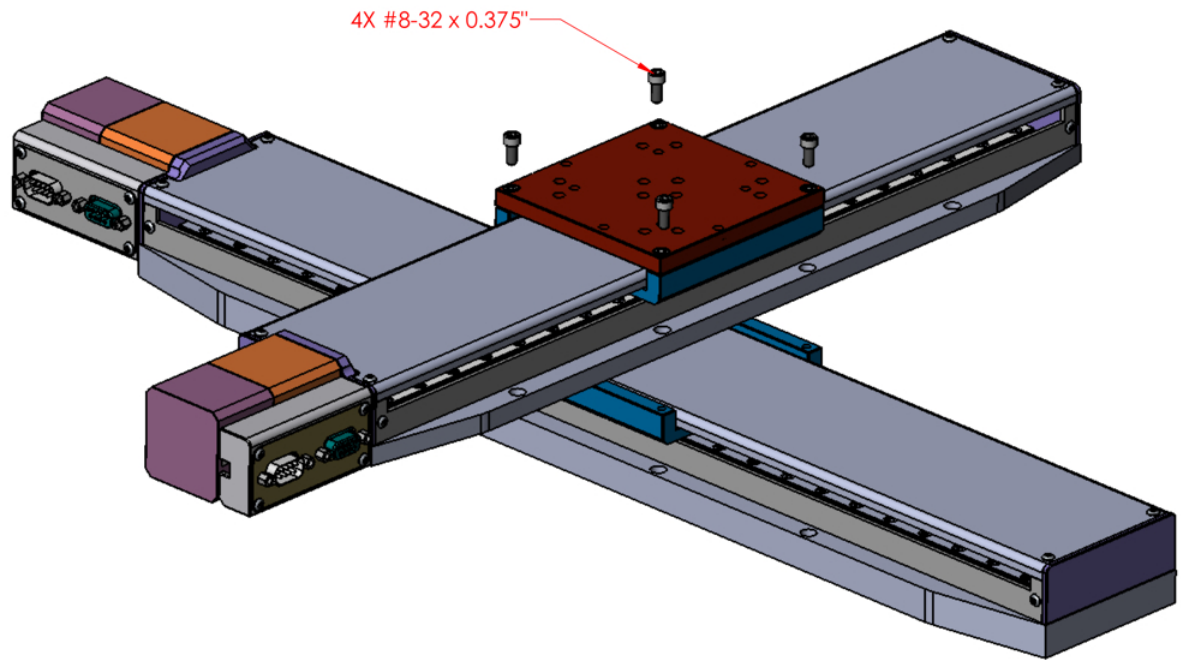
Servo Motor Version



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
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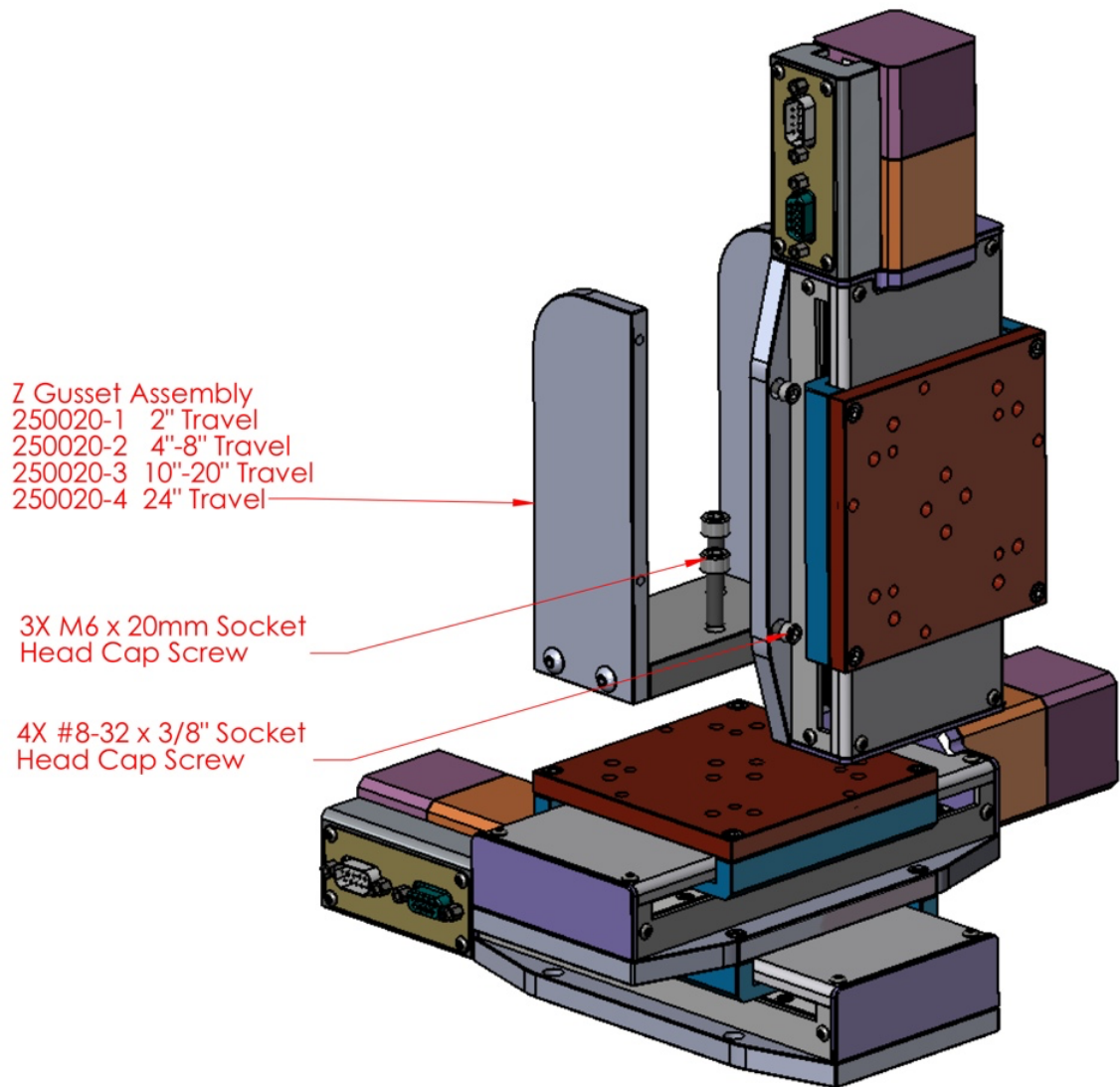
XY Configuration

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'

Motor Specifications

Step Size: 1.8°/step

Amps/Phase: 1.33

Resistance: 2.5 Ohm/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

Motor Connector

DB-9 Male	Description
1.	+24 VDC
2.	Power Ground

Signals Connector

DB-9 Female	Description
1	I/O 3
2	I/O 4
3	GND
4	Analog Input

RS-422 Communications

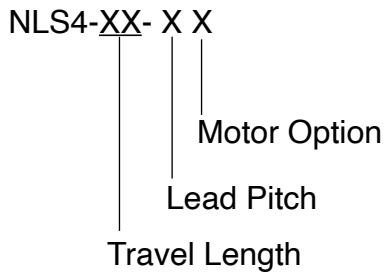
10-Pin IDC	Description
1	TX+
2	TX-
3	RX+
4	RX-
5	Aux-Logic
6	RX+
7	RX-
8	TX-
9	TX+
10	COMM GND

Mating connector: Samtec TCSD-05-01N

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.

Ordering Information

Part Number Configuration



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](#)