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# LSA1

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MOTORIZED PRECISION LINEAR ACTUATOR

## DATASHEET

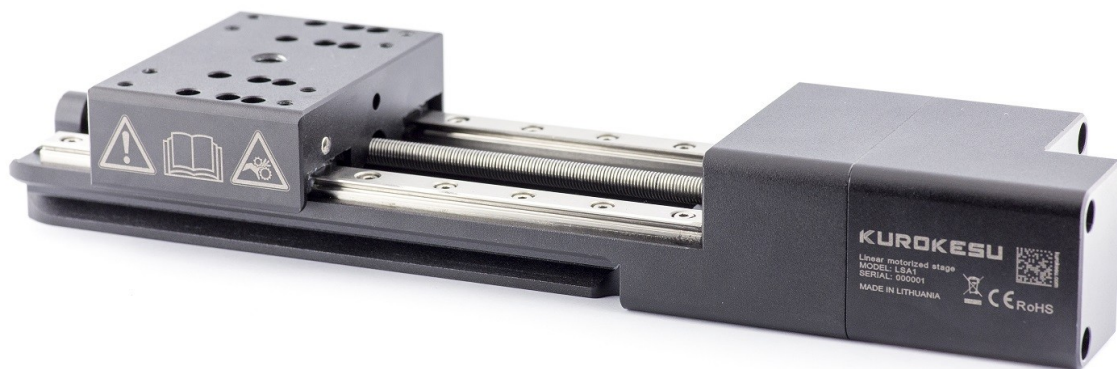


**KUROKESU**

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## Overview

**LSA1** linear motorized actuator designed for automated DOF stacking photography and other precision automated tasks. Can be connected to 4 channel [SCE2-MOTION](#) controller over standard RJ45 cable.



- Anodized CNC machined aluminum construction
- Arca-Swiss compatible quick release base
- Multiple 1/4" mounting holes
- 90mm travel length
- Precision homing position with hall sensor
- Multiple lead screw options: 0.635mm, 1.27mm, ...
- Precision linear guideways with light preload

# Specifications

## LSA1 specifications

Feature	Value	Units
Travel length	90	mm
Max drive speed	500	mm/min
Lead screw options	<ul style="list-style-type: none"><li>• 0.635</li><li>• 1.27</li><li>• 6.35</li></ul>	mm
Static load	>200	N
Push/pull force	>50	N
Weight	517	g

## Notes

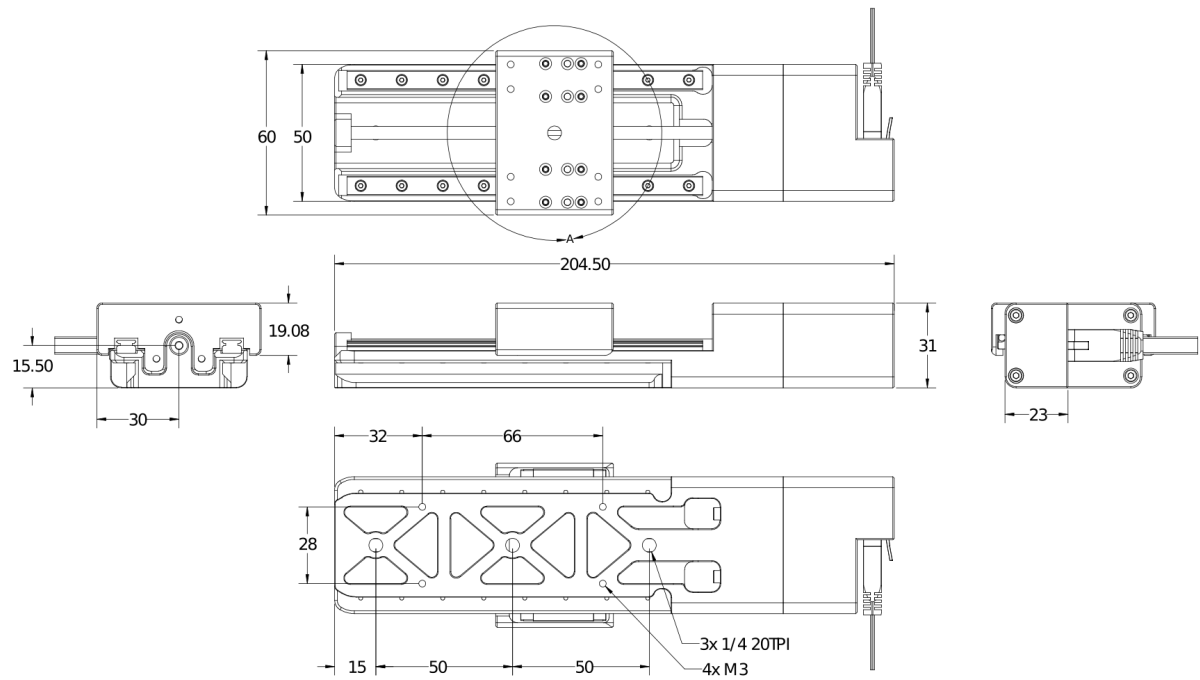


Homing position at 11mm (for pinch safety, but after homing zero position can be driven to -11mm)

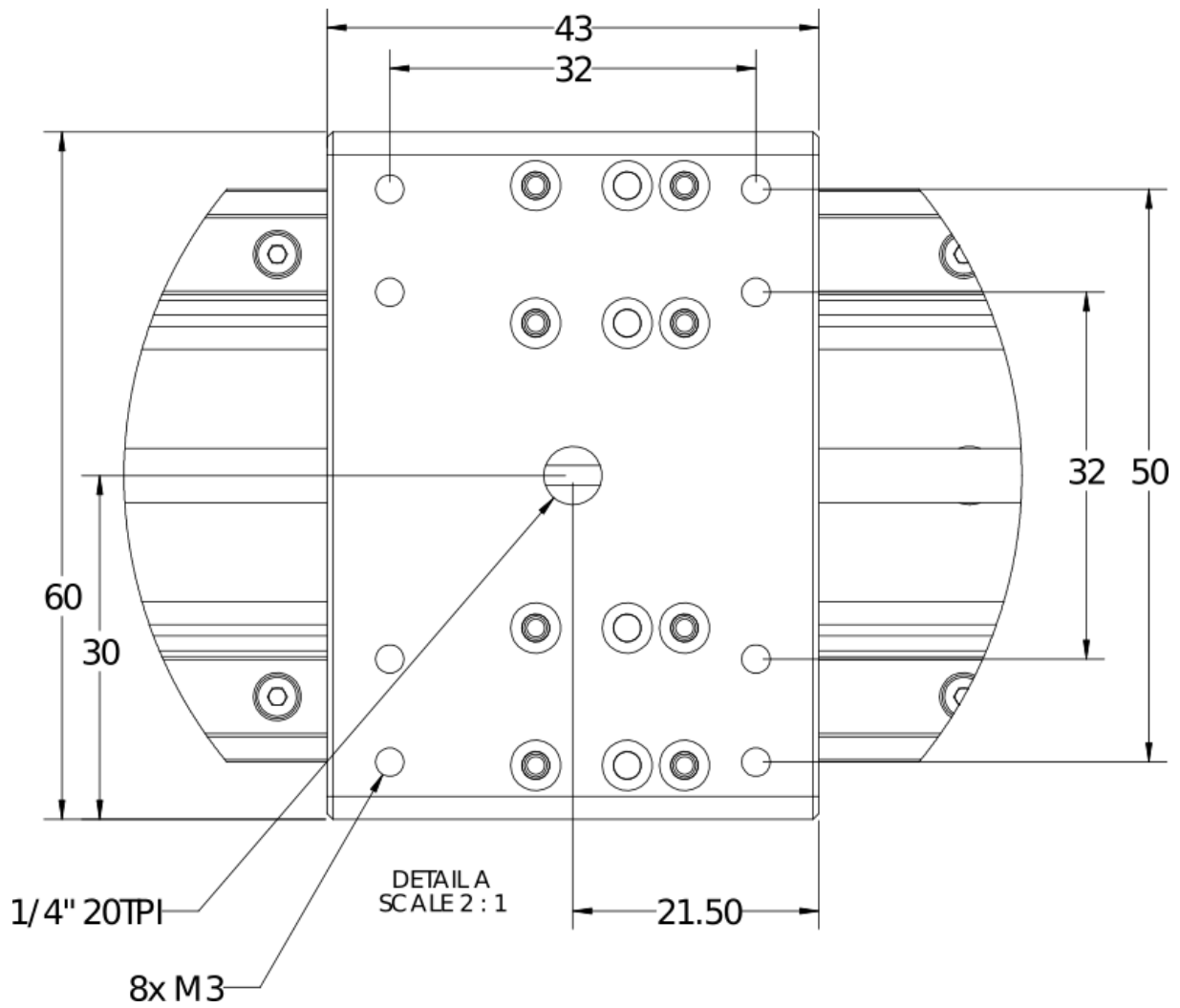
# Dimensions

## External dimensions

LSA1 external dimensions [mm]: 204.5 x 60 x 31



## LSA1 carriage dimensions



3D model

Simplified 3D model is maintained on [GitHub repository](#)

# Wiring

## RJ45 pinout

Pin	Signal
1	GND
2	5V
3	SIG1
4	A1
5	A2
6	SIG2
7	B1
8	B2

 SIG1 is used for homing signal

## Drive train specifications

### Lead screw

LSA1 can be fitted with different spring loaded lead screws

Parameter	Pitch 0.635mm	Pitch 1.27mm	Pitch 6.35mm	Unit
Push pull force	>50	>40	TBD	N
Backlash	5	TBD	TBD	μm

### Motor

Parameter	Value	Unit
Size	NEMA11	
Step angle	1.8 ±5%	deg
Phase count	2	
Rotor inertia	12	g*cm <sup>2</sup>
Mass	180	g
Rated voltage	4.5	V
Rated current	0.75	A
Resistance per phase	6.7 ±10%	Ω
Inductance per phase	3 ±20%	mH
Holding torque	95	mN*m

## GRBL motion settings

### Recommended GRBL parameters

Motion controller needs to know about actuator capabilities.

**i** Assume motor is connected to Y axis.

#### LSA1 pitch 0.635mm

GRBL parameter	Value	Definition
\$101	10078.740158	Y steps/mm
\$111	250.000	Y Max rate, mm/min
\$121	40.000	Y Acceleration, mm/sec <sup>2</sup>
\$131	90.000	Y Max travel, mm

#### LSA1 pitch 1.27mm

GRBL parameter	Value	Definition
\$101	5039.37008	Y steps/mm
\$111	500.000	Y Max rate, mm/min
\$121	50.000	Y Acceleration, mm/sec <sup>2</sup>
\$131	90.000	Y Max travel, mm

#### LSA1 pitch 6.35mm

GRBL parameter	Value	Definition
\$101	1007.87402	Y steps/mm
\$111	2500.000	Y Max rate, mm/min
\$121	300.000	Y Acceleration, mm/sec <sup>2</sup>
\$131	90.000	Y Max travel, mm

### Calculating steps/mm constant

Variable	Value	Definition
p	6.35	Lead screw pitch
s	200	Stepper motor steps per revolution



m	32	Microstepping
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**const = 1/(p\*s\*m)**

## Ordering

LSA1 linear actuator can be ordered directly on [Kurokesu e-store](#)