



PXL33 with 25, 60 and 110 mm travel

### Features

- < 2nm incremental motion possible
- Resolutions to 10nm and 1Vpp available
- Small footprint, low profile
- Travel to 110mm
- Linear motor
- Linear encoder
- Limit sensors
- Directly stackable in XY configurations
- 100% tested for specification compliance

### Overview

Primatics PXL33 series is a small form factor, high precision linear motion stage. It is offered in two accuracy grades. The PXL33A version is a good choice for general purpose positioning. The PXL33B version is optimized for higher accuracy, repeatability, and nanometer level minimum incremental motion. A linear motor and linear encoder provide precise positioning travels of 25, 60, and 110mm. Anti-creep cage cross roller linear bearings result in smooth, flat, and straight motion.

### Applications

The PXL33 series is ideal for use in applications for precision assembly and inspection. Its compact size is ideal for space constrained applications. The ironless linear motor and high resolution encoder yields extremely smooth motion for scanning applications. Process corrections are no problem due to the PXL33B's incredible ability to make nanometer level steps.

### Features

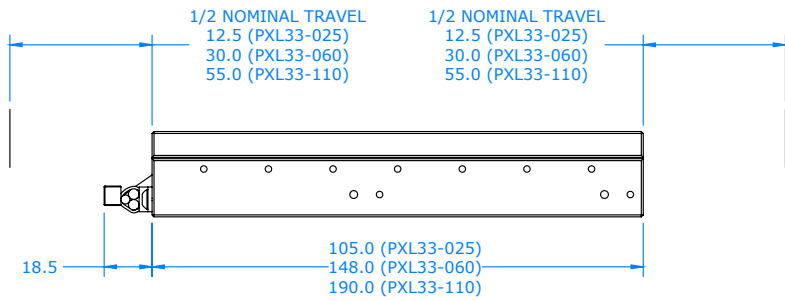
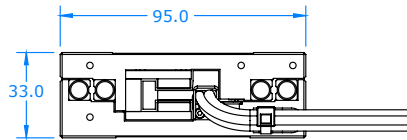
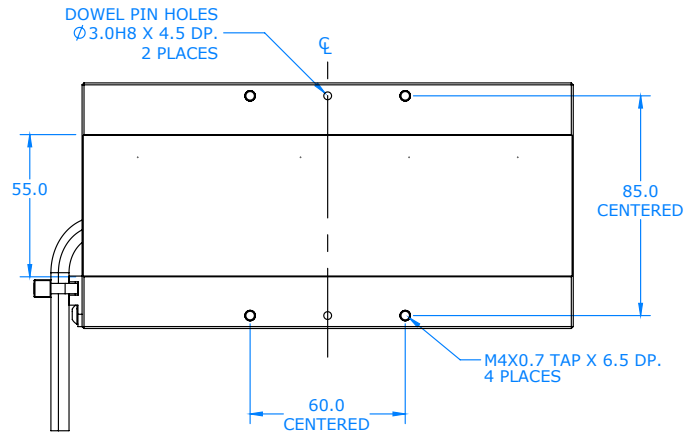
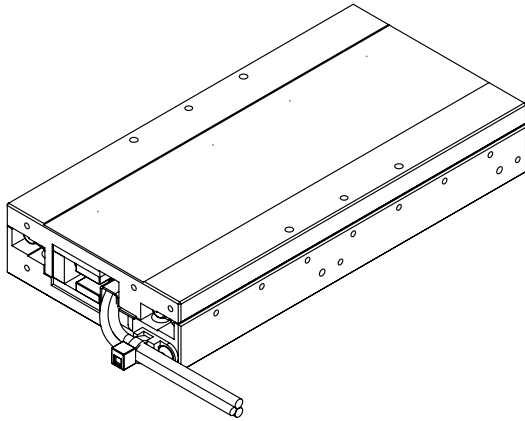
Standard features include a precision linear encoder with index at the center of travel. Multiple resolutions and clock frequencies are available along with a 1Vpp analog version. Forward and reverse limit sensors are also standard. Two PXL33's can be directly stacked for XY configurations with a total height of 66mm and can also be stacked on the larger PXL43.

### Options

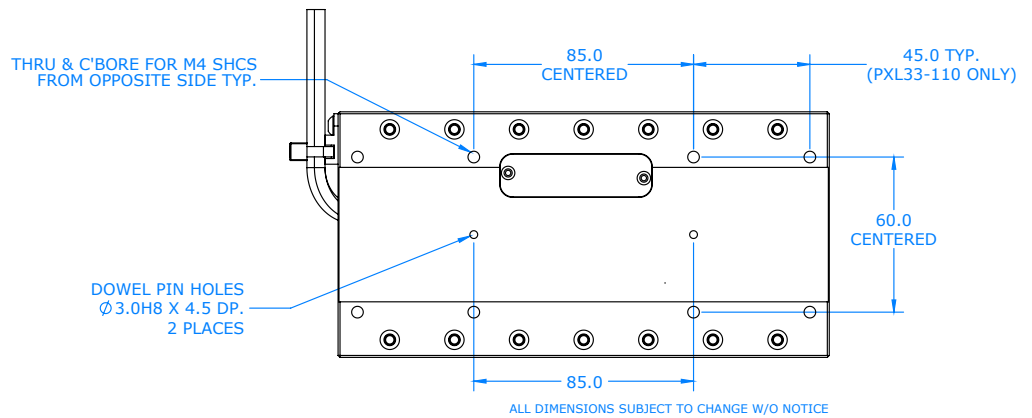
For use in vertical applications an optional pneumatic counterbalance is available. The counterbalance is adjusted for the payload after installation. Improved accuracy can be achieved with the Mapping option. Data is provided from laser interferometer measurements to generate position correction information along the entire travel of the stage.



## Dimensions



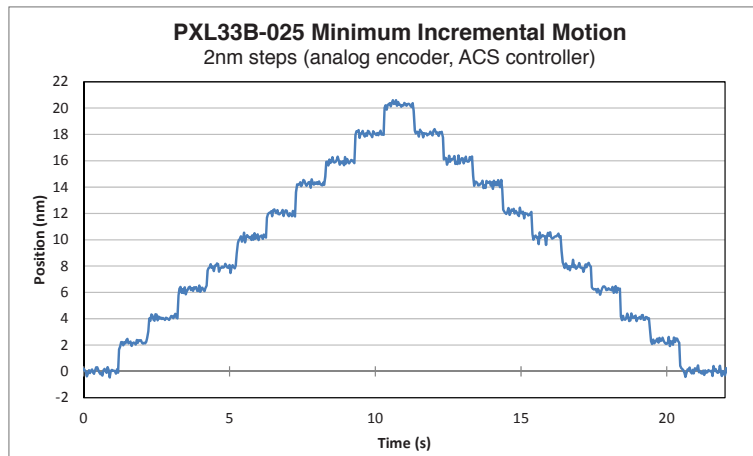
\* SHOWN AT CENTER OF TRAVEL



Specifications

Specifications	Notes	PXL33A-025	PXL33B-025	PXL33A-060	PXL33B-060	PXL33A-110	PXL33B-110
Travel (mm)		25	25	60	60	110	110
Positional Accuracy Over Total Travel ( $\mu\text{m}$ )							
1.00 $\mu\text{m}$ resolution	1,2,3,4,6	+/- 5.5	+/- 2.7	+/- 6.0	+/- 3.0	+/- 7.0	+/- 3.5
0.10 $\mu\text{m}$ resolution		+/- 3.0	+/- 1.0	+/- 4.0	+/- 2.0	+/- 5.5	+/- 2.7
0.05 $\mu\text{m}$ resolution		+/- 3.0	+/- 1.0	+/- 4.0	+/- 2.0	+/- 5.5	+/- 2.7
0.01 $\mu\text{m}$ resolution		+/- 3.0	+/- 1.0	+/- 4.0	+/- 2.0	+/- 5.5	+/- 2.7
Analog		N/A	+/- 1.0	N/A	+/- 2.0	N/A	+/- 2.7
Mapped Accuracy Over Total Travel ( $\mu\text{m}$ )							
1.00 $\mu\text{m}$ resolution	2,3,4,6	N/A	N/A	N/A	N/A	N/A	N/A
0.10 $\mu\text{m}$ resolution		+/- 1.1	+/- 0.9	+/- 1.1	+/- 0.9	+/- 1.1	+/- 0.9
0.05 $\mu\text{m}$ resolution		+/-1.0	+/-0.75	+/-1.0	+/-0.75	+/-1.0	+/-0.75
0.01 $\mu\text{m}$ resolution		+/-1.0	+/- 0.45	+/-1.0	+/- 0.45	+/-1.0	+/- 0.45
Analog		+/-1.0	+/- 0.45	+/-1.0	+/- 0.45	+/-1.0	+/- 0.45
Bi-directional Repeatability ( $\mu\text{m}$ )							
1.00 $\mu\text{m}$ resolution	1,2,3,6	+/- 2.0	+/- 2.0	+/- 2.0	+/- 2.0	+/- 2.0	+/- 2.0
0.10 $\mu\text{m}$ resolution		+/- 0.3	+/- 0.3	+/- 0.3	+/- 0.3	+/- 0.3	+/- 0.3
0.05 $\mu\text{m}$ resolution		+/- 0.25	+/- 0.25	+/- 0.25	+/- 0.25	+/- 0.25	+/- 0.25
0.01 $\mu\text{m}$ resolution		+/- 0.15	+/- 0.10	+/- 0.15	+/- 0.10	+/- 0.15	+/- 0.10
Analog		+/- 0.15	+/- 0.10	+/- 0.15	+/- 0.10	+/- 0.15	+/- 0.10
Straightness of Travel Over Total Travel ( $\mu\text{m}$ )	2,3	+/- 1.0		+/- 1.1		+/- 2.5	
Flatness of Travel Over Total Travel ( $\mu\text{m}$ )	2,3	+/- 1.0		+/- 1.1		+/- 2.5	
Max Speed (mm/sec)	4,5	450 (90 for 0.01 $\mu\text{m}$ resolution) @ 12MHz 670 (130 for 0.01 $\mu\text{m}$ resolution) @ $\geq$ 20MHz					
Max Acceleration (g's, No Load)	4,5	3.5		2.5		2	
Direct Loading Capacity (kg)		6					
Carriage Mass (kg)		0.64		0.89		1.15	
Stage Mass (kg)		1.12		1.59		2.01	
Stage Mass with Counterbalance (kg)		1.24		1.75		2.11	

Notes: 1 - Slope corrected; 2 - Measured 50mm above center of carriage; 3- Stage affixed to flat continuous surface; 4 - Controller and drive dependent; 5 - Maximum obtainable speed is load, resolution, encoder output frequency and move profile dependent.; 6 - Analog version tested at  $\leq$  10nm using ACS controller. All specifications subject to change without notice.



## Motor / Encoder / Sensor Data

Parameter	Notes	Value	
<b>Motor</b>			
Motor Type		Brushless Servo Linear Motor	
Continuous Force (N)	1	9	
Continuous Current (Arms)	1	1.5	
Peak Force (N)	2	30	
Peak Current (Arms)	2	6.0	
Force Constant (N/Arms)		5.0	
Back EMF Constant (V/m/s)		4.3	
Winding Resistance (ohms)		3.1	
Winding Inductance (mH)		0.31	
Thermal Resistance (°C/W)		1.6	
Magnetic Pitch (mm)		21	
Hall Sensor Power		5 to 24VDC, 50mA	
Hall Outputs		Open collector, current sinking, 20mA max	
<b>Encoder</b>			
		<b>PXL33A</b>	<b>PXL33B</b>
Analog Encoder Power		N/A	5VDC +/- 10%, 160mA
Digital Encoder Power		5VDC +/- 5%, 180mA	5VDC +/- 10%, 275mA
Encoder Clock Frequency		12.5 MHz (standard)	12 MHz (standard)
		25 MHz (optional)	20 MHz (optional)
Output		Square wave differential line driver	
Index		Synchronized pulse, duration equal to one resolution bit	
<b>Limit sensors</b>			
Limit Power		Powered by Encoder	
Output - L1 and L2 options		Current sinking, 20mA max	

Notes: 1 - At 25°C maximum temperature rise; 2 - At 10% duty cycle and 1 second maximum; All specifications subject to change without notice.

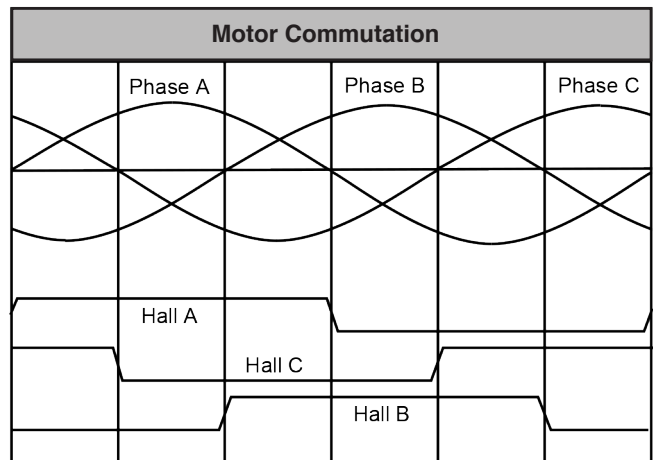
## Stage Information

Stage Information	
Typ. Drag Force (N)	0.2
Nominal Cable Length (mm)	PXL33B-025: 940 PXL33B-060: 920 PXL33B-110: 900
Life at Listed Specifications (km)	2000
Counterbalance Option	
Max Vertical Payload Capacity (kg)	PXL33-025: 2.7 PXL33-060: 2.5 PXL33-110: 2.2
Max Air Pressure (psi)	75
Force Factor (N/psi)	0.46



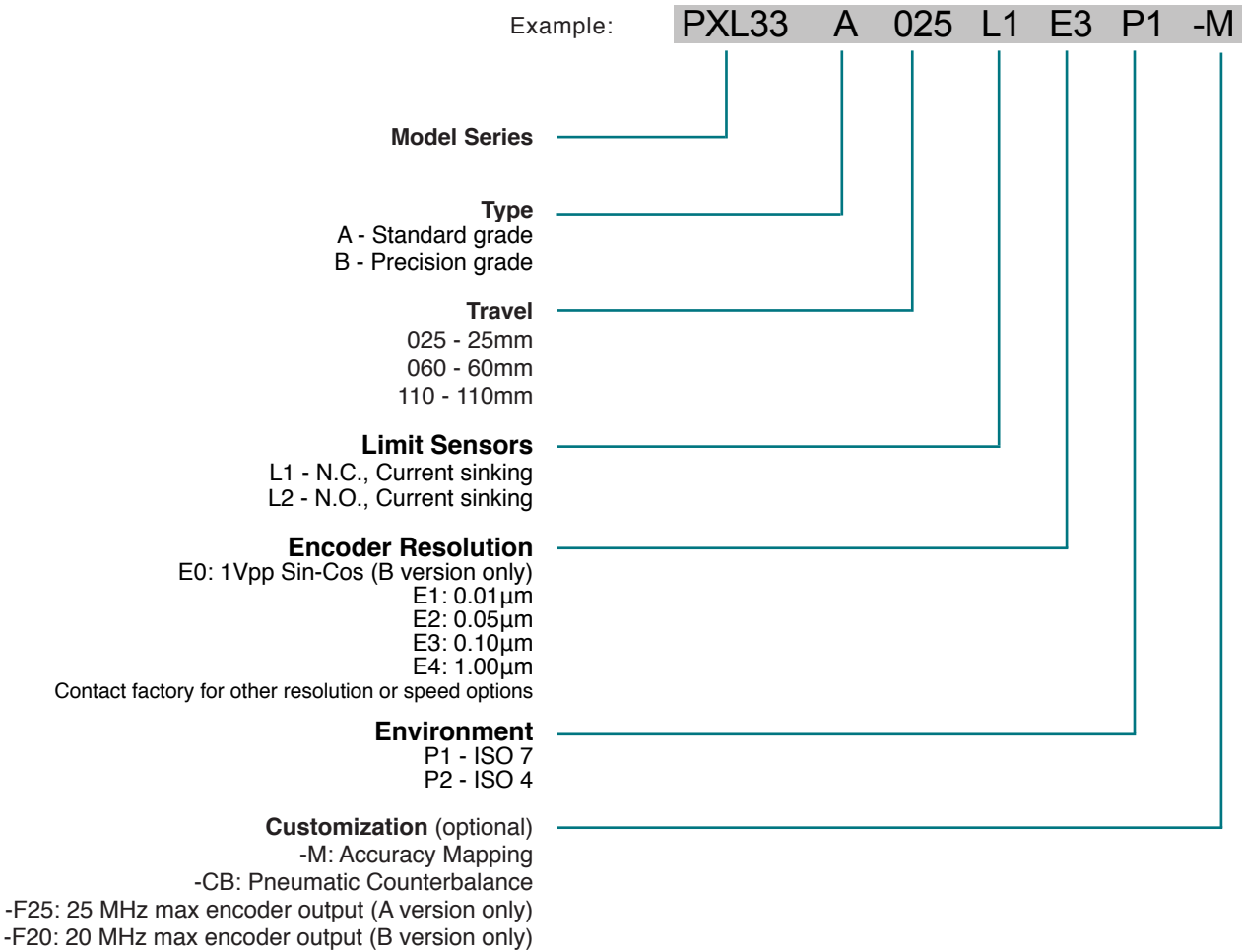
## Connector

PXL33		
Motor Connector: DB9W4P		
PIN	Function	
A1	Motor Phase A	
A2	Motor Phase B	
A3	Motor Phase C	
A4	Motor Shield	
1	Hall V+	
2	Hall V-	
3	Hall A	
4	Hall B	
5	Hall C	
Shell	Signal Shield	
Encoder Connector: DB15P		
PIN	Digital Encoder	Analog Encoder
1	N/A	Encoder Cos-
2	Encoder GND	Encoder Sin-
3	N/A	Encoder Index+
4	Encoder I-	Encoder 5V
5	Encoder B-	N/A
6	Encoder A-	N/A
7	Encoder 5V	Forward Limit
8	N/A	Reverse Limit
9	N/A	Encoder Cos+
10	Reverse Limit	Encoder Sin+
11	Forward Limit	Encoder Index-
12	Encoder I+	Encoder GND
13	Encoder B+	N/A
14	Encoder A+	N/A
15	N/A	N/A
Shell	Encoder Shield	Encoder Shield



PXL33 60mm x 110mm XY stack

### Model Configuration



Not all configurations are valid - consult factory for assistance

### Accessories

Model	Description
PXL33 CONNECTOR KIT	Mating connectors for PXL33, solder terminals and backshells