

S Y S T E M S

PXL SERIES CROSSROLLER STAGE



WHEN MOTION MAKES THE DIFFERENCE

CROSSROLLER STAGE



High Accuracy, Thin Design

The high-precision Low Profile Crossed Roller Linear Actuator (PXL Series) offers compact, high-performance motion solutions for demanding applications. With a thickness of just 25mm, these actuators feature cross-roller bearings for superior rigidity and load capacity, ensuring ultra-smooth linear travel. Available in two sizes (PXL90 & PXL130), the PXL Series is an ideal choice for applications requiring a combination of high accuracy and compact design.

Versatile Applications and Features

Designed for precision tasks, the PXL Series caters to industries such as semiconductor inspection, optical alignment, and precision assembly. These actuators support load capacities of up to 5 kg and offer stroke lengths ranging from 25mm to 250mm. Additionally, the option of ironless linear motors enhances their versatility by delivering impressive dynamic performance while maintaining high reliability.

Precision and Customization

The PXL Series excels in resolution, accuracy, and repeatability, meeting the demands of even the most challenging motion control applications. Configurable with digital or analog encoders, these actuators achieve resolutions as fine as 20nm. With their lightweight and modular design, they enable seamless integration into multi-axis systems, ensuring unparalleled precision and enhanced load-carrying capacity.

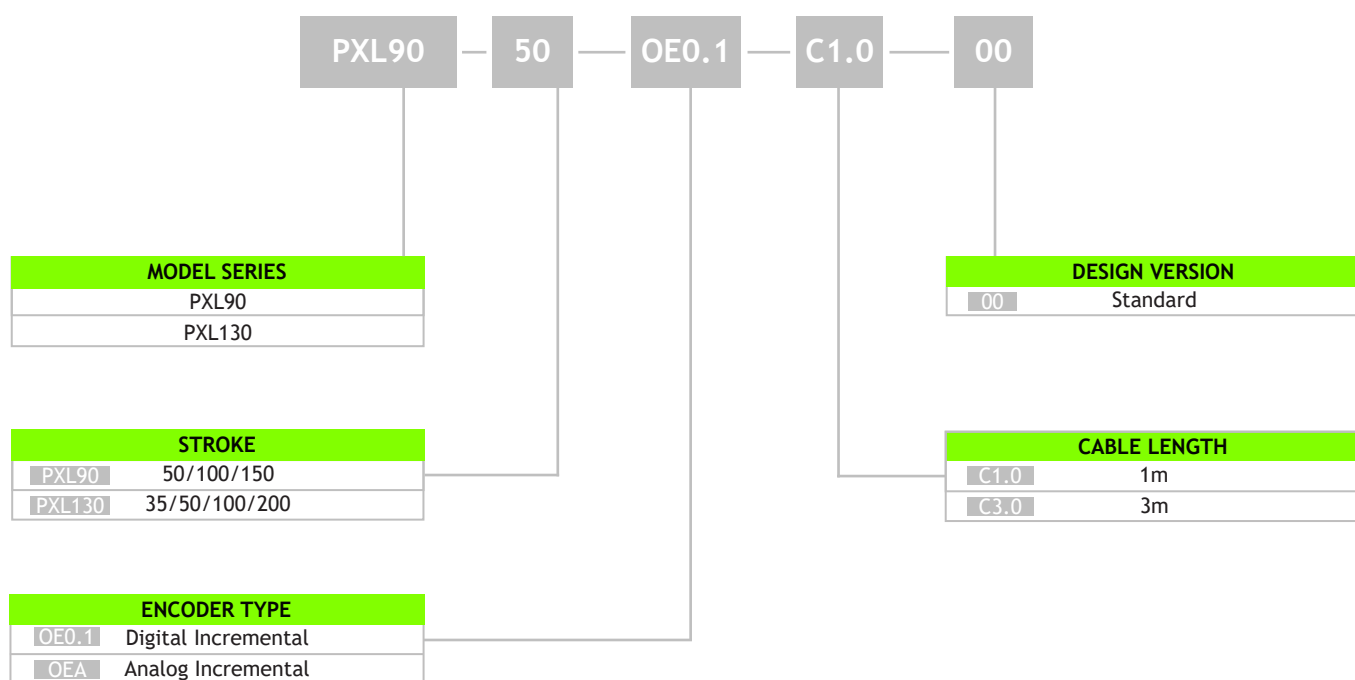
APPLICATION

- Semiconductor and electronics
- Medical and life sciences
- Optics and photonics
- Scanning and digital fabrication
- Sensor testing and qualification
- Fiber alignment

FEATURES

- Low Profile & Compact design
- Zero cogging & Smooth motion
- Crossed roller guide for high load capacity
- Superior geometric performance

PART NUMBERING SYSTEM



PXL SERIES

Crossroller Stage

PXL-90

- Max stroke: 150 mm
- Peak force: 47.5 N
- Low profile & compact design.
- Crossed roller guide for high load capacity.
- Superior geometric performance.
- Zero cogging & smooth motion.



SPECIFICATION

MODEL

PXL-90

50

100

150

Motor Parameters

Unit

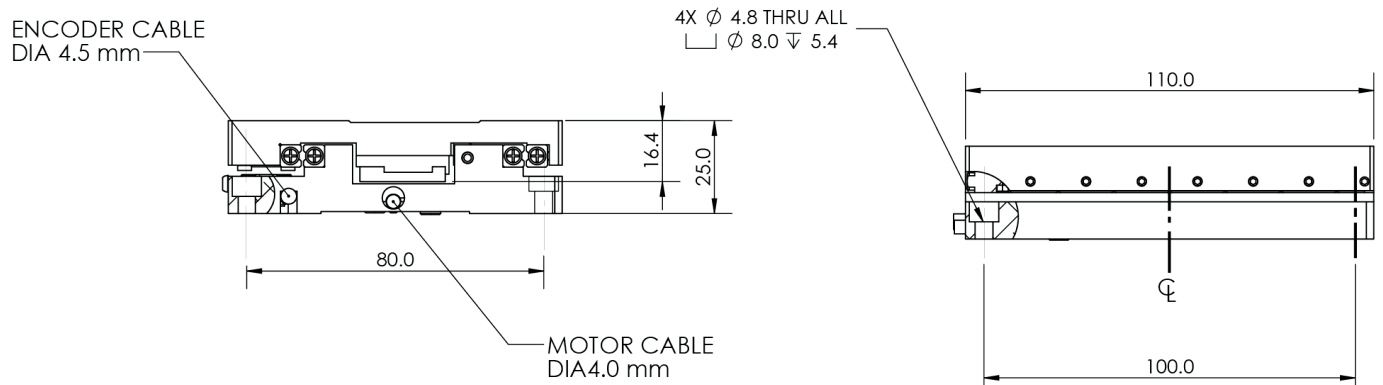
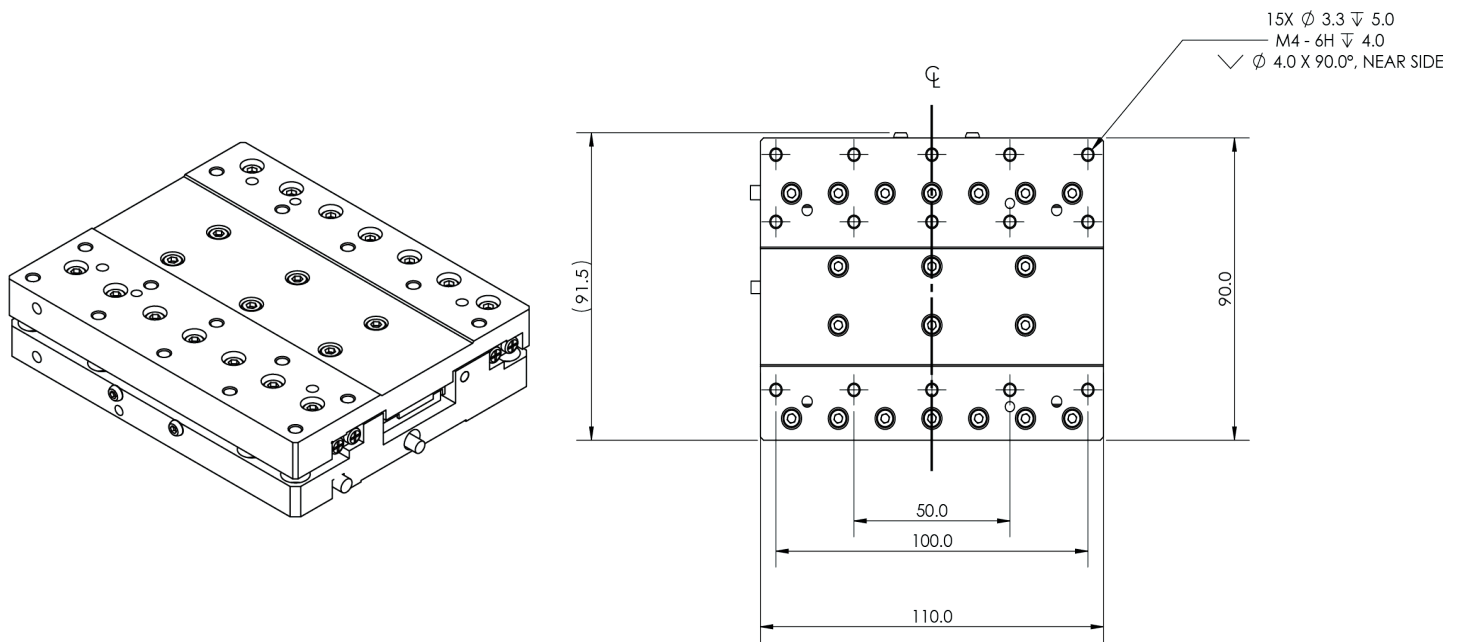
Peak Force	N	47.5
Continuous Stall force @ 100C *	N	8.6
Continuous Stall force @ 125C*	N	9.5
Peak power @ 125C	W	1614.7
Continuous power @ 100C*	W	36.4
Continuous power @ 125C*	W	48.4
Peak Current	Apk	12.5
Continuous Stall Current @ 100°C*	Apk	2.25
Continuous Stall Current @ 125°C*	Apk	2.5
Force Constant @ Mid Stroke	N/Apk	3.8
Back EMF Constant @ Mid Stroke	Vpk/m/s	4.4
Coil Resistance L-L @ 25 °C	Ohm	7.36
Coil Resistance L-L @ 100 °C	Ohm	9.59
Coil Resistance L-L @ 125 °C	Ohm	10.33
Inductance L-L @ 1kHz	mH	0.87
Motor Constant @ 100 °C	N / √W	1.18
Max. Terminal Voltage	Vdc	400
Thermal Resistance @ 100 °C	°C / W	2.06
Max. Winding Temperature	°C	125

Specifications

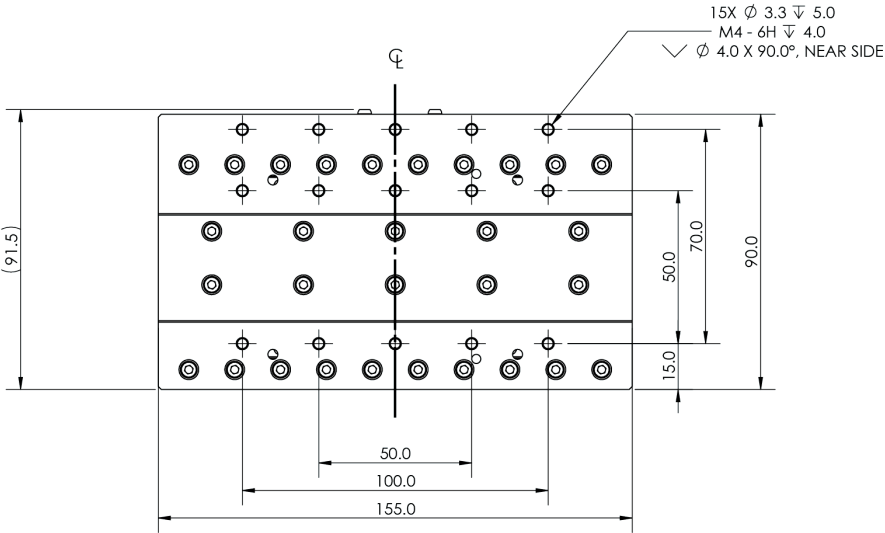
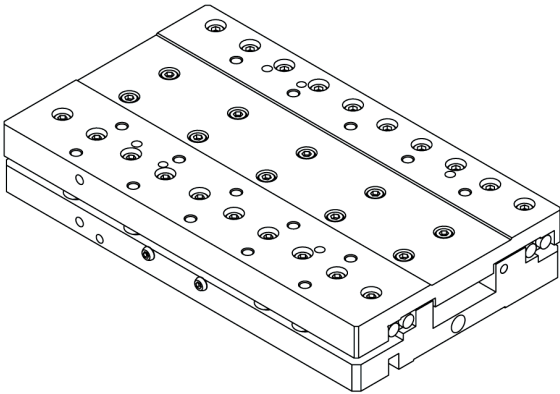
Stroke	mm	50	100	150
Encoder resolution	μm	0.1/sincos		
Min Step	μm	Digital : 0.3		
		Analog : 0.02		
Bi-directional repeatability**	μm	Digital : +/- 0.3		
		Analog : +/- 0.1		
Pitch	arc-sec	±20		
Yaw	arc-sec	±13		
Straightness***	μm	±2		
Flatness***	μm	±2.5		
Velocity	m/s	0.5		
Acceleration	m/s ²	10		
Rated Payload	kg	8		
Total Weight	kg	0.777	0.956	1.471
Moving Mass	kg	0.408	0.474	0.835

Notes:

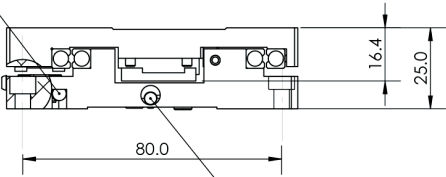
1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms.
2. *Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance - inductance +/-30%, all others +/-10% (for motor parameters).
4. Peak force and current : 4% duty ratio and 1 second duration.
5. ** Depend on encoder resolution.
6. *** Specific straightness, flatness requirements, contact PBA for more information.
7. For customized stroke length, contact PBA.
8. Specifications are subject to change without prior notice.



PXL90-100

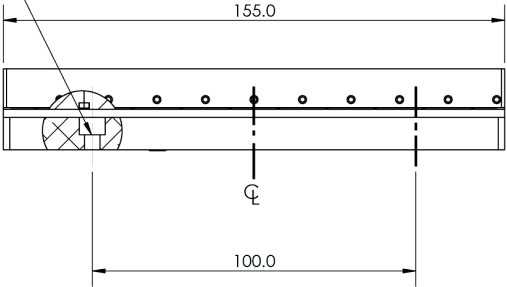


ENCODER CABLE
DIA 4.5 mm

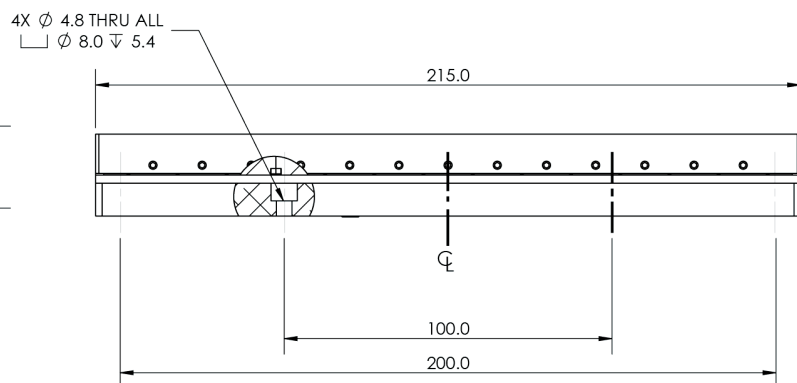
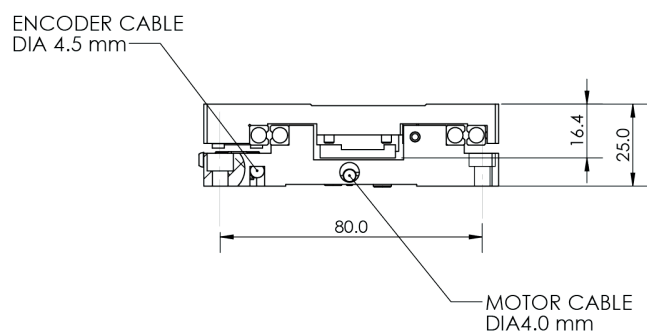
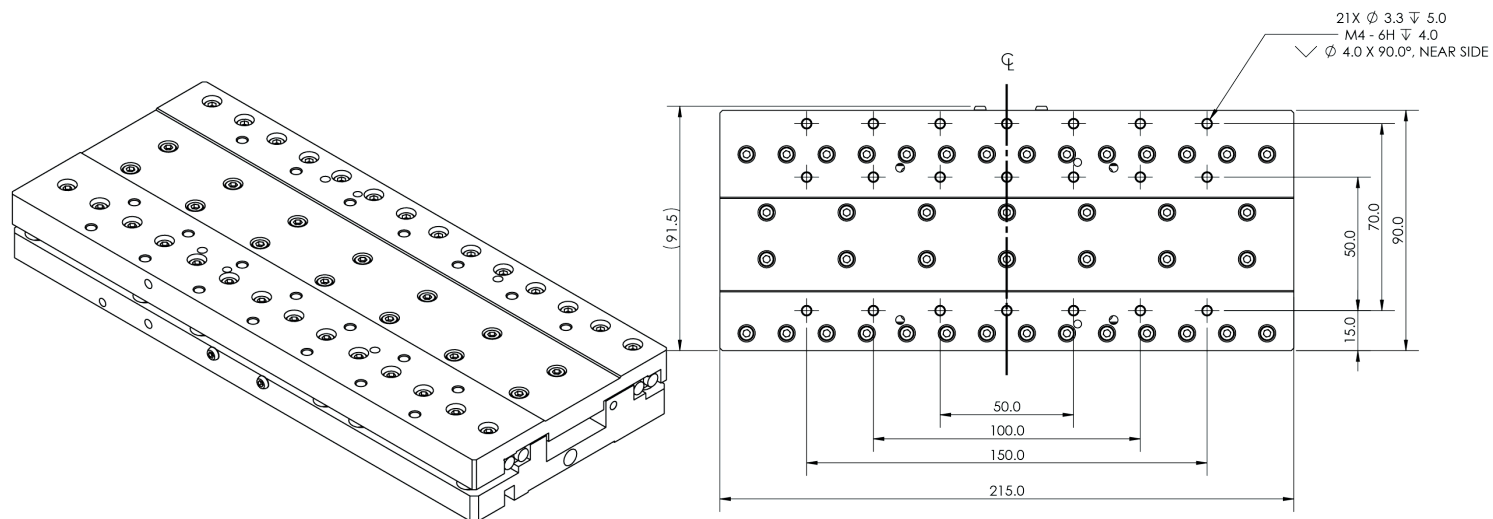


MOTOR CABLE
DIA 4.0 mm

4X $\varnothing 4.8$ THRU ALL
 $\sqcap \varnothing 8.0 \pm 5.4$



PXL90-150



PXL SERIES

Crossroller Stage



PXL-130

- Max Stroke: 200 mm
- Peak force: 147N
- Low profile & compact design.
- Crossed roller guide for high load capacity.
- Superior geometric performance.
- Zero cogging & smooth motion.

SPECIFICATION

MODEL

PXL-130

35

50

100

200

Motor Parameters

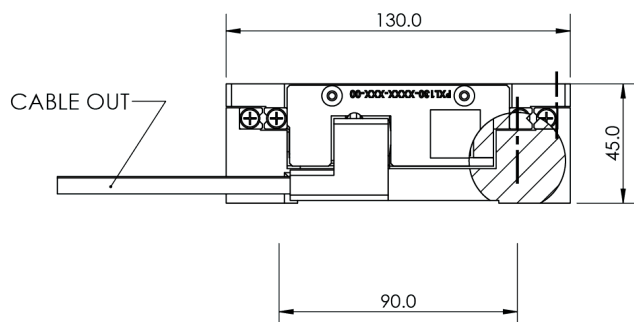
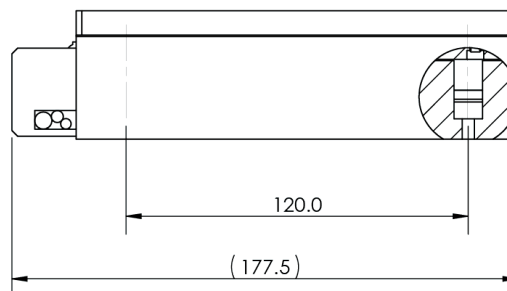
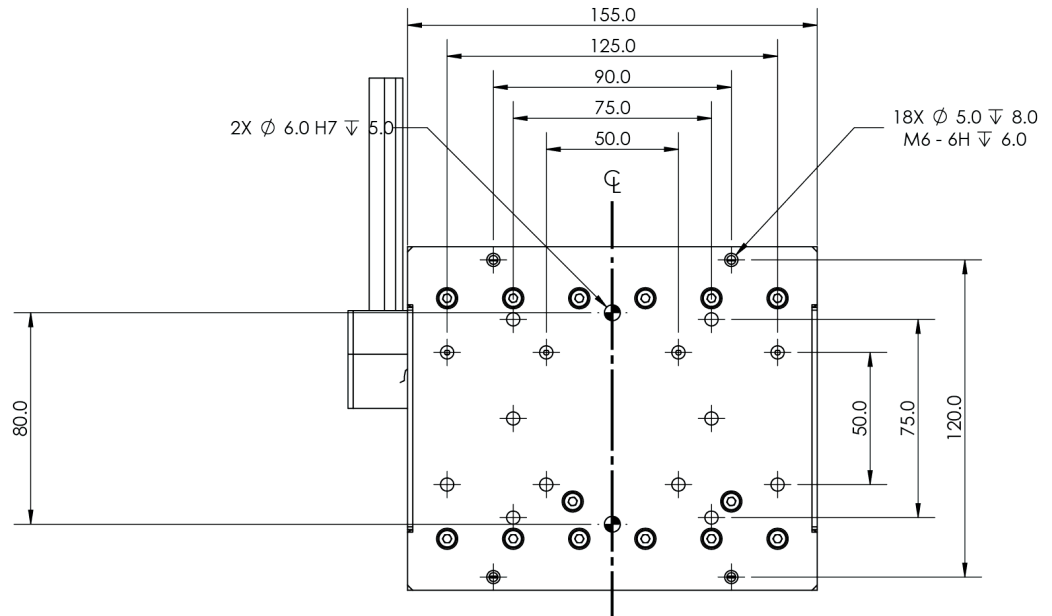
Peak Force	N	147
Continuous Stall force @ 100C*	N	29
Continuous Stall force @ 125C*	N	NA
Peak power @ 125C	W	1805
Continuous power @ 100C*	W	72
Continuous power @ 125C*	W	NA
Peak Current	Apk	11.27
Continuous Stall Current @ 100°C*	Apk	2.25
Continuous Stall Current @ 125°C*	Apk	NA
Force Constant @ Mid Stroke	N/Apk	13.1
Back EMF Constant @ Mid Stroke	Vpk/m/s	15
Coil Resistance L-L @ 25 °C	Ohm	14.6
Coil Resistance L-L @ 100 °C	Ohm	19
Coil Resistance L-L @ 125 °C	Ohm	NA
Inductance L-L @ 1kHz	mH	2.67
Motor Constant @ 100 °C	N / √W	3.95
Max. Terminal Voltage	Vdc	400
Thermal Resistance @ 100 °C	°C / W	1.04
Max. Winding Temperature	°C	100

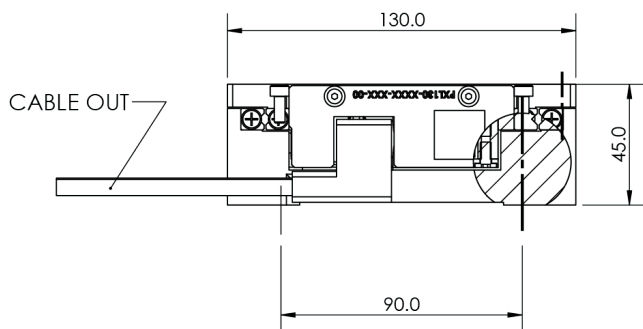
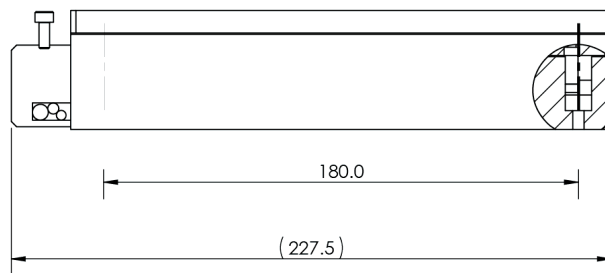
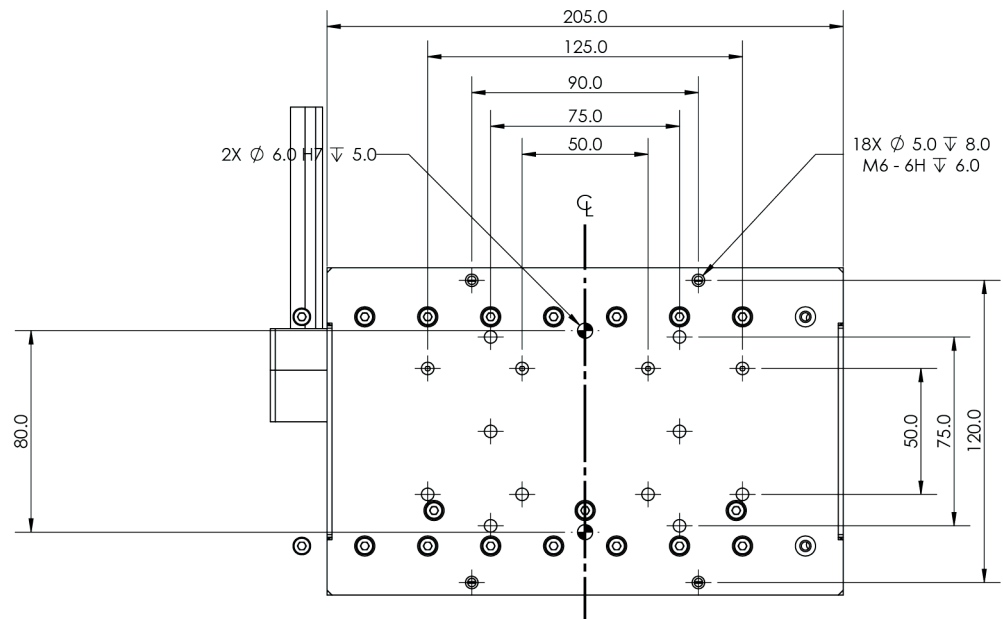
Specifications

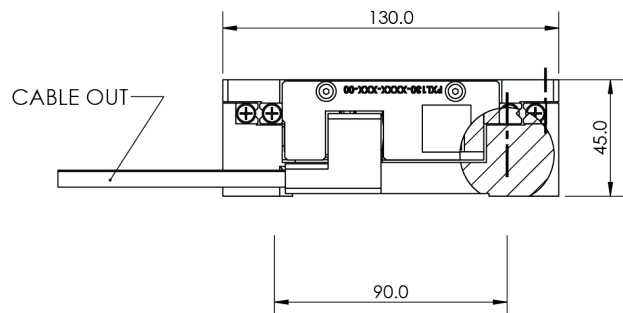
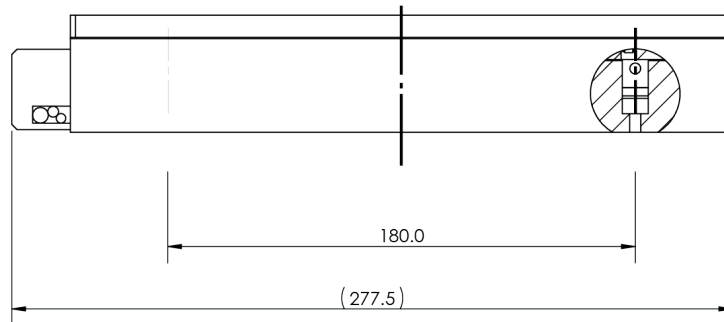
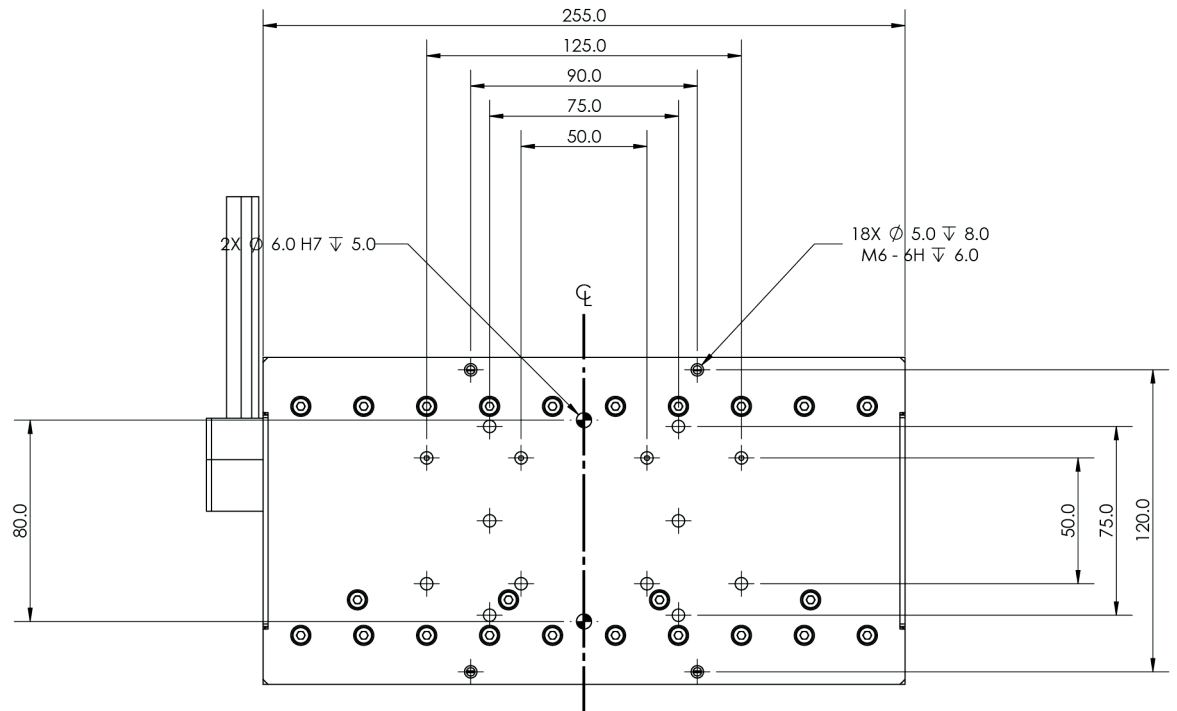
Stroke	mm	35	50	100	200
Encoder resolution	μm	0.1/sincos			
Min Step	μm	Digital : 0.3			
		Analog : 0.02			
Bi-directional repeatability**	μm	Digital : +/- 0.3			
		Analog : +/- 0.1			
Pitch	arc-sec	±20			
Yaw	arc-sec	±13			
Straightness***	μm	±2			
Flatness***	μm	±2.5			
Velocity	m/s	0.5			
Acceleration	m/s²	10			
Rated Payload	kg	15			
Total Weight	kg	2.773	3.638	4.496	6.183
Moving Mass	kg	1.773	2.372	2.964	4.12

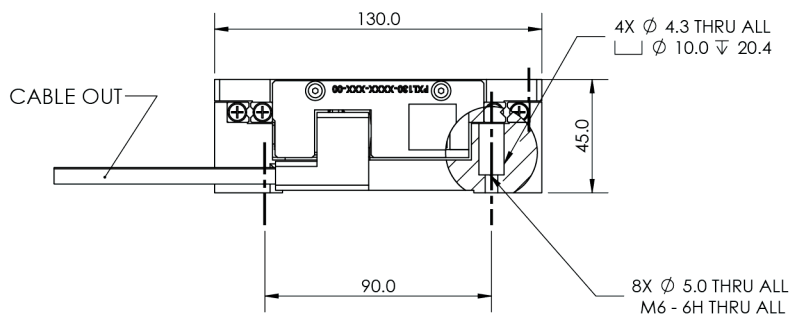
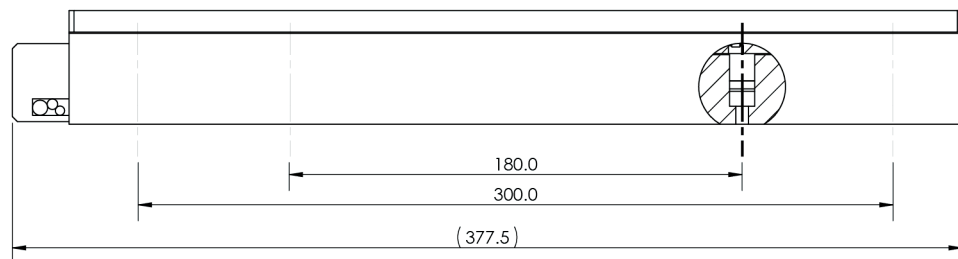
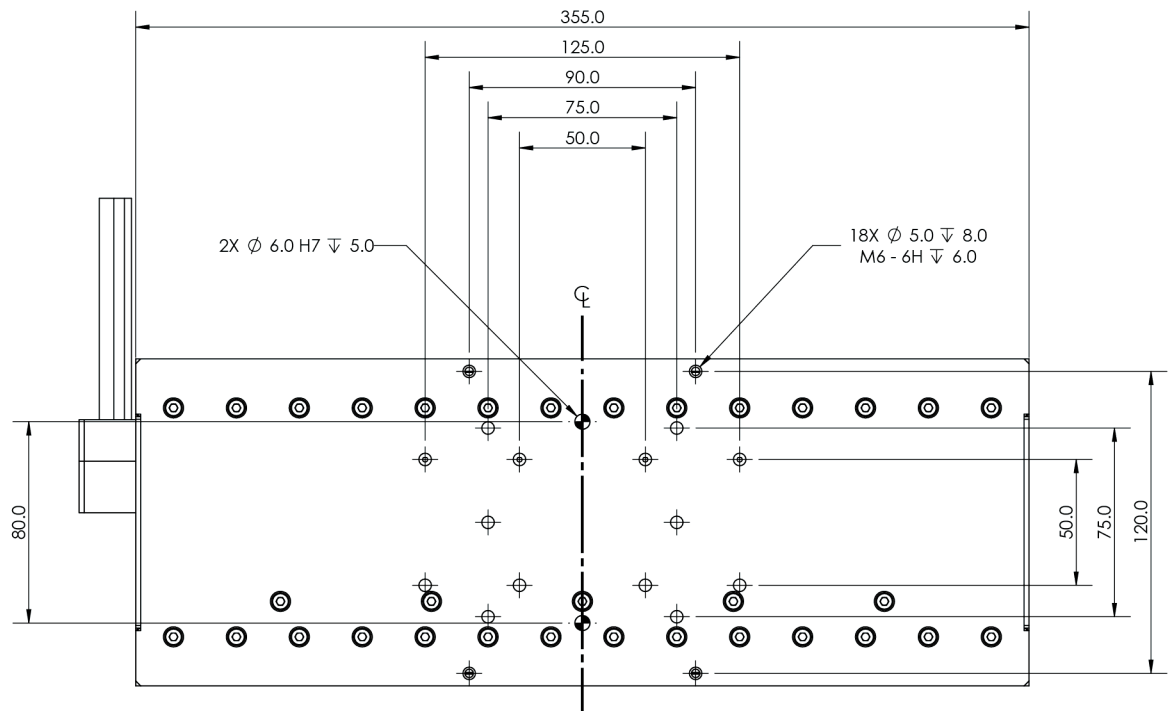
Notes:

1. Apk = 1.414 * Arms; Vpk = 1.414 * Vrms.
2. *Ambient temperature 25°C, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance - inductance +/-30%, all others +/-10% (for motor parameters).
4. Peak force and current : 4% duty ratio and 1 second duration.
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6. *** Specific straightness, flatness requirements, contact PBA for more information.
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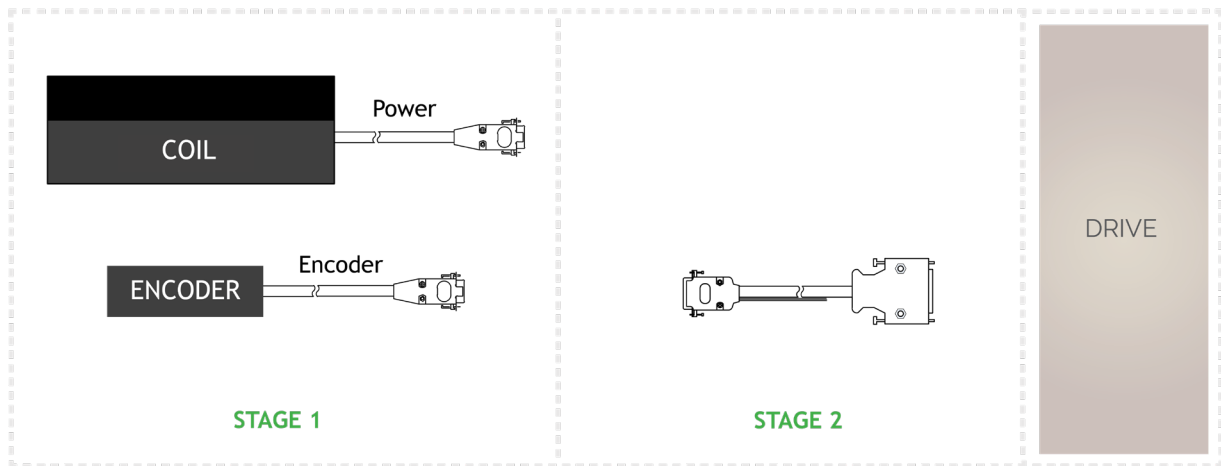




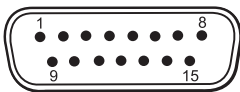




CABLE OPTION



PXL CABLE PIN OUT



APPLICATION FORM - LINEAR ACTUATOR SELECTION

Customer Name:	Date (DD/MM/YY):
Contact Email:	

■ PBA LINEAR ACTUATOR SELECTION QUESTIONNAIRE

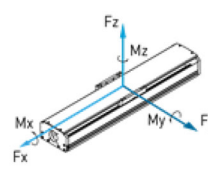
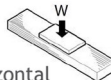
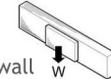
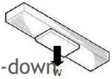
1. Application Description

1a. Application Sketch With Approx Dimensions

2. Load Parameter

Moving mass (without motor coil)		kg			
Frictional force		N			
Opposing force		N			
Mx	N.m	My	N.m	Mz	N.m

Stage Requirements

	☐ Horizontal 	☐ Vertical 
	☐ Sidewall 	☐ Upside-down 

3. Motion Parameter

		Profile 1	Profile 2	Profile 3
Moving distance	mm			
Moving time	s			
Moving velocity	m/s			
Acceleration	m/s ²			
Dwell time	s			

4. Command/Bus (Please Circle Accordingly)

Pulse and direction / Analog / EtherCAT / IO trigger / Other : _____
--

5. Encoder (Please Circle Accordingly)

Resolution	um	
Incremental / Absolute / Analog		

6. Motion Precision

Accuracy	um/mm	
Repeatability	um	

7. Mechanical Specification

Effective stroke	mm	
Flatness	um/mm	
Straightness	um/mm	
Space constraints (L x W x H)	mm	

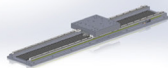
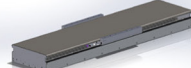
8. Working Environment

Room temperature	°C	
Clean room class		

9. Additional Requirements (Please Tick () Accordingly)

Motor cable length	Controller	Amplifier	Encoder	Other: _____
m				

10. Actuator

Open Frame	Enclosed
	

11. Remarks: If you have any special motion request for sizing procedure, please specify your requirement in below remarks.

PBA SYSTEMS LINEAR MOTOR SIZER SOFTWARE



PBA Systems is a one-stop robotics provider with a focus on the development of core technology to offer a robust range of products and solutions in precision robotics and general robotics - enabling companies to thrive by making Industry 4.0 technology accessible to the market.

Our core strength is in design, development, and manufacturing of direct drive motor design and manufacturing, motion control, and precision modular assemblies.

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PBA SYSTEMS LINEAR MOTOR SIZER SOFTWARE

PBA Systems Motor Sizer Software is available to download from our website to assist in the calculation and selection.

Kindly visit us at www.pbasystems.com.sg or simply scan the QR CODE

SIMULATED PERFORMANCE CHARTS



Application Version: 11.3 | Local Database Version: 8.0.25 | Server Database Version: 8.0.25

Guest About PBA Online

Motor Sizer

Project Details
Customer Name: PBA Customer | Project Name: Project1 | Date: 2/1/2025

Axis Details
Axis Name: X-Axis | Motor Category: DXF | Safety Margin: 20 | Actuator

Profiles

No	Motion Profile	Travel Distance (m)	Travel Time (s)	Max. Speed (m/s)	Max. Accel. (m/s^2)	Dwell Time (s)	Mass of Load (Kg)	Angle Of Incl. (°)	Direction	Coefficient of Friction	Opposing Force (N)	Ambient Temp. (°C)	RMS Force (N)	Peak Force (N)	Frictional Force (N)	Accel. Time (s)	Cruise Time (s)	Decel. Time (s)	Total Time (s)
1	Trapezoidal	0.3000	1.000	0.450	1.350	0.000	2.000	0.000	▶	0.003	0.000	30.000	2.205	2.759	0.059	0.333	0.333	0.333	1.000
2	Trapezoidal	0.1000	0.350	0.429	3.673	0.000	5.000	0.000	▶	0.003	0.000	30.000	14.998	18.514	0.147	0.117	0.117	0.117	0.350

Final Calculations for Axis

Required RMS Force	7.869 N	☐ Show AC	Recommended Motor	Safety (%)
Required Peak Force	18.514 N			
Total Travel Distance	0.400 m			
Total Cycle Time	1.350 s			
Total Dwell Time	0.000 s			
Max Speed	0.450 m/s		DX20F-C1-S	25
Max Acceleration	3.673 m/s^2		DX20F-C2-P	148
Max. Ambient Temp.	30.000 °C		DX20F-C2-S	148
			DX20F-C3-P	255
			DX20F-C3-S	255

Selected Motor
Motor: DX20F-C3-P

Continuous Force	29.00 N	L To L Resistance	3.60 ohm
Peak Force	147.00 N	L To L Inductance	0.67 mH
Continuous Current	4.51 A	Continuous Power	72.00 W
Peak Current	22.54 A	Peak Power	1805.00 W
Motor Constant	3.46 N/VW	Coil Weight	0.180 kg
Force Constant	6.50 N/A	Coil Length	91.00 mm
Back EMF Constant	7.50 V/(m/s)	Attraction Force	0.00 N

Calculated Motor Values for Application

Reqd. RMS Force	8.18 N	Reqd. Peak Force	19.18 N
Cont. Current	1.26 A	Peak Current	2.95 A
Coil Temp	34.52 °C	DC Bus Voltage	13.84 V
Safety Factor	254.64 %		

Servo Drive Model: MT-6/25-230AP1

Cont. Current: 6.30 A | Peak Current: 25.40 A

PBA GROUP

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