

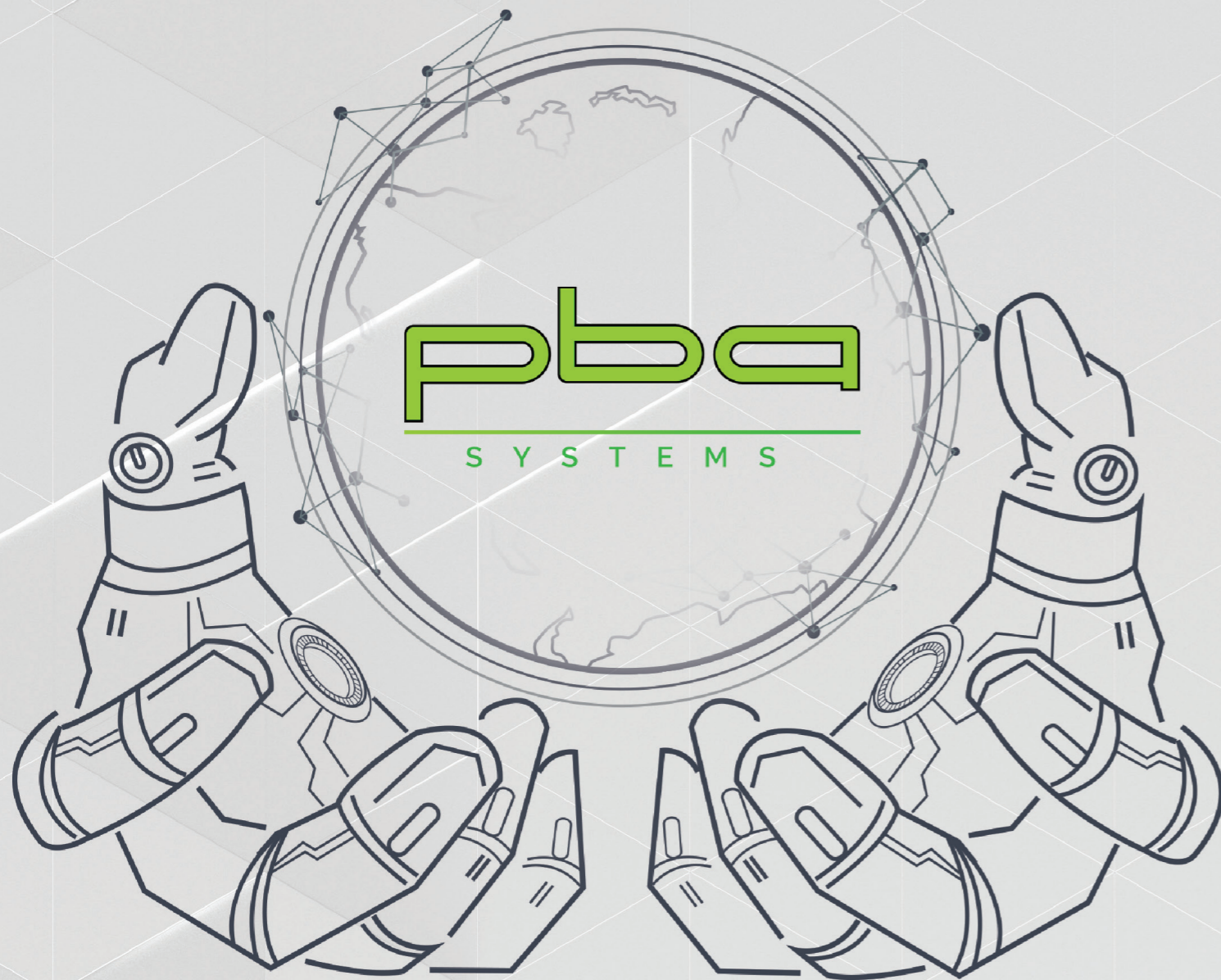
# pba

S Y S T E M S

## PLA SERIES LINEAR ACTUATOR

Product Catalogue

VERSION 1.0



## COMPANY OVERVIEW

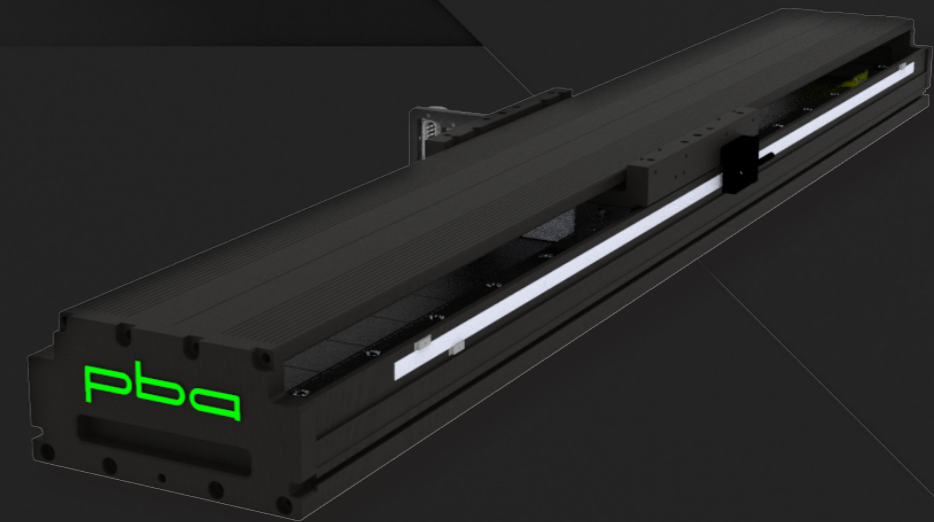
PBA Systems constantly aims for technological breakthroughs and innovations in precision robotics. Our deep knowledge and expertise lie in design and manufacturing of proprietary direct drive motors, stages, motion control and precision systems - delivering solutions for different automation requirements.

A one-stop solution provider, PBA Systems also provides automation/motion control & mechanical components. With more than three decades of track record in the industry, PBA Systems has built a highly skilled team of sales engineers & product specialists in order to provide our customers with the best support. PBA Systems offers mechanical precision components such as bearing solutions, linear systems & other OEM equivalent parts. Our well-established global network enables us to price our products at competitive rates.

PBA Systems is an ISO 9001:2015 certified company (Cert No. 2016-1-0962), and a member of PBA Group of Companies - a Robotics and Automation enabler in Southeast Asia. PBA Group (PBA: Platform for Bots and Automation) focuses on developing our core technology - building robotics products and offering turnkey automation solutions to help businesses scale up with Industry 4.0 (I4.0) technology.

[www.pbasystems.com.sg](http://www.pbasystems.com.sg)

For enquiries, please email us at [sales@pbasystems.com.sg](mailto:sales@pbasystems.com.sg) or call us at +65 6576 6766



## PLA SERIES PRECISION LINEAR ACTUATOR

# HIGH SPEED HIGH PRECISION



The PLA Actuator Series is built with enhanced specifications for high-performance production applications to improve productivity through uncompromised speed and precision.

The key notable features of the PLA Actuator are compact-size, high-speed, high precision, and zero backlash, especially when compared to traditional actuators with ball screws.

Bringing high accuracy and high repeatability to the applications the PLA Series is designed for - ranging from precision pick-and-place to automated optical inspection - the actuator is also a low-maintenance solution which is suitable for clean environment applications.

This precision-driven linear solution offers a modular actuator inclusive of precision linear encoders and linear guideways. These modules offer optimal acceleration/velocity possibilities and rigidity that allows for faster settling, accuracy and highly repeatable positioning. The PLA actuator is configurable as open frame systems for basic applications as well as partially enclosed.

The PLA Series Linear Actuators come with a selection of either the DXF Ironless or the PIX Ironcore Linear Motors, two of our proprietary direct drive products, depending on each application and its required features.

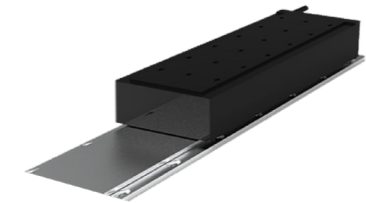
*Cogging is a result of the iron core motor design. It is caused by the interaction between the edges of the permanent magnet and the motor. Permanent magnets in conventional iron core motors produce an attraction force to all magnetic materials. The effect of this attraction is that the iron core motor then has "set" positions relative to the magnets, and the motor has to adjust its thrust force to overcome these positions. This results in a motion which is not as smooth when compared to that of an ironless linear motor, as well as velocity ripple.*

## PIX B Series Ironcore Linear Motors

**PIX Ironcore motors** offer an affordable high-force solution to demanding linear applications with a unique anti-cogging design, removing an issue that is associated with traditional ironcore linear motors. They are designed for optimal dissipation of heat and thus capable of extremely high forces. PBA's PIX B Series ironcore linear motor is designed with proprietary, unique anti-cogging features, which results in low velocity ripple and higher stability.

For applications requiring:

- Higher force
- Smooth motion with anti-cogging features
- Zero backlash
- Cleanroom environment

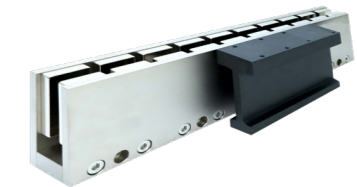


## DX F Series Ironless Linear Motors

**DX F Ironless linear motors** feature an ironless patented overlapping winding formers which provides an excellent force density vs coil size ratio, resulting in high-force and acceleration generation for a smoother motion and high stability.

For applications requiring:

- High precision
- High dynamic response
- Low velocity ripple
- Compact-size



For applications requiring:

- Compact module that ready for plug and play
- Constant performance even for long travel stroke
- Cost effective solution
- High accuracy and Repeatability
- Low maintenance
- Suitable for cleanroom environment applications

# OVERVIEW

## APPLICATIONS



Laser-cutting process



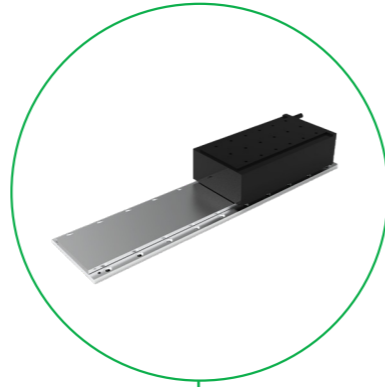
AOI Inspection



Multiple end effector on same axis



High-speed Pick-and-Place



## FEATURES



High Speed



High Precision



Anti-Cogging Design



Long stroke



Zero Backlash

### Carriage Options

Multiple carriages available for customisation upon customers request.



Carriage

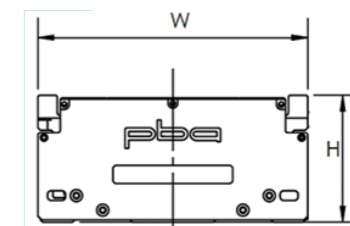
Specially designed, to serve your low-velocity ripple and low-vibration.

Linear Guide

Class 1,000/  
10,000

### Compact Size

Provides a compact size with the smallest dimension of 140mm\*74mm (W\*H).



Volume

One of the most compact and high-force actuators in the market

Designed with cover and minimal opening for clean environment friendly.

Frame Body

### Encoder Options

We have various types of encoders to choose from - optical incremental digital encoders, optical incremental analog encoders and optical absolute encoders.

Encoder



UL Empowered Motor

# FEATURES



## 1 High Payload

High-density coil design given our actuator capability to carry high load object. Suitable for high-speed transportation of large-volume objects.

**Max. Payload  
up to 90kg**

## 2 High Repeatability

Zero backlash actuator that is able to meet a high repeatability.

Comparison of actuators accuracy	Linear motor module	Ballscrew module	
	Resolution 0.01µm optical encoder	C7 ballscrew	C5 ground ballscrew
Repeatability	±1µm	±5µm	±3µm

	Encoder Option			
	Digital 1µm	Digital 0.1µm	Analog	Absolute 0.05µm
Repeatability	±2µm	±1µm		

## 3 Stroke Available

Standard stroke up to 1240mm. Customise stroke available up to 3500mm.

PIX motor

**Max. Stroke  
1192 mm**

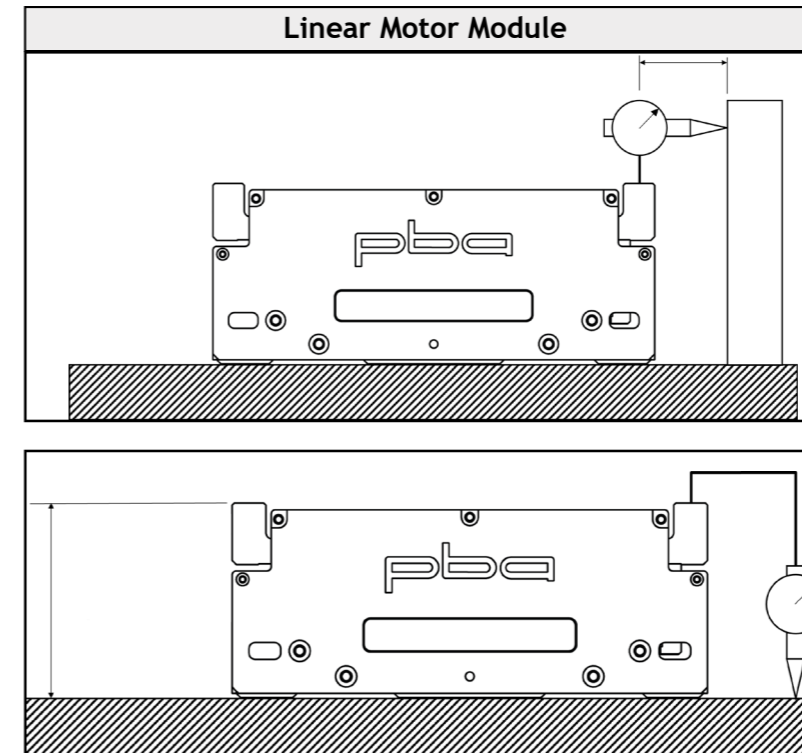
DX motor

**Max. Stroke  
1240 mm**

## 4 Stable Movement with Low Cogging

For high-stability applications, our actuator is the best choice. As it specially-designed to suppress the velocity ripple during operation. At 500 mm/s speed, the actuator can achieve velocity ripple of +/- 0.2%.

## 5 Straightness & Flatness

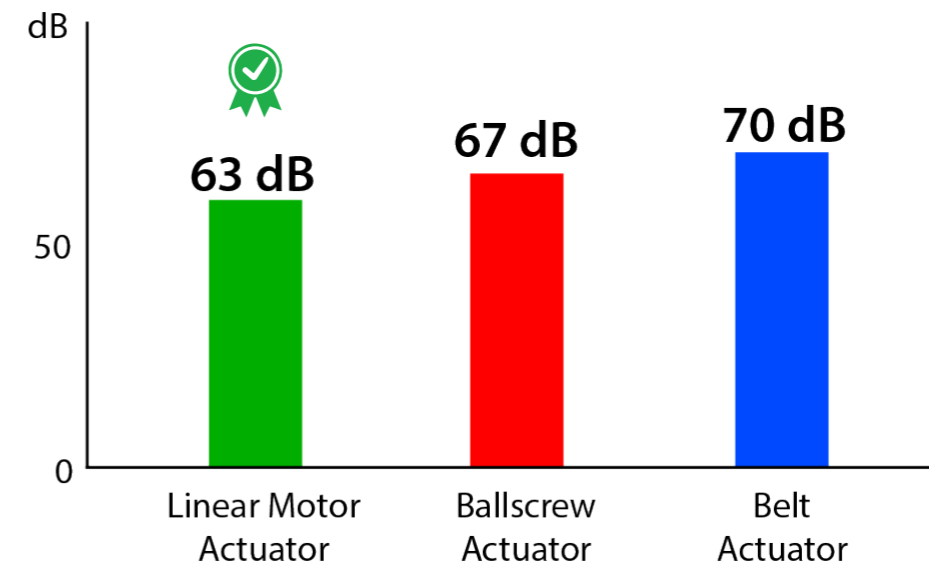


**Straightness  
10µm/500mm**

**Flatness  
20µm/500mm**

**Can be customised according to request**

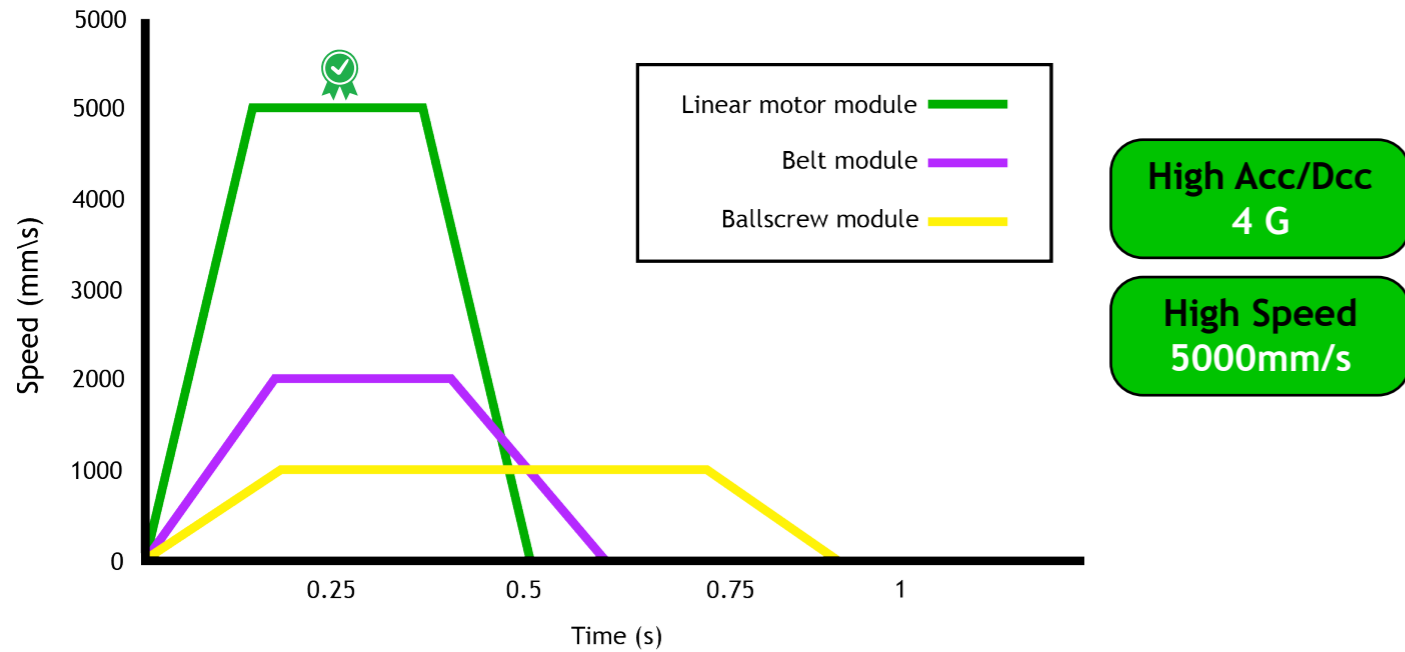
## 6 Low Noise Level



Noise comparison between linear motor actuator, ballscrew actuator and belt actuator (The test condition is 500 mm/s).

## 7 High Speed & Acceleration

The linear motor can achieve maximum acceleration and deceleration of 4 G and maximum speed of 5000 mm/s, which greatly shortens the reciprocating movement time and increases the production efficiency of the equipment.



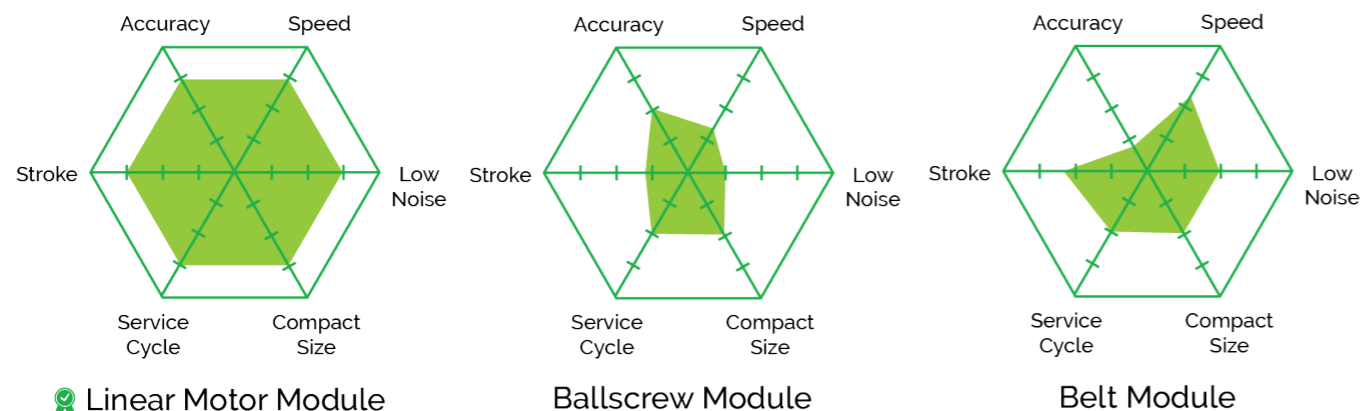
High Acc/Dcc  
4 G

High Speed  
5000mm/s

## 8 High Durability & Low Maintenance

Generally, the actuator is driven by the ball-screw and belt and the ball-screw will be damaged after long-term use. The belt type actuator needs to be tightened at a fixed time each year to maintain accuracy. The linear motor actuator has no drive components to wear and can maintain the system accuracy of the whole machine for a long time.

## 9 Achievement of Optimal Performance



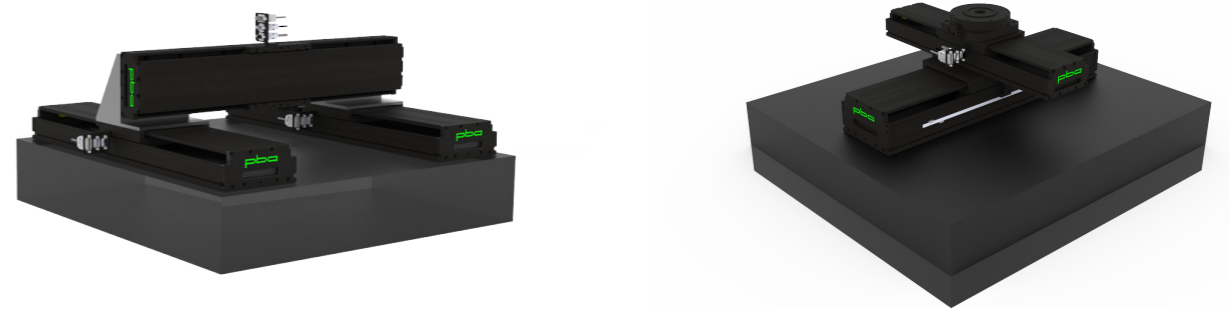
Linear Motor Module

Ballscrew Module

Belt Module

## 10 Multiple Choices & Flexible Customisation

Possess the flexibility to mix and match to form the desired design that suite your application with compact size.



Capability to have multiple carriages on a single axis. Traditional ballscrew does not have the option to do so. It will need at least 2 ballscrews to achieve this application which will increase the cost significantly.



## 11 Low Cost/Performance Ratio & Shorter Lead Time

We provide faster delivery with effective lead time for all our proprietary actuators and linear motors, due to most components being designed and built in our manufacturing facilities - with effective cost control, on top of ISO-certified quality control, resulting in delivery of optimal value with cost-effective solutions.

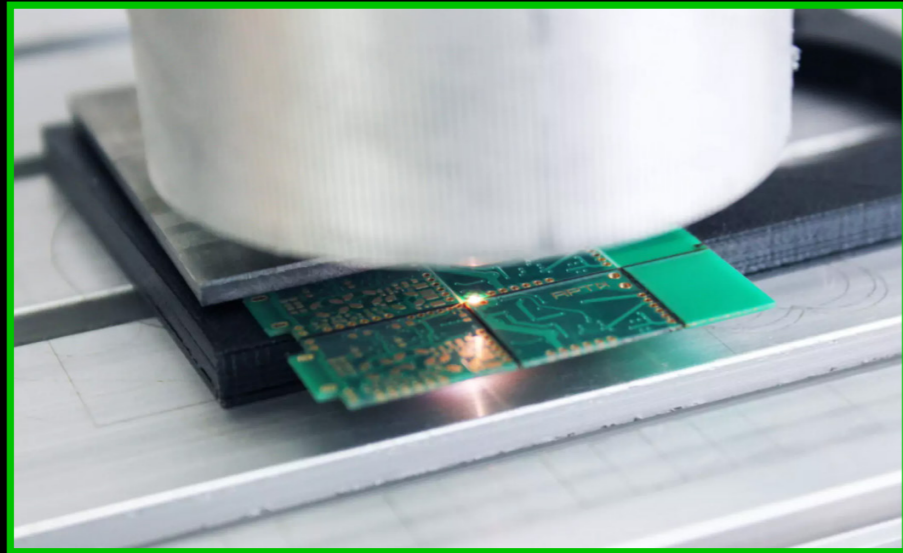
Cost-effective

Shorter lead time

Customisation

Proprietary components made in-house

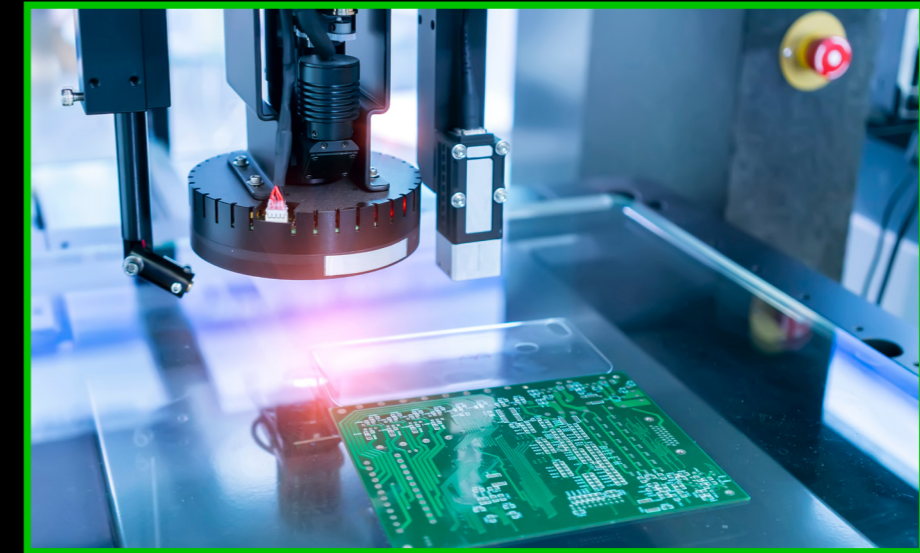
# APPLICATIONS



## Laser Cutting Machine

Mount Laser Head on to the axes and move around XY axes for cutting the PCB into pieces. Constant velocity is required for the process.

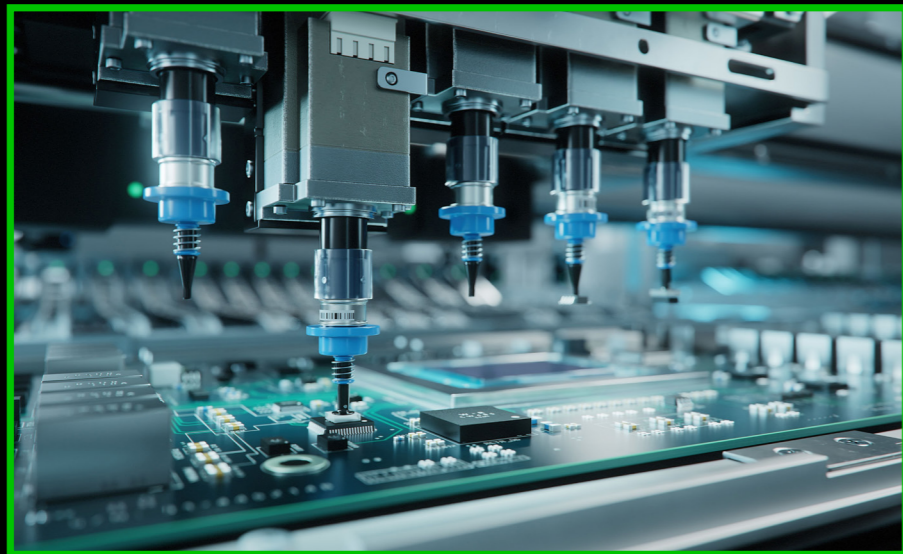
\*Recommended Model: PLA180-DX30F & PLA220-DX50F



## Inspection Machine

Vision Inspection applications require high-stability movement for good image-capturing to prevent error in inspection due to blurry image, especially in on-the-fly scanning processes.

\*Recommended Model: PLA180-DX30F & PLA220-DX50F



## PCB Assembly Machine

Multiple components are being soldered to PCB board, therefore a multiple carriage system mounted with end effector can highly increase your productivity with fast pace to insert the component to the PCB board for soldering.

\*Recommended Model: PLA180-PIX & PLA220-PIX



## Dispenser Machine

Dispensing process requires high accuracy and repeatability to ensure good distribution of precise micro fluid. Zero backlash system is a must in the application is a must. By mounting the dispenser head to the actuator and forming XY axes can provide a high-speed system with high-accuracy and high-repeatability features.

Recommended Model: PLA180-PIX & PLA220-PIX

# PLA SERIES

## PRECISION LINEAR ACTUATOR

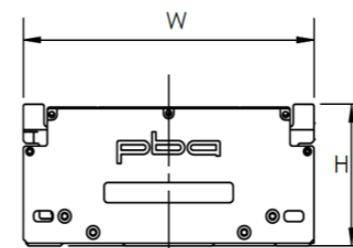


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### PLA Series - Specification table

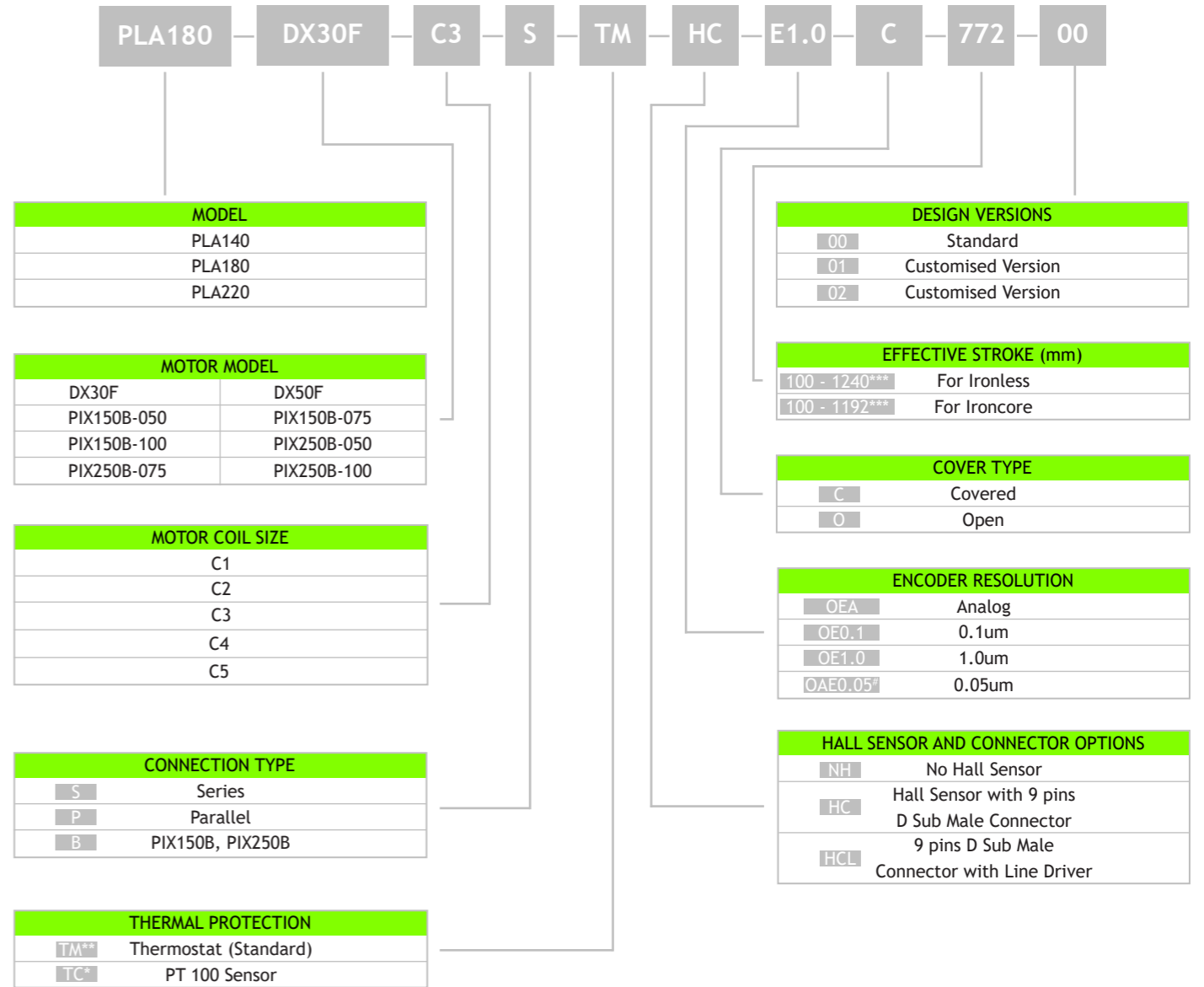
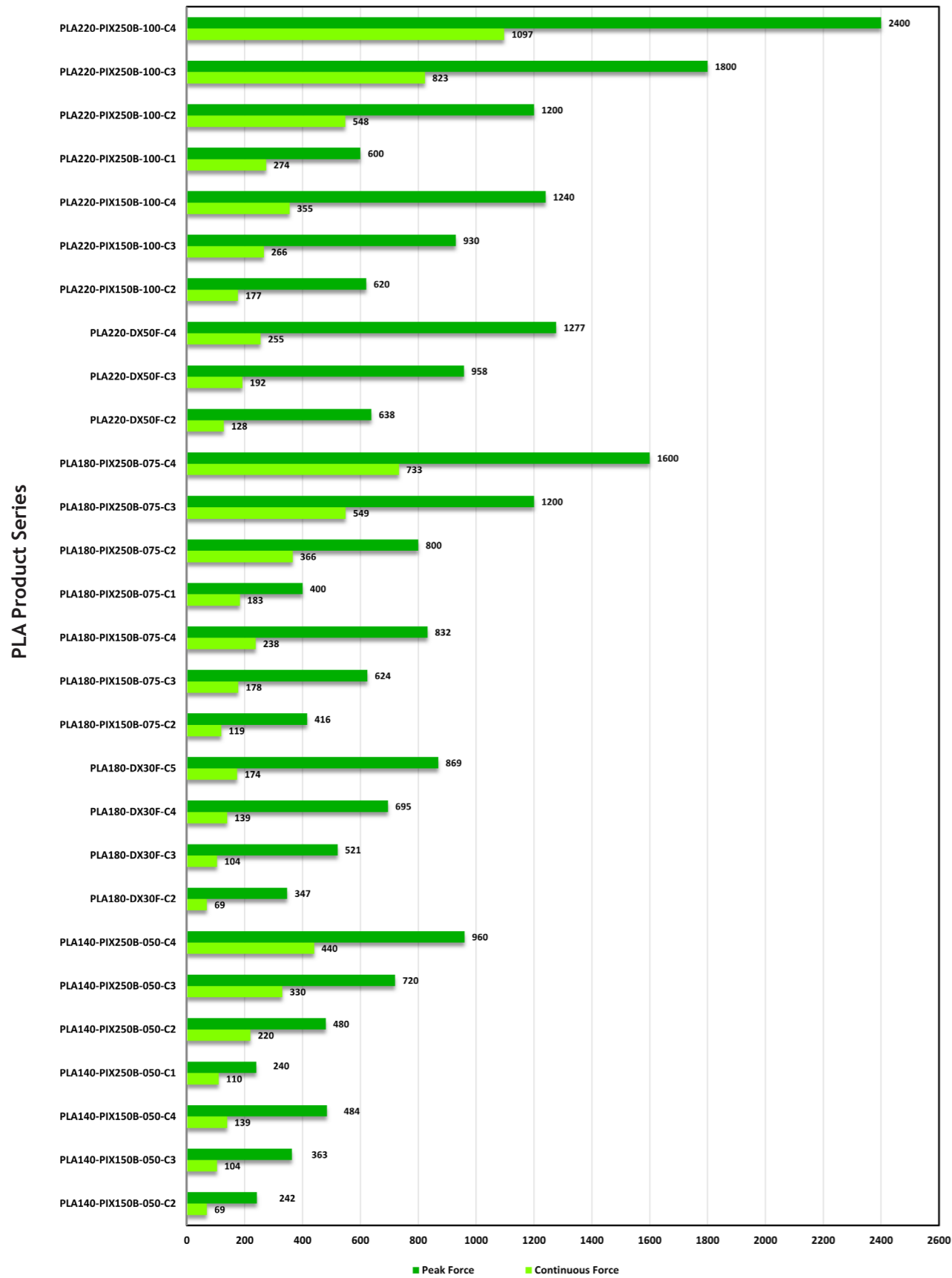
Model	Motor Series	Motor Coil	Effective Stroke (mm)	Continuous Force (N)	Peak Force (N)	Actuator Dimensions W x H (mm)	
PLA140	Ironcore Linear Motor PIX150B	PIX150B-050-C2	100 - 1192 (In increment of 84mm)	69	242	140 X 74	
		PIX150B-050-C3		104	363		
		PIX150B-050-C4		139	484		
	Ironcore Linear Motor PIX250B	PIX250B-050-C1	100 - 1192 (In increment of 84mm)	110	240	140 X 101	
		PIX250B-050-C2		220	480		
		PIX250B-050-C3		330	720		
PLA180	Ironless Linear Motor DX30F	DX30F-C2	100 - 1240 (In increment of 60mm)	69	347	180 X 81	
		DX30F-C3		104	521		
		DX30F-C4		139	695		
		DX30F-C5		174	869		
	Ironcore Linear Motor PIX150B	PIX150B-075-C2	100 - 1192 (In increment of 84mm)	119	416	180 X 81	
		PIX150B-075-C3		178	624		
		PIX150B-075-C4		238	832		
	Ironcore Linear Motor PIX250B	PIX250B-075-C1	100 - 1192 (In increment of 84mm)	183	400	180 X 108	
		PIX250B-075-C2		366	800		
		PIX250B-075-C3		549	1200		
	PLA220	Ironless Linear Motor DX50F	DX50F-C2	100 - 1240 (In increment of 60mm)	128	638	225 X 91.7
			DX50F-C3		192	958	
DX50F-C4			255		1277		
Ironcore Linear Motor PIX150B		PIX150B-100-C2	100 - 1192 (In increment of 84mm)	177	620	225 X 91.7	
		PIX150B-100-C3		266	930		
		PIX150B-100-C4		355	1240		
Ironcore Linear Motor PIX250B		PIX250B-100-C1	100 - 1192 (In increment of 84mm)	274	600	225 X 105	
		PIX250B-100-C2		548	1200		
		PIX250B-100-C3		823	1800		
		PIX250B-100-C4		1097	2400		



Note: Continuous force is measured under natural convection, refer to the detail parameters table for more information



Force Chart For PLA Series Actuator



\* TC - Sensor output to temperature controller  
 \*\* TM - ON/Off switch, Triggers at 100 C  
 \*\*\* Customized Max Stroke 3500mm  
 #BiSS (Default), please contact PBA for other option

OEA - Optical Incremental Analog Encoder  
 OE - Optical Incremental Digital Encoder  
 OAE - Optical Absolute Encoder

# PLA140 SERIES

Ironcore Linear Motor

## PLA140-PIX150B-050

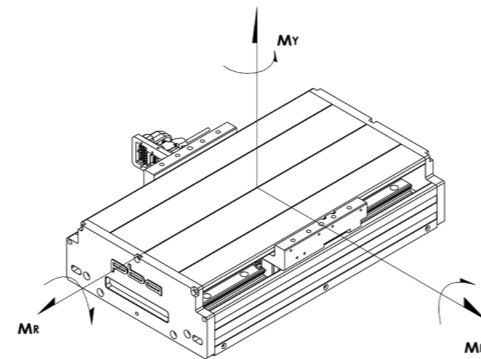
- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 484N, Continuous force up to 139N
- Modular Hall Sensor
- Anti-Cogging Function



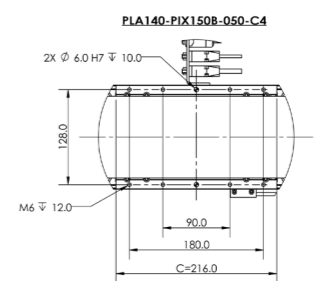
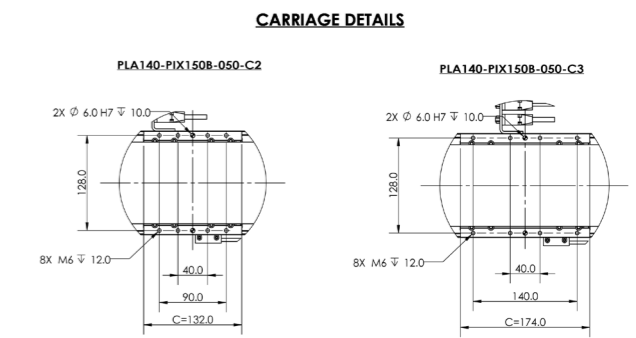
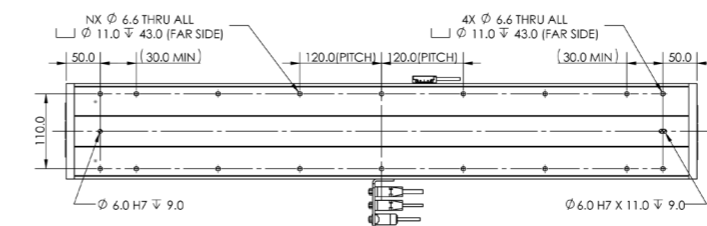
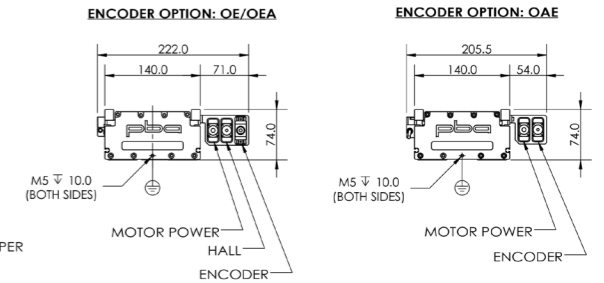
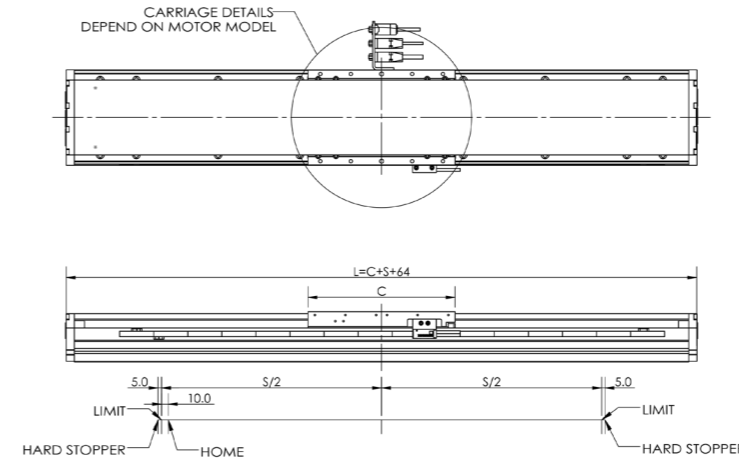
SPECIFICATION		MODEL		
Motor Series		PIX150B-050-C2	PIX150B-050-C3	PIX150B-050-C4
Motor Specification	Unit			
Peak Force	N	242	363	484
Continuous Force @ 100°C*	N	69	104	139
Peak Current	A <sup>pk</sup>	12.7	12.7	25.4
Continuous Current @ 100°C*	A <sup>pk</sup>	3.3	3.3	6.5
Force Constant	N/A <sup>pk</sup>	21.3	32.0	21.3
Back EMF Constant	V <sup>pk</sup> /m/s	24.6	36.9	24.6
<b>Mechanical Specification</b>				
Effective Stroke**	mm	100 - 1192		
In increment of stroke	mm	84		
Bidirectional Repeatability	Encoder: 1um Resolution	±2		
	Encoder: 0.1um			
	Encoder: Analog	±1		
	Absolute Encoder 0.05um			
Straightness	um	10um/500mm		
Flatness	um	20um/500mm		
Moving Mass without Payload	kg	1.9	2.3	2.7
Rated Payload***	kg	10.0	20.0	20.0
<b>Static Moments</b>				
Max Yaw Moment M <sub>Y</sub>	Nm	60	151	205
Max Roll Moment M <sub>R</sub>	Nm	120	120	120
Max Pitch Moment M <sub>P</sub>	Nm	60	151	205

**Note:**

1.  $A_{pk} = 1.414 * Arms$ ;  $V_{pk} = 1.414 * Vrms$
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH .
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



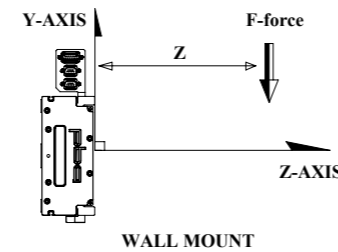
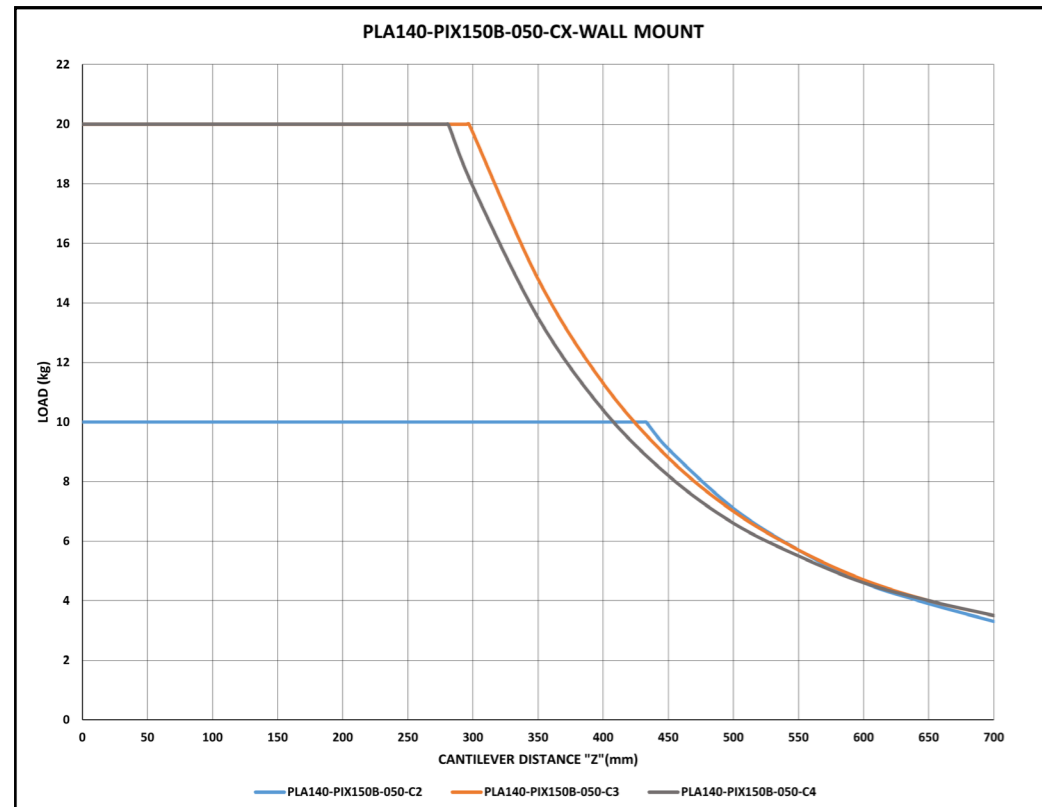
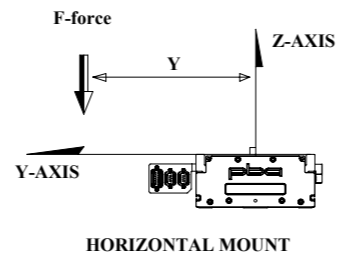
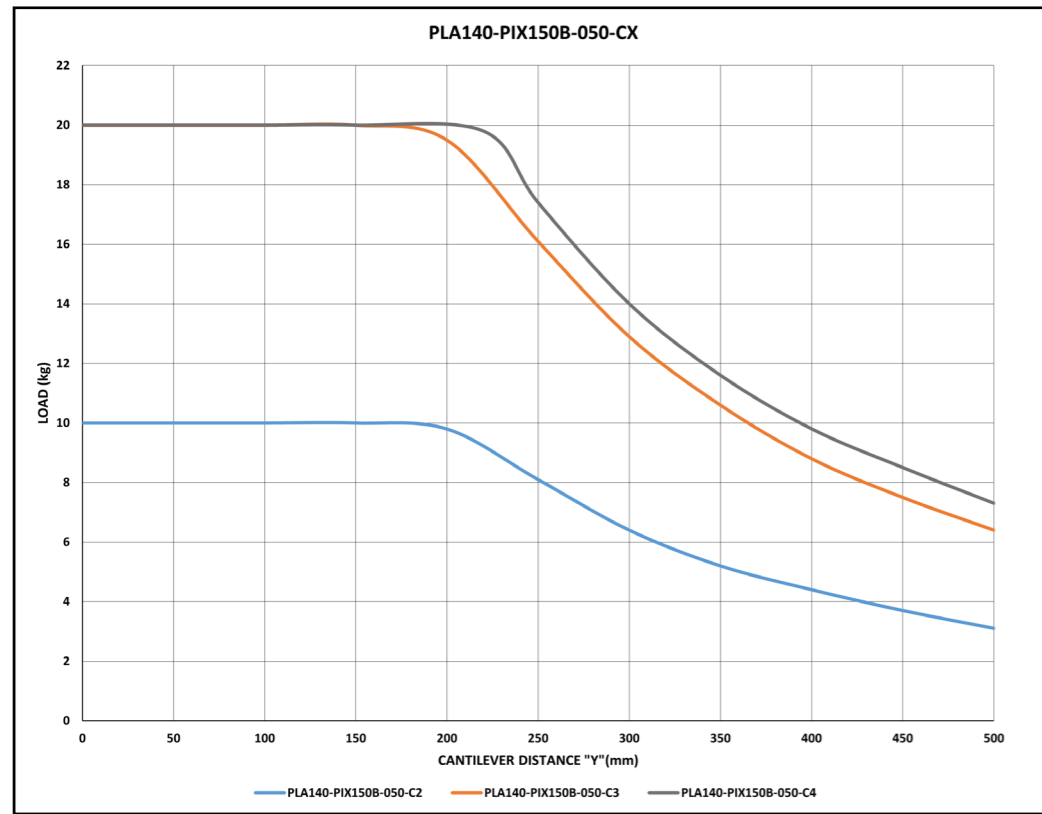
# PLA140-PIX150B-050



- Note:**
1. S = ACTUATOR STROKE
  2. L = ACTUATOR LENGTH
  3. C = CARRIAGE LENGTH (REFER TO CARRIAGE DETAILS)
  4. N = NO. OF 120MM PITCH CBORE HOLES FROM CENTER
  5. ACTUATOR MAIN BODY MATERIAL = BLACK ANODIZED ALUMINIUM
  6. FOR ABSOLUTE ENCODERS, HALL SENSOR, LIMIT SENSOR AND HOME SENSOR WILL NOT BE NECESSARY FOR THE ACTUATOR
  7. TOP MOUNTING APPLIED ON STANDARD ACTUATOR, FOR BOTTOM MOUNTING, PLEASE CONTACT PBA FOR CUSTOMISATION

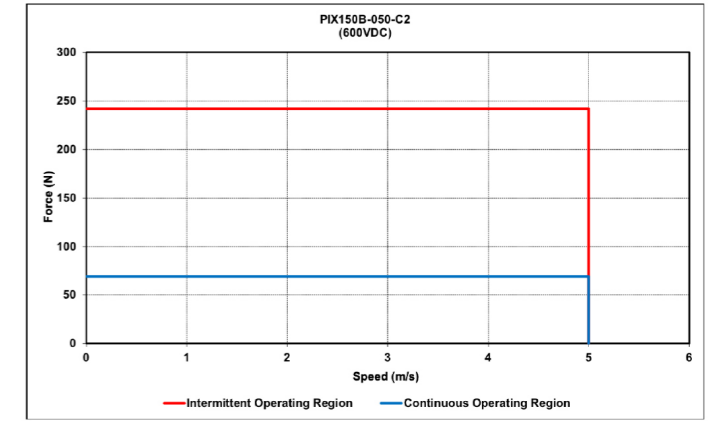
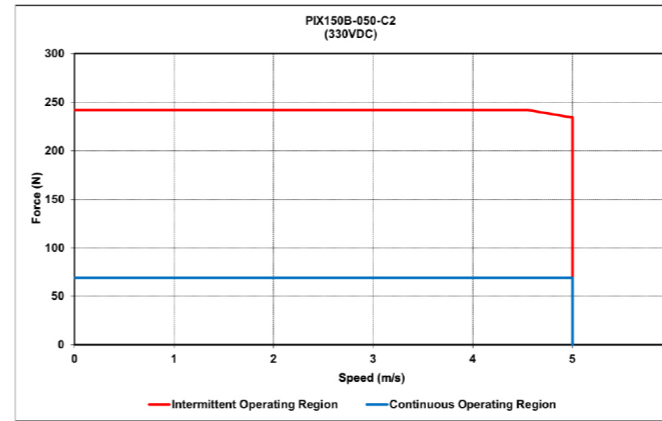
Effective Stroke (S) mm	Actuator PLA140					
	PIX150B-050-C2		PIX150B-050-C3		PIX150B-050-C4	
	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg
100	296	6.0	338	6.9	380	7.9
184	380	7.0	422	7.9	464	8.9
268	464	8.0	506	8.9	548	9.9
352	548	9.0	590	9.9	632	10.8
436	632	10.0	674	10.9	716	11.8
520	716	11.0	758	11.9	800	12.8
604	800	12.0	842	12.9	884	13.8
688	884	13.0	926	13.9	968	14.8
772	968	14.0	1010	14.9	1052	15.8
856	1052	15.0	1094	15.9	1136	16.8
940	1136	15.9	1178	16.9	1220	17.8
1024	1220	16.9	1262	17.9	1304	18.8
1108	1304	17.9	1346	18.9	1388	19.8
1192	1388	18.9	1430	19.9	1472	20.8

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA140-PIX150B-050

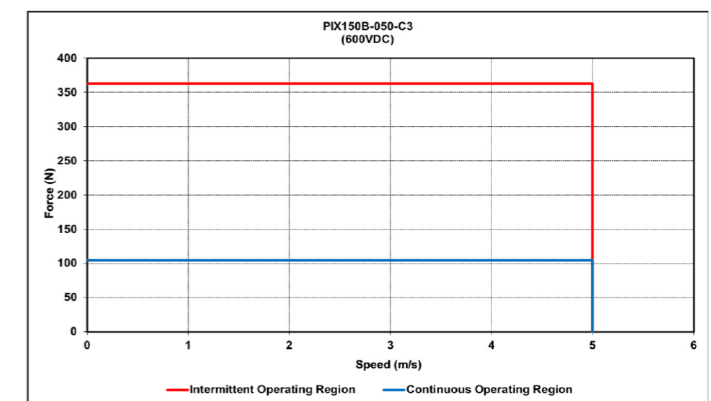
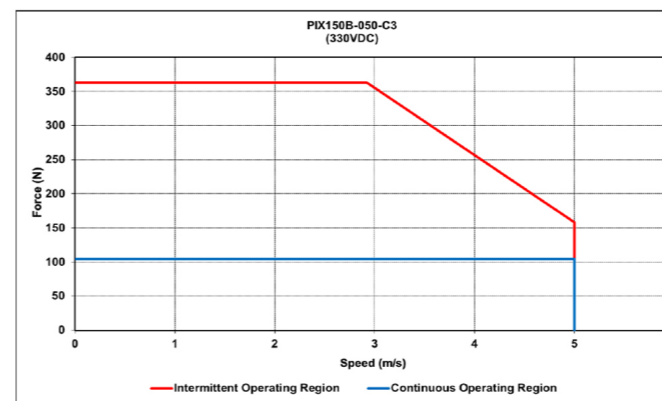


# GRAPH: FORCE VS SPEED FOR PLA140-PIX150B-050

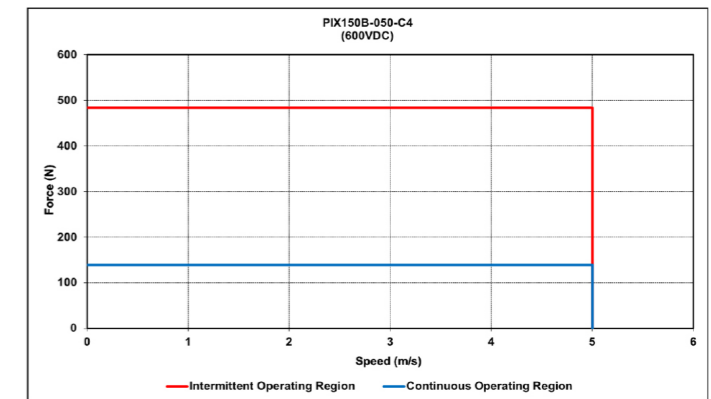
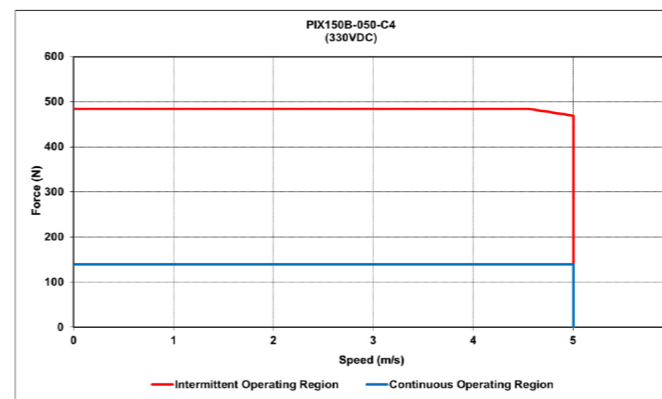
## PIX150B-050-C2



## PIX150B-050-C3



## PIX150B-050-C4



# PLA140 SERIES

Ironcore Linear Motor

## PLA140-PIX250B-050

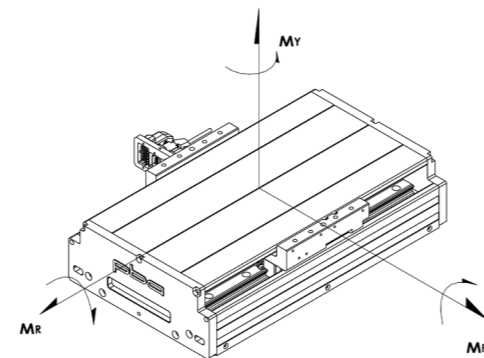
- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 960N, Continuous force up to 440N
- Modular Hall Sensor
- Anti-Cogging Function



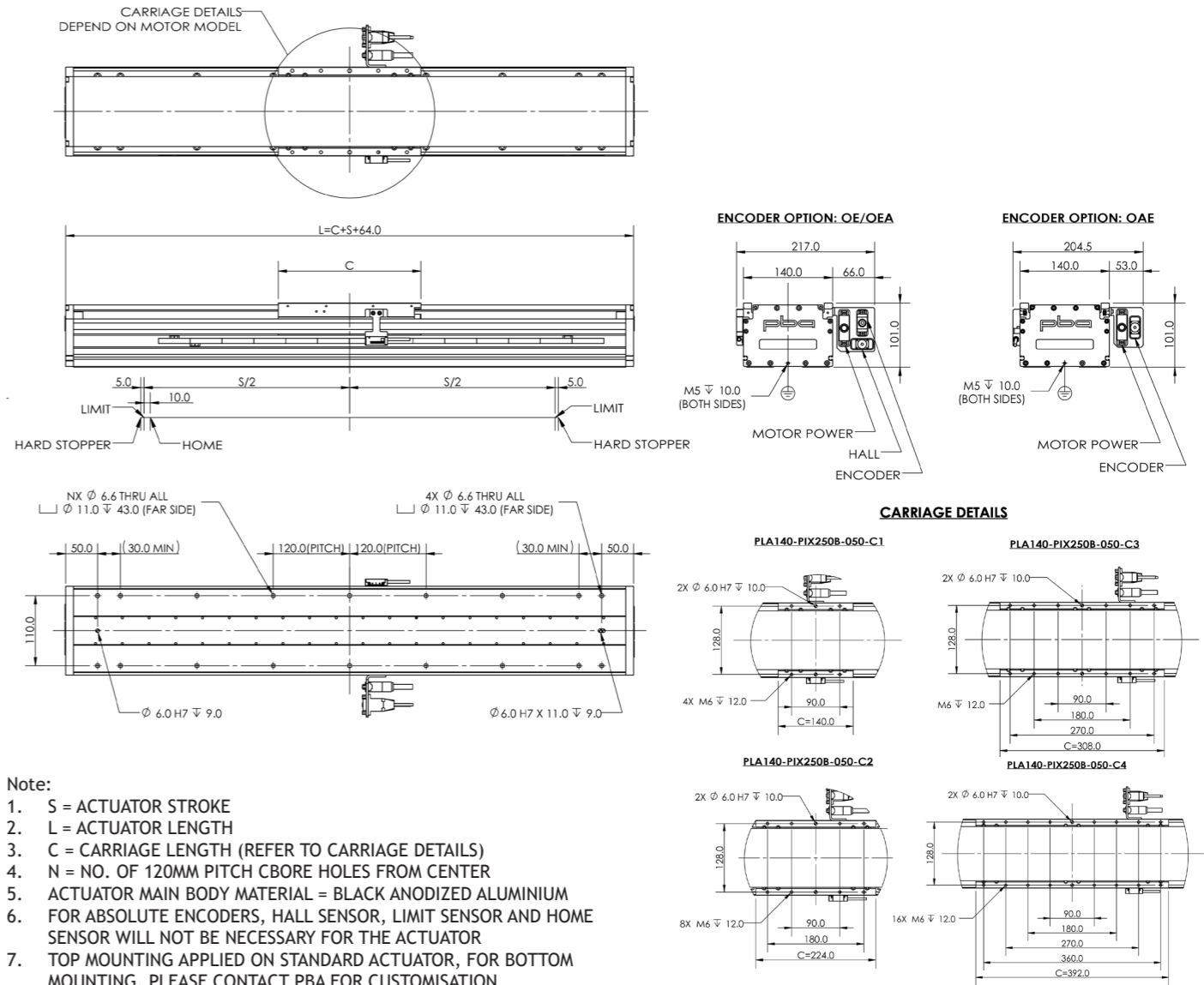
SPECIFICATION		MODEL			
		PIX250B-050-C1	PIX250B-050-C2	PIX250B-050-C3	PIX250B-050-C4
Motor Series					
Motor Specification	Unit				
Peak Force	N	240	480	720	960
Continuous Force @ 100°C*	N	110	220	330	440
Peak Current	A <sup>pk</sup>	20.4	20.4	20.4	40.7
Continuous Current @ 100°C*	A <sup>pk</sup>	6.8	6.8	6.8	13.6
Force Constant	N/A <sup>pk</sup>	16.2	32.4	48.6	32.4
Back EMF Constant	V <sup>pk</sup> /m/s	18.7	37.4	56.1	37.4
<b>Mechanical Specification</b>					
Effective Stroke**	mm	100 - 1192			
In increment of stroke	mm	84			
Bidirectional Repeatability	Encoder: 1um Resolution	±2			
	Encoder: 0.1um				
	Encoder: Analog	±1			
	Absolute Encoder 0.05um				
Straightness	um	10um/500mm			
Flatness	um	20um/500mm			
Moving Mass without Payload	kg	3.1	4.7	6.7	8.3
Rated Payload***	kg	10.0	20.0	20.0	30.0
<b>Static Moments</b>					
Max Yaw Moment M <sub>Y</sub>	Nm	105	213	241	321
Max Roll Moment M <sub>R</sub>	Nm	120	120	120	120
Max Pitch Moment M <sub>P</sub>	Nm	105	213	241	321

Note:

1. Apk = 1.414 \* Arms; Vpk = 1.414 \* Vrms
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH.
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



# PLA140-PIX250B-050

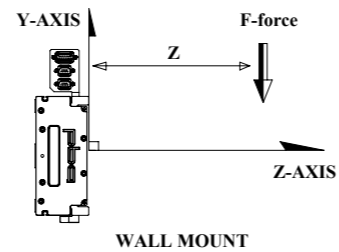
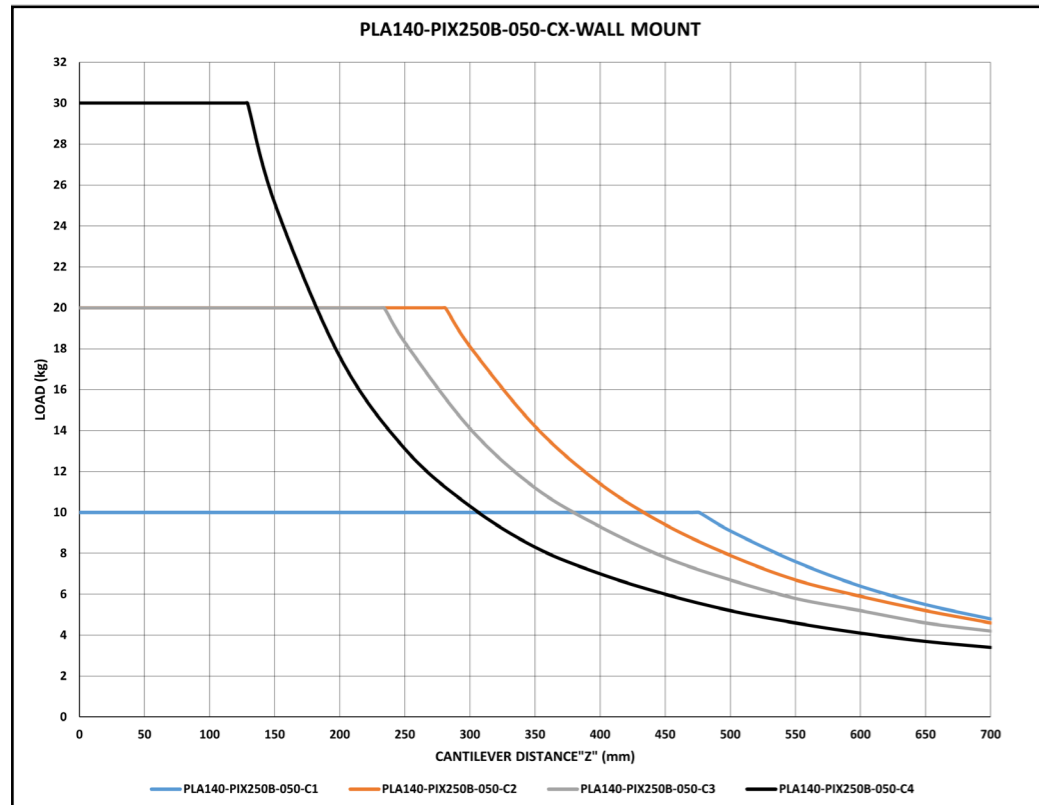
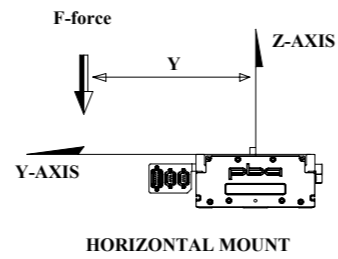
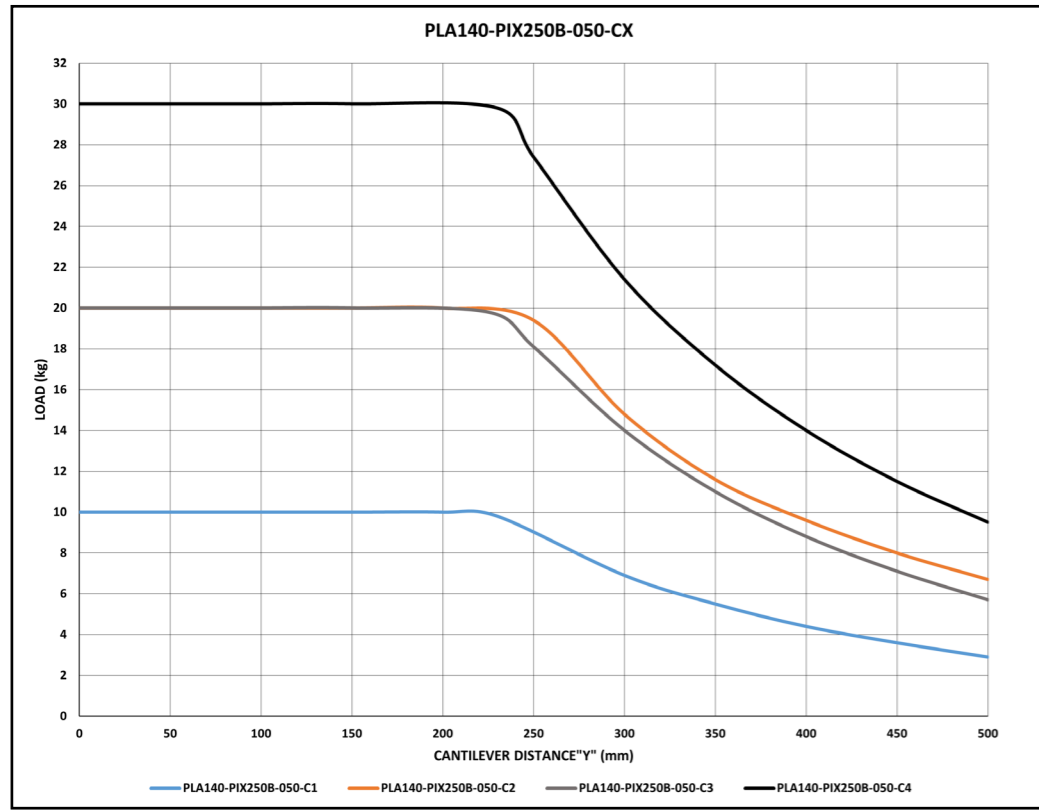


Note:

1. S = ACTUATOR STROKE
2. L = ACTUATOR LENGTH
3. C = CARRIAGE LENGTH (REFER TO CARRIAGE DETAILS)
4. N = NO. OF 120MM PITCH CBORE HOLES FROM CENTER
5. ACTUATOR MAIN BODY MATERIAL = BLACK ANODIZED ALUMINIUM
6. FOR ABSOLUTE ENCODERS, HALL SENSOR, LIMIT SENSOR AND HOME SENSOR WILL NOT BE NECESSARY FOR THE ACTUATOR
7. TOP MOUNTING APPLIED ON STANDARD ACTUATOR, FOR BOTTOM MOUNTING, PLEASE CONTACT PBA FOR CUSTOMISATION

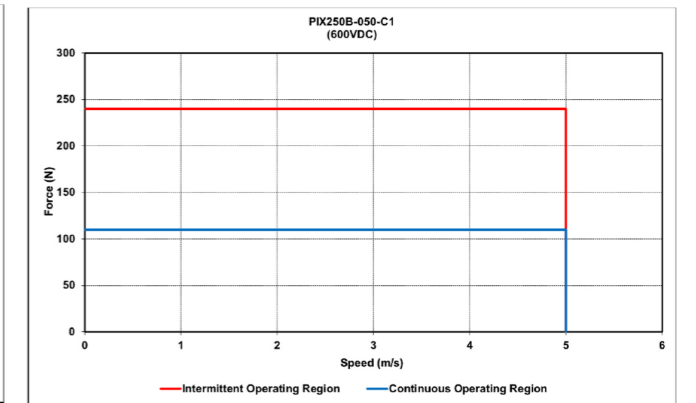
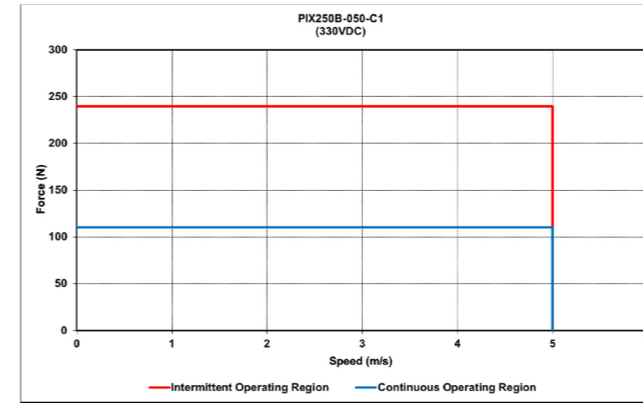
Effective Stroke (S) mm	Actuator PLA140							
	PIX250B-050-C1		PIX250B-050-C2		PIX250B-050-C3		PIX250B-050-C4	
	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg
100	304	7.4	388	10.1	472	13.0	556	15.6
184	388	8.4	472	11.1	556	14.0	640	16.6
268	472	9.4	556	12.0	640	14.9	724	17.6
352	556	10.4	640	13.0	724	15.9	808	18.5
436	640	11.4	724	14.0	808	16.9	892	19.5
520	724	12.4	808	15.0	892	17.9	976	20.5
604	808	13.4	892	16.0	976	18.9	1060	21.5
688	892	14.4	976	17.0	1060	19.9	1144	22.5
772	976	15.3	1060	18.0	1144	20.9	1228	23.5
856	1060	16.3	1144	19.0	1228	21.8	1312	24.5
940	1144	17.3	1228	19.9	1312	22.8	1396	25.4
1024	1228	18.3	1312	20.9	1396	23.8	1480	26.4
1108	1312	19.3	1396	21.9	1480	24.8	1564	27.4
1192	1396	20.3	1480	22.9	1564	25.8	1648	28.4

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA140-PIX250B-050

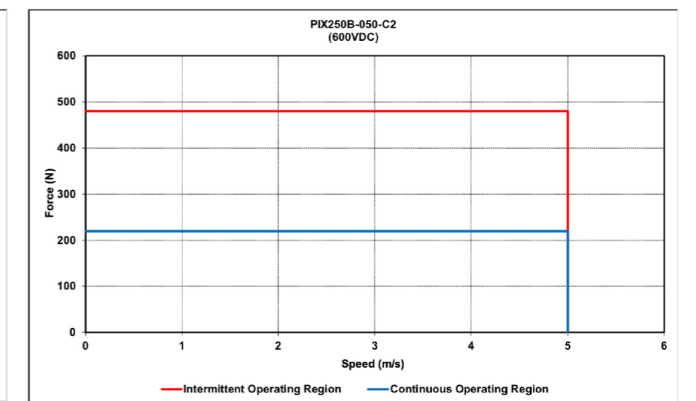
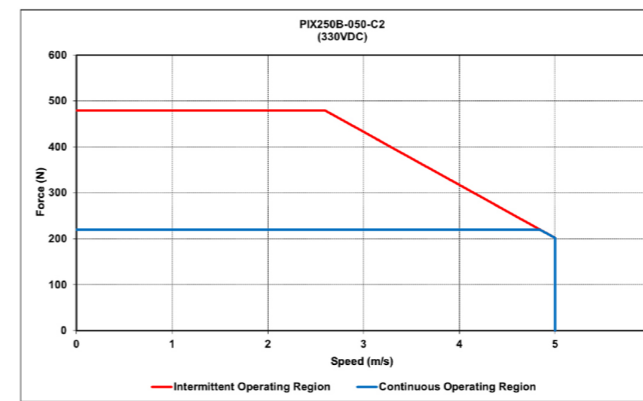


# GRAPH: FORCE VS SPEED FOR PLA140-PIX250B-050

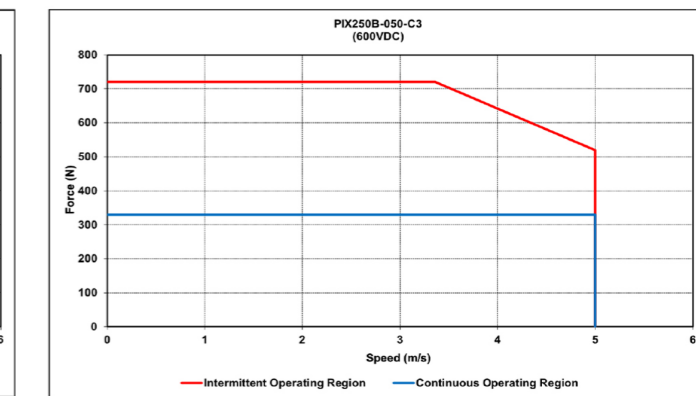
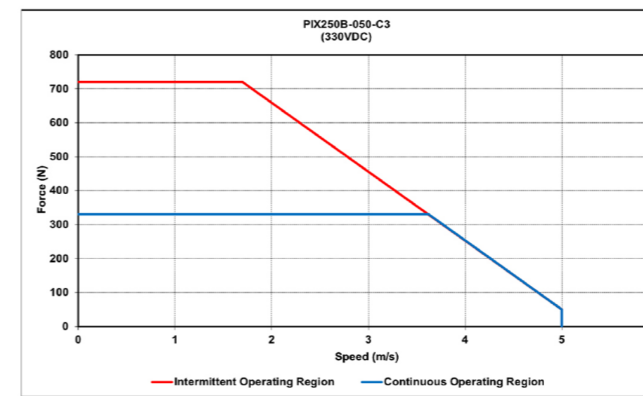
## PIX250B-050-C1



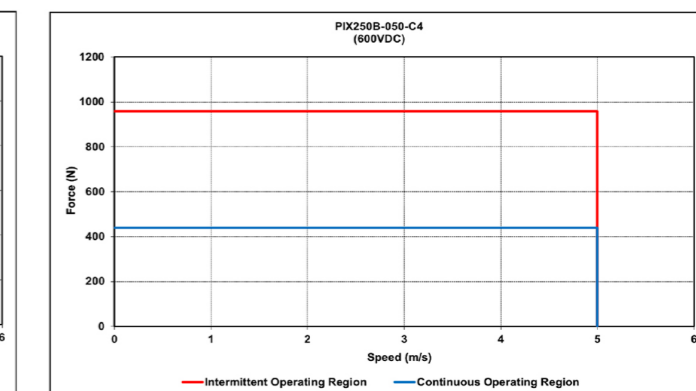
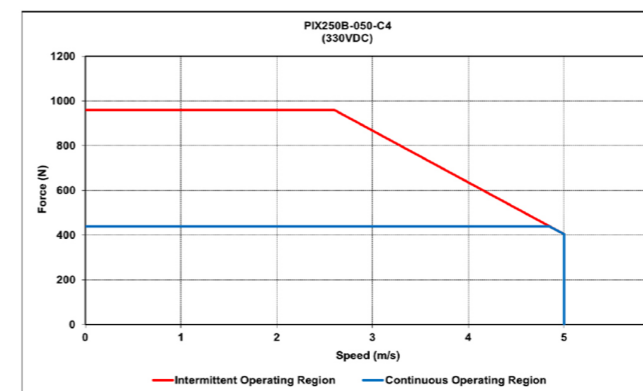
## PIX250B-050-C2



## PIX250B-050-C3



## PIX250B-050-C4



# PLA180 SERIES

Ironless Linear Motor

## PLA180-DX30F

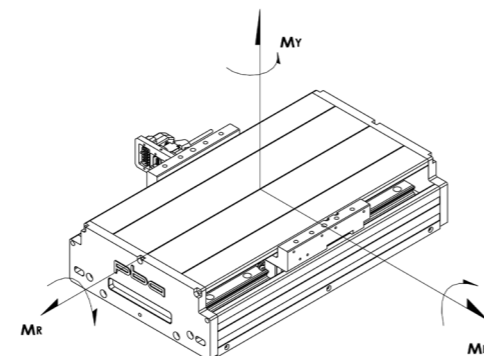
- Max Stroke - 1240mm
- Max Speed - 5 m/s
- Peak force up to 869N, Continuous force up to 174N
- Modular Hall Sensor
- Low Velocity Ripple



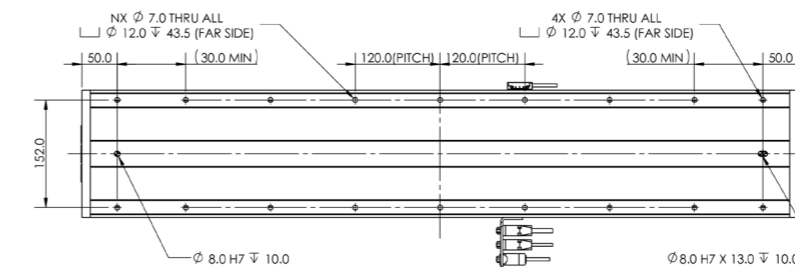
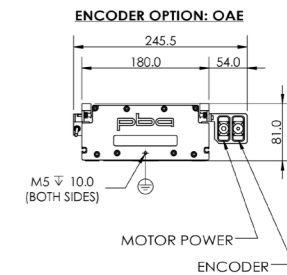
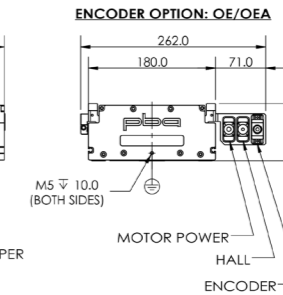
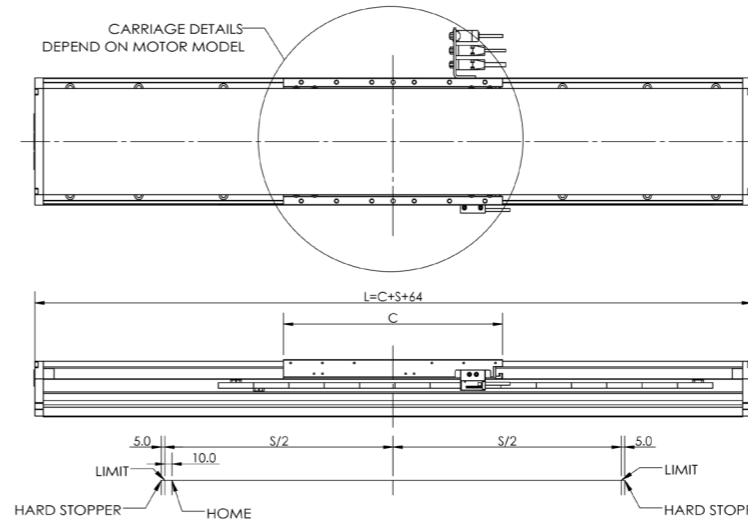
SPECIFICATION		MODEL									
Motor Series		DX30F-C2		DX30F-C3		DX30F-C4		DX30F-C5			
		S	P	S	P	S	P	S	P	S	P
<b>Motor Specification</b>											
Peak Force	N	347	347	521	521	695	695	869	869		
Continuous Force @ 100°C*	N	69	69	104	104	139	139	174	174		
Peak Current	A <sub>pk</sub>	14.13	28.25	14.13	28.25	14.13	28.25	14.13	28.25		
Continuous Current @ 100°C*	A <sub>pk</sub>	2.83	5.65	2.83	5.65	2.83	5.65	2.83	5.65		
Force Constant	N/A <sub>pk</sub>	24.6	12.3	36.9	18.5	49.2	24.6	61.5	30.8		
Back EMF Constant	V <sub>pk</sub> /m/s	28.3	14.1	42.4	21.2	56.6	28.3	70.7	35.4		
<b>Mechanical Specification</b>											
Effective Stroke**	mm	100 - 1240									
In increment of stroke	mm	60									
Bidirectional Repeatability	Encoder: 1um Resolution	±2									
	Encoder: 0.1um										
	Encoder: Analog	±1									
	Absolute Encoder 0.05um										
Straightness	um	10um/500mm									
Flatness	um	20um/500mm									
Moving Mass without Payload	kg	2.0	2.6	3.3	3.9						
Rated Payload***	kg	10.0	15.0	20.0	30.0						
<b>Static Moments</b>											
Max Yaw Moment M <sub>Y</sub>	Nm	87	164	241	318						
Max Roll Moment M <sub>R</sub>	Nm	171	171	171	171						
Max Pitch Moment M <sub>P</sub>	Nm	87	164	241	318						

**Note:**

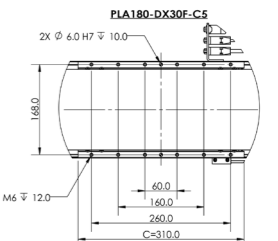
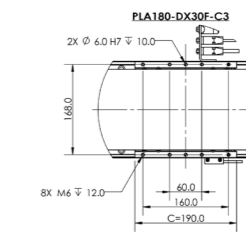
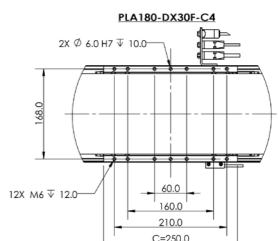
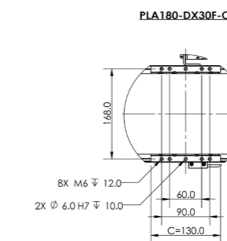
1. A<sub>pk</sub> = 1.414 \* Arms; V<sub>pk</sub> = 1.414 \* Vr<sub>ms</sub>
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130 °C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40 °C.
10. Ambient Operating Humidity : 10 - 90% RH .
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



# PLA180-DX30F



**CARRIAGE DETAILS**

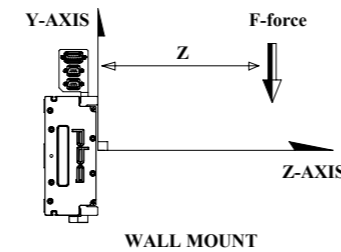
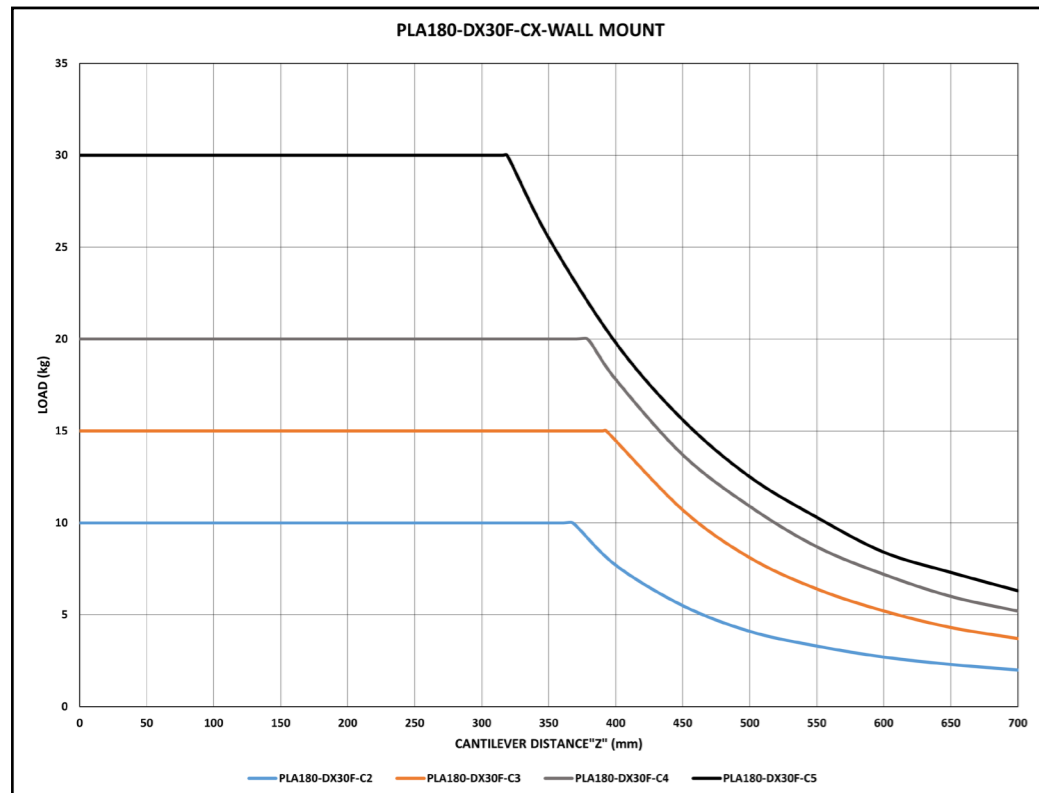
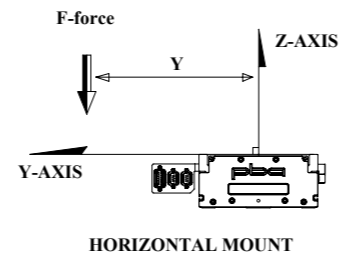
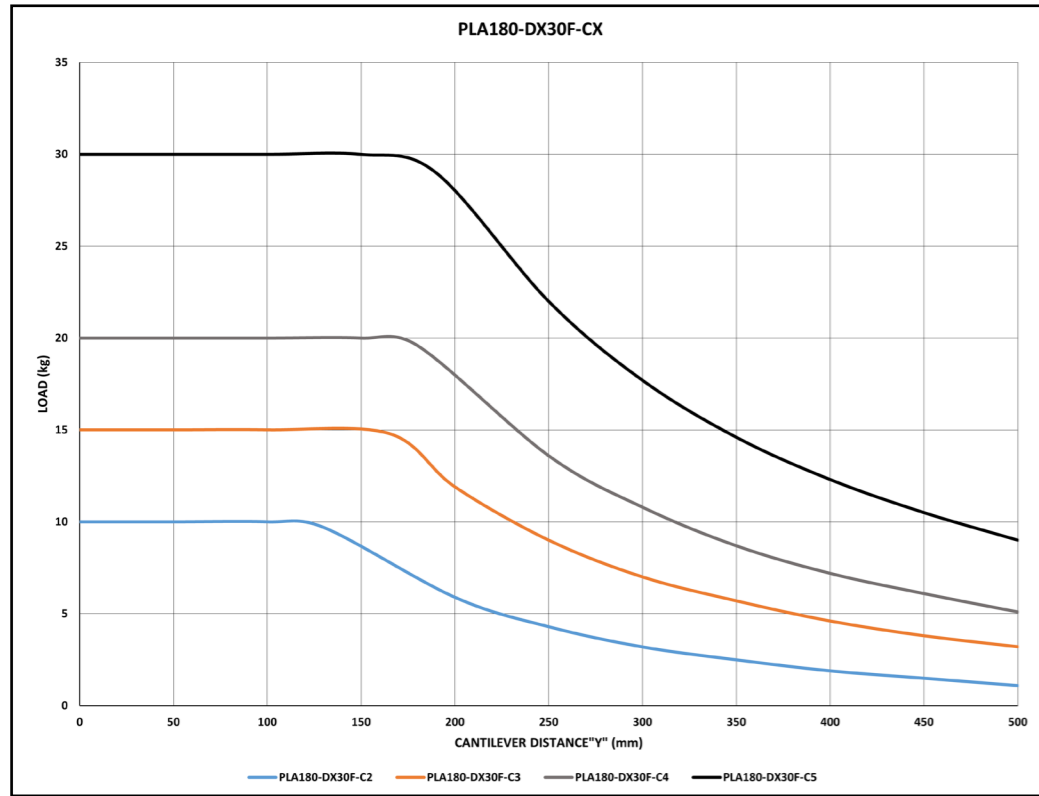


**Note:**

1. S = ACTUATOR STROKE
2. L = ACTUATOR LENGTH
3. C = CARRIAGE LENGTH (REFER TO CARRIAGE DETAILS)
4. N = NO. OF 120MM PITCH CBORE HOLES FROM CENTER
5. ACTUATOR MAIN BODY MATERIAL = BLACK ANODIZED ALUMINIUM
6. FOR ABSOLUTE ENCODERS, HALL SENSOR, LIMIT SENSOR AND HOME SENSOR WILL NOT BE NECESSARY FOR THE ACTUATOR
7. TOP MOUNTING APPLIED ON STANDARD ACTUATOR, FOR BOTTOM MOUNTING, PLEASE CONTACT PBA FOR CUSTOMISATION

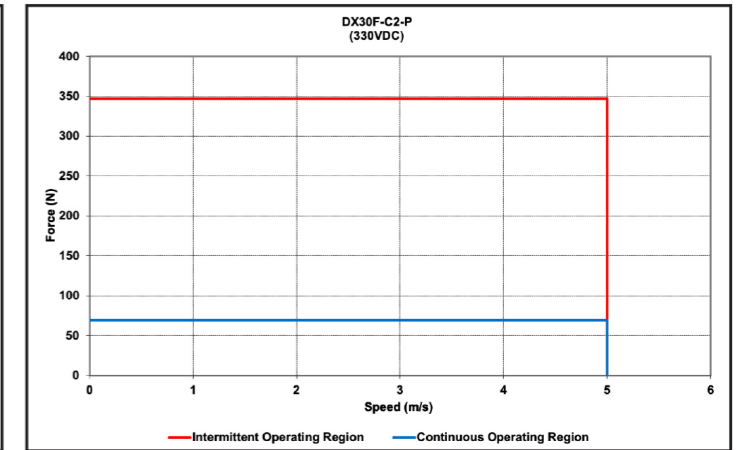
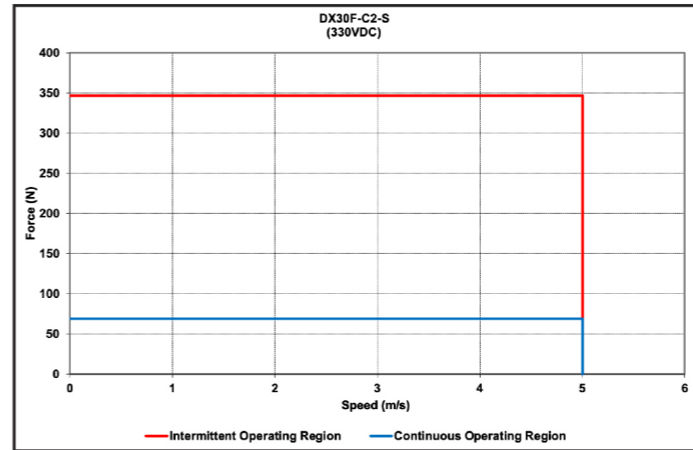
Effective Stroke (S) mm	Actuator PLA180							
	DX30F-C2		DX30F-C3		DX30F-C4		DX30F-C5	
	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg
100	294	8.6	354	10.4	414	12.3	474	14.2
160	354	9.8	414	11.7	474	13.6	534	15.4
220	414	11.1	474	12.9	534	14.8	594	16.7
280	474	12.3	534	14.2	594	16.0	654	17.9
340	534	13.6	594	15.4	654	17.3	714	19.2
400	594	14.8	654	16.6	714	18.5	774	20.4
460	654	16.0	714	17.9	774	19.8	834	21.6
520	714	17.3	774	19.1	834	21.0	894	22.9
580	774	18.5	834	20.4	894	22.3	954	24.1
640	834	19.8	894	21.6	954	23.5	1014	25.4
700	894	21.0	954	22.8	1014	24.7	1074	26.6
760	954	22.3	1014	24.1	1074	26.0	1134	27.8
820	1014	23.5	1074	25.3	1134	27.2	1194	29.1
880	1074	24.7	1134	26.6	1194	28.5	1254	30.3
940	1134	26.0	1194	27.8	1254	29.7	1314	31.6
1000	1194	27.2	1254	29.1	1314	31.0	1374	32.8
1060	1254	28.5	1314	30.3	1374	32.2	1434	34.1
1120	1314	29.7	1374	31.5	1434	33.4	1494	35.3
1180	1374	31.0	1434	32.8	1494	34.7	1554	36.5
1240	1434	32.2	1494	34.0	1554	35.9	1614	37.8

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA180-DX30F

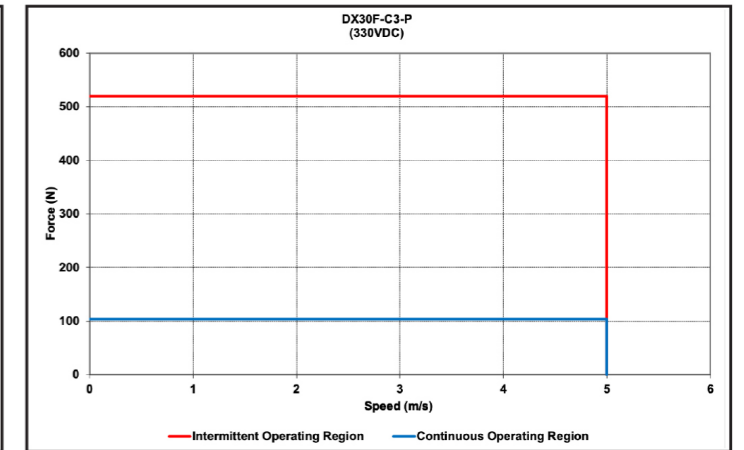
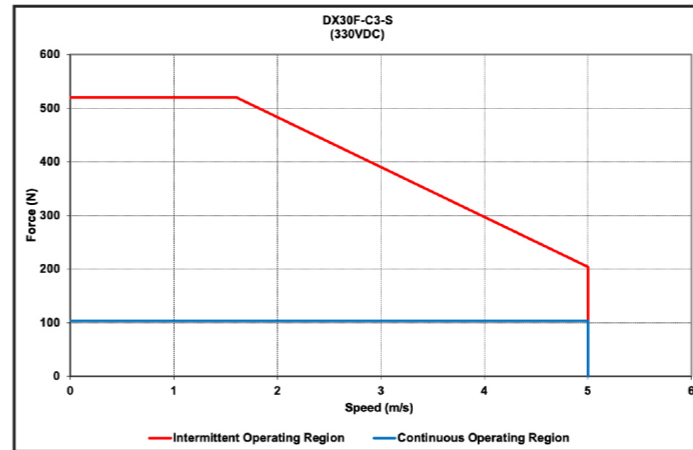


# GRAPH: FORCE VS SPEED FOR PLA180-DX30F

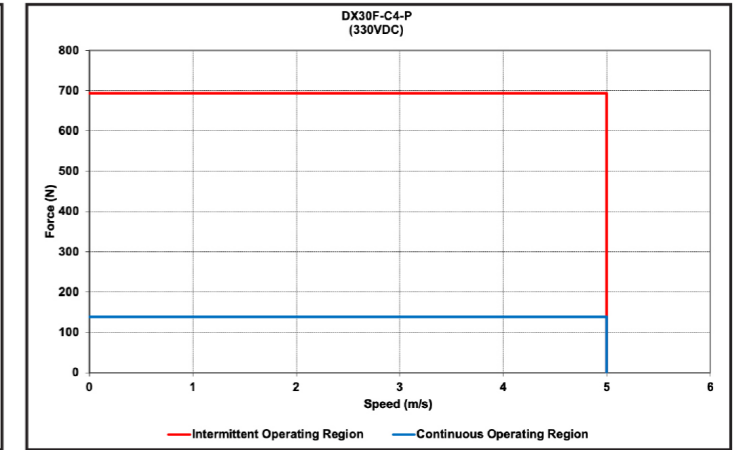
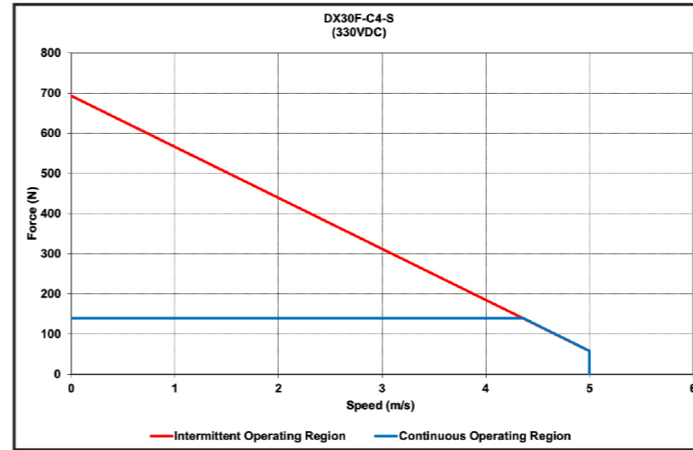
## DX30F-C2

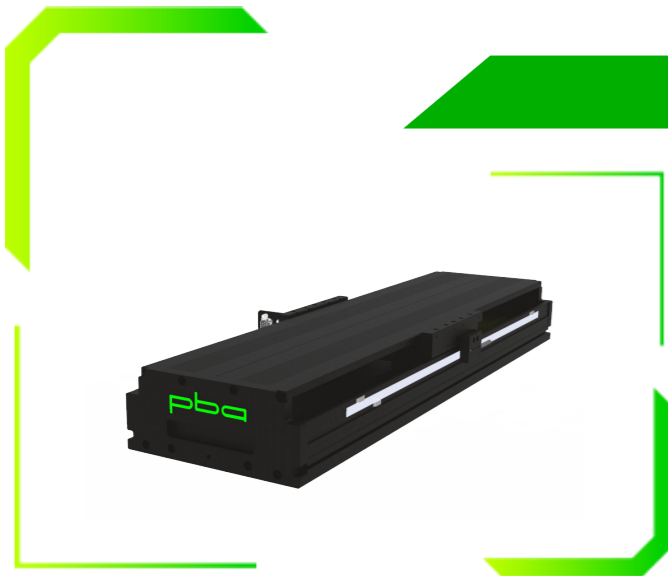


## DX30F-C3



## DX30F-C4





## PLA180 SERIES

Ironcore Linear Motor

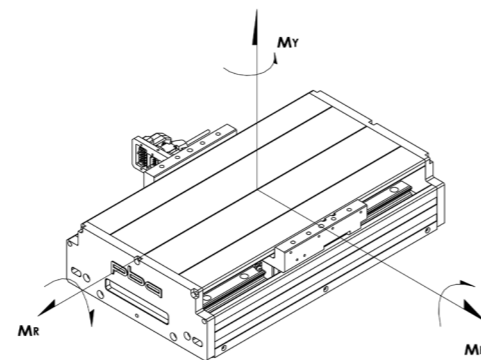
### PLA180-PIX150B-075

- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 832N, Continuous force up to 238N
- Modular Hall Sensor
- Anti-Cogging Function

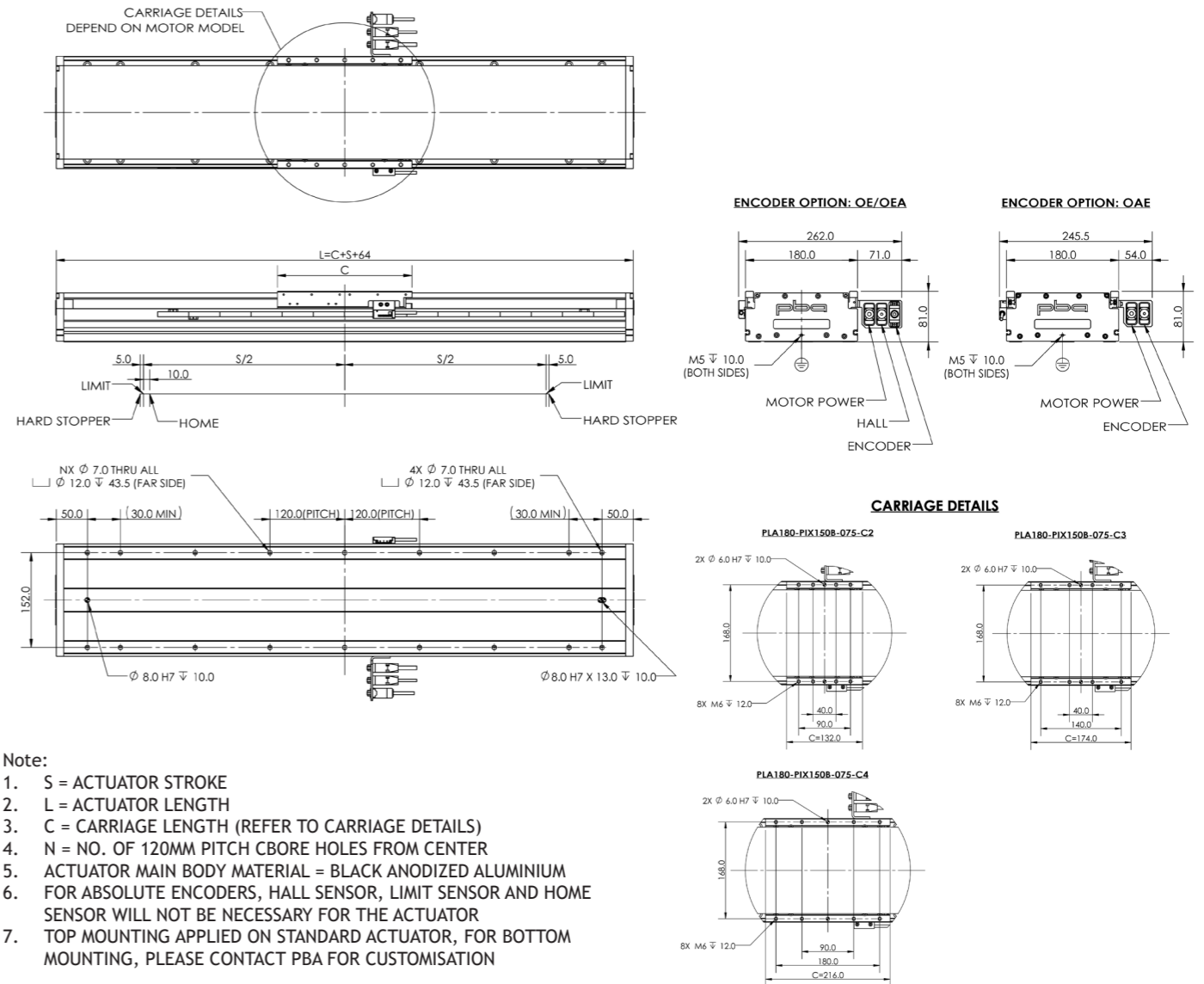
SPECIFICATION		MODEL		
		PIX150B-075-C2	PIX150B-075-C3	PIX150B-075-C4
Motor Series				
Motor Specification	Unit			
Peak Force	N	416	624	832
Continuous Force @ 100°C*	N	119	178	238
Peak Current	A <sup>pk</sup>	12.7	12.7	25.4
Continuous Current @ 100°C*	A <sup>pk</sup>	3.3	3.3	6.5
Force Constant	N/A <sup>pk</sup>	36.5	54.8	36.5
Back EMF Constant	V <sup>pk</sup> /m/s	42.2	63.3	42.2
<b>Mechanical Specification</b>				
Effective Stroke**	mm	100 - 1192		
In increment of stroke	mm	84		
Bidirectional Repeatability	Encoder: 1µm Resolution	±2		
	Encoder: 0.1µm			
	Encoder: Analog	±1		
	Absolute Encoder 0.05µm			
Straightness	µm	10µm/500mm		
Flatness	µm	20µm/500mm		
Moving Mass without Payload	kg	2.4	3.0	3.7
Rated Payload***	kg	10.0	15.0	20.0
<b>Static Moments</b>				
Max Yaw Moment M <sub>Y</sub>	Nm	90	144	198
Max Roll Moment M <sub>R</sub>	Nm	171	171	171
Max Pitch Moment M <sub>P</sub>	Nm	90	144	198

Note:

1.  $A_{pk} = 1.414 * Arms$ ;  $V_{pk} = 1.414 * V_{rms}$
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH .
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



## PLA180-PIX150B-075



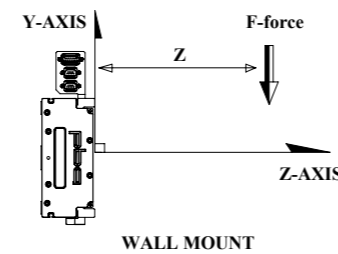
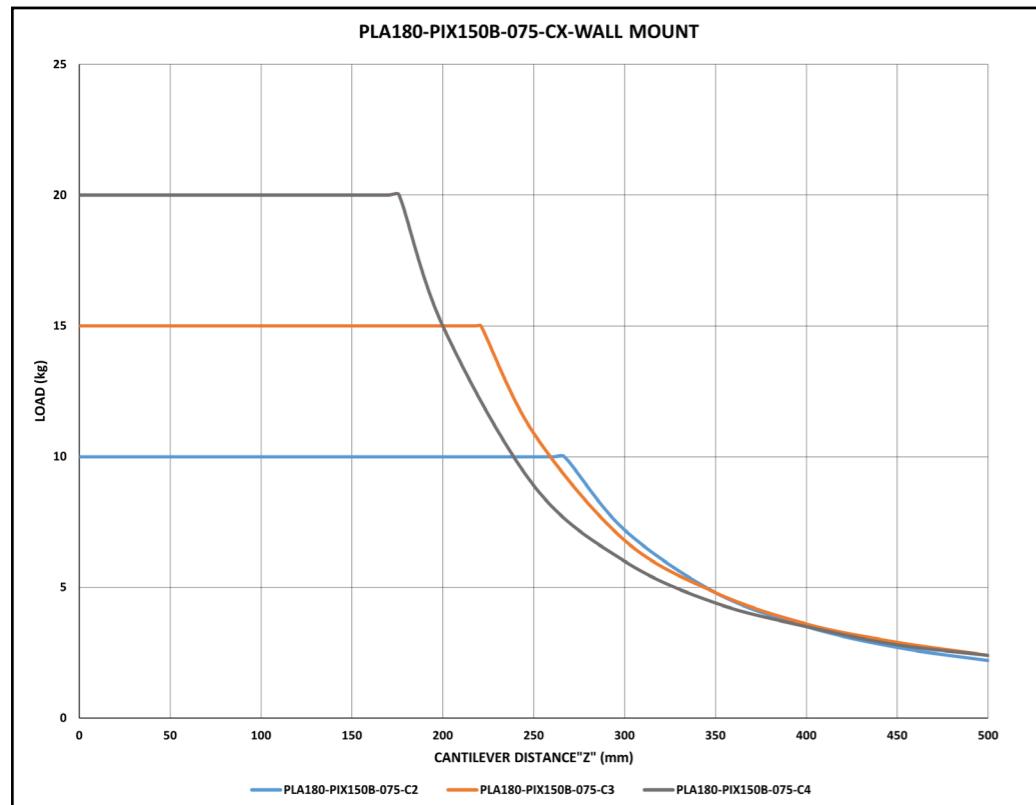
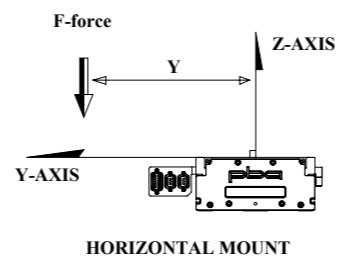
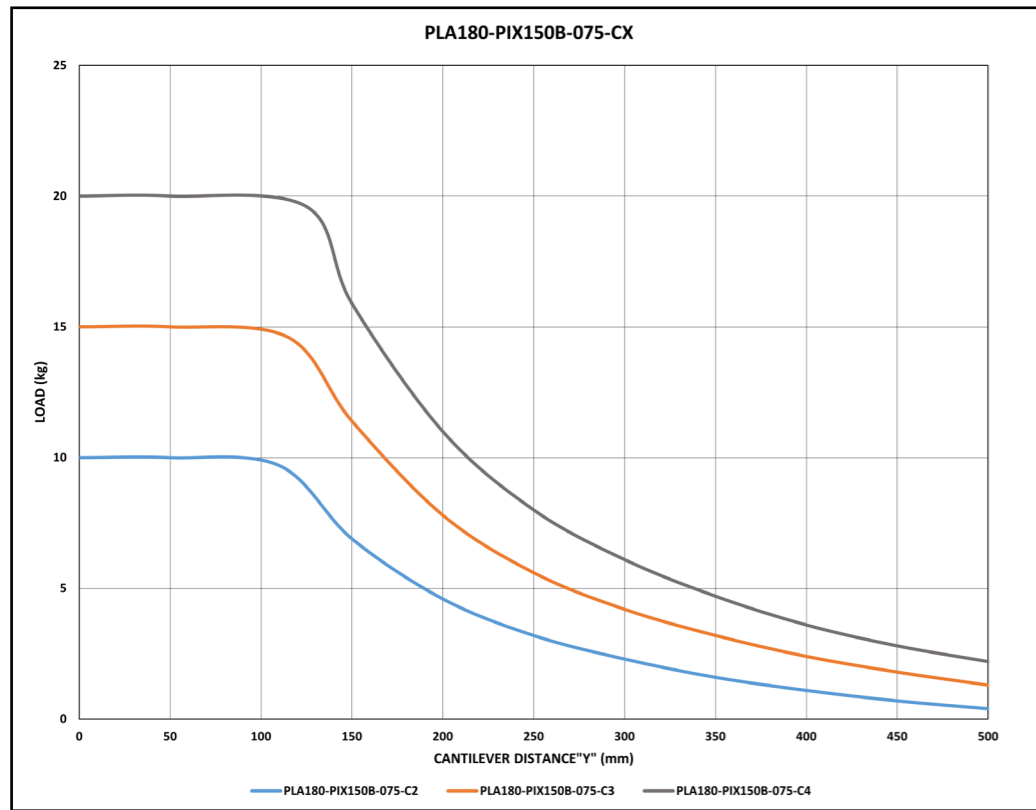
Note:

1. S = ACTUATOR STROKE
2. L = ACTUATOR LENGTH
3. C = CARRIAGE LENGTH (REFER TO CARRIAGE DETAILS)
4. N = NO. OF 120MM PITCH CBORE HOLES FROM CENTER
5. ACTUATOR MAIN BODY MATERIAL = BLACK ANODIZED ALUMINIUM
6. FOR ABSOLUTE ENCODERS, HALL SENSOR, LIMIT SENSOR AND HOME SENSOR WILL NOT BE NECESSARY FOR THE ACTUATOR
7. TOP MOUNTING APPLIED ON STANDARD ACTUATOR, FOR BOTTOM MOUNTING, PLEASE CONTACT PBA FOR CUSTOMISATION

Effective Stroke (S) mm	Actuator PLA180					
	PIX150B-075-C2		PIX150B-075-C3		PIX150B-075-C4	
	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg
100	296	8.2	338	9.6	380	10.9
184	380	9.6	422	11.0	464	12.4
268	464	11.1	506	12.5	548	13.8
352	548	12.5	590	13.9	632	15.3
436	632	14.0	674	15.3	716	16.7
520	716	15.4	758	16.8	800	18.1
604	800	16.9	842	18.2	884	19.6
688	884	18.3	926	19.7	968	21.0
772	968	19.7	1010	21.1	1052	22.5
856	1052	21.2	1094	22.6	1136	23.9
940	1136	22.6	1178	24.0	1220	25.4
1024	1220	24.1	1262	25.4	1304	26.8
1108	1304	25.5	1346	26.9	1388	28.2
1192	1388	27.0	1430	28.3	1472	29.7

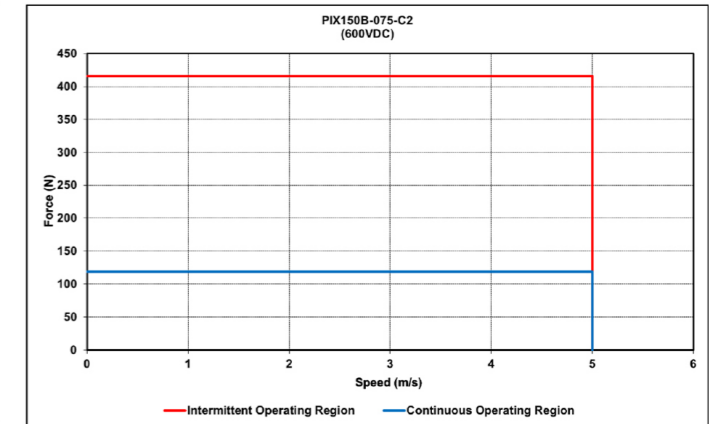
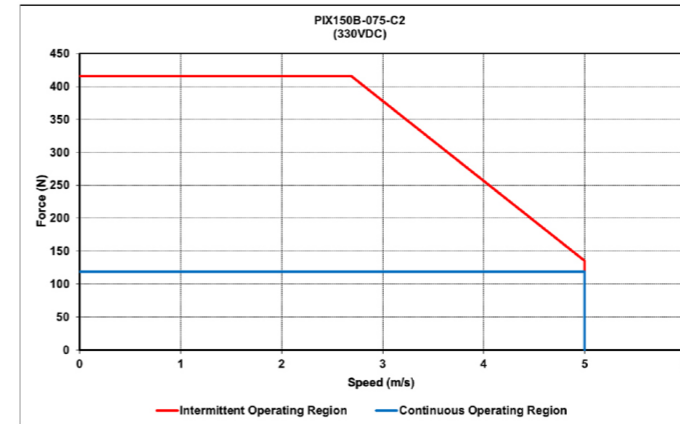


# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA180-PIX150B-075

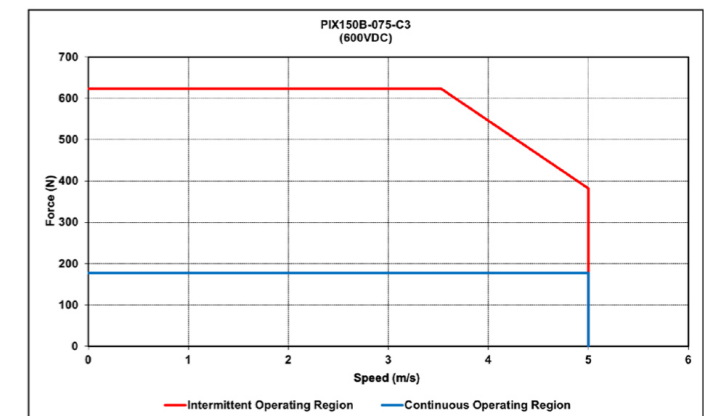
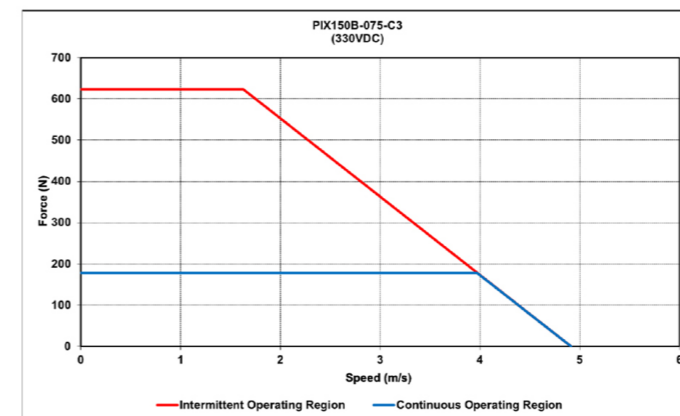


# GRAPH: FORCE VS SPEED FOR PLA180-PIX150B-075

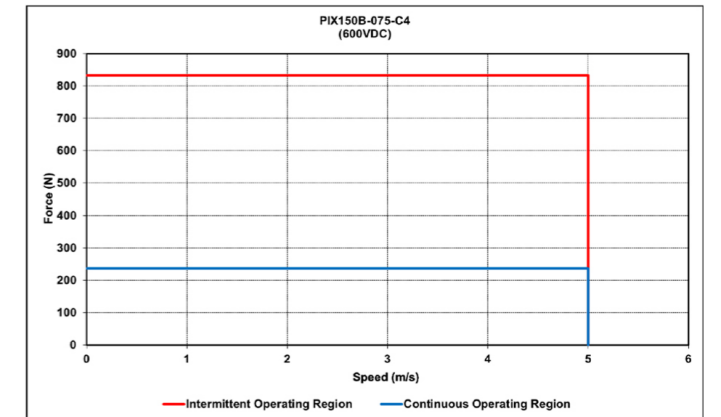
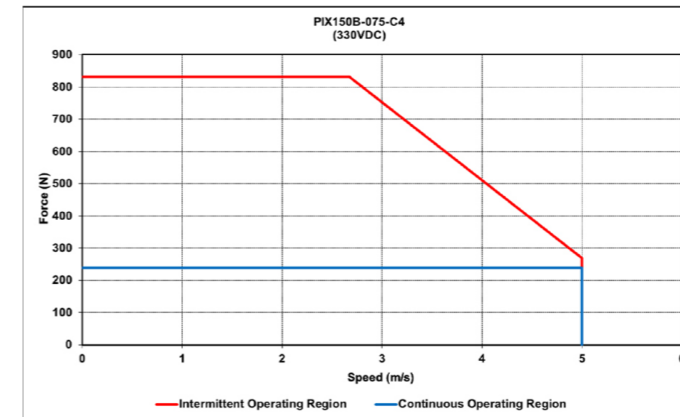
## PIX150B-075-C2



## PIX150B-075-C3



## PIX150B-075-C4



# PLA180 SERIES

Ironcore Linear Motor

## PLA180-PIX250B-075

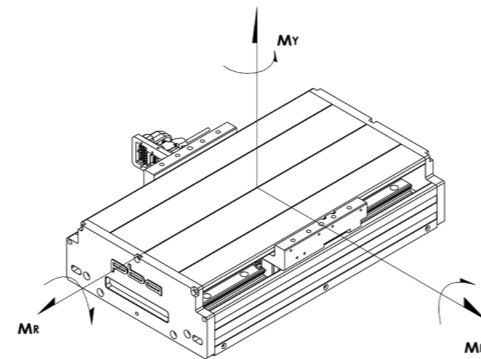
- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 1600N, Continuous force up to 733N
- Modular Hall Sensor
- Anti-Cogging Function



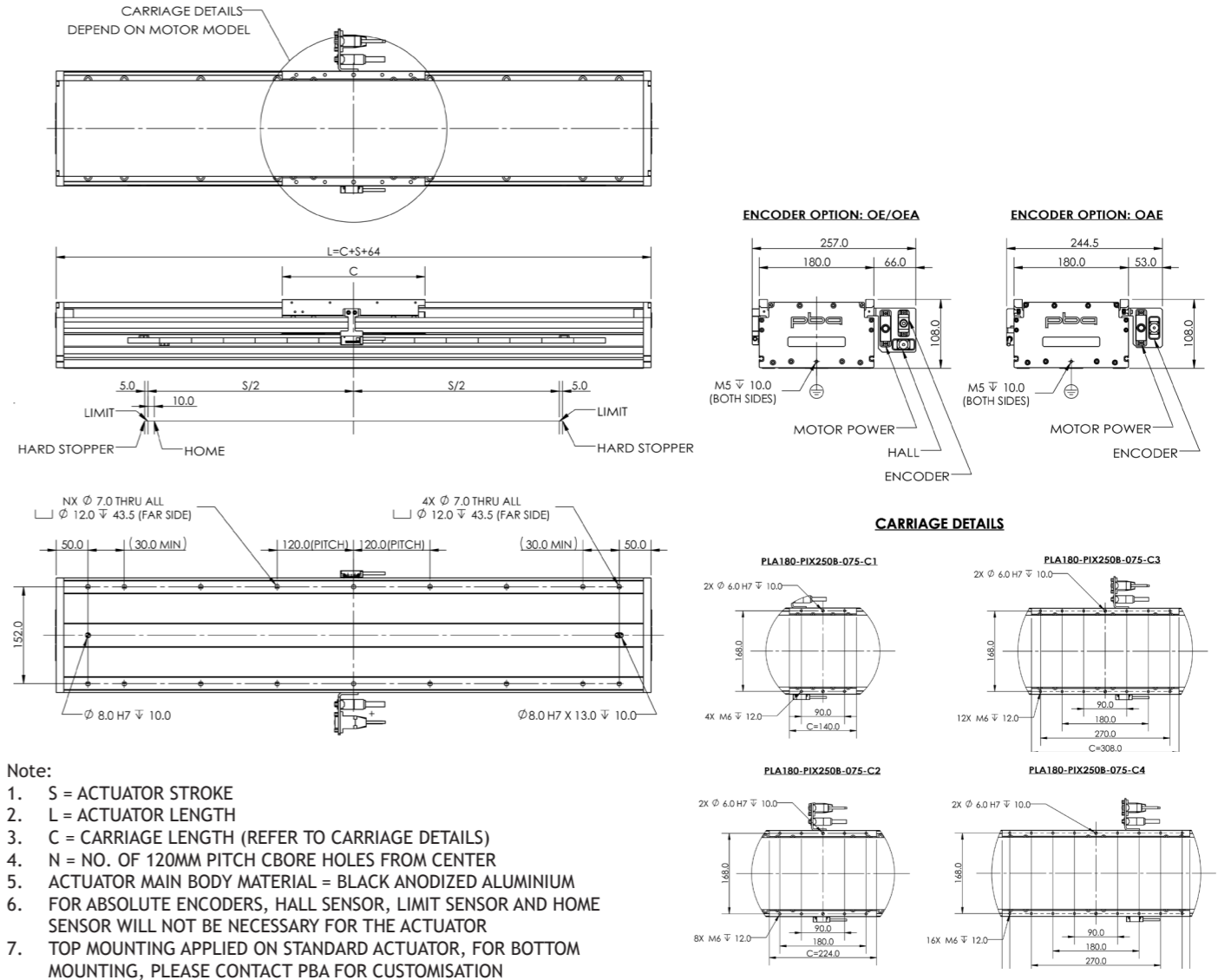
SPECIFICATION		MODEL			
Motor Series	Unit	PIX250B-075-C1	PIX250B-075-C2	PIX250B-075-C3	PIX250B-075-C4
Motor Specification					
Peak Force	N	400	800	1200	1600
Continuous Force @ 100°C*	N	183	366	549	733
Peak Current	A <sup>pk</sup>	20.4	20.4	20.4	40.8
Continuous Current @ 100°C*	A <sup>pk</sup>	6.8	6.8	6.8	13.6
Force Constant	N/A <sup>pk</sup>	26.9	53.9	80.8	53.9
Back EMF Constant	V <sup>pk</sup> /m/s	31.1	62.2	93.3	62.2
<b>Mechanical Specification</b>					
Effective Stroke**	mm	100 - 1192			
In increment of stroke	mm	84			
Bidirectional Repeatability	Encoder: 1um Resolution	±2			
	Encoder: 0.1um	±1			
	Encoder: Analog				
	Absolute Encoder 0.05um				
Straightness	um	10um/500mm			
Flatness	um	20um/500mm			
Moving Mass without Payload	kg	4.7	7.4	10.6	13.3
Rated Payload***	kg	10.0	20.0	40.0	50.0
<b>Static Moments</b>					
Max Yaw Moment M <sub>y</sub>	Nm	100	215	247	333
Max Roll Moment M <sub>R</sub>	Nm	174	174	174	174
Max Pitch Moment M <sub>P</sub>	Nm	100	215	247	333

**Note:**

1.  $A_{pk} = 1.414 * Arms$ ;  $V_{pk} = 1.414 * V_{rms}$
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH .
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.

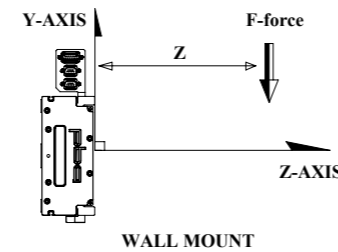
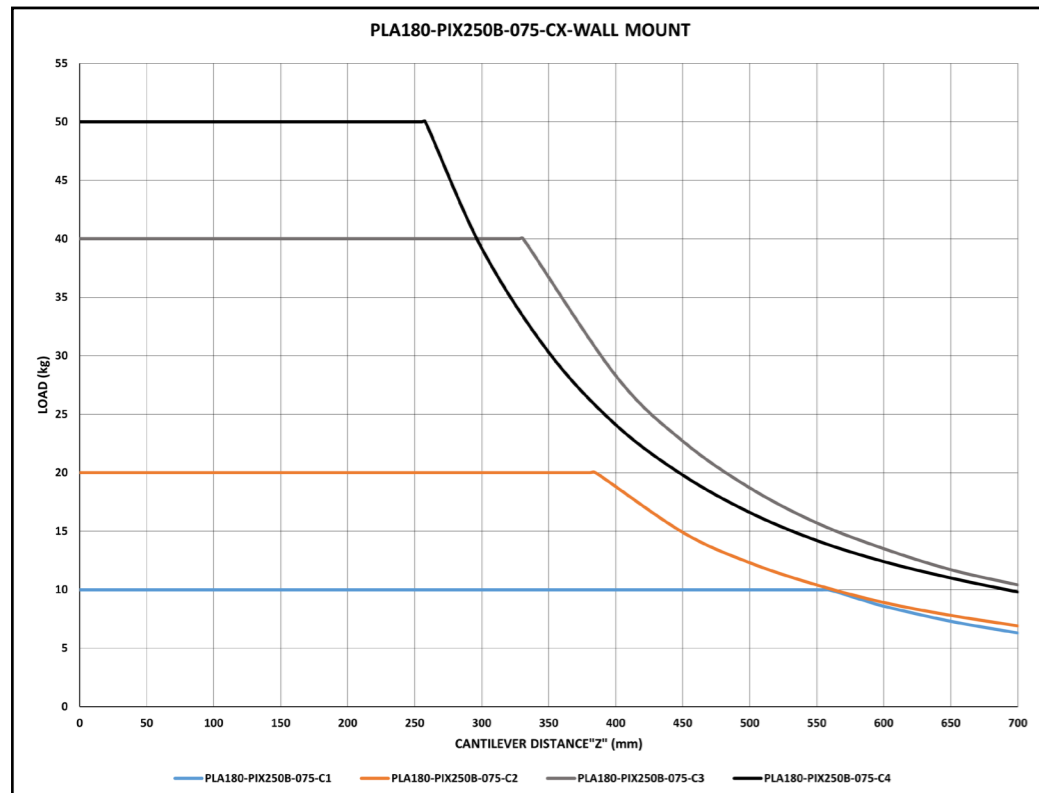
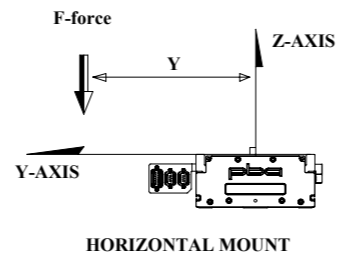
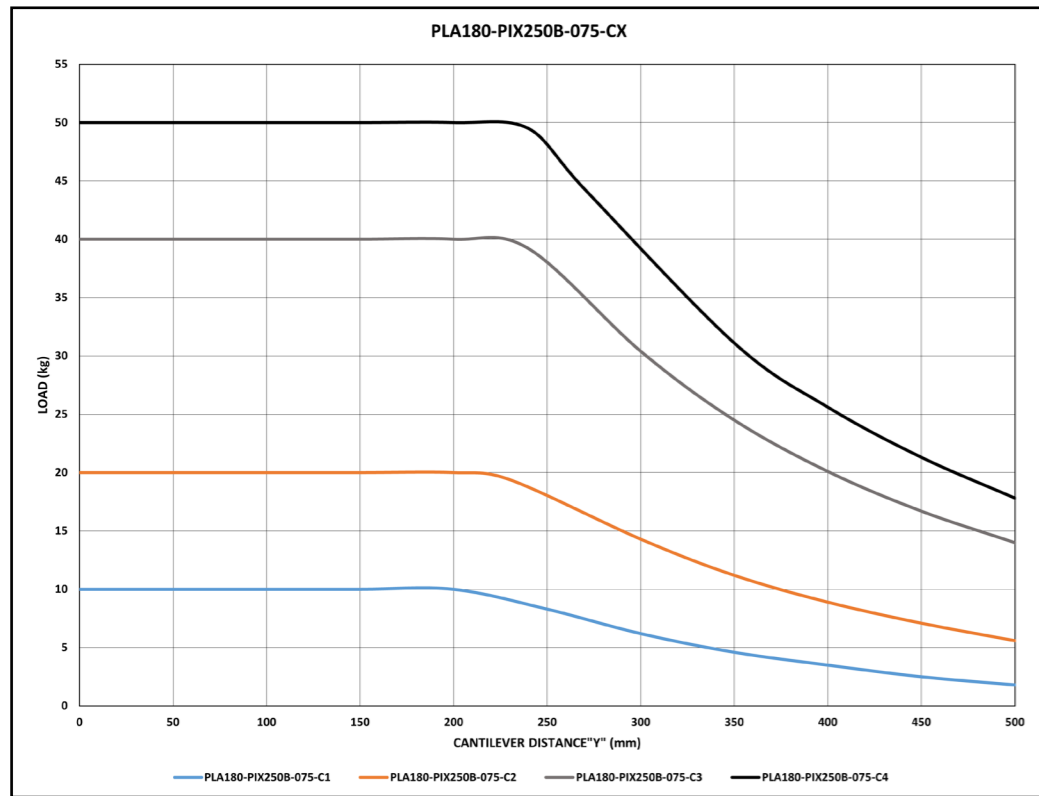


# PLA180-PIX250B-075



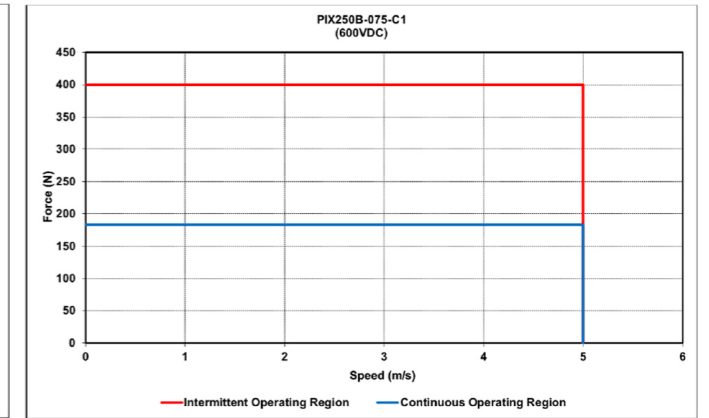
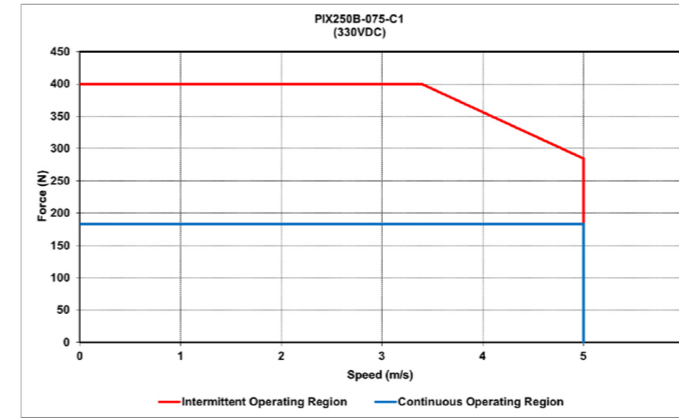
Effective Stroke (S) mm	Actuator PLA180							
	PIX250B-075-C1		PIX250B-075-C2		PIX250B-075-C3		PIX250B-075-C4	
	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg
100	304	11.0	388	15.3	472	20.0	556	24.2
184	388	12.5	472	16.8	556	21.5	640	25.7
268	472	14.1	556	18.3	640	23.0	724	27.3
352	556	15.6	640	19.8	724	24.5	808	28.8
436	640	17.1	724	21.4	808	26.1	892	30.3
520	724	18.6	808	22.9	892	27.6	976	31.8
604	808	20.2	892	24.4	976	29.1	1060	33.4
688	892	21.7	976	25.9	1060	30.6	1144	34.9
772	976	23.2	1060	27.4	1144	32.2	1228	36.4
856	1060	24.7	1144	29.0	1228	33.7	1312	37.9
940	1144	26.3	1228	30.5	1312	35.2	1396	39.4
1024	1228	27.8	1312	32.0	1396	36.7	1480	41.0
1108	1312	29.3	1396	33.5	1480	38.3	1564	42.5
1192	1396	30.8	1480	35.1	1564	39.8	1648	44.0

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA180-PIX250B-075

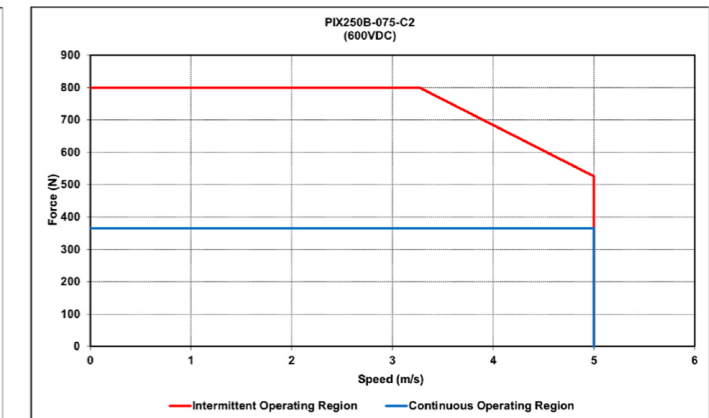
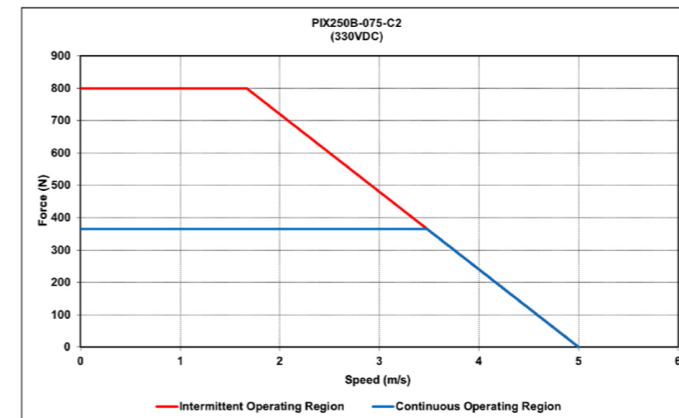


# GRAPH: FORCE VS SPEED FOR PLA180-PIX250B-075

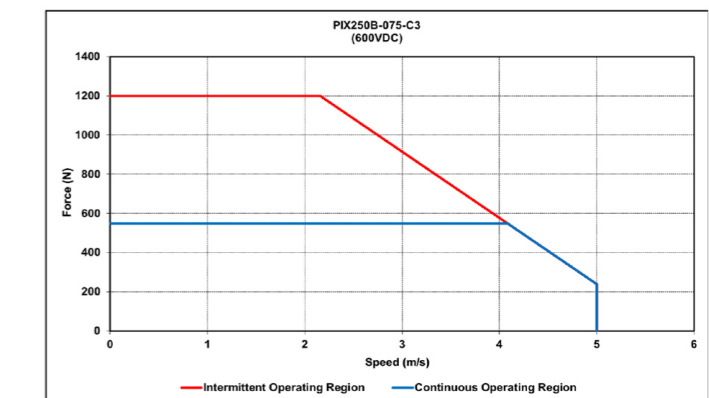
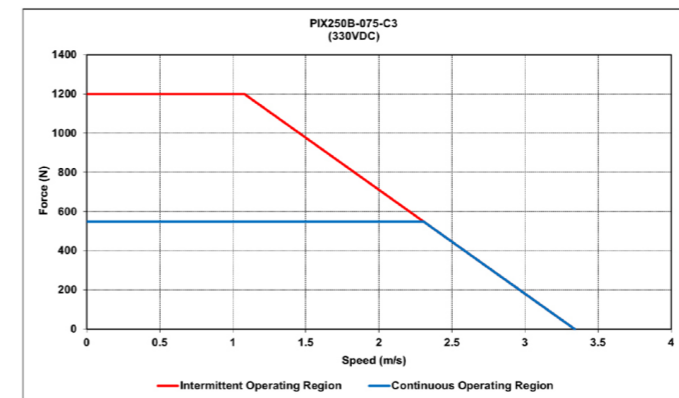
## PIX250B-075-C1



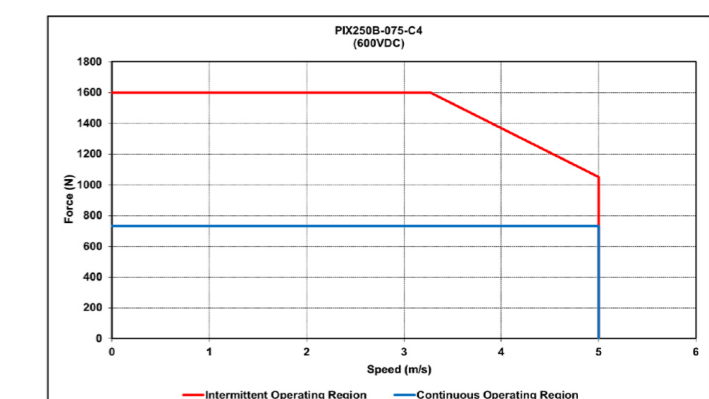
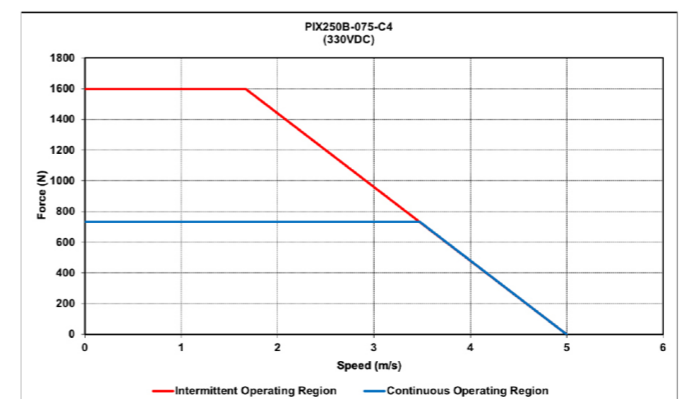
## PIX250B-075-C2



## PIX250B-075-C3



## PIX250B-075-C4



# PLA220 SERIES

Ironless Linear Motor

## PLA220-DX50F

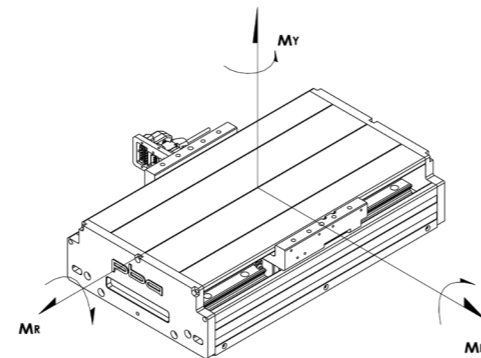
- Max Stroke - 1240mm
- Max Speed - 5 m/s
- Peak force up to 1277N, Continuous force up to 255N
- Modular Hall Sensor
- Low Velocity Ripple



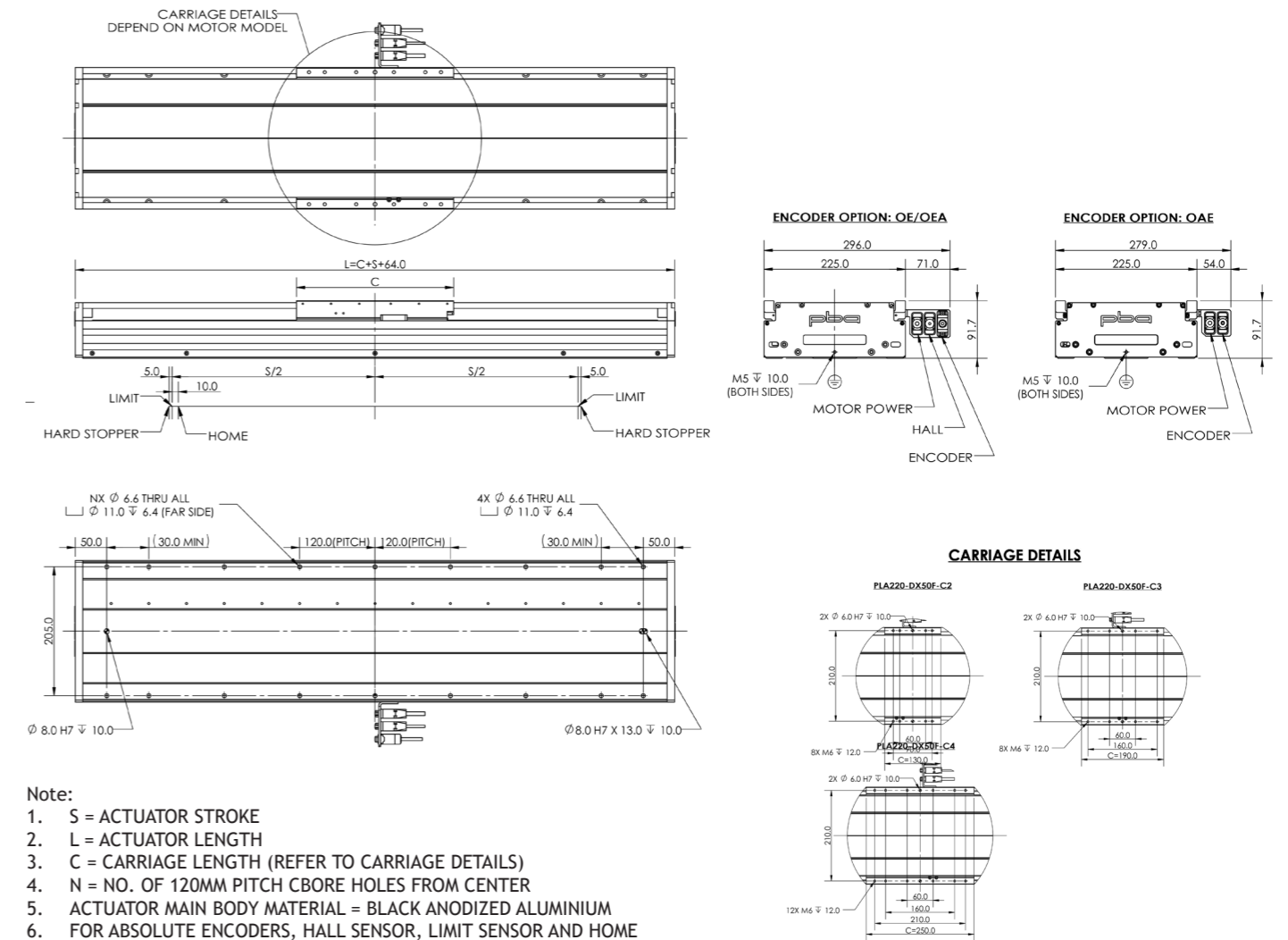
SPECIFICATION		MODEL			
Motor Series		DX50F-C2	DX50F-C3	DX50F-C4	DX50FT-C4
	Unit	P	P	P	P
<b>Motor Specification</b>					
Peak Force	N	638	958	1277	1277
Continuous Force @ 100°C*	N	128	192	255	255
Peak Current	A <sup>pk</sup>	28.25	28.25	28.25	56.5
Continuous Current @ 100°C*	A <sup>pk</sup>	5.65	5.65	5.65	11.3
Force Constant	N/A <sup>pk</sup>	22.6	33.9	45.2	22.6
Back EMF Constant	V <sup>pk</sup> /m/s	26	39	52	26
<b>Mechanical Specification</b>					
Effective Stroke**	mm	100-1240			
In increment of stroke	mm	60			
Bidirectional Repeatability	Encoder: 1um Resolution	±2			
	Encoder: 0.1um				
	Encoder: Analog	±1			
	Absolute Encoder 0.05um				
Straightness	um	10um/500mm			
Flatness	um	20um/500mm			
Moving Mass without Payload	kg	2.6	3.5	4.4	4.4
Rated Payload***	kg	10.0	20.0	30.0	30.0
<b>Static Moments</b>					
Max Yaw Moment M <sub>Y</sub>	Nm	94	171	183	183
Max Roll Moment M <sub>R</sub>	Nm	198	198	198	198
Max Pitch Moment M <sub>P</sub>	Nm	94	171	183	183

**Note:**

1.  $A_{pk} = 1.414 * Arms$ ;  $V_{pk} = 1.414 * V_{rms}$
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH.
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.

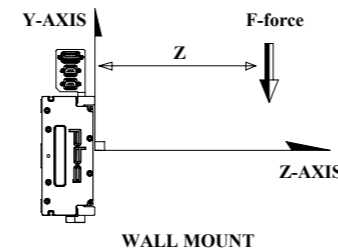
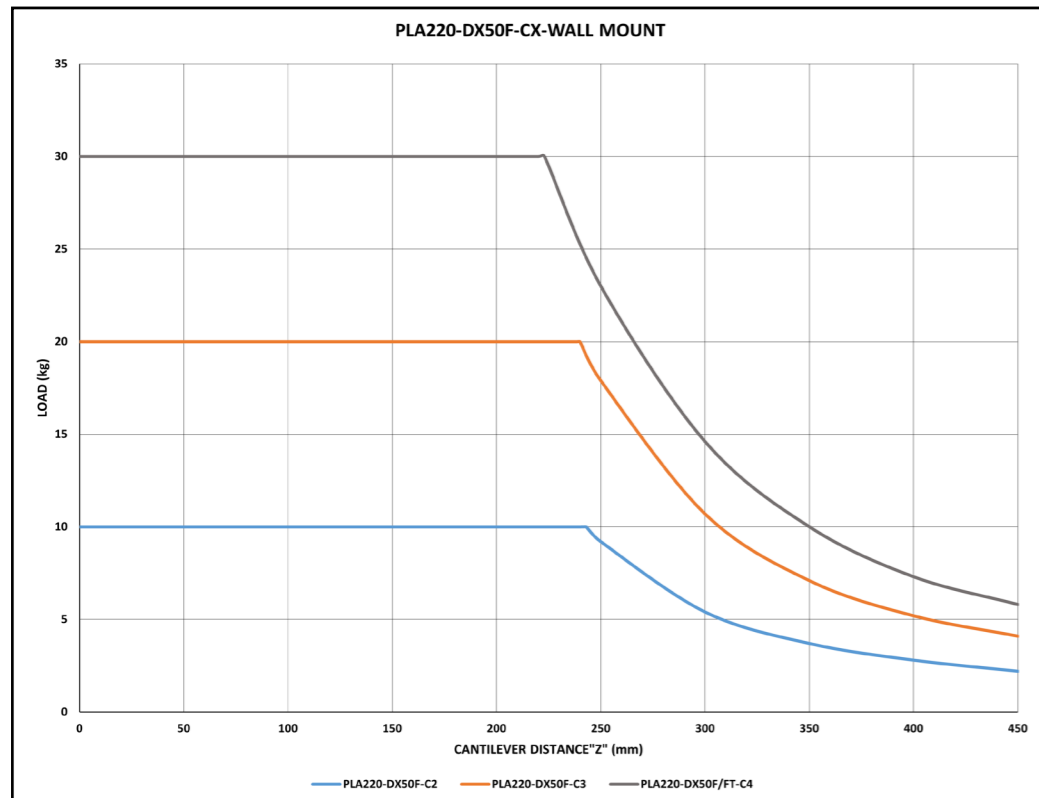
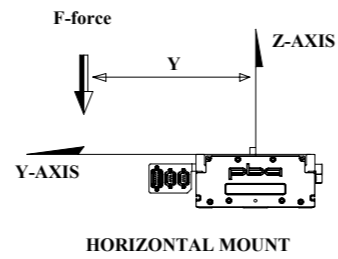
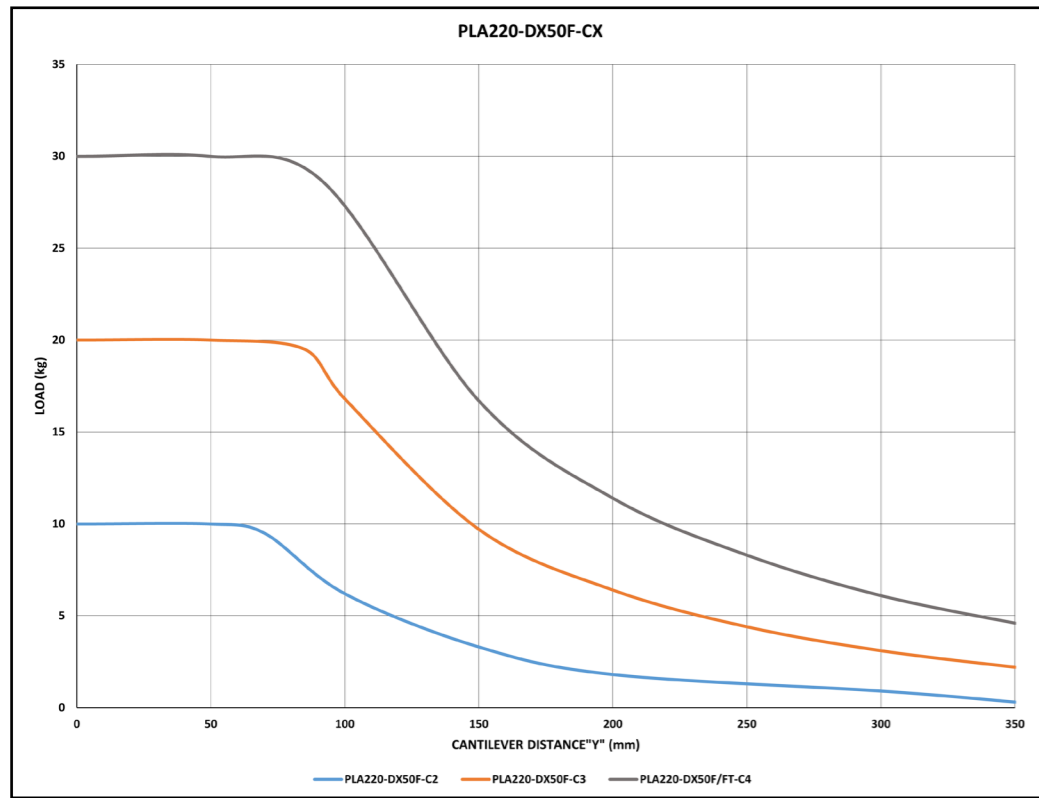


# PLA220-DX50F



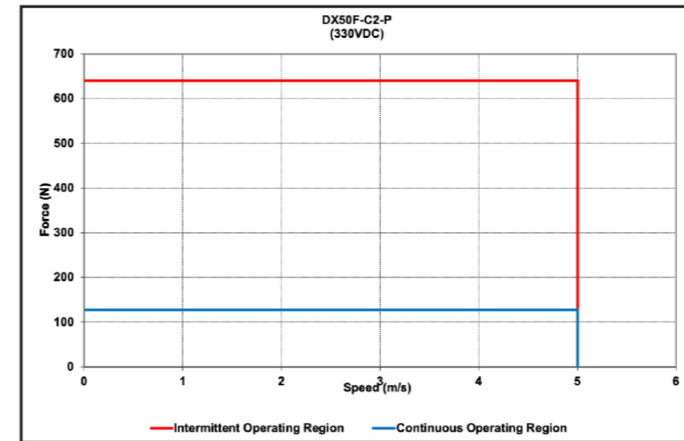
Effective Stroke (S) mm	Actuator PLA220					
	DX50F-C2		DX50F-C3		DX50F-C4	
	Length (L) mm	Mass kg	Length (L) mm	Mass kg	Length (L) mm	Mass kg
100	294	12.6	354	15.5	414	18.4
160	354	14.6	414	17.5	474	20.4
220	414	16.5	474	19.4	534	22.3
280	474	18.5	534	21.4	594	24.3
340	534	20.5	594	23.4	654	26.3
400	594	22.5	654	25.4	714	28.3
460	654	24.5	714	27.4	774	30.2
520	714	26.4	774	29.3	834	32.2
580	774	28.4	834	31.3	894	34.2
640	834	30.4	894	33.3	954	36.2
700	894	32.4	954	35.3	1014	38.2
760	954	34.3	1014	37.2	1074	40.1
820	1014	36.3	1074	39.2	1134	42.1
880	1074	38.3	1134	41.2	1194	44.1
940	1134	40.3	1194	43.2	1254	46.1
1000	1194	42.2	1254	45.1	1314	48.0
1060	1254	44.2	1314	47.1	1374	50.0
1120	1314	46.2	1374	49.1	1434	52.0
1180	1374	48.2	1434	51.1	1494	54.0
1240	1434	50.1	1494	53.0	1554	55.9

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA220-DX50F

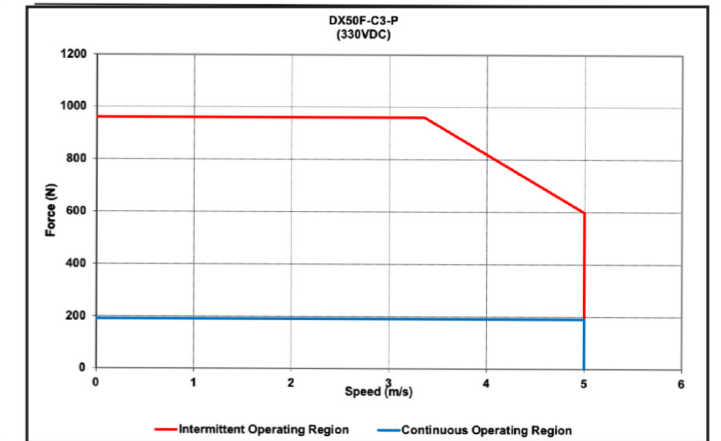


# GRAPH: FORCE VS SPEED FOR PLA220-DX50F

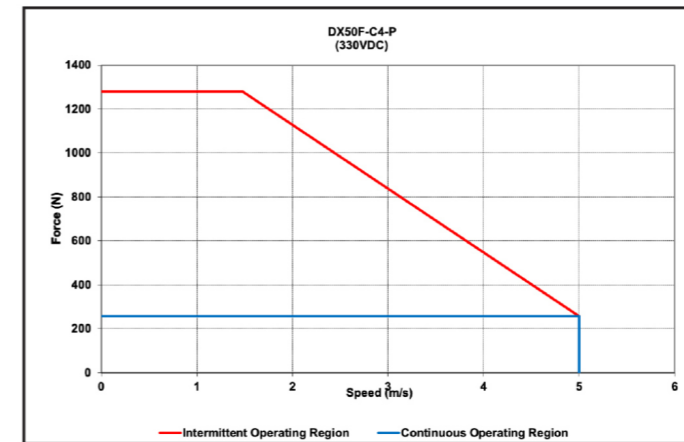
## DX50F-C2



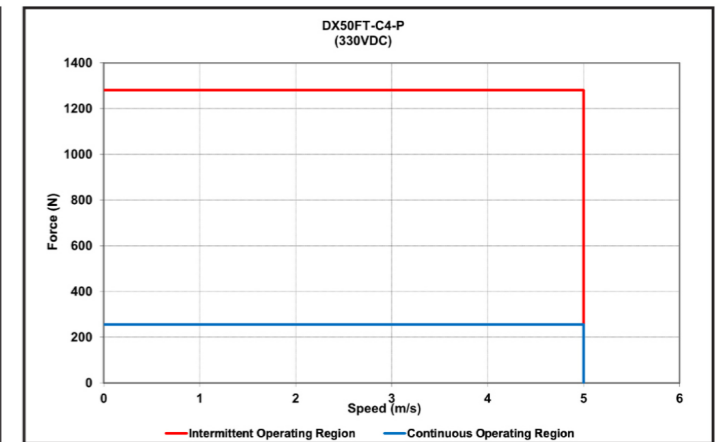
## DX50F-C3



## DX50F-C4



## DX50FT-C4



# PLA220 SERIES

Ironcore Linear Motor

## PLA220-PIX150B-100

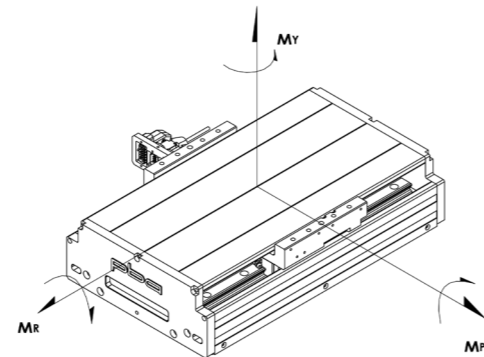
- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 1240N, Continuous force up to 355N
- Modular Hall Sensor
- Anti-Cogging Function



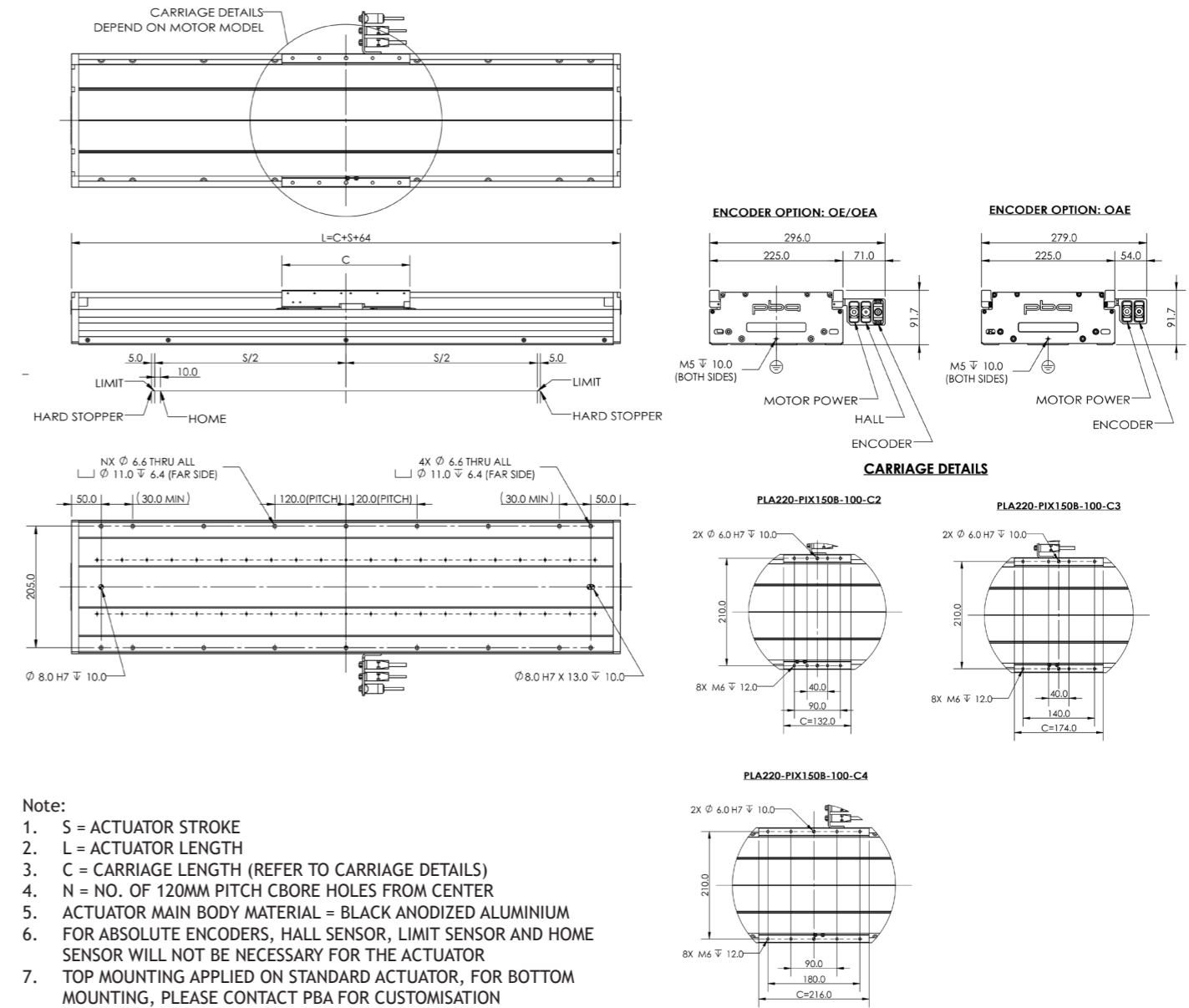
SPECIFICATION		MODEL		
Motor Series		PIX150B-100-C2	PIX150B-100-C3	PIX150B-100-C4
Motor Specification	Unit			
Peak Force	N	620	930	1240
Continuous Force @ 100°C*	N	177	266	355
Peak Current	A <sup>pk</sup>	12.7	12.7	25.4
Continuous Current @ 100°C*	A <sup>pk</sup>	3.3	3.3	6.5
Force Constant	N/A <sup>pk</sup>	54.6	81.8	54.6
Back EMF Constant	V <sup>pk</sup> /m/s	63.0	94.5	63.0
<b>Mechanical Specification</b>				
Effective Stroke**	mm	100 -1192		
In increment of stroke	mm	84		
Bidirectional Repeatability	Encoder: 1um Resolution	±2		
	Encoder			
	Encoder: Analog	±1		
	Absolute Encoder 0.05um			
Straightness	um	10um/500mm		
Flatness	um	20um/500mm		
Moving Mass without Payload	kg	3.7	4.7	5.7
Rated Payload***	kg	15.0	20.0	25.0
<b>Static Moments</b>				
Max Yaw Moment M <sub>Y</sub>	Nm	89	147	204
Max Roll Moment M <sub>R</sub>	Nm	211	211	211
Max Pitch Moment M <sub>P</sub>	Nm	89	147	204

**Note:**

1.  $A_{pk} = 1.414 * Arms$ ;  $V_{pk} = 1.414 * Vrms$
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH .
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



# PLA220-PIX150B-100

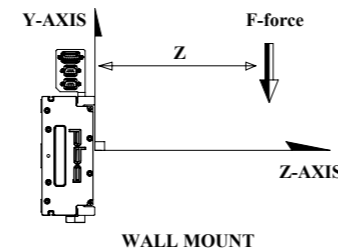
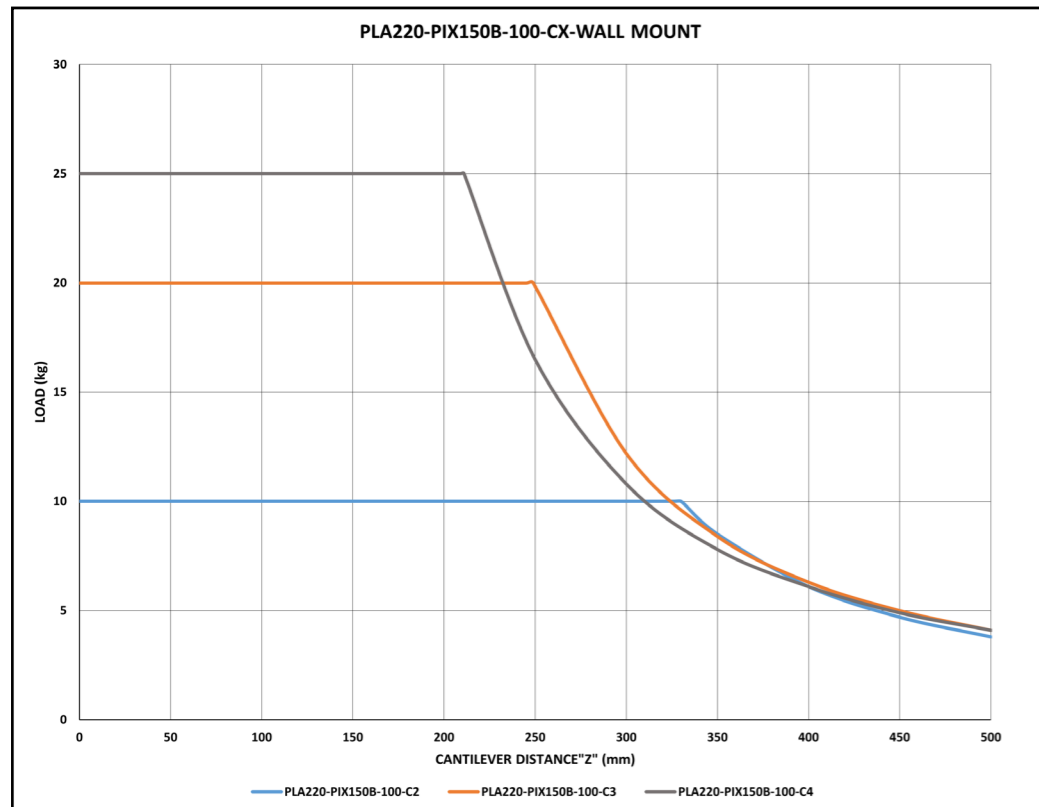
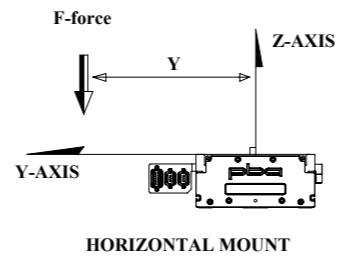
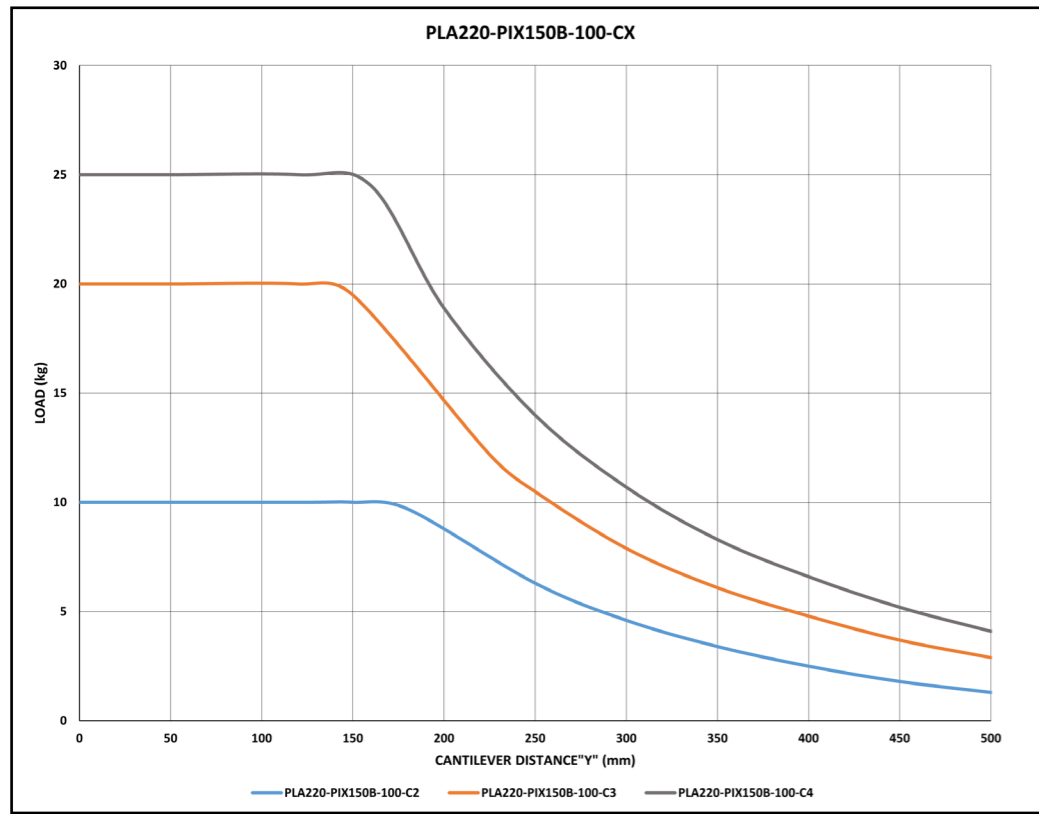


**Note:**

1. S = ACTUATOR STROKE
2. L = ACTUATOR LENGTH
3. C = CARRIAGE LENGTH (REFER TO CARRIAGE DETAILS)
4. N = NO. OF 120MM PITCH CBORE HOLES FROM CENTER
5. ACTUATOR MAIN BODY MATERIAL = BLACK ANODIZED ALUMINIUM
6. FOR ABSOLUTE ENCODERS, HALL SENSOR, LIMIT SENSOR AND HOME SENSOR WILL NOT BE NECESSARY FOR THE ACTUATOR
7. TOP MOUNTING APPLIED ON STANDARD ACTUATOR, FOR BOTTOM MOUNTING, PLEASE CONTACT PBA FOR CUSTOMISATION

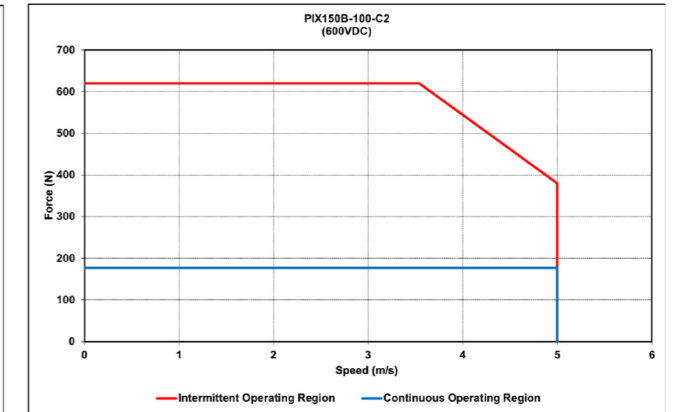
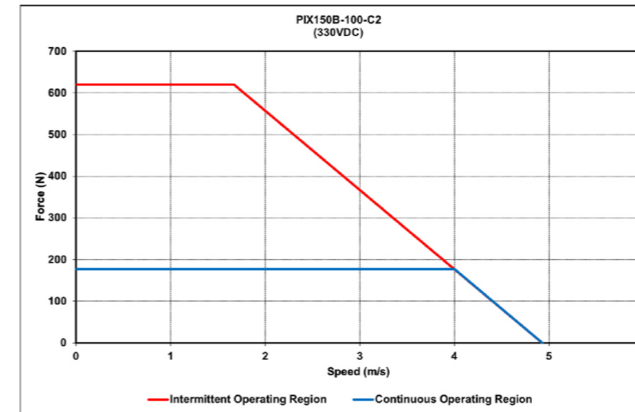
Effective Stroke (S) mm	Actuator PLA220					
	PIX150B-100-C2		PIX150B-100-C3		PIX150B-100-C4	
	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg
100	296	12.2	338	14.2	380	16.3
184	380	14.4	422	16.4	464	18.5
268	464	16.5	506	18.6	548	20.7
352	548	18.7	590	20.8	632	22.8
436	632	20.9	674	22.9	716	25.0
520	716	23.1	758	25.1	800	27.2
604	800	25.2	842	27.3	884	29.4
688	884	27.4	926	29.5	968	31.5
772	968	29.6	1010	31.6	1052	33.7
856	1052	31.8	1094	33.8	1136	35.9
940	1136	33.9	1178	36.0	1220	38.1
1024	1220	36.1	1262	38.2	1304	40.2
1108	1304	38.3	1346	40.4	1388	42.4
1192	1388	40.5	1430	42.5	1472	44.6

# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA220-PIX150B-100

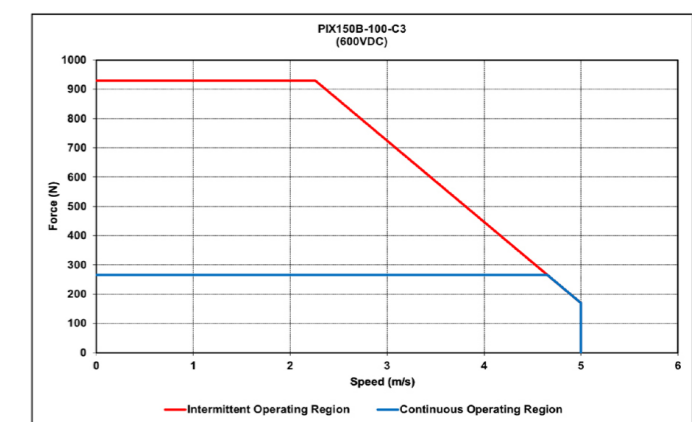
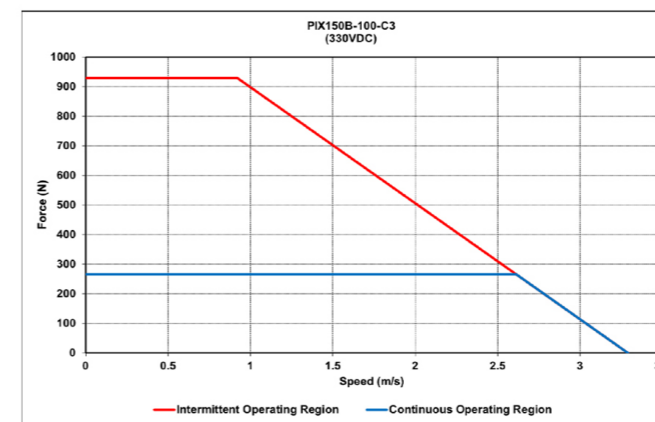


# GRAPH: FORCE VS SPEED FOR PLA220-PIX150B-100

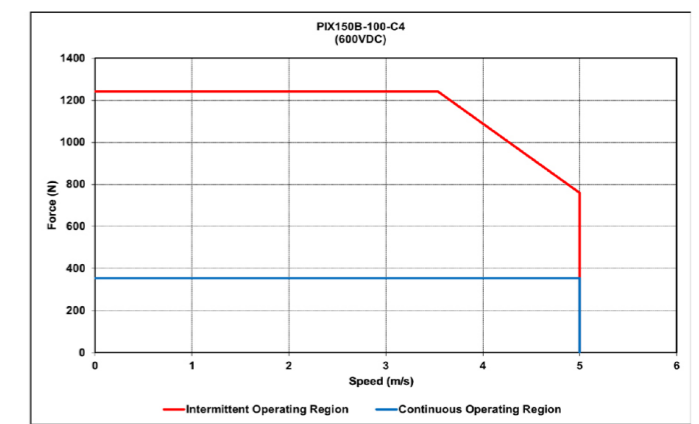
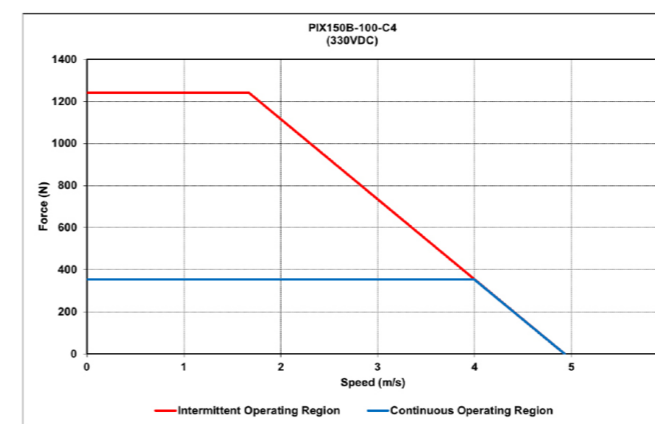
## PIX150B-100-C2



## PIX150B-100-C3



## PIX150B-100-C4



# PLA220 SERIES

Ironcore Linear Motor

## PLA220-PIX250B-100

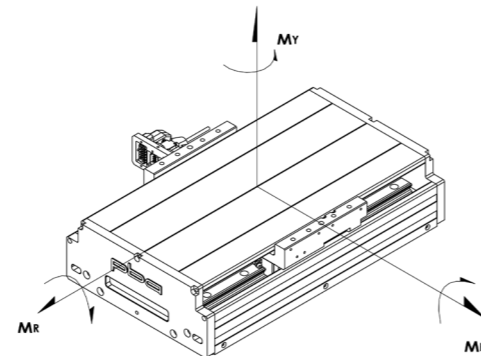
- Max Stroke - 1192mm
- Max Speed - 5 m/s
- Peak force up to 2400N, Continuous force up to 1097N
- Modular Hall Sensor
- Anti-Cogging Function



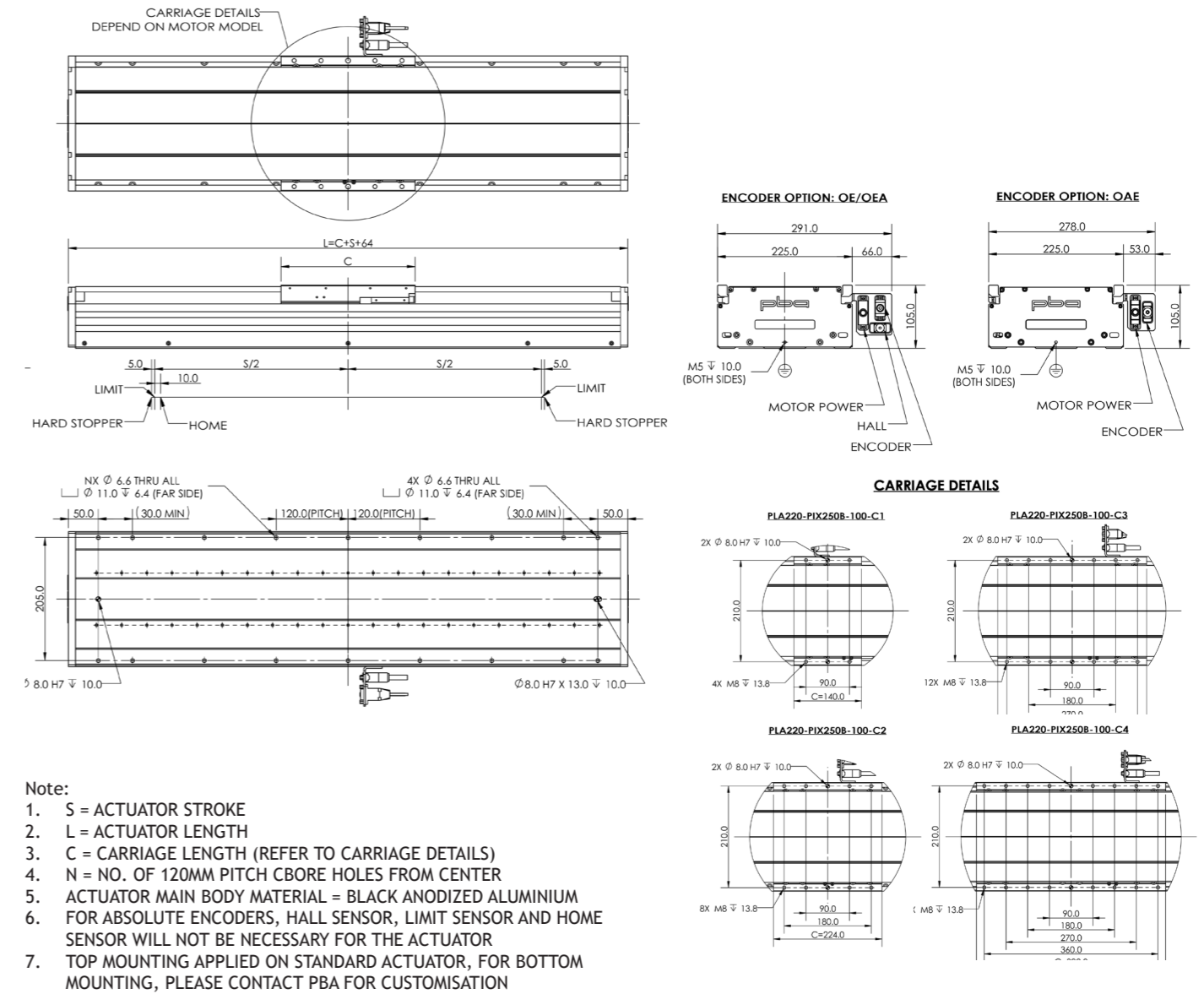
SPECIFICATION		MODEL			
		PIX250B-100-C1	PIX250B-100-C2	PIX250B-100-C3	PIX250B-100-C4
Motor Series					
Motor Specification	Unit				
Peak Force	N	600	1200	1800	2400
Continuous Force @ 100°C*	N	274	548	823	1097
Peak Current	A <sup>pk</sup>	20.4	20.4	20.4	40.7
Continuous Current @ 100°C*	A <sup>pk</sup>	6.8	6.8	6.8	13.6
Force Constant	N/A <sup>pk</sup>	40.4	80.8	121.2	80.8
Back EMF Constant	V <sup>pk</sup> /m/s	46.7	93.3	140.0	93.3
<b>Mechanical Specification</b>					
Effective Stroke**	mm	100 - 1192			
In increment of stroke	mm	84			
Bidirectional Repeatability	Encoder: 1um Resolution	±2			
	Encoder: 0.1um				
	Encoder: Analog	±1			
	Absolute Encoder 0.05um				
Straightness	um	10um/500mm			
Flatness	um	20um/500mm			
Moving Mass without Payload	kg	5.2	9.0	12.1	15.9
Rated Payload***	kg	20.0	30.0	60.0	90.0
<b>Static Moments</b>					
Max Yaw Moment M <sub>Y</sub>	Nm	98	197	316	326
Max Roll Moment M <sub>R</sub>	Nm	231	231	231	231
Max Pitch Moment M <sub>P</sub>	Nm	98	197	316	326

Note:

1. Apk = 1.414 \* Arms; Vpk = 1.414 \* Vrms
2. All values are measured based on Single Actuator mounted on a 5µm granite table.
3. \*\*Customized Max Stroke 3500mm. For more options, please contact PBA.
4. \*\*\*Recommended payload based on 10m/s<sup>2</sup> acceleration. CG position 100mm above the center of carriage.
5. Peak Force and Current : 4% duty ratio and 1 second duration.
6. Motor Insulation Class : Class B (130°C).
7. IEC Protection Class : Class 1.
8. Compliance Standards : CE, RoHS.
9. Ambient Operating Temperature : 0 - 40°C.
10. Ambient Operating Humidity : 10 - 90% RH.
11. Cleanroom Class 10,000. For Cleanroom Class 1000, please contact PBA.
12. Specifications are subjected to change without prior notice.



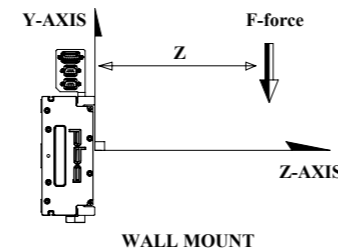
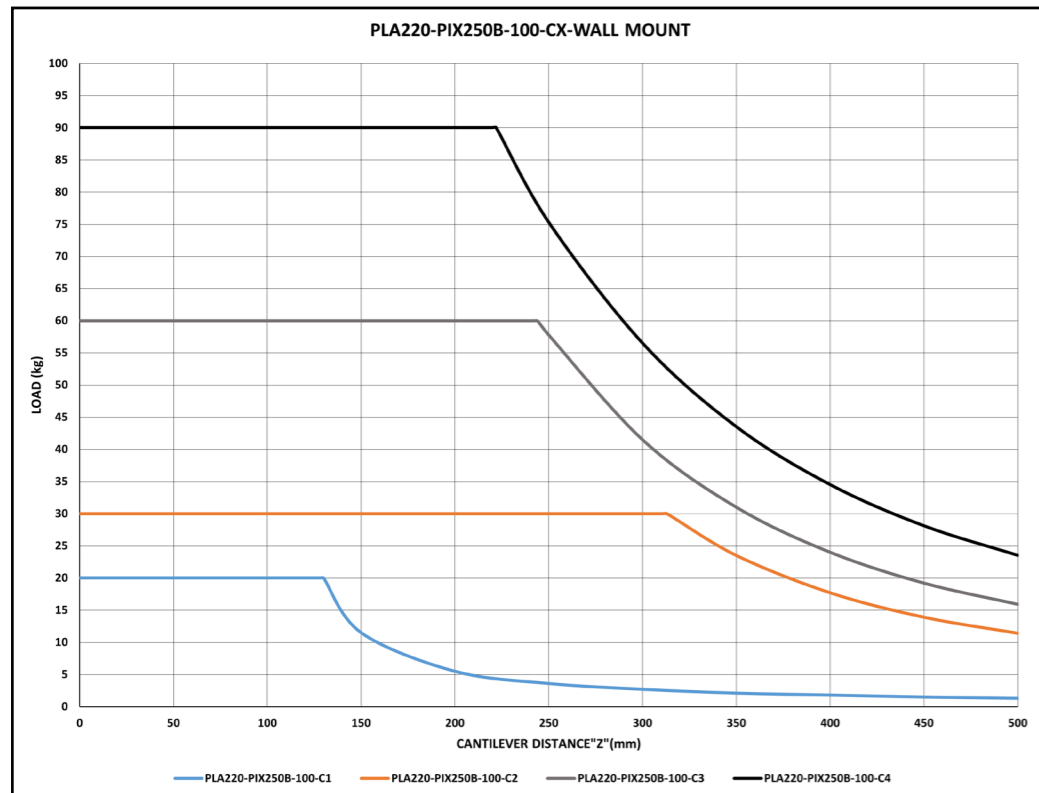
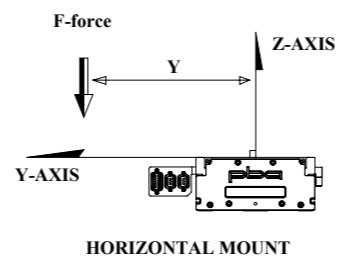
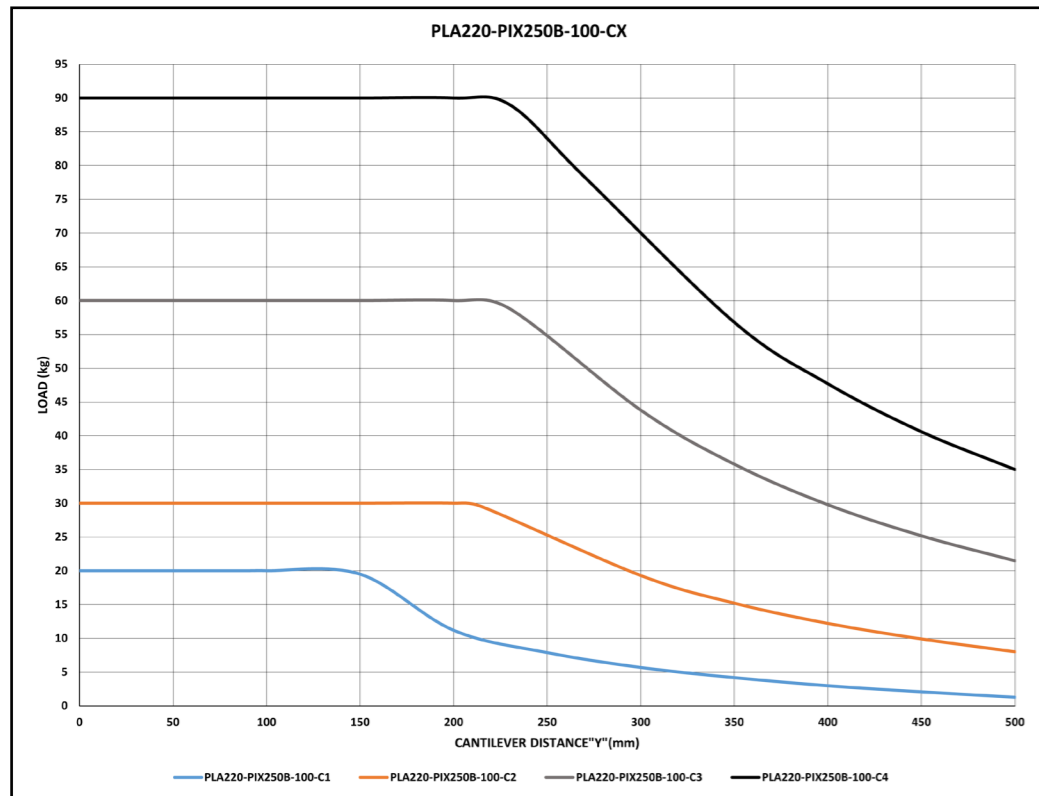
# PLA220-PIX250B-100



Effective Stroke(S) mm	Actuator PLA220							
	PIX250B-100-C1		PIX250B-100-C2		PIX250B-100-C3		PIX250B-100-C4	
	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg	Length ( L ) mm	Mass kg
100	304	14.3	388	20.4	472	25.7	556	31.8
184	388	16.6	472	22.7	556	28.0	640	34.1
268	472	18.9	556	24.9	640	30.3	724	36.3
352	556	21.1	640	27.2	724	32.5	808	38.6
436	640	23.4	724	29.5	808	34.8	892	40.9
520	724	25.7	808	31.7	892	37.1	976	43.1
604	808	28.0	892	34.0	976	39.3	1060	45.4
688	892	30.2	976	36.3	1060	41.6	1144	47.7
772	976	32.5	1060	38.6	1144	43.9	1228	50.0
856	1060	34.8	1144	40.8	1228	46.1	1312	52.2
940	1144	37.0	1228	43.1	1312	48.4	1396	54.5
1024	1228	39.3	1312	45.4	1396	50.7	1480	56.8
1108	1312	41.6	1396	47.6	1480	53.0	1564	59.0
1192	1396	43.8	1480	49.9	1564	55.2	1648	61.3

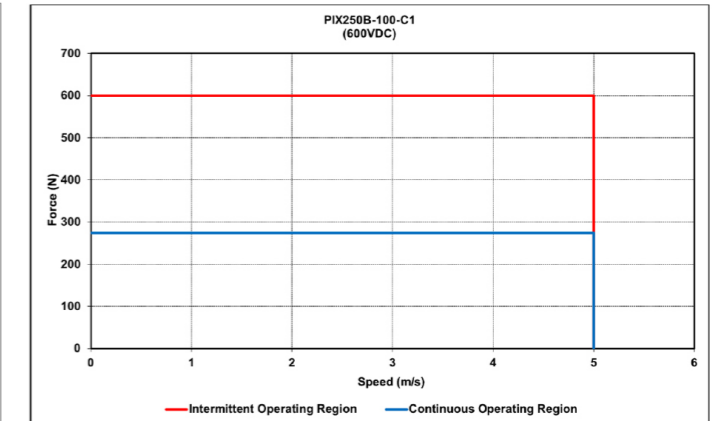
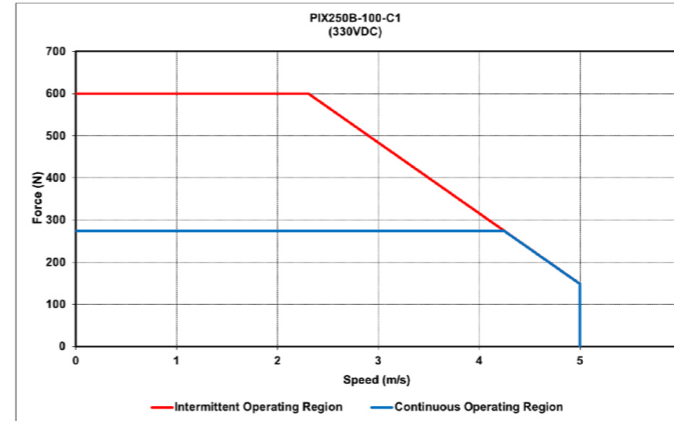


# GRAPH : LOAD VS CANTILEVER DISTANCE FOR PLA220-PIX250B-100

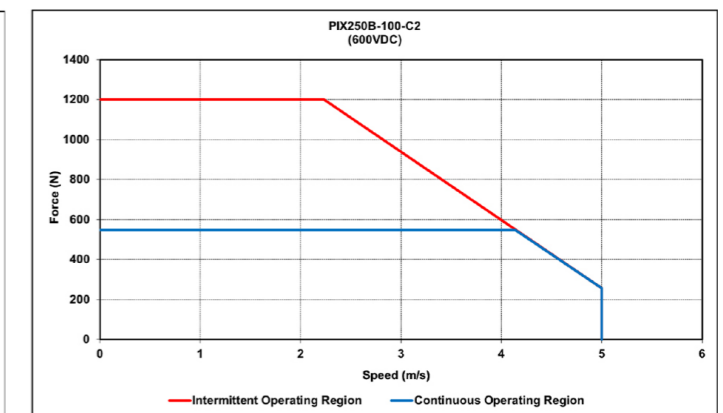
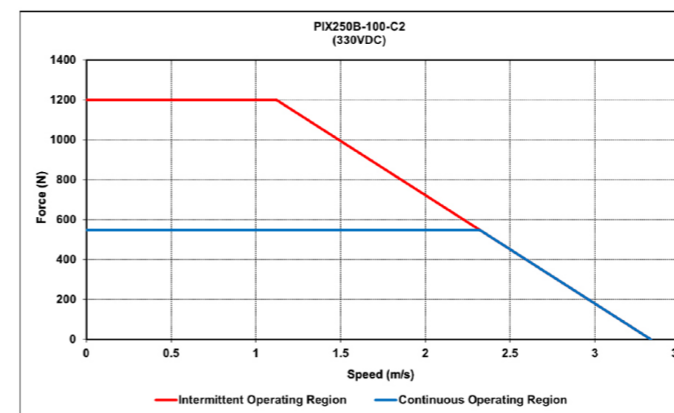


# GRAPH: FORCE VS SPEED FOR PLA220-PIX250B-100

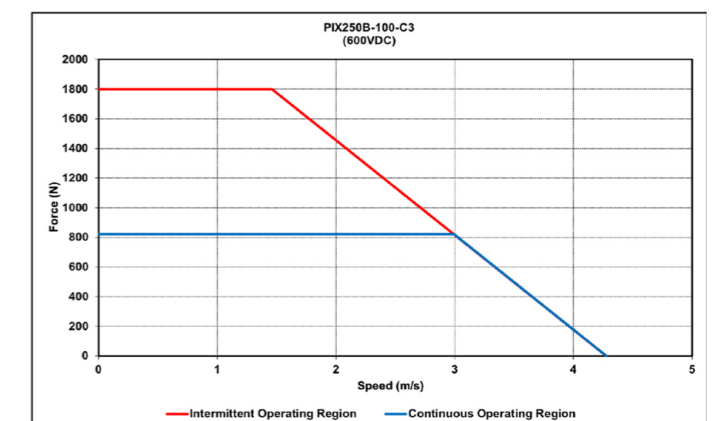
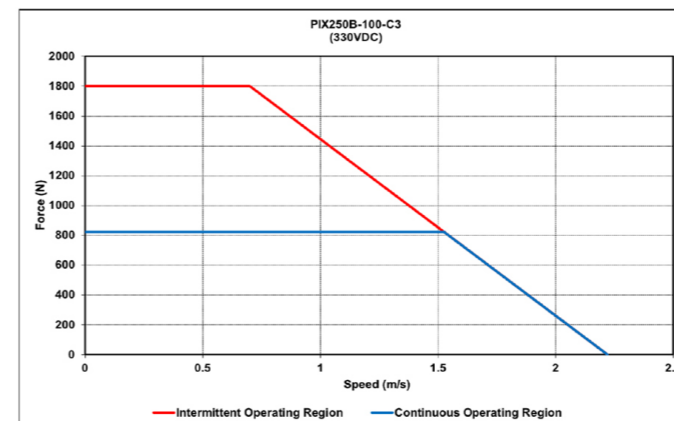
## PIX250B-100-C1



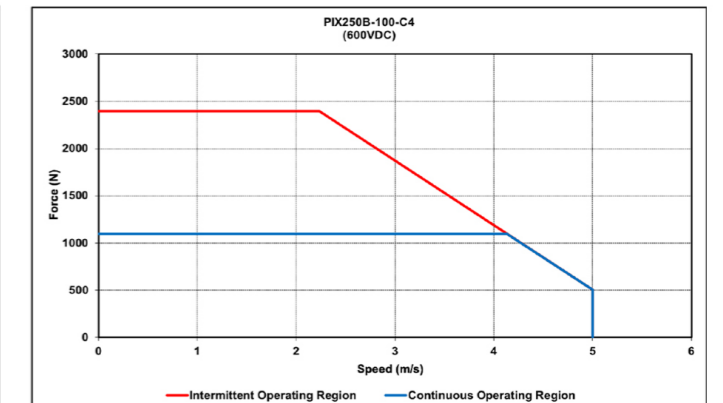
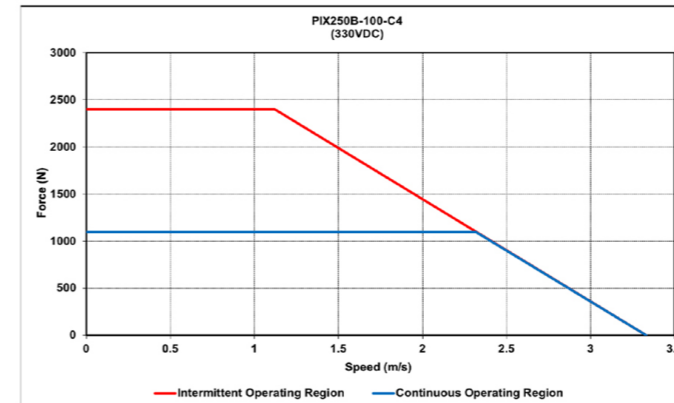
## PIX250B-100-C2



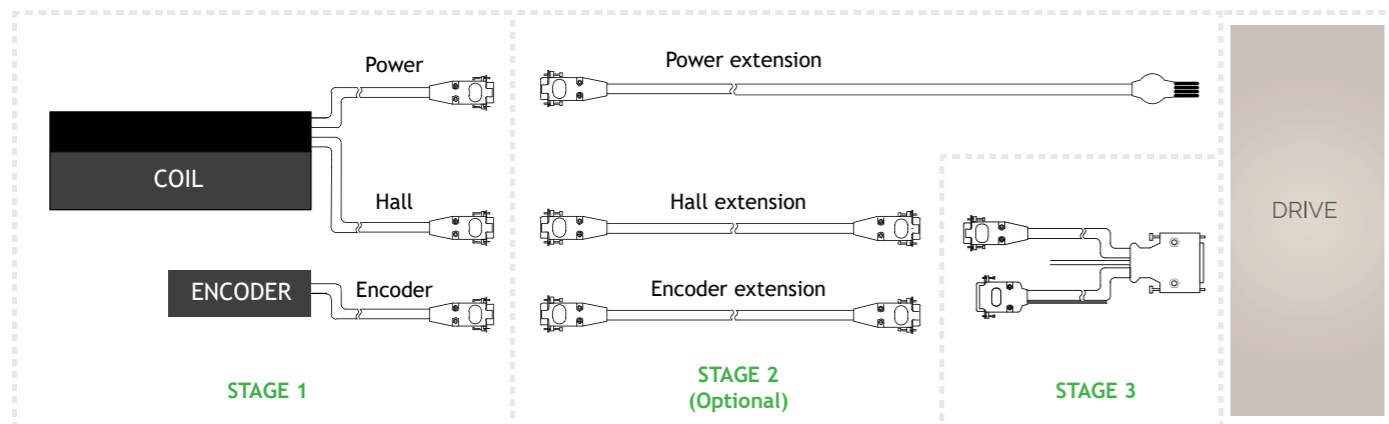
## PIX250B-100-C3



## PIX250B-100-C4



## CABLE OPTION



## THERMAL PROTECTION

The temperature at which the thermal device is activated is shown below

MODEL	THERMAL DEVICE TYPE	
DX30F, DX50F, PIX150B, PIX250B	PT100	TC: Refer to note 1
DX30F, DX50F, PIX150B, PIX250B	THERMOSTAT	TM: (NC) Opens at 100°C

Note 1:

- Programmable and can be used where there are temperature controllers or drivers/motion controllers with analog inputs.
- Recommended to set cut-off temperature to 100°C (max) to prevent coil damage.
- User has to ensure that the thermal protection devices are wired to appropriate electronics to ensure that the motor power cutoff is active when temperature reaches its allowable limit.

## STAGE 1 | POWER, HALL AND ENCODER CABLE PIN OUT

POWER CABLE PIN OUT		
9NF		DX F / PIX150B
		P1 M1 Grey
		P2 M1 Black (Jumper)
		P3 M3 Black
		P4 M3 Black (Jumper)
		P5 M2 Brown
		P6 M2 Black (Jumper)
		P7 Temp sensor 1 Black
		P8 Temp sensor 2 Orange
P9 PE Yellow		
9NF		PIX250B
		A1 M1 Red
		A2 M2 Blue
		A3 M3 Brown
		P1 TS1 Red
		P3 TS2 Black
		A4 PE Yellow

HALL CABLE PIN OUT		
HC		DX F & PIX150B & PIX250B
		P1 Hall A White
		P2 Hall B Green
		P3 Hall C Blue
		P4 5V Red
P5 0V Black		
HCL		DX F & PIX150B & PIX250B
		P1 Hall A+
		P2 Hall A-
		P3 Hall B+
		P4 Hall B-
		P5 Hall C+
		P6 Hall C-
		P7 5V
P8 0V		

Notes: All connectors shown are front view

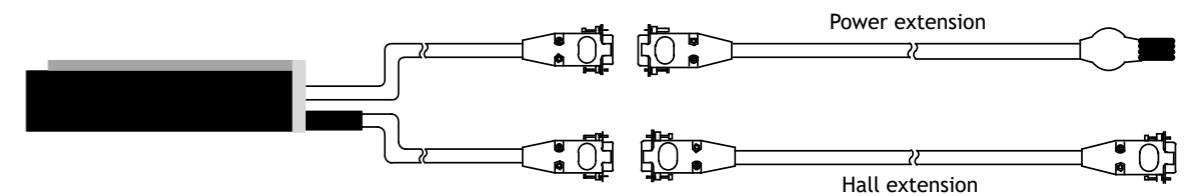
## ENCODER PINOUT

OAE - PBA ABSOLUTE OPTICAL ENCODER			
	ENCODERS		
	SIGNAL	PIN	COLOURS
	+5V	4	BROWN + GREEN
	+5V SENSOR	5	BLUE + BLUE-RED(ORANGE)
	0V	8	WHITE + YELLOW
	0V SENSOR	9	RED + GREY-PINK
	CLOCK	2	BLACK
	\CLOCK	3	PURPLE
	DATA	6	GREY
\DATA	7	PINK	
GROUND	HOUSING	SHIELD	

OE - OPTICAL INCREMENTAL DIGITAL ENCODER			
	ENCODERS		
	FUNCTION	SIGNAL	15 PIN D TYPE
	POWER	5V	7
		0V	8
	INCREMENTAL SIGNALS	A+	2
		A-	9
		B+	14
		B-	6
	REFERENCE MARK	Z+	13
		Z-	5
			12
	LIMITS	P	4
		Q	11
	ALARM	E-	10
REMOTE CAL	CAL	3	
SHIELD	-	1	
		CASE	

OEA - OPTICAL INCREMENTAL ANALOG ENCODER			
	ENCODERS		
	FUNCTION	SIGNAL	15 PIN D TYPE
	POWER	5V	4
		0V	5
			12
	INCREMENTAL SIGNALS	V1+	13
		V1-	9
		V2+	1
		V2-	10
	REFERENCE MARK	V0+	2
		V0-	11
		VP	7
	LIMITS	VQ	8
	ALARM	Vx	6
	REMOTE CAL	CAL	14
SHIELD	-	CASE	

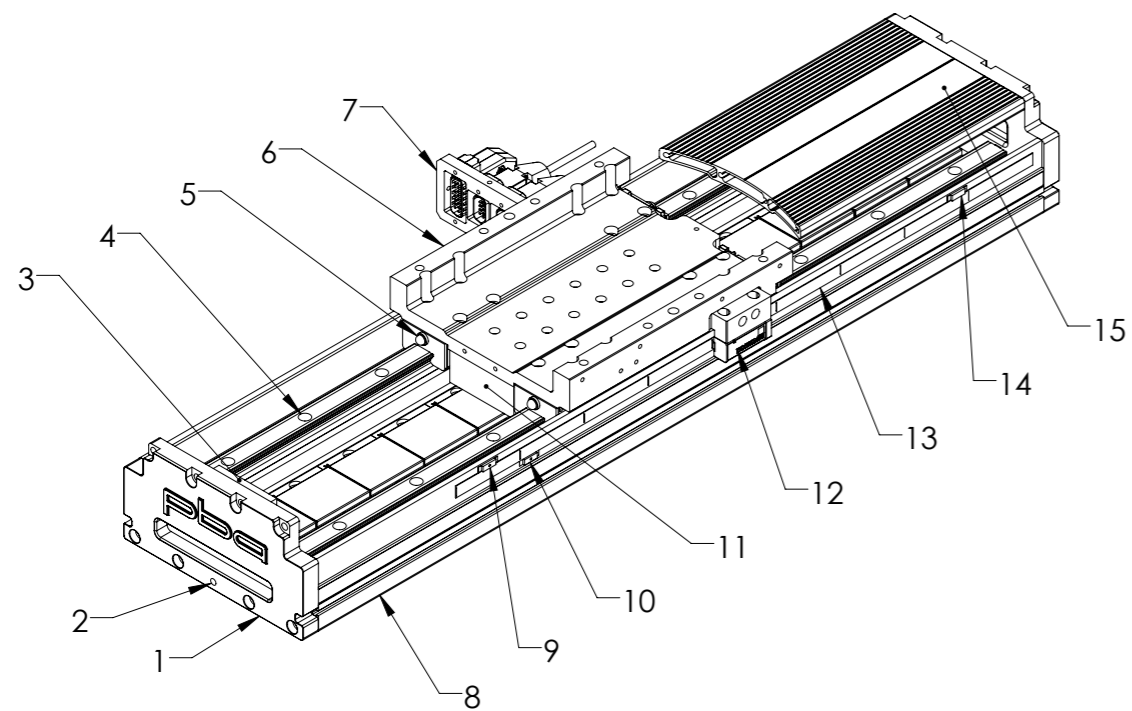
## STAGE 2 | EXTENSION CABLE



EXTENSION CABLE		PART NUMBER
Power Extension Cable		CBL_EXT_PWR1_X.X CBL_EXT_PWR1_UL_X.X (DX F / PIX150B)
		CBL_EXT_PWR3_X.X CBL_EXT_PWR3_UL_X.X (PIX250B-XXX-C1 to C3)
Power Extension Cable		CBL_EXT_PWR4_X.X CBL_EXT_PWR4_UL_X.X (PIX250B-XXX-C4)
		CBL_EXT_PWR4_X.X CBL_EXT_PWR4_UL_X.X (PIX250B-XXX-C4)
Hall Sensor Extension Cable		CBL_EXT_HALLO_X.X CBL_EXT_HALLO_UL_X.X (DX F / PIX150B / PIX250B)
		CBL_EXT_HALLO_DIF_X.X CBL_EXT_HALLO_DIF_UL_X.X (DX F / PIX150B / PIX250B)
Encoder Extension Cable		CBL_EXT_PAOF1_X.X CBL_EXT_PAOF1_UL_X.X PBA ABSOLUTE
		CBL_EXT_REN00_X.X CBL_EXT_REN00_UL_X.X QUANTIC Digital
		CBL_EXT_REN00A_X.X CBL_EXT_REN00A_UL_X.X QUANTIC Analog

Notes: 1. X.X is the length of the cable in meters. 2. For customized cable length, contact PBA

1. End Cover
2. Ground Connections (screw excluded)
3. Hard Stopper
4. Linear Guide Rail
5. Linear Guide Runner Block
6. Carriage
7. Connections for power cable, hall, feedback
8. Frame
9. Encoder Q limit
10. Encoder Reference Mark Selector
11. Linear Motor
12. Encoder
13. Scale
14. Encoder P limit
15. Top cover



# APPLICATION FORM - LINEAR ACTUATOR SELECTION

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

## PBA LINEAR ACTUATOR SELECTION QUESTIONNAIRE

### 1. Application Description

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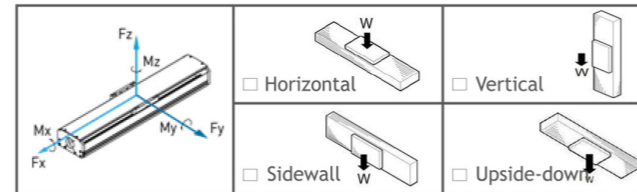
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### 1a. Application Sketch With Approx Dimensions

### 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



### 3. Motion Parameter

	Profile 1	Profile 2	Profile 3
Moving distance	mm		
Moving time	s		
Moving velocity	m/s		
Acceleration	m/s <sup>2</sup>		
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

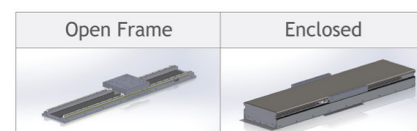
### 8. Working Environment

Room temperature	°C
Clean room class	

### 9. Additional Requirements (Please Tick ( ) Accordingly)

Motor cable length	Controller	Amplifier	Encoder	Other: _____
m				

### 10. Actuator



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

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# 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](http://www.pbasystems.com.sg) or simply scan the QR CODE

## SIMULATED PERFORMANCE CHARTS

**Motor Sizer**

Project Details: Customer Name: PBA, Project Name: XYZ, Date: 6/1/2022, Project Data Version: 7.0.16

Axis Details: Axis Name: X, Motor Category: DXB, Safety Margin: 20 to 300

No	Motion Profile	Travel Distnco (m)	Travel Time (s)	Max. Speed (m/s)	Max. Accel. (m/s <sup>2</sup> )	Dwell Time (s)	Mass of Load (Kg)	Angle Of Incln. (°)	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	1.000	1.000	1.500	4.500	0.100	10.000	0.000	▶	0.003	0.000	30.000	35.034	45.294	0.294	0.333	0.333	0.333	1.100
2	Trapezoidal	0.500	1.000	0.750	2.250	0.000	20.000	0.000	▶	0.003	0.000	30.000	36.747	45.589	0.589	0.333	0.333	0.333	1.000
3	Trapezoidal	0.500	1.000	0.750	2.250	0.000	30.000	0.000	▶	0.003	0.000	30.000	55.121	68.383	0.883	0.333	0.333	0.333	1.000

Final Calculations for Axis:

Required RMS Force	43.026 N	Recommended Motor	Safety (%)
Required Peak Force	68.383 N	DX308-C2-S	32
Total Travel Distance	2.000 m	DX308-C2-P	32
Total Cycle Time	3.100 s	DX508-C2-S	101
Total Dwell Time	0.100 s	DX508-C2-P	101
Max Speed	1.500 m/s	DX508T-C2-P	101
Max Acceleration	4.500 m/s <sup>2</sup>	DX508T-C4-P	294
Max. Ambient Temp.	30.000 °C		

Selected Motor: DX508-C2-S

Continuous Force	89.00 N	L To L Resistance	8.40 ohm
Peak Force	446.00 N	L To L Inductance	6.22 mH
Continuous Current	2.63 A	Continuous Power	60.00 W
Peak Current	13.13 A	Peak Power	1502.00 W
Motor Constant	11.51 N/vW	Coil Weight	0.520 kg
Force Constant	34.00 N/A	Coil Length	121.00 mm
Back EMF Constant	39.10 V/(m/s)	Attractive Force	0.00 N

Calculated Motor Values for Application:

Reqd. RMS Force	44.21 N	Reqd. Peak Force	69.57 N
Cont. Current	1.30 A	Peak Current	2.05 A
Coil Temp	48.03 °C	DC Bus Voltage	70.42 V
Safety Factor	101.29 %		

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

Cont. Current	6.30 A	Peak Current	25.40 A
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