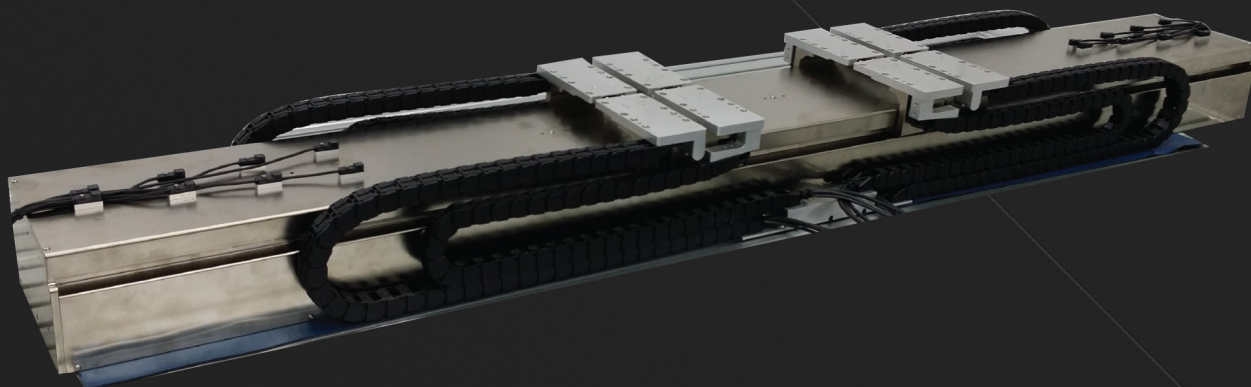




DIRECT DRIVE TECHNOLOGY
Product Catalogue
VERSION 4.1



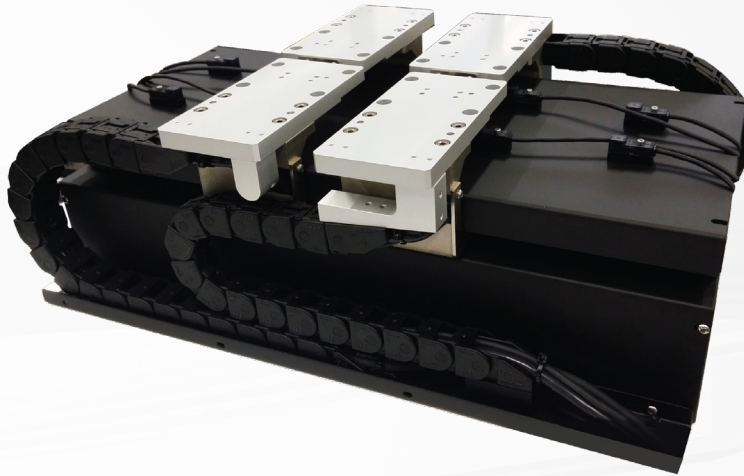
OCTO SERIES

MULTI-HEAD LINEAR ACTUATOR

- PLAY VIDEO -

OCTO SERIES

MULTI-HEAD LINEAR ACTUATOR



Multi-Headed Linear Positioning Enclosed Stage

PBA Systems introduces OCTO, a multi-headed linear positioning enclosed stage ideal for applications that require independent control of multiple axes travelling on the same directional vector/plane. For Further versatility, OCTO actuators provide two independent travel paths/lanes which allow for carriages on different lanes to “overtake each other without risk of collision.

Powered by the DX series of ironless motors, the independent carriages are guided by linear encoders and precision recirculation linear ball bearing blocks on a single rail. Each carriage has its own encoder readhead (Digital and analogue options available) and has a resolution of up to 80nm resolution when analogue encoder option is selected and used in tandem with PBA Maxtune drives. ---- This allows for extremely precise independent control of individual carriages.

- Multiple motors on single travel path
- Dual lane operations to allow for overtaking
- Custom strokes, and feedback resolution configurations
- Effective stroke - Up to 4m (Enclosed version : 2m Max)
- Cable carrier attachment

APPLICATION

- Sorting
- Pick & place
- Inspection
- Scanning
- Parts transfer
- Clean room
- Hi speed automated assembly lines

PART NUMBERING SYSTEM

DXB/BT
PIX
PSM/PSME
CVC
CVCA
RVCA
PDDR
PCA
PVA
PLA
PDAB
PIAB
OCTO
PRG
LINEAR ENCODER
SERVO AMPLIFIER

OCTO

L44

D3

C1

S

TM

1.0

FC

HC

E1.0

1250

00

ACTUATOR MODEL

CARRIAGE PER LANE

L11
L12
L13
L14
L22
L23
L24
L33
L34
L44

MOTOR MODEL

D3 DX30B

MOTOR SIZE

C1

CONNECTION TYPE

S Series
P Parallel

THERMAL PROTECTION

TC* PT 100
TM** Thermostat

CABLE LENGTH***

0.5 0.5m
1.0 1.0m
2.0 2.0m
3.0 3.0m
4.0 4.0m
5.0 5.0m

DESIGN VERSIONS

00 Standard
01 Customized Version
:

EFFECTIVE STROKE

350
650
950
1250
1550
1850
2150
2450

ENCODER RESOLUTION

EA Analog
E0.5 0.5um
E1.0 1.0um

HALL SENSOR AND CONNECTOR OPTIONS

H Flying Leads
(No Connector)
HC 9 pins D Sub
(Male Connector)
CHC 5 Pins Circular
(Quick Lock Male Connector)
HCL 9 pins D Sub
(Male Connector with Line Driver)

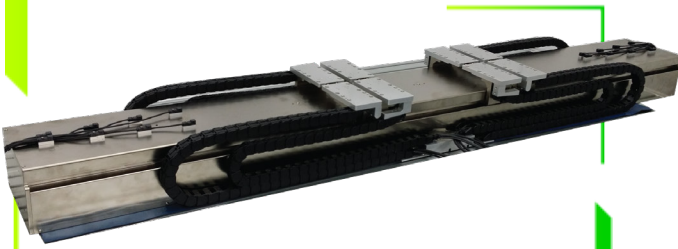
POWER CABLE OPTIONS

NF No Ferrite Core
(Flying Leads)
FC Ferrite Core
(Recommended)
9NF No Ferrite Core, D
Sub 9 pins
Female Connector
CNF No Ferrite Core,
Circular Quick
Lock 6 pins Male Connector

* TC - Sensor output to temperature controller
** TM - On/Off switch, triggers at 100°C
*** Encoder, power & hall cable

OCTO SERIES

MULTI-AXIS ACTUATOR



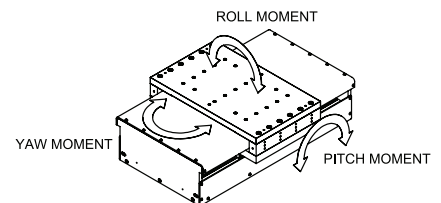
PBA OCTO ACTUATOR

- Multi-axis Actuator
- Peak force to 145N, Continuous force to 29N

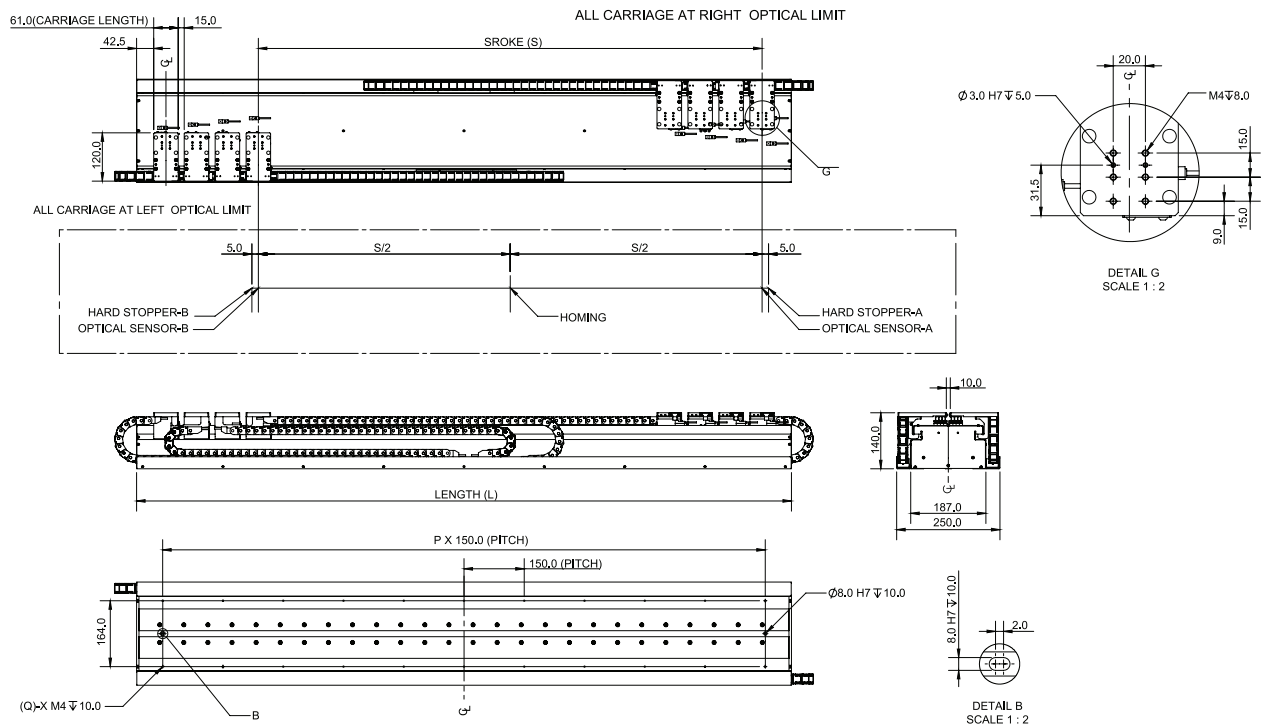
SPECIFICATION		MODEL	
		OCTO-LXX-D3-C1	
Motor Parameters	Unit	S	P
Peak Force	N	145	
Continuous Force @ 120°C*	N	29	
Peak Power @ 120°C	W	695	
Continuous Power @ 120°C*	W	28	
Peak Current	A ^{pk}	11.81	88.7
Continuous Current @ 120°C*	A ^{pk}	2.36	11.7
Continuous Stall Current @ 120°C*	Arms	1.75	8.30
Force Constant	N/A ^{pk}	12.3	15.2
Back EMF Constant	V ^{pk} /m/s	14.1	17.5
Coil Resistance L-L @ 25°C	Ohm	4.8	0.7
Coil Resistance L-L @ 120°C*	Ohm	6.6	0.9
Inductance L-L @ 1kHz	mH	3.00	1.8
Motor Constant @ 25°C*	N//W	6.46	
Motor Constant @ 120°C*	N//W	5.49	
Max. Terminal Voltage	Vdc	400	
Thermal Resistance @ 120°C*	°C/W	3.42	
Max. Coil Temperature	°C	120	
Electrical Cycle Length	mm	60	
Repeatability**	um	±2.0	
Accuracy***	um	±30um/300mm	
Straightness***	um	±10um/200mm	
Flatness***	um	±10um/200mm	
Linear Guide Rated Load and Static Moment			
Model Code		LM Guide	
Block Quantity		1	
Maximum bearing load	kN	4.8	
Pitch moment	Nm	15.2	
Yaw moment	Nm	8.1	
Roll moment	Nm	28.1	

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 accuracy, straightness and flatness requirement, contact PBA for more information.
7. For customized stroke length, contact PBA.
8. For different motor models, contact PBA.
9. Specifications are subject to change without prior notice.



PBA OCTO ACTUATOR

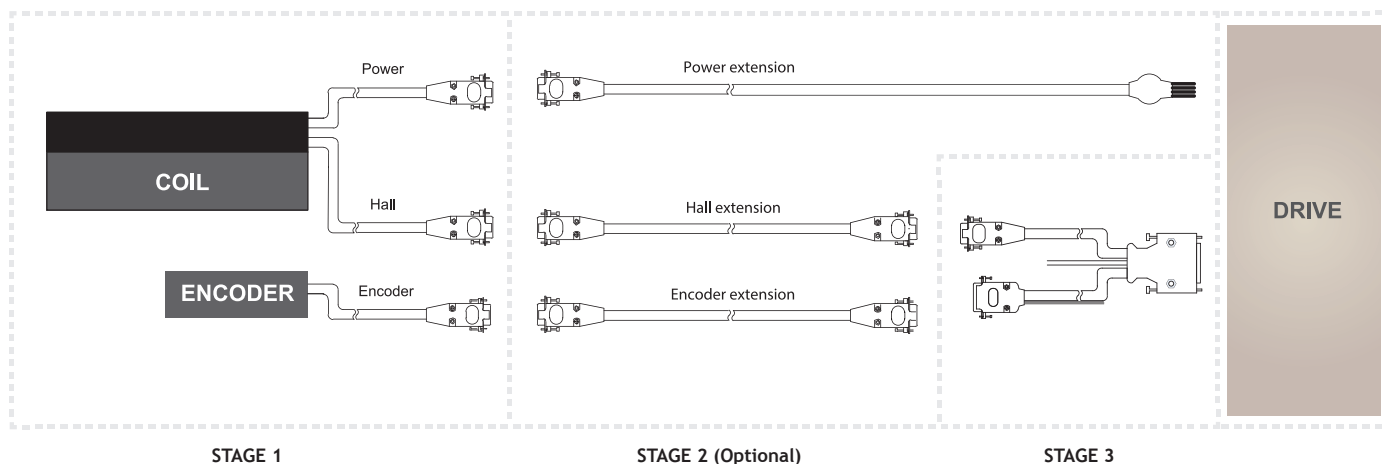


MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	P	Q	SLIDER MASS kg	MODULE MASS (W) kg
C1	350	728	04	10	0.8	10.4
	650	1028	06	14		19.4
	950	1328	08	18		29.2
	1250	1628	10	22		38.6
	1550	1928	12	26		48.0
	1850	2228	14	30		57.4
	2150	2528	16	34		66.8
	2450	2828	18	38		76.2

Notes:

1. Slider Mass = Coil Mass + Carriage Mass

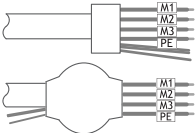
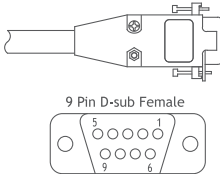
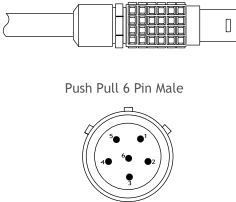
CABLE OPTION



STAGE 1 | POWER AND HALL CABLE OPTION

OCTO-L44-D3-C1-S-TM-1.0-FC-HC-E1.0-1250-00

POWER CABLE OPTIONS

C		<table> <tr><td>M1</td><td>Grey</td></tr> <tr><td>M2</td><td>Brown</td></tr> <tr><td>M3</td><td>Black</td></tr> <tr><td>PE</td><td>Yellow</td></tr> <tr><td>Temp sensor 1</td><td>Black</td></tr> <tr><td>Temp sensor 2</td><td>Orange</td></tr> </table>	M1	Grey	M2	Brown	M3	Black	PE	Yellow	Temp sensor 1	Black	Temp sensor 2	Orange															
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M2	Brown																												
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Temp sensor 2	Orange																												
9NF	 <p>9 Pin D-sub Female</p>	<table> <tr><td>P1</td><td>M1</td><td>Grey</td></tr> <tr><td>P2</td><td>M1</td><td>Black (jumper)</td></tr> <tr><td>P3</td><td>M3</td><td>Black</td></tr> <tr><td>P4</td><td>M3</td><td>Black (jumper)</td></tr> <tr><td>P5</td><td>M2</td><td>Brown</td></tr> <tr><td>P6</td><td>M2</td><td>Black (jumper)</td></tr> <tr><td>P7</td><td>Temp sensor 1</td><td>Black</td></tr> <tr><td>P8</td><td>Temp sensor 2</td><td>Orange</td></tr> <tr><td>P9</td><td>PE</td><td>Yellow & Green</td></tr> </table>	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 & Green
P1	M1	Grey																											
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CNF	 <p>Push Pull 6 Pin Male</p>	<table> <tr><td>P1</td><td>M1</td><td>Grey</td></tr> <tr><td>P2</td><td>M2</td><td>Brown</td></tr> <tr><td>P3</td><td>M3</td><td>Black</td></tr> <tr><td>P4</td><td>Temp sensor 1</td><td>Black</td></tr> <tr><td>P5</td><td>Temp sensor 2</td><td>Orange</td></tr> <tr><td>P6</td><td>PE</td><td>Yellow & Green</td></tr> </table>	P1	M1	Grey	P2	M2	Brown	P3	M3	Black	P4	Temp sensor 1	Black	P5	Temp sensor 2	Orange	P6	PE	Yellow & Green									
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HALL SENSOR OPTIONS

H		<table> <tr><td>Hall A</td><td>White</td></tr> <tr><td>Hall B</td><td>Green</td></tr> <tr><td>Hall C</td><td>Blue</td></tr> <tr><td>5V</td><td>Red</td></tr> <tr><td>0V</td><td>Black</td></tr> </table>	Hall A	White	Hall B	Green	Hall C	Blue	5V	Red	0V	Black						
Hall A	White																	
Hall B	Green																	
Hall C	Blue																	
5V	Red																	
0V	Black																	
HC		<table> <tr><td>P1</td><td>Hall A</td><td>White</td></tr> <tr><td>P2</td><td>Hall B</td><td>Green</td></tr> <tr><td>P3</td><td>Hall C</td><td>Blue</td></tr> <tr><td>P4</td><td>5V</td><td>Red</td></tr> <tr><td>P5</td><td>0V</td><td>Black</td></tr> </table>	P1	Hall A	White	P2	Hall B	Green	P3	Hall C	Blue	P4	5V	Red	P5	0V	Black	
P1	Hall A	White																
P2	Hall B	Green																
P3	Hall C	Blue																
P4	5V	Red																
P5	0V	Black																
CHC		<table> <tr><td>P1</td><td>Hall A</td><td>White</td></tr> <tr><td>P2</td><td>Hall B</td><td>Green</td></tr> <tr><td>P3</td><td>Hall C</td><td>Blue</td></tr> <tr><td>P4</td><td>5V</td><td>Red</td></tr> <tr><td>P5</td><td>0V</td><td>Black</td></tr> </table>	P1	Hall A	White	P2	Hall B	Green	P3	Hall C	Blue	P4	5V	Red	P5	0V	Black	
P1	Hall A	White																
P2	Hall B	Green																
P3	Hall C	Blue																
P4	5V	Red																
P5	0V	Black																
HCL		<table> <tr><td>P1</td><td>Hall A+</td></tr> <tr><td>P2</td><td>Hall A-</td></tr> <tr><td>P3</td><td>Hall B+</td></tr> <tr><td>P4</td><td>Hall B-</td></tr> <tr><td>P5</td><td>Hall C+</td></tr> <tr><td>P6</td><td>Hall C-</td></tr> <tr><td>P7</td><td>5V</td></tr> <tr><td>P8</td><td>0V</td></tr> </table>	P1	Hall A+	P2	Hall A-	P3	Hall B+	P4	Hall B-	P5	Hall C+	P6	Hall C-	P7	5V	P8	0V
P1	Hall A+																	
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P4	Hall B-																	
P5	Hall C+																	
P6	Hall C-																	
P7	5V																	
P8	0V																	

Notes: All connectors shown are front view

The temperature in which the thermostat is active is shown as below:

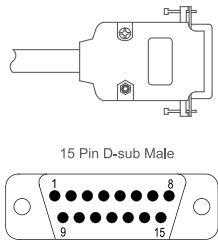
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX30B	PT100	See Note 1
DX30B	Thermostat	100° C

Note 1

- Programmable on temperature controller or analog inputs on motion controller.
- 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.

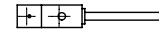
OCTO CABLE PIN OUT

ENCODER CONNECTOR - 15 PIN D-SUB MALE



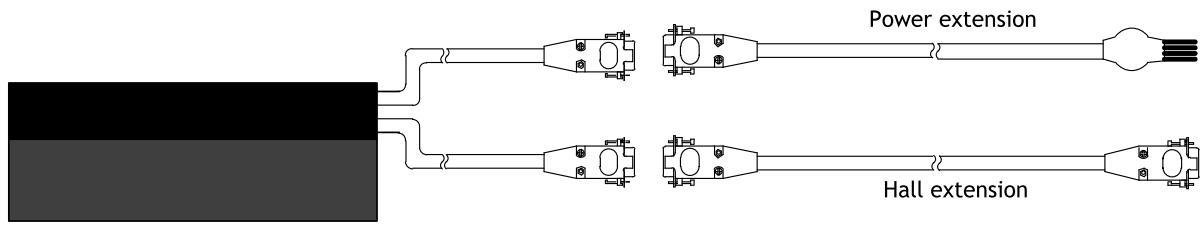
RGH41		
15 Pin D-sub Male	Digital	Analog
P1	X	V1-
P2	0V	V2-
P3	E-	V0+
P4	Z-	5V
P5	B-	
P6	A-	BID
P7	5V	Vp/ Vx
P8		Vq
P9	0V	V1+
P10	Q	V2+
P11	E+/P	V0-
P12	Z+	0V
P13	B+	
P14	A+	DIR
P15	Shield	Shield


PROXIMITY SENSOR (refer GL-8FX10 Data Sheet)



STAGE 2 | OCTO EXTENSION CABLE

Connection example: OCTO-L44-D3-C1-S-TM-1.0-FC-HC-E1.0-1250-00



Extension Cable			Part Number	
Power Extension Cable			CBL_EXT_PWR_DX_X.X	
			CBL_EXT_PWR_DX_CC_X.X	
Hall Sensor Extension Cable			CBL_EXT_HALLO_X.X	
			CBL_EXT_HALLO_CC_X.X	
			CBL_EXT_HALLO_DIF_X.X	
Encoder Extension Cable			CBL_EXT_REN00_X.X	

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

Application Form - Linear Motor Selection

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

PBA LINEAR MOTOR 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

	<input type="checkbox"/> Horizontal	<input type="checkbox"/> Vertical
	<input type="checkbox"/> Sidewall	<input type="checkbox"/> 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				
	PARTIAL 	BELOW 	STRIP SEAL 		

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.

Address:
**505 Yishun Industrial Park, A,
Singapore 768733**

Contact Us:
**Tel: +(65) 6576 6766
Fax: +(65) 6576 6768**



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

PBA Motor Sizer

Application Version: 10.7.0.0 | Local Database Version: 7.0.16 | Server Database Version: 7.0.16

Guest [About PBA](#) [Online](#)

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

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	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

Parameter	Value
Required RMS Force	43.026 N
Required Peak Force	68.383 N
Total Travel Distance	2.000 m
Total Cycle Time	3.100 s
Total Dwell Time	0.100 s
Max Speed	1.500 m/s
Max Acceleration	4.500 m/s ²
Max. Ambient Temp.	30.000 °C

Recommended Motor

Motor	Safety (%)
DX30B-C2-S	32
DX30B-C2-P	32
DX50B-C2-S	101
DX50B-C2-P	101
DX50BT-C2-P	101
DX50BT-C4-P	294

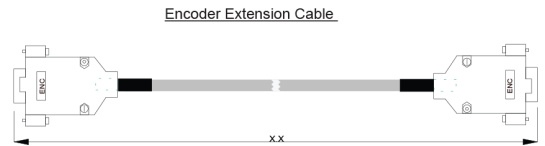
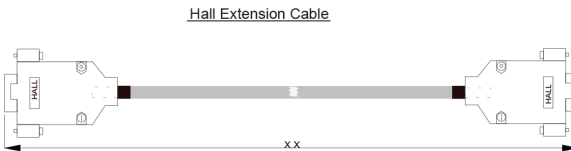
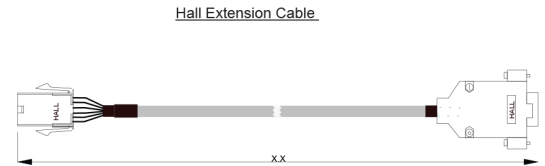
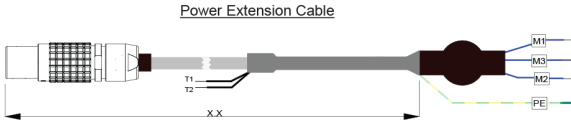
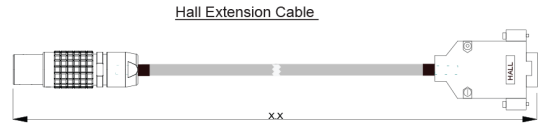
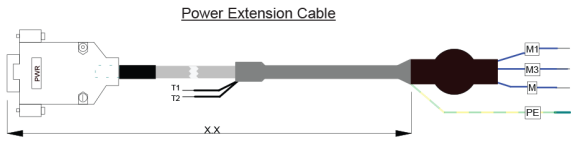
Selected Motor

Parameter	Value
Motor	DX50B-C2-S
Continuous Force	89.00 N
Peak Force	446.00 N
Continuous Current	2.63 A
Peak Current	13.13 A
Motor Constant	11.51 N/V
Force Constant	34.00 N/A
Back EMF Constant	39.10 V/(m/s)
L To L Resistance	8.40 ohm
L To L Inductance	6.22 mH
Continuous Power	60.00 W
Peak Power	1502.00 W
Coil Weight	0.520 kg
Coil Length	121.00 mm
Attractive Force	0.00 N

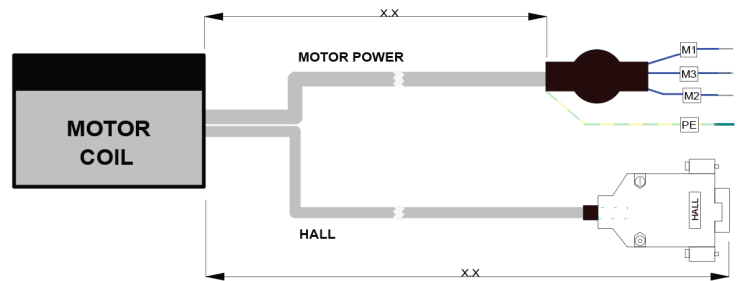
Calculated Motor Values for Application

Parameter	Value
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

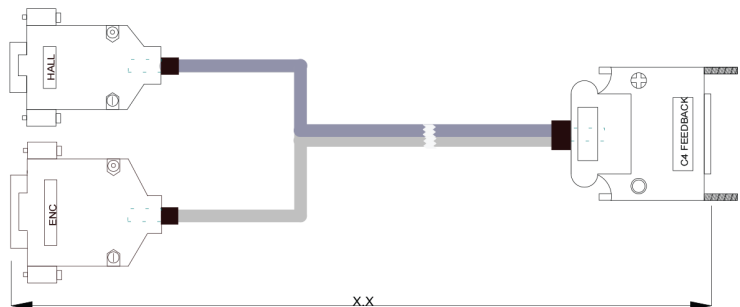
APPENDIX



MOTOR POWER HALL CABLE



MAXTUNE FEEDBACK CABLE



Notes:

1. X.X is the length of the cable in meter with a tolerance of $+ 0.10$ $- 0$
2. All measurements are in meters (m) unless stated