PBA SYSTEMS

Direct Drive Technology
Product Catalog
- Version 2.0 -

PBA SYSTEMS

COMPANY OVERVIEW

Since 1999, PBA Systems continuously aims for technological breakthroughs and innovations, working to deliver the best products to our customers while providing excellent service and uncompromising quality standards.

An ISO 9001:2008 certified company that designs, manufactures and innovates direct drive technology products including:

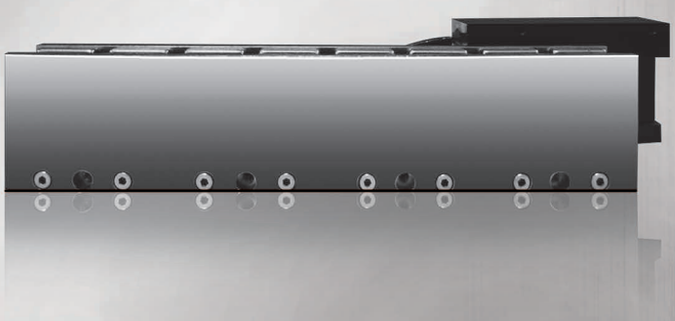
- **Linear Motor**
  - Ironless
  - Iron Core
  - Shaft
  - Actuators
  - Multi-Axis Module
- **Rotary Motor**
  - Inner Rotor
  - Outer Rotor
  - Ironless
  - Iron Core
- **Voice Coil**
  - Circular
  - Rectangular
  - Actuators

---PBA Systems - Makes A Difference---

* For enquiries on any of our products,
email us at **sales@pbasystems.com.sg** or
call us at **+65 6576 6767**

ISO 9001: 2008 Cert.No.: 601191

TABLE OF CONTENT



DX B/BT SERIES

IRONLESS LINEAR MOTOR

HIGH SPEED

"zero" cogging with minimal velocity ripple

PBA SYSTEMS

www.pbasystems.com.sg

HIGH SPEED
"zero" cogging with minimal velocity ripple

DX B/BT SERIES
IRONLESS LINEAR MOTOR

High Speed Ironless Linear Motors With Minimal Velocity Ripple

DX series' ironless patented overlapping winding forcers provides excellent force density Vs coil size ratio resulting in high force and acceleration generation. DX Coil's overlapping manufacturing technology allows for selection of smaller size motors in comparison against the competition due to its higher force density and further improved heat dissipation achieved through optional forced air-cooling methods.

All DX series forces are designed with high flex cables, embedded hall effect sensor and over temperature protection (thermostats or PT100) that makes it the ideal choice for the most demanding applications. The Modular U-channel Magnet tracks available in 60mm length increments allows for easy assembly of un-restricted stroke length.

- Low speed/torque ripple
- Fast dynamic response
- Zero backlash
- Maintenance free
- High acceleration
- Long strokes without performance loss
- Easy assembly over long stroke lengths

Application

- Laser trimming
- Precision positioning stages
- Photonics
- Biotech handlers
- FPD/LCD transfer
- Wire and Die Bonding
- Microscope stages
- Semiconductor machines
- Diamond cutting
- Micro Precise Fabrication
- Precision Stamping

* Technical specifications subject to change without prior notice

HIGH SPEED

"zero" cogging with minimal velocity ripple

Model	Peak Force (N)	Continuous Force AC (N)	Peak Current (A^{pk})	Continuous Current AC (A^{pk})	Coil Length (mm)
DX10B	63.3	12.7	14.01	2.8	22-85
DX20B	229	60	21	5.46	61-151
DX30B/BT	724	188	47.25	12.29	61-301
DX50B/BT	1339	348	52.50	13.65	61-361
DX65B/BT	5191	1247	93.75	22.50	121-901
DX90B/BT	5366	1234	67.50	15.53	121-721

PART NUMBERING SYSTEM

Coil Assembly

DX50B - C4 - P - TM - 2.0 - NC - FC - HC - 00

MOTOR MODEL	
DX10B	DX50BT
DX20B	DX65B
DX30B	DX65BT
DX30BT	DX90B
DX50B	DX90BT

MOTOR COIL SIZE
C1
C2
C3
C4
C5
:

All models inclusive of built-in hall sensor
(Hall sensor not available for DX10)

CONNECTION TYPE	
S	Series
P	Parallel

THERMAL PROTECTION	
TC*	PT 100 Sensor
Available for all DX series	
TM**	Thermostat
Available for DX30-90B/BT only	

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

* TC - Sensor output to temperature controller
** TM - On/Off switch, triggers at 100°C
*** Minimum Bending Radius - 10 times of cable diameter

DESIGN VERSIONS	
00	Standard
01	Customized Version
:	

HALL SENSOR CONNECTOR OPTIONS	
NH	No Hall Cable/ Connector (Only applies to DX10, All other models inclusive hall sensor)
H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector

POWER CABLE OPTIONS	
NF	No Ferrite Core (Flying Leads)
FC	Ferrite Core (Recommended, not applies to DX10)
9NF	No Ferrite Core, D Sub 9 pins Female Connector
CNF	No Ferrite Core, Circular Quick Lock 6 pins Male Connector

COOLING TYPE	
NC	No Cooling (Standard)
AC	Air Cooling
WC	Water Cooling

Magnet Track

DX50B - TL300

MOTOR MODEL	
DX10B	DX50B
DX20B	DX65B
DX30B	DX90B

MAGNET TRACK LENGTH*	
TL63 - 63mm*	TL240 - 240mm**
TL84 - 84mm*	TL300 - 300mm**
TL105 - 105mm*	TL360 - 360mm**
TL120 - 120mm**	TL480 - 480mm**
TL180 - 180mm**	TL660 - 660mm**

* Only applicable to DX10 only
** Track length in incremental of 60mm

DX10B

- Ironless Motor
- Peak force to 63N, Continuous force to 12N
- Ideal for high precision/smooth motion
- Hall sensor not available for DX10

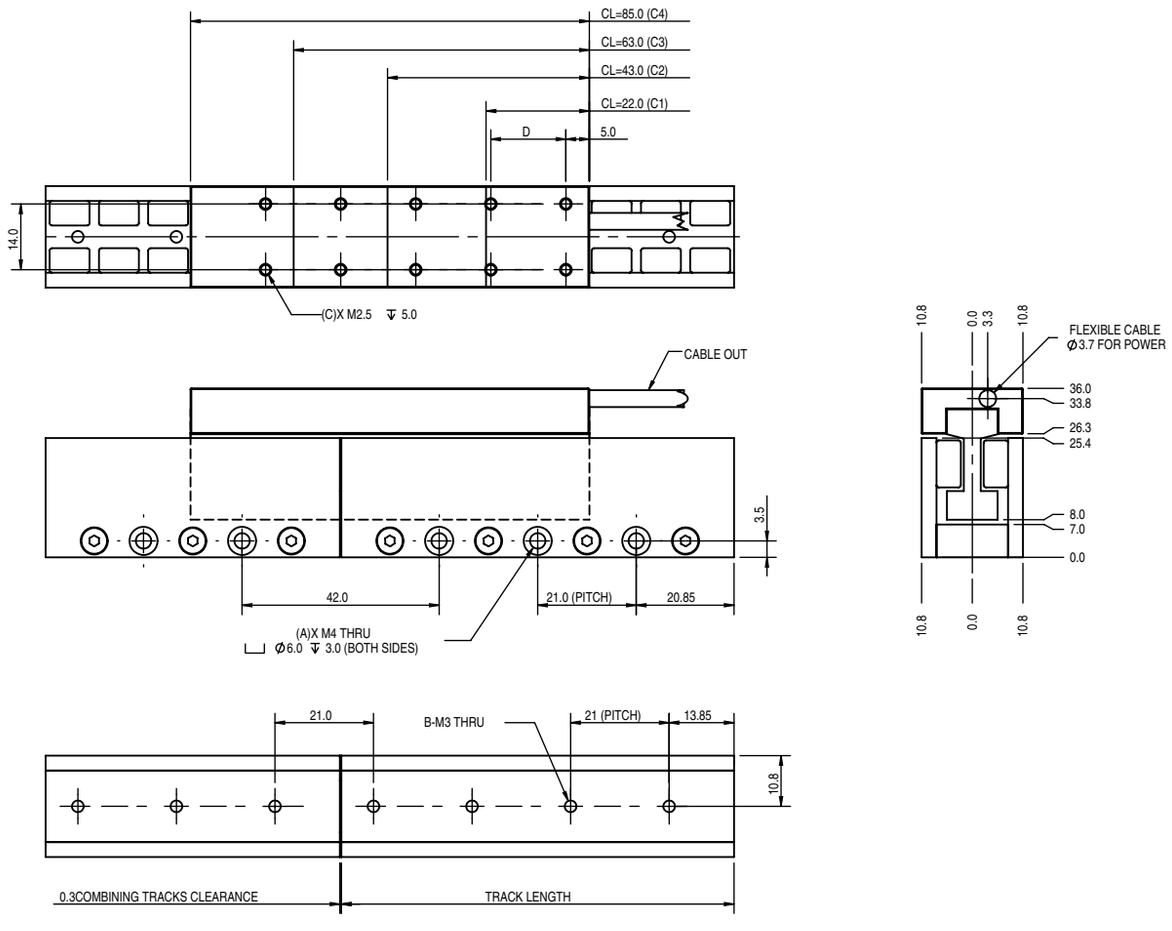
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL			
		DX10B-C1	DX10B-C2	DX10B-C3	DX10B-C4
Connection Type		S	S	S	S
Performance	**Unit**				
Peak Force	N	15.8	31.6	47.5	63.3
Continuous Force @ 120ºC*	N	3.2	6.3	9.5	12.7
Peak Power @ 120ºC	W	316	631	947	1262
Continuous Power @ 120ºC*	W	12.6	25.2	37.9	50.5
Electrical					
Peak Current	A^{pk}	14.01			
Continuous Current @ 120ºC*	A^{pk}	2.80			
Continuous Stall Current @ 120ºC*	Arms	1.98			
Force Constant	N/A^{pk}	1.1	2.3	3.4	4.5
Back EMF Constant	V^{pk}/m/s	1.3	2.6	3.9	5.2
Coil Resistance L-L @ 25ºC	ohm	1.6	3.1	4.7	6.2
Coil Resistance L-L @ 120ºC*	ohm	2.1	4.3	6.4	8.6
Inductance L-L @ 1kHz	mH	0.11	0.22	0.33	0.44
Motor Constant @ 25ºC*	N/√W	1.05	1.48	1.81	2.09
Motor Constant @ 120ºC*	N/√W	0.89	1.26	1.54	1.78
Max. Terminal Voltage	Vdc	60			
Thermal					
Thermal Resistance @ 120ºC*	ºC/W	7.53	3.66	2.51	1.88
Max. Coil Temperature	ºC	120			
Mechanical					
Coil Weight	kg	0.02	0.04	0.06	0.08
Coil Length	mm	22	43	64	85
Attractive Force	N	0			
Electrical Cycle Length	mm	21			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Only available in series winding.
5. Peak force and current - 1 second duration.

DX10B



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 63	62.7	0.15	2	3
TL 84	83.7	0.20	3	4
TL 105	104.7	0.25	4	5

Motor Coil

SIZE	WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C	MOUNTING HOLE PITCH D (mm)
C1	0.02	4	12.0
C2	0.04	6	16.0
C3	0.06	8	16.0
C4	0.08	10	16.0

For COOLING OPTIONS, please ask for detail drawing

DX20B

- Ironless Motor
- Peak force to 229N, Continuous force to 60N
- Integrated Hall Sensor

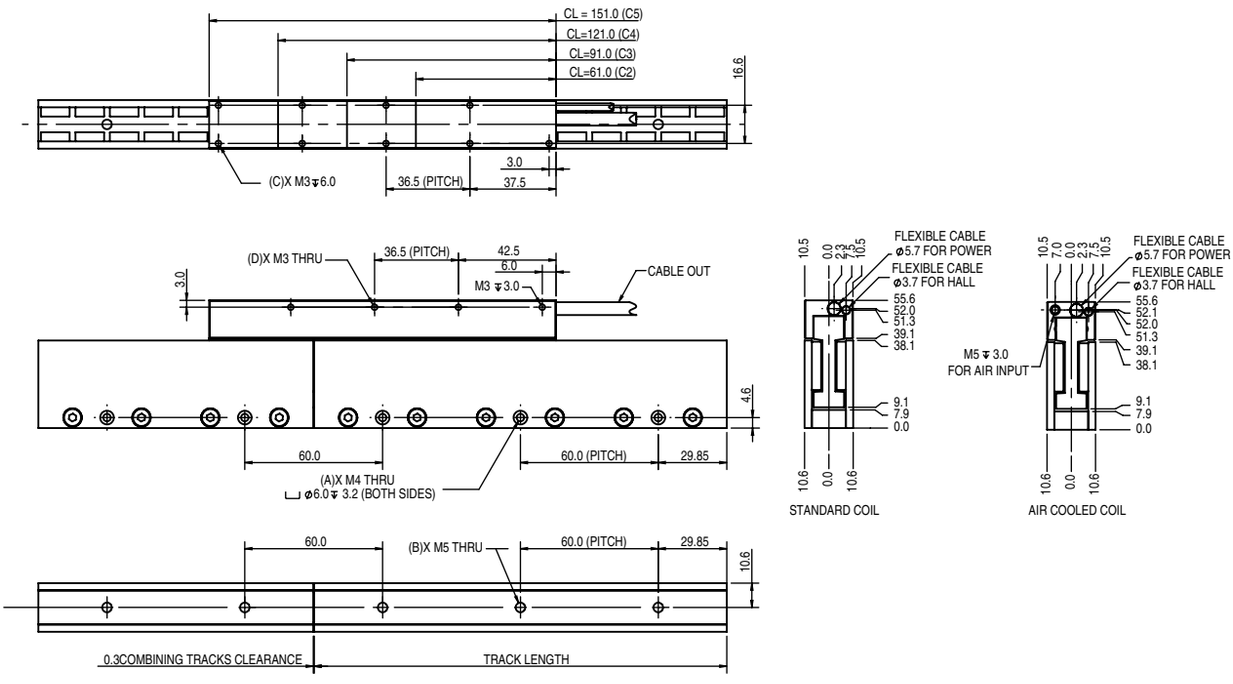
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL							
		DX20B-C2		DX20B-C3		DX20B-C4		DX20B-C5	
Connection Type		S	P	S	P	S	P	S	P
Performance	**Unit**								
Peak Force	N	92		137		183		229	
Continuous Force @ 120ºC*	N	18		27		37		46	
Continuous Force AC @ 120ºC^	N	24		36		48		60	
Peak Power @ 120ºC	W	744		1116		1488		1860	
Continuous Power @ 120ºC*	W	30		45		60		74	
Continuous Power AC @ 120ºC^	W	50		75		101		126	
Electrical									
Peak Current	A^{pk}	10.50	21.00	10.50	21.00	10.50	21.00	10.50	21.00
Continuous Current @ 120ºC*	A^{pk}	2.10	4.20	2.10	4.20	2.10	4.20	2.10	4.20
Continuous Current AC @ 120ºC^	A^{pk}	2.73	5.46	2.73	5.46	2.73	5.46	2.73	5.46
Continuous Stall Current @ 120ºC*	Arms	1.40	2.80	1.40	2.80	1.40	2.80	1.40	2.80
Force Constant	N/A^{pk}	8.70	4.40	13.10	6.50	17.40	8.70	21.80	10.9
Back EMF Constant	$V^{pk}/m/s$	10.0	5.0	15.0	7.50	20.1	10.0	25.10	12.5
Coil Resistance L-L @ 25ºC	ohm	6.5	1.6	9.8	2.4	13.0	3.3	16.3	4.1
Coil Resistance L-L @ 120ºC*	ohm	9.0	2.2	13.5	3.4	18.0	4.5	22.5	5.6
Inductance L-L @ 1kHz	mH	1.53	0.38	2.30	0.57	3.06	0.77	3.83	0.96
Motor Constant @ 25ºC*	N/√W	3.95		4.84		5.59		6.24	
Motor Constant @ 120ºC*	N/√W	3.36		4.11		4.75		5.31	
Max. Terminal Voltage	Vdc	400							
Thermal									
Thermal Resistance @ 120ºC*	ºC/W	3.19		2.13		1.60		1.28	
Thermal Resistance AC @ 120ºC^	ºC/W	1.89		1.26		0.94		0.76	
Max. Coil Temperature	ºC	120							
Mechanical									
Coil Weight	kg	0.11		0.17		0.23		0.28	
Coil Weight AC^	kg	0.11		0.17		0.23		0.28	
Coil Length	mm	61		91		121		151	
Attractive Force	N	0							
Electrical Cycle Length	mm	30							

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX20B



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.7	0.44	2	2
TL 180	179.7	0.66	3	3
TL 240	239.7	0.88	4	4
TL 300	299.7	1.10	5	5
TL 360	359.7	1.32	6	6
TL 480	479.7	1.76	8	8
TL 660	659.7	2.42	11	11

Motor Coil

SIZE	WEIGHT (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C	NUMBER OF MOUNTING HOLE (SIDE MOUNT) D
C2	0.11	3	1
C3	0.17	5	2
C4	0.23	7	3
C5	0.28	9	3

For COOLING OPTIONS, please ask for detail drawing

DX30B / BT

- Ironless Motor
- Peak force to 724N, Continuous force to 188N
- Integrated Hall Sensor

DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL						
		DX30B-C1		DX30B-C2		DX30BT-C2	DX30B-C3	
Connection Type		S	P	S	P	P	S	P
Performance	**Unit**							
Peak Force	N	145		289			434	
Continuous Force @ 120ºC*	N	29		58			87	
Continuous Force AC @ 120ºC^	N	38		75			113	
Peak Power @ 120ºC	W	695		1390			2086	
Continuous Power @ 120ºC*	W	28		56			83	
Continuous Power AC @ 120ºC^	W	47		94			141	
Electrical								
Peak Current	A^{pk}	11.81	23.63	11.81	23.63	47.25	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73	2.36	4.73	9.45	2.36	4.73
Continuous Current AC @ 120ºC^	A^{pk}	3.07	6.14	3.07	6.14	12.29	3.07	6.14
Continuous Stall Current @ 120ºC*	Arms	1.75	3.50	1.75	3.50	7.00	1.75	3.50
Force Constant	N/A^{pk}	12.3	6.1	24.5	12.3	6.1	36.8	18.4
Back EMF Constant	$V^{pk}/m/s$	14.1	7.0	28.2	14.1	7.0	42.3	21.1
Coil Resistance L-L @ 25ºC	ohm	4.8	1.2	9.6	2.4	0.6	14.4	3.6
Coil Resistance L-L @ 120ºC*	ohm	6.6	1.7	13.3	3.3	0.8	19.9	5.0
Inductance L-L @ 1kHz	mH	3.00	0.75	6.00	1.50	0.38	9.00	2.25
Motor Constant @ 25ºC*	$N/\sqrt{W}$	6.46		9.13			11.18	
Motor Constant @ 120ºC*	$N/\sqrt{W}$	5.49		7.76			9.51	
Max. Terminal Voltage	Vdc	400						
Thermal								
Thermal Resistance @ 120ºC*	ºC/W	3.42		1.71			1.14	
Thermal Resistance AC @ 120ºC^	ºC/W	2.02		1.01			0.67	
Max. Coil Temperature	ºC	120						
Mechanical								
Coil Weight	kg	0.21		0.41		0.43	0.62	
Coil Weight AC^	kg	0.23		0.46		0.48	0.69	
Coil Length	mm	61		121			181	
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX30B / BT

- Ironless Motor
- Peak force to 724N, Continuous force to 188N
- Integrated Hall Sensor

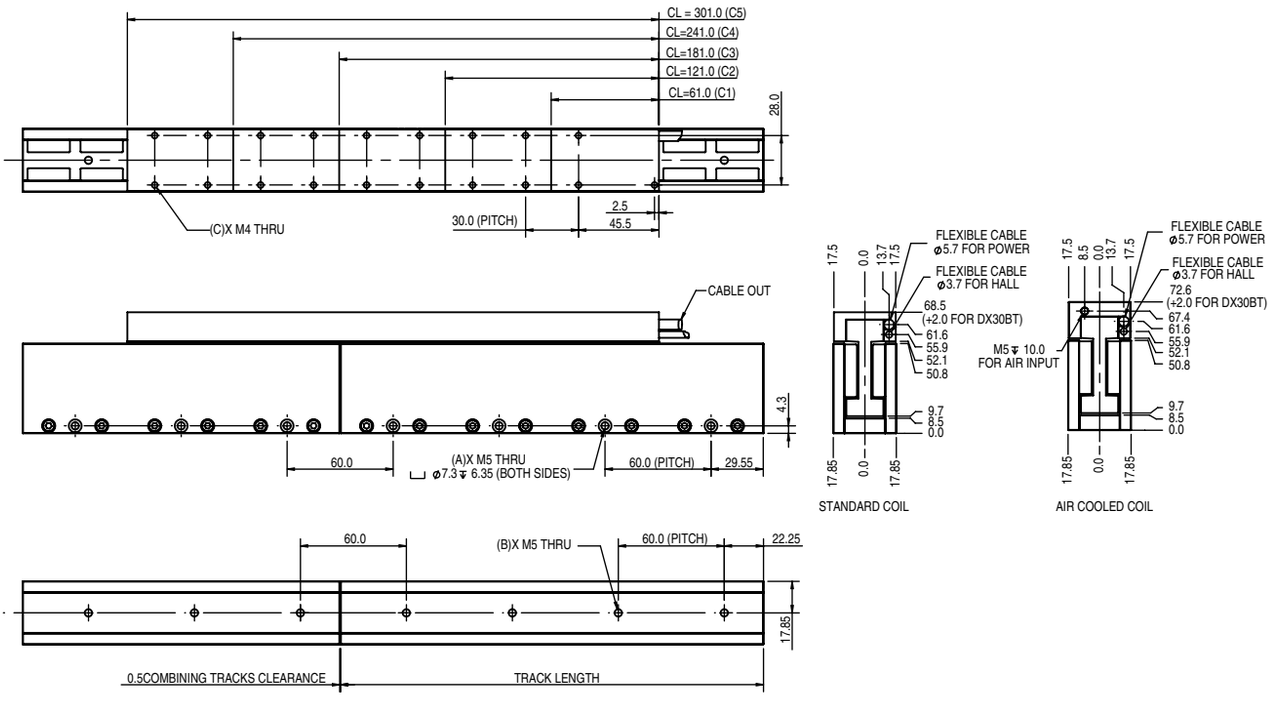
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL				
		DX30B-C4		DX30BT-C4	DX30B-C5	
Connection Type		S	P	P	S	P
Performance	**Unit**					
Peak Force	N	579			724	
Continuous Force @ 120ºC*	N	116			145	
Continuous Force AC @ 120ºC^	N	150			188	
Peak Power @ 120ºC	W	2781			3476	
Continuous Power @ 120ºC*	W	111			139	
Continuous Power AC @ 120ºC^	W	188			235	
Electrical						
Peak Current	A^{pk}	11.81	23.63	47.25	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73	9.45	2.36	4.73
Continuous Current AC @ 120ºC^	A^{pk}	3.07	6.14	12.29	3.07	6.14
Continuous Stall Current @ 120ºC*	Arms	1.75	3.50	7.00	1.75	3.50
Force Constant	N/A^{pk}	49.0	24.5	12.3	61.3	30.6
Back EMF Constant	$V^{pk}/m/s$	56.4	28.2	14.1	70.4	35.2
Coil Resistance L-L @ 25ºC	ohm	19.2	4.8	1.2	24.0	6.0
Coil Resistance L-L @ 120ºC*	ohm	26.6	6.6	1.7	33.2	8.3
Inductance L-L @ 1kHz	mH	12.00	3.00	0.75	15.00	3.75
Motor Constant @ 25ºC*	N/√W	12.91			14.44	
Motor Constant @ 120ºC*	N/√W	10.98			12.27	
Max. Terminal Voltage	Vdc	400				
Thermal						
Thermal Resistance @ 120ºC*	ºC/W	0.85			0.68	
Thermal Resistance AC @ 120ºC^	ºC/W	0.51			0.40	
Max. Coil Temperature	ºC	120				
Mechanical						
Coil Weight	kg	0.83		0.88	1.04	
Coil Weight AC^	kg	0.93		0.97	1.16	
Coil Length	mm	241			301	
Attractive Force	N	0				
Electrical Cycle Length	mm	60				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX30B / BT



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.5	1.14	2	2
TL 180	179.5	1.71	3	3
TL 240	239.5	2.28	4	4
TL 300	299.5	2.85	5	5
TL 360	359.5	3.42	6	6
TL 480	479.5	4.56	8	8

DX 30B Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.21	0.23	3
C2	0.41	0.46	7
C3	0.62	0.69	11
C4	0.83	0.93	15
C5	1.04	1.16	19

DX 30BT Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C2	0.43	0.48	7
C4	0.88	0.97	15

DX50B / BT

- Ironless Motor
- Peak force to 1339N, Continuous force to 348N
- Integrated Hall Sensor

DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL						
		DX50B-C1		DX50B-C2		DX50BT-C2	DX50B-C3	
Connection Type		S	P	S	P	P	S	P
Performance	**Unit**							
Peak Force	N	223		446			669	
Continuous Force @ 120ºC*	N	45		89			134	
Continuous Force AC @ 120ºC^	N	58		116			174	
Peak Power @ 120ºC	W	751		1502			2253	
Continuous Power @ 120ºC*	W	30		60			90	
Continuous Power AC @ 120ºC^	W	51		102			152	
Electrical								
Peak Current	A^{pk}	13.13	26.25	13.13	26.25	52.50	13.13	26.25
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	2.63	5.25	10.50	2.63	5.25
Continuous Current AC @ 120ºC^	A^{pk}	3.41	6.83	3.41	6.83	13.65	3.41	6.83
Continuous Stall Current @ 120ºC*	Arms	2.10	4.20	2.10	4.20	8.40	2.10	4.20
Force Constant	N/A^{pk}	17.0	8.5	34.0	17.0	8.5	51.0	25.5
Back EMF Constant	$V^{pk}/m/s$	19.6	9.8	39.1	19.6	9.8	58.7	29.3
Coil Resistance L-L @ 25ºC	ohm	4.2	1.1	8.4	2.1	0.5	12.6	3.2
Coil Resistance L-L @ 120ºC*	ohm	5.8	1.5	11.6	2.9	0.7	17.4	4.4
Inductance L-L @ 1kHz	mH	3.11	0.78	6.22	1.56	0.39	9.33	2.33
Motor Constant @ 25ºC*	N/√W	9.58		13.55			16.59	
Motor Constant @ 120ºC*	N/√W	8.14		11.51			14.10	
Max. Terminal Voltage	Vdc	400						
Thermal								
Thermal Resistance @ 120ºC*	ºC/W	3.16		1.58			1.05	
Thermal Resistance AC @ 120ºC^	ºC/W	1.87		0.94			0.62	
Max. Coil Temperature	ºC	120						
Mechanical								
Coil Weight	kg	0.25		0.52		0.54	0.76	
Coil Weight AC^	kg	0.28		0.57		0.60	0.85	
Coil Length	mm	61		121			181	
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX50B / BT

- Ironless Motor
- Peak force to 1339N, Continuous force to 348N
- Integrated Hall Sensor

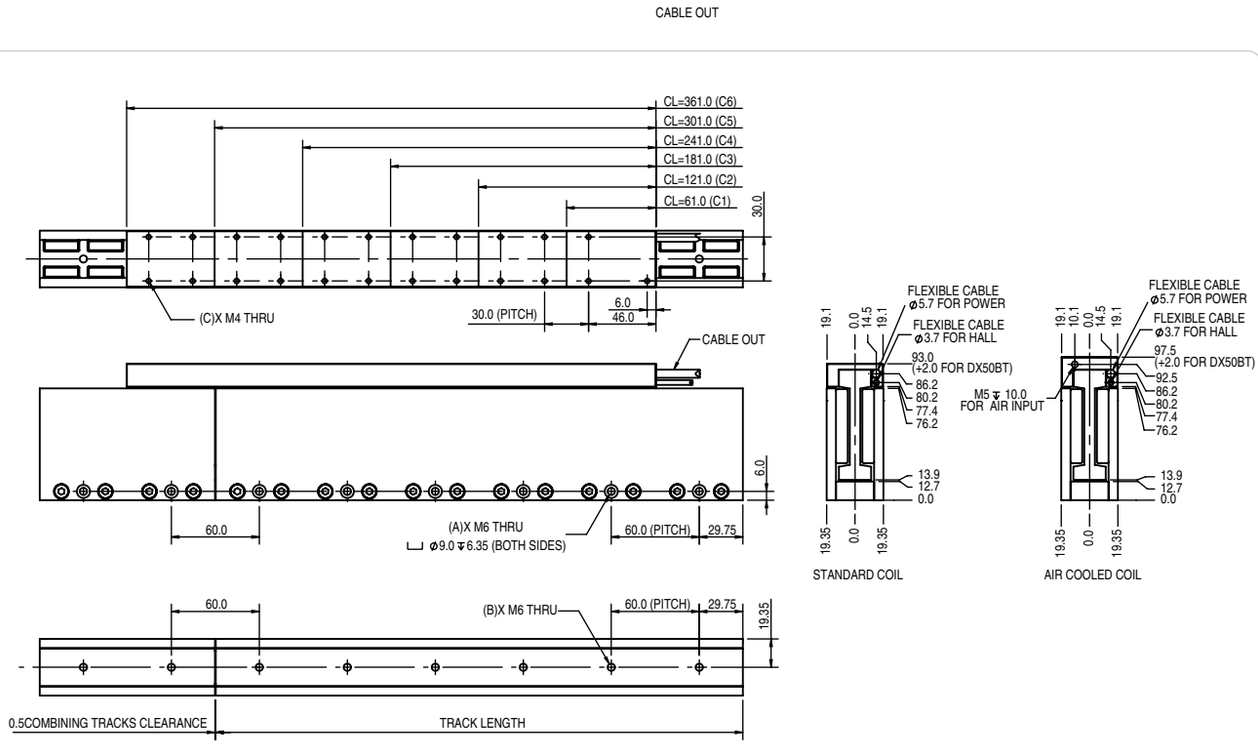
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL					
		DX50B-C4		DX50BT-C4	DX50B-C5		DX50BT-C6
Connection Type		S	P	P	S	P	P
Performance	**Unit**						
Peak Force	N	893			1116		1339
Continuous Force @ 120ºC*	N	179			223		268
Continuous Force AC @ 120ºC^	N	232			290		348
Peak Power @ 120ºC	W	3004			3755		4506
Continuous Power @ 120ºC*	W	120			150		180
Continuous Power AC @ 120ºC^	W	203			254		305
Electrical							
Peak Current	A^{pk}	13.13	26.25	52.50	13.13	26.25	52.50
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	10.50	2.63	5.25	10.50
Continuous Current AC @ 120ºC^	A^{pk}	3.41	6.83	13.65	3.41	6.83	13.65
Continuous Stall Current @ 120ºC*	Arms	2.10	4.20	8.40	2.10	4.20	8.40
Force Constant	N/A^{pk}	68.0	34.0	17.0	85.0	42.5	25.5
Back EMF Constant	$V^{pk}/m/s$	78.2	39.1	19.6	97.8	48.9	29.3
Coil Resistance L-L @ 25ºC	ohm	16.8	4.2	1.1	21.0	5.3	1.6
Coil Resistance L-L @ 120ºC*	ohm	23.2	5.8	1.5	29.1	7.3	2.2
Inductance L-L @ 1kHz	mH	12.44	3.11	0.78	15.55	3.89	1.17
Motor Constant @ 25ºC*	$N/\sqrt{W}$	19.16			21.42		23.46
Motor Constant @ 120ºC*	$N/\sqrt{W}$	16.28			18.21		19.94
Max. Terminal Voltage	Vdc	400					
Thermal							
Thermal Resistance @ 120ºC*	ºC/W	0.79			0.63		0.53
Thermal Resistance AC @ 120ºC^	ºC/W	0.47			0.37		0.31
Max. Coil Temperature	ºC	120					
Mechanical							
Coil Weight	kg	1.07		1.05	1.25		1.58
Coil Weight AC^	kg	1.19		1.17	1.40		1.75
Coil Length	mm	241			301		361
Attractive Force	N	0					
Electrical Cycle Length	mm	60					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX50B / BT



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 120	119.5	1.73	2	2
TL 180	179.5	2.60	3	3
TL 240	239.5	3.46	4	4
TL 300	299.5	4.33	5	5
TL 360	359.5	5.20	6	6
TL 480	479.5	6.92	10	10

DX 50B Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C1	0.25	0.28	3
C2	0.52	0.57	7
C3	0.76	0.85	11
C4	1.07	1.19	15
C5	1.25	1.40	19

DX 50BT Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C2	0.54	0.60	7
C4	1.05	1.17	15
C6	1.58	1.75	23

* Technical specifications subject to change without prior notice

DX65B / BT

- Ironless Motor
- Peak force to 5191N, Continuous force to 1038N
- Integrated Hall Sensor

DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL							
		DX65B-C2		DX65B-C3		DX65B-C4		DX65B-C5	
Connection Type		S	P	S	P	S	P	S	P
Performance	**Unit**								
Peak Force	N	692		1038		1384		1730	
Continuous Force @ 120ºC*	N	138		208		277		346	
Continuous Force AC @ 120ºC^	N	173		260		346		415	
Peak Power @ 120ºC	W	1951		2927		3902		4878	
Continuous Power @ 120ºC*	W	78		117		156		195	
Continuous Power AC @ 120ºC^	W	122		183		244		281	
Electrical									
Peak Current	A^{pk}	15.63	31.25	15.63	31.25	15.63	31.25	15.63	31.25
Continuous Current @ 120ºC*	A^{pk}	3.13	6.25	3.13	6.25	3.13	6.25	3.13	6.25
Continuous Current AC @ 120ºC^	A^{pk}	3.91	7.81	3.91	7.81	3.91	7.81	3.75	7.50
Continuous Stall Current @ 120ºC*	Arms	2.50	5.00	2.50	5.00	2.50	5.00	2.50	5.00
Force Constant	N/A^{pk}	44.3	22.2	66.5	33.2	88.6	44.3	110.8	55.4
Back EMF Constant	$V^{pk}/m/s$	50.9	25.5	76.4	38.2	101.9	50.9	127.4	63.7
Coil Resistance L-L @ 25ºC	ohm	7.7	1.9	11.6	2.9	15.4	3.9	19.3	4.8
Coil Resistance L-L @ 120ºC*	ohm	10.7	2.7	16.0	4.0	21.3	5.3	26.6	6.7
Inductance L-L @ 1kHz	mH	9.11	2.28	13.67	3.42	18.22	4.56	22.78	5.69
Motor Constant @ 25ºC*	$N/\sqrt{W}$	18.4		22.6		26.1		29.1	
Motor Constant @ 120ºC*	$N/\sqrt{W}$	15.7		19.2		22.2		24.8	
Max. Terminal Voltage	Vdc	600							
Thermal									
Thermal Resistance @ 120ºC*	ºC/W	1.22		0.81		0.61		0.49	
Thermal Resistance AC @ 120ºC^	ºC/W	0.78		0.52		0.39		0.34	
Max. Coil Temperature	ºC	120							
Mechanical									
Coil Weight	kg	1.05		1.57		2.09		2.61	
Coil Weight AC^	kg	1.13		1.69		2.25		2.81	
Coil Length	mm	121		181		241		301	
Attractive Force	N	0							
Electrical Cycle Length	mm	60							

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX65B / BT

- Ironless Motor
- Peak force to 5191N, Continuous force to 1038N
- Integrated Hall Sensor

DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL					
		DX65B-C6		DX65BT-C6	DX65B-C8		DX65BT-C8
Connection Type		S	P	P	S	P	P
Performance	**Unit**						
Peak Force	N	2077			2769		
Continuous Force @ 120ºC*	N	415			554		
Continuous Force AC @ 120ºC^	N	498					
Peak Power @ 120ºC	W	5854			7805		
Continuous Power @ 120ºC*	W	234			312		
Continuous Power AC @ 120ºC^	W	337					
Electrical							
Peak Current	A^{pk}	15.63	31.25	62.5	15.63	31.25	62.50
Continuous Current @ 120ºC*	A^{pk}	3.13	6.25	12.5	3.13	6.25	12.50
Continuous Current AC @ 120ºC^	A^{pk}	3.75	7.50	15.00			
Continuous Stall Current @ 120ºC*	Arms	2.50	5.00	10.00	2.50	5.00	10.00
Force Constant	N/A^{pk}	132.9	66.5	33.2	177.2	88.6	44.3
Back EMF Constant	$V^{pk}/m/s$	152.8	76.4	38.2	203.8	101.9	50.9
Coil Resistance L-L @ 25ºC	ohm	23.1	5.8	1.4	30.8	7.7	1.9
Coil Resistance L-L @ 120ºC*	ohm	32.0	8.0	2.0	42.6	10.7	2.7
Inductance L-L @ 1kHz	mH	27.33	6.83	1.71	36.44	9.11	2.28
Motor Constant @ 25ºC*	$N/\sqrt{W}$	31.9			36.9		
Motor Constant @ 120ºC*	$N/\sqrt{W}$	27.1			31.3		
Max. Terminal Voltage	Vdc	600					
Thermal							
Thermal Resistance @ 120ºC*	ºC/W	0.41			0.30		
Thermal Resistance AC @ 120ºC^	ºC/W	0.28					
Max. Coil Temperature	ºC	120					
Mechanical							
Coil Weight	kg	3.13		3.23	4.36		4.43
Coil Weight AC^	kg	3.37		3.47			
Coil Length	mm	361			481		
Attractive Force	N	0					
Electrical Cycle Length	mm	60					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX65B / BT

- Ironless Motor
- Peak force to 5191N, Continuous force to 1247N
- Integrated Hall Sensor

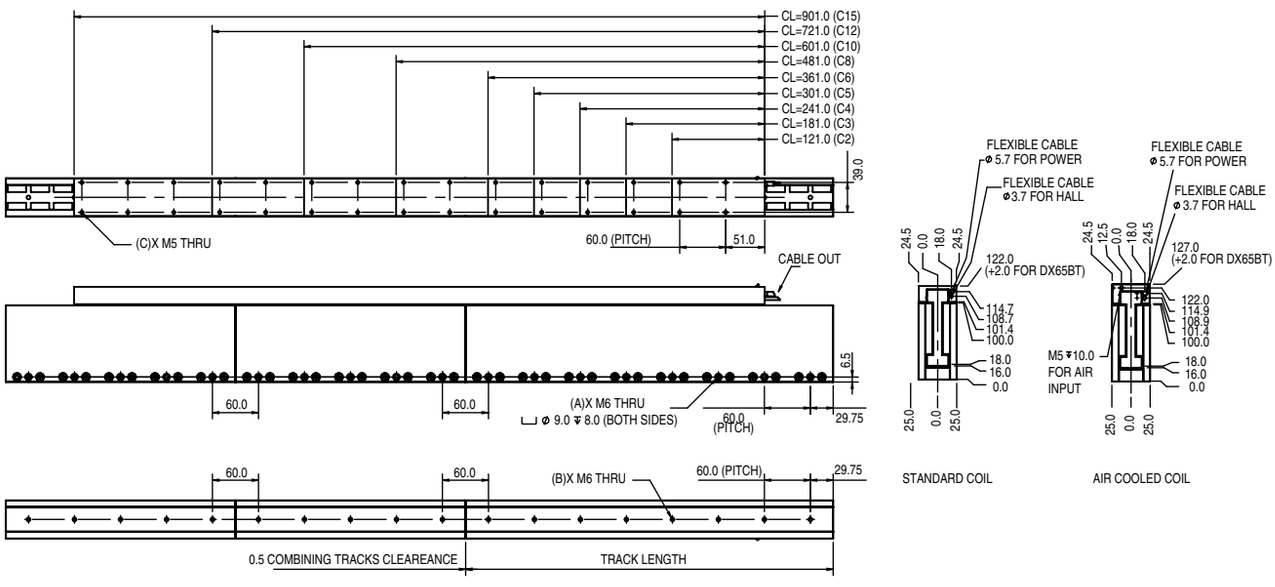
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL				
		DX65B-C10		DX65BT-C10	DX65BT-C12	DX65BT-C15
Connection Type		S	P	P	P	P
Performance	**Unit**					
Peak Force	N	3461			4153	5191
Continuous Force @ 120ºC*	N	692			831	1038
Continuous Force AC @ 120ºC^	N					
Peak Power @ 120ºC	W	9756			11707	14634
Continuous Power @ 120ºC*	W	390			468	585
Continuous Power AC @ 120ºC^	W					
Electrical						
Peak Current	A^{pk}	15.63	31.25	62.50	62.50	93.75
Continuous Current @ 120ºC*	A^{pk}	3.13	6.25	12.5	12.50	18.75
Continuous Current AC @ 120ºC^	A^{pk}					
Continuous Stall Current @ 120ºC*	Arms	2.50	5.00	10		15.00
Force Constant	N/A^{pk}	221.5	110.8	55.4	66.5	55.4
Back EMF Constant	$V^{pk}/m/s$	254.7	127.4	63.7	76.4	63.7
Coil Resistance L-L @ 25ºC	ohm	38.5	9.6	2.4	2.9	1.6
Coil Resistance L-L @ 120ºC*	ohm	53.3	13.3	3.3	4.0	2.2
Inductance L-L @ 1kHz	mH	45.55	11.39	2.85	3.42	1.90
Motor Constant @ 25ºC*	$N/\sqrt{W}$	41.2			45.2	50.5
Motor Constant @ 120ºC*	$N/\sqrt{W}$	35.0			38.4	42.9
Max. Terminal Voltage	Vdc	600				
Thermal						
Thermal Resistance @ 120ºC*	ºC/W	0.24			0.20	0.16
Thermal Resistance AC @ 120ºC^	ºC/W					
Max. Coil Temperature	ºC	120				
Mechanical						
Coil Weight	kg	5.45		5.54	6.64	8.55
Coil Weight AC^	kg					
Coil Length	mm	601			721	901
Attractive Force	N	0				
Electrical Cycle Length	mm	60				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Peak force and current - 1 second duration.

DX65B / BT



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 180	179.5	4.50	3	3
TL 240	239.5	6.00	4	4
TL 300	299.5	7.50	5	5
TL 360	359.5	9.00	6	6
TL 480	479.5	12.00	8	8

DX 65B Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C2	1.05	1.13	4
C3	1.57	1.69	6
C4	2.09	2.25	8
C5	2.61	2.81	10
C6	3.13	3.37	12
C8	4.36		16
C10	5.45		20

DX 65BT Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C6	3.23	3.47	12
C8	4.43		16
C10	5.54		20
C12	6.64		24
C15	8.55		30

* Technical specifications subject to change without prior notice

DX90B / BT

- Ironless Motor
- Peak force to 5366N, Continuous force to 1234N
- Integrated Hall Sensor

DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL								
		DX90B-C2		DX90B-C3		DX90B-C4		DX90B-C6		DX90BT-C6
Connection Type		S	P	S	P	S	P	S	P	P
Performance	**Unit**									
Peak Force	N	894		1342		1789		2683		
Continuous Force @ 120ºC*	N	179		268		358		537		
Continuous Force AC @ 120ºC^	N	215		322		429		617		
Peak Power @ 120ºC	W	2217		3325		4433		6650		
Continuous Power @ 120ºC*	W	89		133		177		266		
Continuous Power AC @ 120ºC^	W	128		192		255		352		
Electrical										
Peak Current	A^{pk}	16.88	33.75	16.88	33.75	16.88	33.75	16.88	33.75	67.50
Continuous Current @ 120ºC*	A^{pk}	3.38	6.75	3.38	6.75	3.38	6.75	3.38	6.75	13.50
Continuous Current AC @ 120ºC^	A^{pk}	4.05	8.10	4.05	8.10	4.05	8.10	3.88	7.76	15.53
Continuous Stall Current @ 120ºC*	Arms	2.70	5.40	2.70	5.40	2.70	5.40	2.70	5.40	10.80
Force Constant	N/A^{pk}	53.0	26.5	79.5	39.8	106.0	53.0	159.0	79.5	39.8
Back EMF Constant	$V^{pk}/m/s$	61.0	30.5	91.4	45.7	121.9	61.0	182.9	91.4	45.7
Coil Resistance L-L @ 25ºC	ohm	7.5	1.9	11.3	2.8	15.0	3.8	22.5	5.6	1.4
Coil Resistance L-L @ 120ºC*	ohm	10.4	2.6	15.6	3.9	20.8	5.2	31.1	7.8	1.9
Inductance L-L @ 1kHz	mH	8.51	2.13	12.77	3.19	17.03	4.26	25.54	6.39	1.60
Motor Constant @ 25ºC*	N/√W	22.3		27.4		31.6		38.7		
Motor Constant @ 120ºC*	N/√W	19.0		23.3		26.9		32.9		
Max. Terminal Voltage	Vdc	600								
Thermal										
Thermal Resistance @ 120ºC*	ºC/W	1.07		0.71		0.54		0.36		
Thermal Resistance AC @ 120ºC^	ºC/W	0.74		0.50		0.37		0.27		
Max. Coil Temperature	ºC	120								
Mechanical										
Coil Weight	kg	1.30		1.95		2.56		3.90		4.00
Coil Weight AC^	kg	1.39		2.08		2.74		4.16		4.27
Coil Length	mm	121		181		241		361		
Attractive Force	N	0								
Electrical Cycle Length	mm	60								

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Air cool (AC), 6mm/4mm (OD/ID) 2m long air hose, pressure >2bar.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

DX90B / BT

- Ironless Motor
- Peak force to 5366N, Continuous force to 1234N
- Integrated Hall Sensor

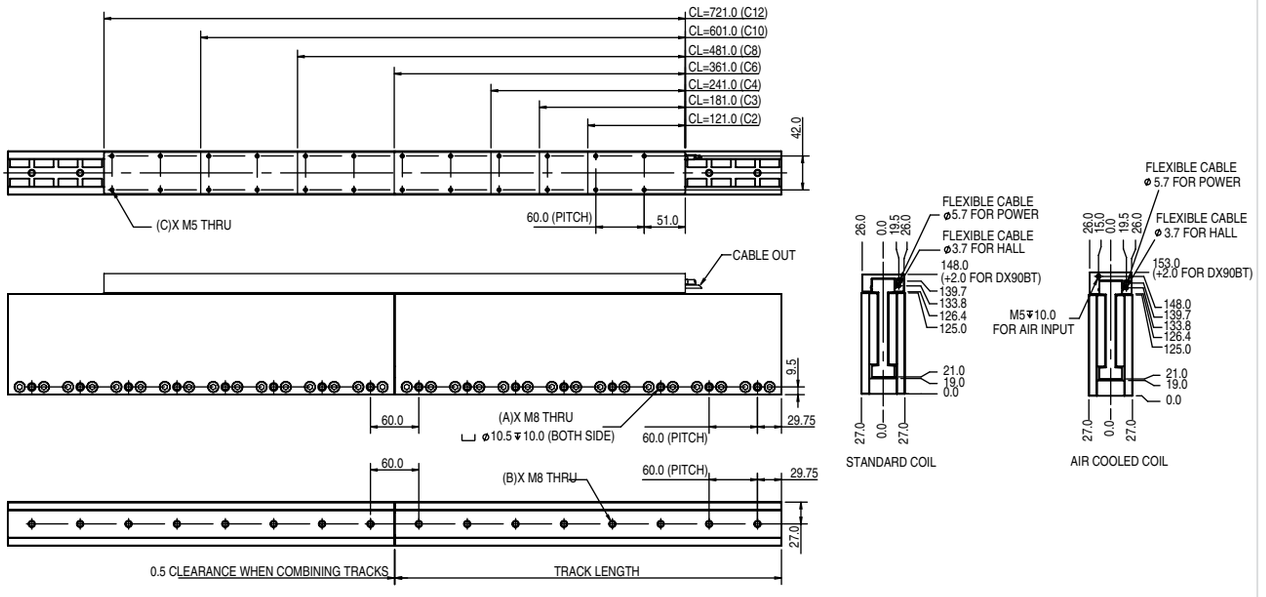
DX B / BT SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL						
		DX90B-C8		DX90BT-C8	DX90B-C10		DX90BT-C10	DX90BT-C12
Connection Type		S	P	P	S	P	P	P
Performance	**Unit**							
Peak Force	N	3578			4472			5366
Continuous Force @ 120ºC*	N	716			894			1073
Continuous Force AC @ 120ºC^	N							
Peak Power @ 120ºC	W	8867			11084			13300
Continuous Power @ 120ºC*	W	355			443			532
Continuous Power AC @ 120ºC^	W							
Electrical								
Peak Current	A^{pk}	16.88	33.75	67.50	16.88	33.75	67.50	
Continuous Current @ 120ºC*	A^{pk}	3.38	6.75	13.50	3.38	6.75	13.50	
Continuous Current AC @ 120ºC^	A^{pk}							
Continuous Stall Current @ 120ºC*	Arms	2.70	5.40	10.80	2.70	5.40	10.80	
Force Constant	N/A^{pk}	212.0	106.0	53.0	265.0	132.5	66.3	79.5
Back EMF Constant	$V^{pk}/m/s$	243.8	121.9	61.0	304.8	152.4	76.2	91.4
Coil Resistance L-L @ 25ºC	ohm	30.0	7.5	1.9	37.5	9.4	2.3	2.8
Coil Resistance L-L @ 120ºC*	ohm	41.5	10.4	2.6	51.9	13.0	3.2	3.9
Inductance L-L @ 1kHz	mH	34.06	8.51	2.13	42.57	10.64	2.66	3.19
Motor Constant @ 25ºC*	N/√W	44.7			50.0			54.7
Motor Constant @ 120ºC*	N/√W	38.0			42.5			46.5
Max. Terminal Voltage	Vdc	600						
Thermal								
Thermal Resistance @ 120ºC*	ºC/W	0.27			0.21			0.18
Thermal Resistance AC @ 120ºC^	ºC/W							
Max. Coil Temperature	ºC	120						
Mechanical								
Coil Weight	kg	5.17		5.31	6.46		6.63	7.96
Coil Weight AC^	kg							
Coil Length	mm	481			601			721
Attractive Force	N	0						
Electrical Cycle Length	mm	60						

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Peak force and current - 1 second duration.

DX90B / BT



Standard Magnet Track

SIZE	TRACK LENGTH (mm)	WEIGHT (kg)	NUMBER OF MOUNTING HOLE A	NUMBER OF MOUNTING HOLE B
TL 240	239.5	8.50	4	4
TL 300	299.5	10.50	5	5
TL 360	359.5	12.50	6	6
TL 480	479.5	16.80	8	8

DX 90B Motor Coil

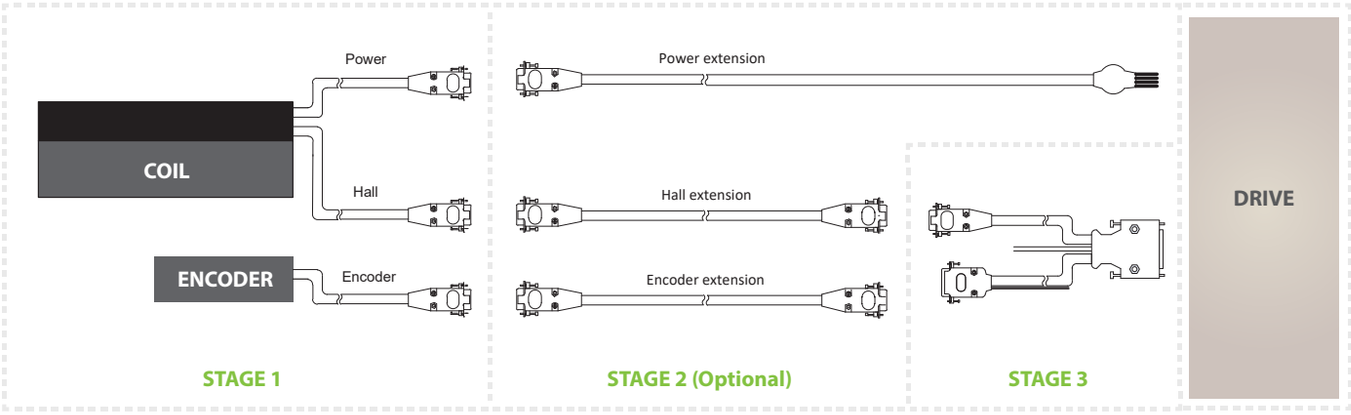
SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C2	1.30	1.39	4
C3	1.95	2.08	6
C4	2.56	2.74	8
C6	3.90	4.16	12
C8	5.17		16
C10	6.46		20

DX 90BT Motor Coil

SIZE	WEIGHT (kg)	WEIGHT AIR COOL (kg)	NUMBER OF MOUNTING HOLE (TOP MOUNT) C
C6	4.00	4.27	12
C8	5.31		16
C10	6.63		20
C12	7.96		24

* Technical specifications subject to change without prior notice

CABLE OPTION

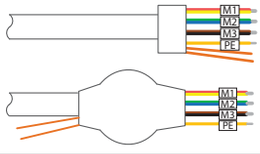


STAGE 1 — POWER AND HALL CABLE OPTION

DX50B-C4-P-TM-2.0-NC-FC-HC-00

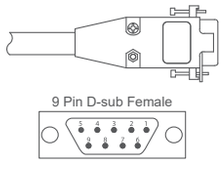
POWER CABLE OPTIONS

NF / FC



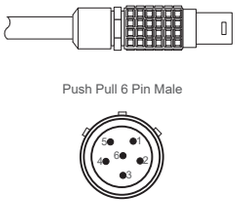
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Pink
P2	M1	Yellow
P3	M3	Black
P4	M3	Brown
P5	M2	Blue
P6	M2	Green
P7	Temp sensor 1	Orange/Black
P8	Temp sensor 2	Orange
P9	PE	White

CNF



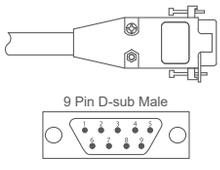
P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

HALL SENSOR OPTIONS

H

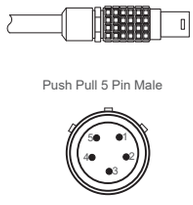
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

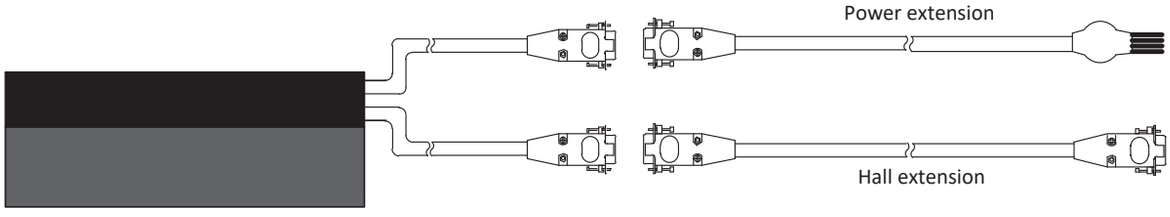
The temperature in which the thermostat is active is shown as below:

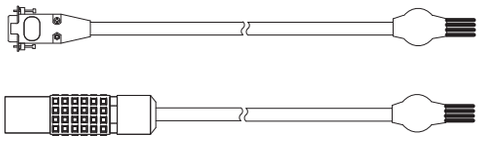
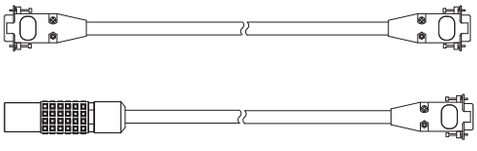
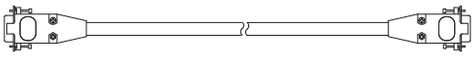
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX10B	PT100	See Note 1
DX20B	PT100	See Note 1
DX30B	Thermostat	100°C
DX50B	Thermostat	100°C
DX65B	Thermostat	100°C
DX90B	Thermostat	100°C

- 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.

STAGE 2 — DX B SERIES EXTENSION CABLE

Connection example: DX□B-□-□-□-□-□-9NF-HC-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_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X
		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X
		CBL_EXT_REN05_X.X
		CBL_EXT_REN05A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Interface Digital
05A	ATOM Ri Interface Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

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

PIX/PIXA SERIES

IRONCORE LINEAR MOTOR

PBA SYSTEMS

www.pbasystems.com.sg

HIGH FORCE

heavy load capacity motion with minimal cogging

PIX / PIXA SERIES

IRONCORE LINEAR MOTOR

RoHS COMPLIANT CE*

Heavy Duty Motors For Hi-Speed Point-To-Point Applications

PIX Ironcore motors offer an affordable high force solution to demanding linear applications with minimal cogging effect that is associated with traditional iron core linear motors.

Our Ironcore design is designed for optimal dissipation of heat and thus capable of extremely high forces (>9000N). These motors coils are manufactured with high flex cables and optional external hall effect attachments widely used in multiple general automation applications.

Modular Flat Magnet tracks are available in different length increments complete this product selection and allows for easy assembly of un-restricted effective stroke by butting tracks of different lengths together.

- High force / thrust
- Maintenance Free
- High stiffness
- Compact size
- Minimal cogging

Application

- Material Transfer / Pick and place
- Laser cutting
- Extruders
- Machine Tools
- Large format printing
- Textile printing
- Digital printing

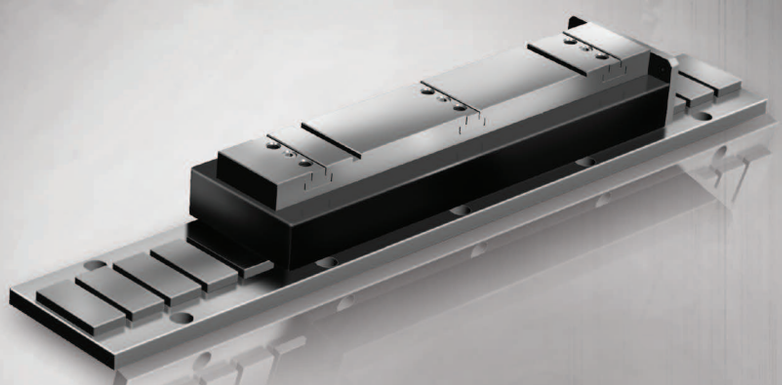
* Technical specifications subject to change without prior notice

* CE pending for PIX

HIGH FORCE

heavy load capacity motion with minimal cogging

Model	Peak Force (N)	Continuous Force AC (N)	Peak Current (A^{pk})	Continuous Current (A^{pk})	Coil Length (mm)
PIX200-027	1393	279	60.8	8.60	64-320
PIX200-040	2307	461	43.8	8.80	64-320
PIXA030	320	80	11.31	2.83	120-480
PIXA050	597	149	21.27	5.32	120-480
PIXA065	2205	551	36.25	9.06	120-480
PIXA085	3968	992	65.27	16.32	120-480
PIXA110	6409	1602	82.01	20.50	120-480
PIXA135	8196	2049	76.75	19.19	120-480
PIXA160	9827	2457	92.02	23.01	120-480



PIX SERIES

IRONCORE LINEAR MOTOR

COMPACT DESIGN

ultra high force motion system

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PIX 200-027-050 - S - TC - 2.0 - FC - HC - 00

MOTOR MODEL

MOTOR COIL SIZE

200-027-030
200-027-050
200-027-080
200-040-030
200-040-050
200-040-080

CONNECTION TYPE

S	Series
P	Parallel

THERMAL PROTECTION

TC*	PT100 (Stock Program)
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
	:

HALL SENSOR AND CONNECTOR OPTIONS

NH	No Hall Sensor
H	Hall Sensor with Flying Leads (No Connector)
HC	Hall Sensor with 9 pins D Sub Male Connector
CHC	Hall Sensor with 5 pins Circular Quick Lock Male Connector

POWER CABLE OPTIONS

NF	No Ferrite Core (Not recommended)
FC	Ferrite Core (Standard)
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
*** Minimum Bending Radius - 10 times of cable diameter

Magnet Track

PIXM030 - TL064 - NC

MOTOR MODEL

PIXM030
PIXM050
PIXM080

TRACK COVER

NC	Without Cover
C	With Cover

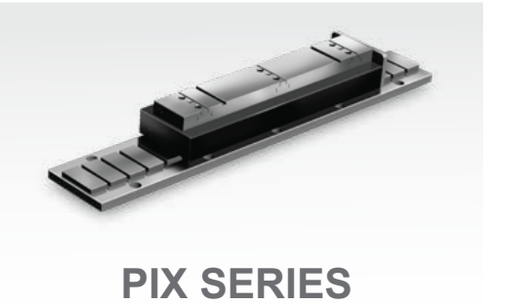
TOTAL TRACK LENGTH

TL064 - 64mm
TL128 - 128mm
TL192 - 192mm
TL320 - 320mm

* Minimum Bending Radius - 10 times of cable diameter

PIX 200-027

- Peak force to 1393N, Continuous force to 279N
- Hall Sensor (Optional)



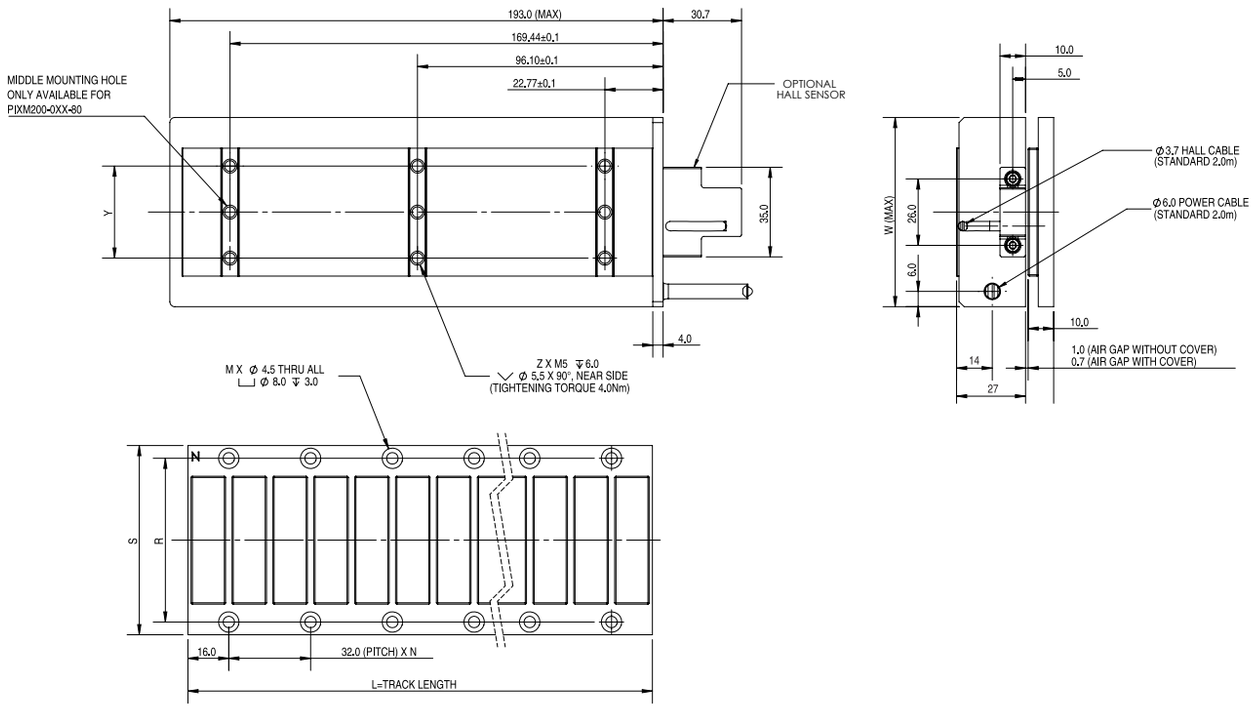
PIX SERIES
IRONCORE LINEAR MOTOR

SPECIFICATION		MODEL					
		PIX200-027					
		PIX200-027-030		PIX200-027-050		PIX200-027-080	
Connection Type		S	P	S	P	S	P
Performance	**Unit**						
Peak Force	N	542		893		1393	
Continuous Force @ 120ºC*	N	108		179		279	
Continuous Stall Force @ 120ºC*	N	77		126		197	
Peak Power @ 120ºC	W	1823		2323		2932	
Continuous Power @ 120ºC*	W	73		93		117	
Electrical							
Peak Current	A^{pk}	30.4	60.8	29.3	58.7	27.9	55.7
Continuous Current @ 120ºC*	A^{pk}	6.1	12.2	5.9	11.7	5.6	11.1
Continuous Stall Current @ 120ºC*	Arms	4.30	8.60	4.15	8.30	3.94	7.88
Force Constant	N/A^{pk}	17.8	8.9	30.4	15.2	50.0	25.0
Back EMF Constant	$V^{pk}/m/s$	20.5	10.3	35	17.5	57.5	28.8
Coil Resistance L-L @ 25ºC	ohm	1.9	0.5	2.6	0.7	3.6	0.9
Coil Resistance L-L @ 120ºC*	ohm	2.6	0.7	3.6	0.9	5.0	1.3
Inductance L-L @ 1kHz	mH	4.9	1.2	7.1	1.8	10.5	2.6
Motor Constant @ 25ºC*	N/√W	14.9		21.8		30.3	
Motor Constant @ 120ºC*	N/√W	12.7		18.5		25.7	
Max. Terminal Voltage	Vdc	600					
Thermal							
Thermal Resistance @ 120ºC*	ºC/W	1.3		1.02		0.81	
Max. Coil Temperature	ºC	120					
Mechanical							
Coil Weight	kg	1.3		2.0		3.1	
Attractive Force	N	1560		2600		4160	
Electrical Cycle Length	mm	32					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-15%, all others +/-10%.
4. Peak force and current - 1 second duration.

PIX200-027



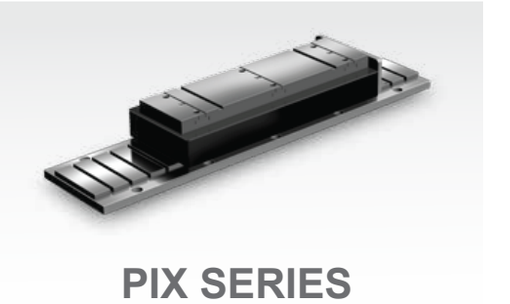
COIL	W (mm)	Y (mm)	NUMBER OF MOUNTING HOLE Z	COMPATIBLE TRACK
PIX200-027-030	54	16	4	PIXM030-TLXXX
PIX200-027-050	74	36	4	PIXM050-TLXXX
PIX200-027-080	104	66	6	PIXM080-TLXXX

MAGNET TRACK		L (mm)	S (mm)	R (mm)	N	M	WEIGHT (g)	COMPATIBLE COIL
PIXM030	TL064	64	54	44	1	4	207.6	PIX200-027-030
	TL128	128			3	8	415.2	
	TL192	192			5	12	622.8	
	TL320	320			9	20	1038	
PIXM050	TL064	64	74	64	1	4	300.3	PIX200-027-050
	TL128	128			3	8	600.6	
	TL192	192			5	12	901	
	TL320	320			9	20	1501.6	
PIXM080	TL064	64	104	94	1	4	439.4	PIX200-027-080
	TL128	128			3	8	878.8	
	TL192	192			5	12	1318.2	
	TL320	320			9	20	2197	

* Technical specifications subject to change without prior notice

PIX 200-040

- Peak force to 2307N, Continuous force to 461N
- Hall Sensor (Optional)



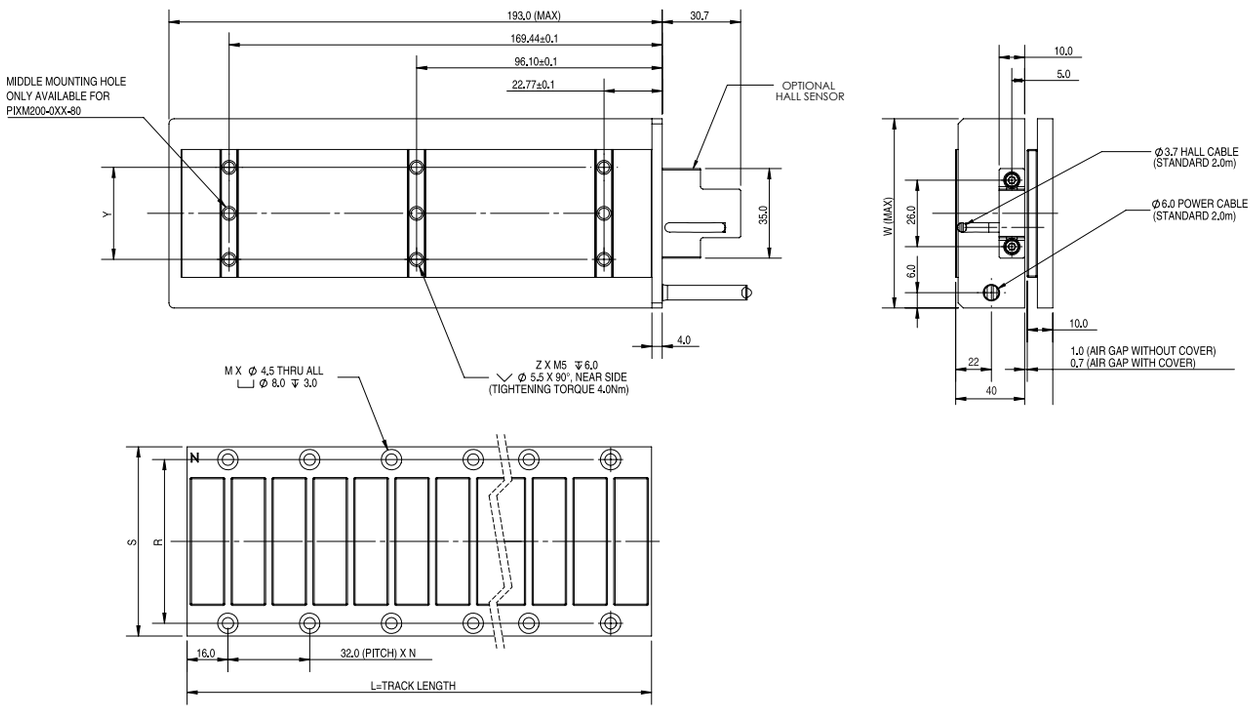
PIX SERIES
IRONCORE LINEAR MOTOR

SPECIFICATION		MODEL					
		PIX200-040					
		PIX200-040-030		PIX200-040-050		PIX200-040-080	
Connection Type		S	P	S	P	S	P
Performance	**Unit**						
Peak Force	N	943		1515		2307	
Continuous Force @ 120ºC*	N	189		303		461	
Continuous Stall Force @ 120ºC*	N	133		214		326	
Peak Power @ 120ºC	W	2144		2662		3457	
Continuous Power @ 120ºC*	W	86		106		138	
Electrical							
Peak Current	A^{pk}	21.9	43.8	20.5	41.0	19.8	39.6
Continuous Current @ 120ºC*	A^{pk}	4.4	8.8	4.1	8.2	4.0	7.9
Continuous Stall Current @ 120ºC*	Arms	3.10	6.20	2.90	5.80	2.80	5.60
Force Constant	N/A^{pk}	43.0	21.5	73.9	37.0	116.5	58.3
Back EMF Constant	$V^{pk}/m/s$	49.5	24.8	85.0	42.5	134.0	67.0
Coil Resistance L-L @ 25ºC	ohm	4.3	1.1	6.1	1.5	8.5	2.1
Coil Resistance L-L @ 120ºC*	ohm	6.0	1.5	8.4	2.1	11.8	2.9
Inductance L-L @ 1kHz	mH	39.4	9.9	60.6	15.1	88.7	22.2
Motor Constant @ 25ºC*	N/√W	24.0		34.6		46.1	
Motor Constant @ 120ºC*	N/√W	20.4		29.4		39.2	
Max. Terminal Voltage	Vdc			600			
Thermal							
Thermal Resistance @ 120ºC*	ºC/W	1.11		0.89		0.69	
Max. Coil Temperature	ºC			120			
Mechanical							
Coil Weight	kg	2.1		3.1		4.6	
Attractive Force	N	1560		2600		4160	
Electrical Cycle Length	mm			32			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-15%, all others +/-10%.
4. Peak force and current - 1 second duration.

PIX200-040



COIL	W (mm)	Y (mm)	NUMBER OF MOUNTING HOLE Z	COMPATIBLE TRACK
PIX200-040-030	54	16	4	PIXM030-TLXXX
PIX200-040-050	74	36	4	PIXM050-TLXXX
PIX200-040-080	104	66	6	PIXM080-TLXXX

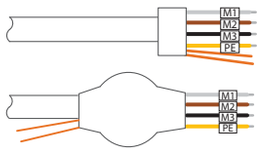
MAGNET TRACK		L (mm)	S (mm)	R (mm)	N	M	WEIGHT (g)	COMPATIBLE COIL
PIXM030	TL064	64	54	44	1	4	207.6	PIX200-040-030
	TL128	128			3	8	415.2	
	TL192	192			5	12	622.8	
	TL320	320			9	20	1038	
PIXM050	TL064	64	74	64	1	4	300.3	PIX200-040-050
	TL128	128			3	8	600.6	
	TL192	192			5	12	901	
	TL320	320			9	20	1501.6	
PIXM080	TL064	64	104	94	1	4	439.4	PIX200-040-080
	TL128	128			3	8	878.8	
	TL192	192			5	12	1318.2	
	TL320	320			9	20	2197	

STAGE 1 — POWER AND HALL CABLE OPTION

PIX200-027-050-S-TC-2.0-FC-HC-00

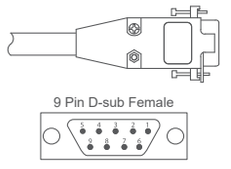
POWER CABLE OPTIONS

NF / FC



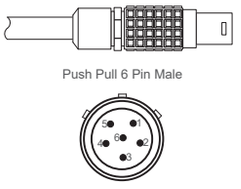
M1	Grey
M2	Brown
M3	Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



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	Orange / Black
P8	Temp sensor 2	Orange
P9	PE	Yellow & Green

CNF



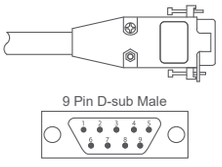
P1	M1	Grey
P2	M2	Brown
P3	M3	Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	Yellow & Green

HALL SENSOR OPTIONS

H

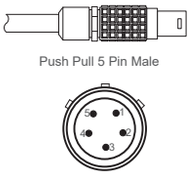
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

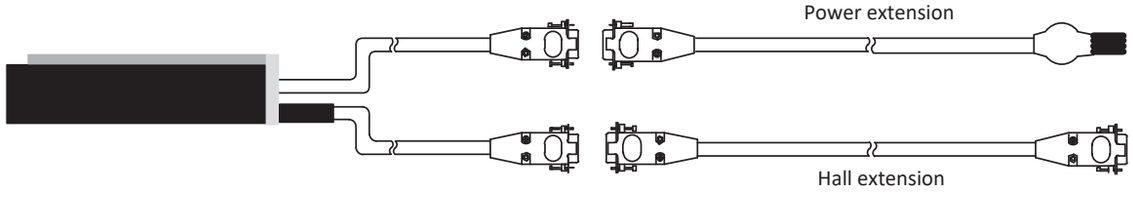
CHC

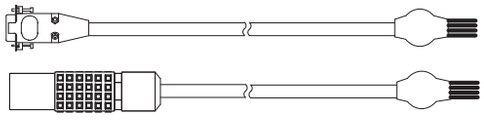
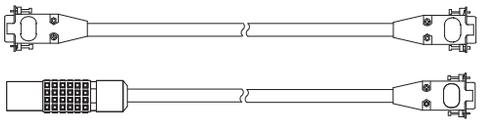
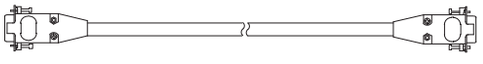


P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

STAGE 2 — PIX SERIES EXTENSION CABLE

Connection example: PIX200-□-□-□-□-□-9NF-HC-00



Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_PIX_X.X
		CBL_EXT_PWR_PIX_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_PIX_X.X
		CBL_EXT_HALL_PIX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X
		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X
		CBL_EXT_REN05_X.X
		CBL_EXT_REN05A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Interface Digital
05A	ATOM Ri Interface Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

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

PIXA SERIES

IRONCORE LINEAR MOTOR

HIGH FORCE
heavy load capacity motion with minimal cogging

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PIXA 110-023-030 - S - TM - 0.5 - 9NF - HC - 00

MOTOR MODEL

MOTOR COIL SIZE

110-023-030
190-023-030
110-023-050
190-023-050
190-047-065
360-047-065
360-047-085
530-047-085
530-047-110
690-047-110
690-047-135
690-047-160

CONNECTION TYPE

S	Series
P	Parallel

THERMOSTAT

CABLE LENGTH

0.5	0.5m

DESIGN VERSIONS

00	Standard
01	Customized Version
:	

HALL SENSOR AND CONNECTOR OPTIONS

NH	No Hall Sensor
H	Hall Sensor with Flying Leads (No Connector)
HC	Hall Sensor with 9 pins D Sub Male Connector
CHC	Hall Sensor with 5 pins Circular Quick Lock Male Connector

POWER CABLE OPTIONS

NF	No Ferrite Core
9NF	No Ferrite Core, D Sub 9 pins Female Connector
CNF	No Ferrite Core, Circular Quick Lock 6 pins Male Connector

Magnet Track

PIXMA030 - TL120 - C

MOTOR MODEL

PIXMA030
PIXMA050
PIXMA065
PIXMA085
PIXMA110
PIXMA135
PIXMA160

TRACK COVER

C	With Cover
NC	Without Cover

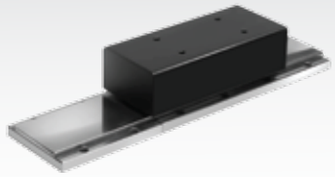
TRACK LENGTH

TL120 - 120mm
TL240 - 240mm
TL480 - 480mm

* Minimum Bending Radius - 10 times of cable diameter

PIXA 030

- Ironcore Motor
- Peak force to 320N, Continuous force to 80N
- Integrated with Hall Sensor (Optional)
- Ideal for high force

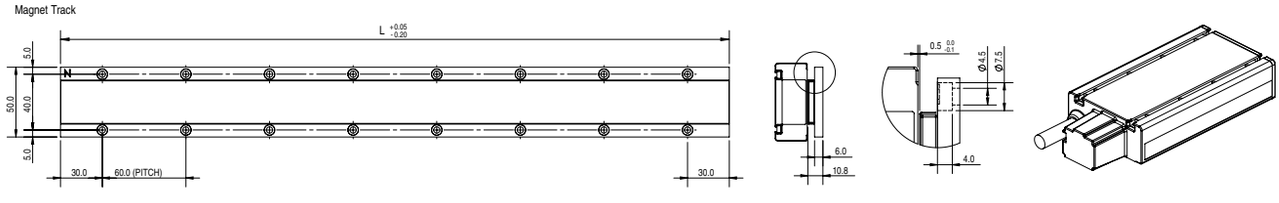


PIXA SERIES
IRONCORE LINEAR MOTOR

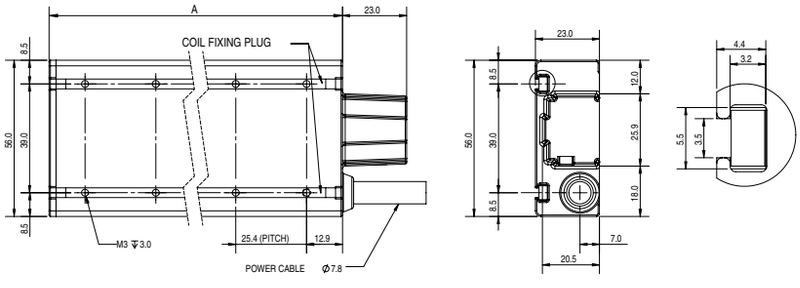
SPECIFICATION		MODEL			
		PIXA110-023-030		PIXA190-023-030	
Connection Type		S	P	S	P
Performance	**Unit**				
Peak Force	N	160		320	
Continuous Force @ 105ºC*	N	40		80	
Continuous Stall Force @ 105ºC*	N	28		57	
Peak Power @ 105ºC	W	357		713	
Continuous Power @ 105ºC*	W	22.3		45	
Electrical					
Peak Current	A^{pk}	2.49	5.66	4.98	11.31
Continuous Current @ 105ºC*	A^{pk}	0.62	1.41	1.24	2.83
Continuous Stall Current @ 105ºC*	Arms	0.44	1.00	0.88	2.00
Force Constant	N/A^{pk}	64.4	28.3	64.4	28.3
Back EMF Constant	$V^{pk}/m/s$	74.0	32.5	74.0	32.5
Coil Resistance L-L @ 25ºC	ohm	58.0	12.0	29.0	6.0
Coil Resistance L-L @ 105ºC*	ohm	76.8	15.9	38.4	7.9
Inductance L-L @ 1kHz	mH	180	35	90	18
Motor Constant @ 105ºC*	N/√W	8.5		12.0	
Electrical Cycle Length	mm	24			
Max. Terminal Voltage	Vdc	600			
Thermal					
Thermal Resistance @ 105ºC*	ºC/W	3.6		1.8	
Max. Coil Temperature	ºC	125			
Mechanical					
Coil Weight	kg	0.55		1.00	
Attractive Force	N	260		520	

Notes: 1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms. 2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%. 4. Peak force and current - 1 second duration.

Magnet Track



Motor Coil



Standard Magnet Track

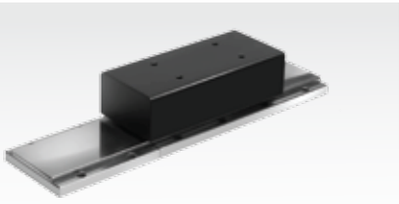
TRACK	L (mm)	WEIGHT(kg)
TL120	120	0.4
TL240	240	0.8
TL480	480	1.6

Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA110-023-030	102	0.55
PIXA190-023-030	186	1.00

PIXA 050

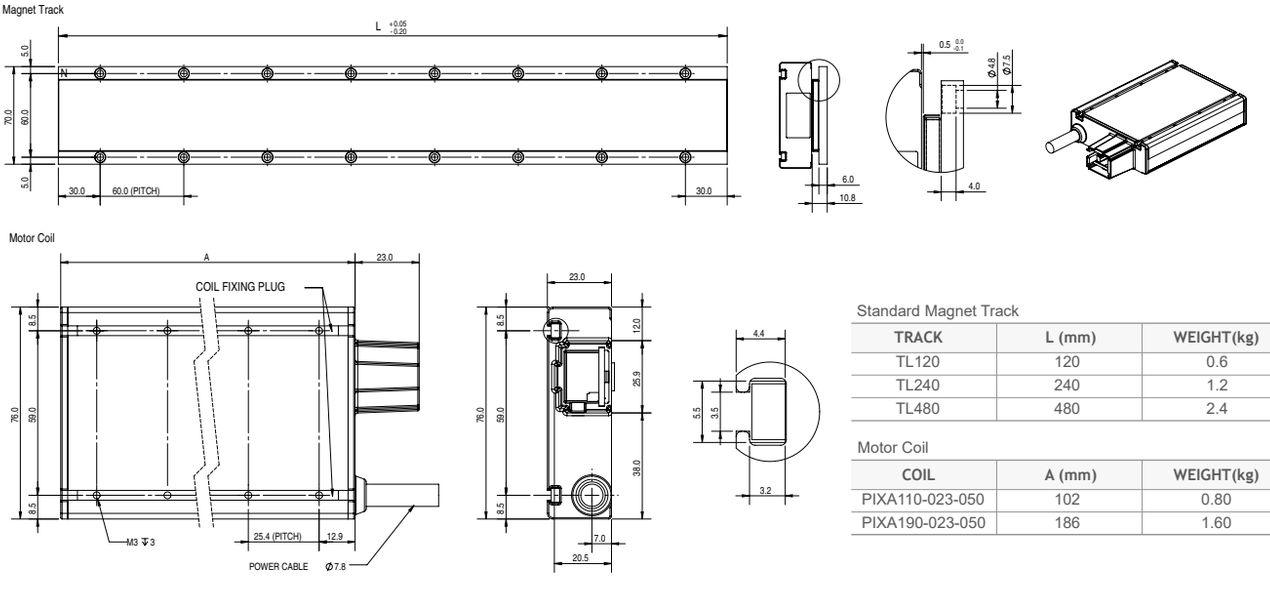
- Ironcore Motor
- Peak force to 597N, Continuous force to 149N
- Integrated with Hall Sensor (Optional)
- Ideal for high force



PIXA SERIES
IRONCORE LINEAR MOTOR

SPECIFICATION		MODEL			
		PIXA110-023-050		PIXA190-023-050	
Connection Type		S	P	S	P
Performance	**Unit**				
Peak Force	N	298		597	
Continuous Force @ 105ºC*	N	75		149	
Continuous Stall Force @ 105ºC*	N	53		106	
Peak Power @ 105ºC	W	683		1366	
Continuous Power @ 105ºC*	W	42.7		85	
Electrical					
Peak Current	A^{pk}	4.64	10.63	9.28	21.27
Continuous Current @ 105ºC*	A^{pk}	1.16	2.66	2.32	5.32
Continuous Stall Current @ 105ºC*	Arms	0.82	1.88	1.64	3.76
Force Constant	N/A^{pk}	64.4	28.3	64.4	28.3
Back EMF Constant	$V^{pk}/m/s$	74.0	32.5	74.0	32.5
Coil Resistance L-L @ 25ºC	ohm	32.0	6.0	16.0	3.0
Coil Resistance L-L @ 105ºC*	ohm	42.3	7.9	21.2	4.0
Inductance L-L @ 1kHz	mH	111	21	55	11
Motor Constant @ 105ºC*	N/√W	11.4		16.2	
Electrical Cycle Length	mm	24			
Max. Terminal Voltage	Vdc	600			
Thermal					
Thermal Resistance @ 105ºC*	ºC/W	1.9		0.9	
Max. Coil Temperature	ºC	125			
Mechanical					
Coil Weight	kg	0.80		1.60	
Attractive Force	N	430		860	

Notes: 1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms. 2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%. 4. Peak force and current - 1 second duration.



Standard Magnet Track

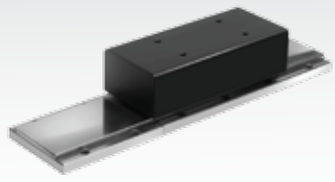
TRACK	L (mm)	WEIGHT(kg)
TL120	120	0.6
TL240	240	1.2
TL480	480	2.4

Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA110-023-050	102	0.80
PIXA190-023-050	186	1.60

PIXA 065

- Ironcore Motor
- Peak force to 2205N, Continuous force to 551N
- Integrated with Hall Sensor (Optional)
- Ideal for high force

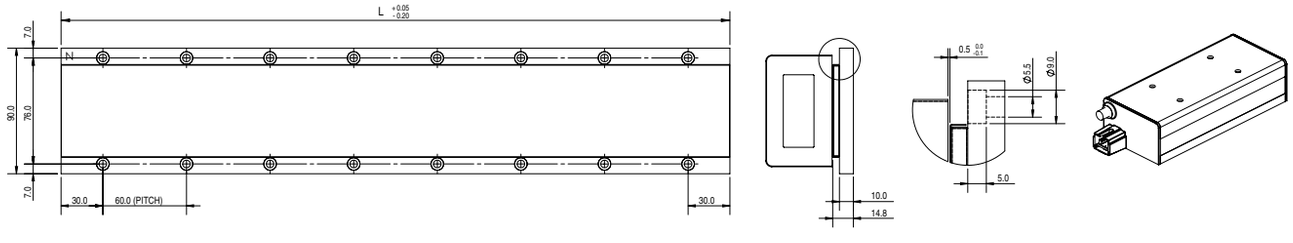


PIXA SERIES
IRONCORE LINEAR MOTOR

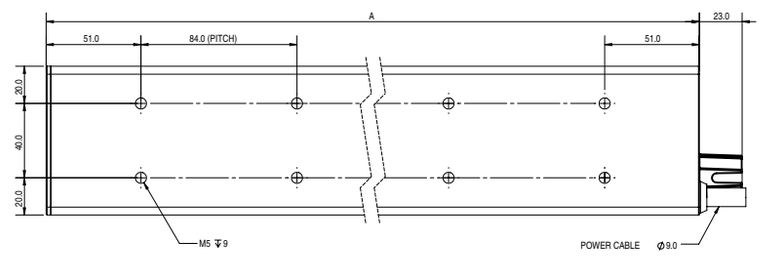
SPECIFICATION		MODEL			
		PIXA190-047-065		PIXA360-047-065	
Connection Type		S	P	S	P
Performance	**Unit**				
Peak Force	N	1101		2205	
Continuous Force @ 105ºC*	N	275		551	
Continuous Stall Force @ 105ºC*	N	195		390	
Peak Power @ 105ºC	W	1393		3172	
Continuous Power @ 105ºC*	W	87.0		198	
Electrical					
Peak Current	A^{pk}	9.67	16.97	20.64	36.25
Continuous Current @ 105ºC*	A^{pk}	2.42	4.24	5.16	9.06
Continuous Stall Current @ 105ºC*	Arms	1.71	3.00	3.65	6.41
Force Constant	N/A^{pk}	113.9	64.4	106.8	60.8
Back EMF Constant	$V^{pk}/m/s$	130.9	74.0	122.8	69.9
Coil Resistance L-L @ 25ºC	ohm	15.0	4.9	7.5	2.5
Coil Resistance L-L @ 105ºC*	ohm	19.8	6.5	9.9	3.3
Inductance L-L @ 1kHz	mH	206	68	103	34
Motor Constant @ 105ºC*	N/√W	29.5		39.1	
Electrical Cycle Length	mm	48			
Max. Terminal Voltage	Vdc	600			
Thermal					
Thermal Resistance @ 105ºC*	ºC/W	0.92		0.40	
Max. Coil Temperature	ºC	125			
Mechanical					
Coil Weight	kg	3		7	
Attractive Force	N	1202		2405	

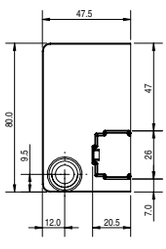
Notes: 1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms. 2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%. 4. Peak force and current - 1 second duration.

Magnet Track



Motor Coil





Standard Magnet Track

TRACK	L (mm)	WEIGHT(kg)
TL120	120	1.1
TL240	240	2.2
TL480	480	4.4

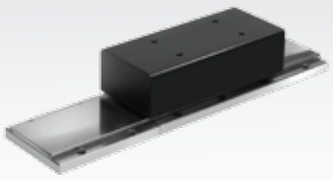
Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA190-047-065	186	3.00
PIXA360-047-065	354	7.00

* Technical specifications subject to change without prior notice

PIXA 085

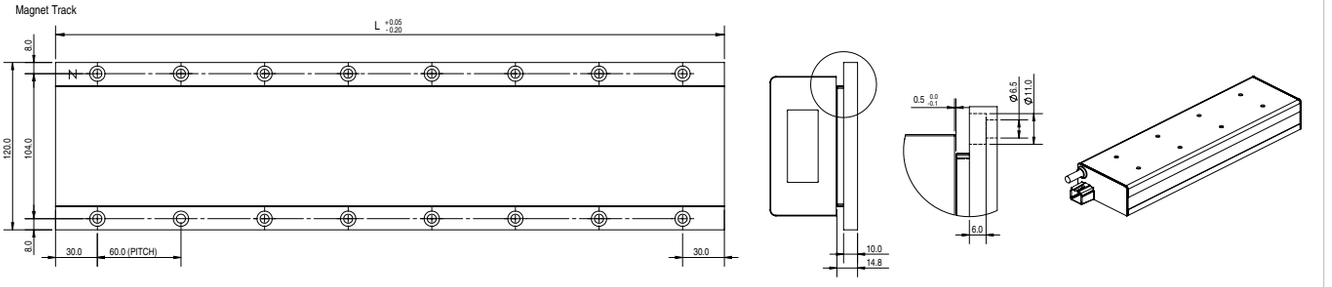
- Ironcore Motor
- Peak force to 3968N, Continuous force to 992N
- Integrated with Hall Sensor (Optional)
- Ideal for high force

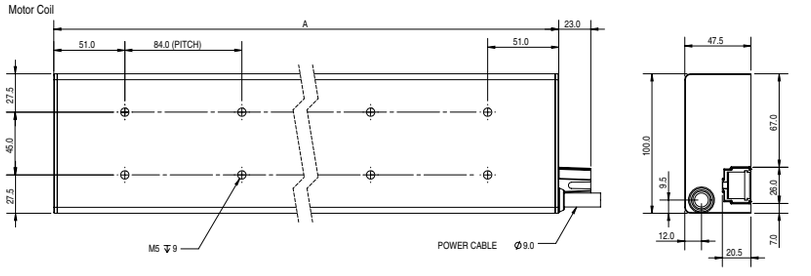


PIXA SERIES
IRONCORE LINEAR MOTOR

SPECIFICATION		MODEL			
		PIXA360-047-085		PIXA530-047-085	
Connection Type		S	P	S	P
Performance	**Unit**				
Peak Force	N	2646		3968	
Continuous Force @ 105ºC*	N	661		992	
Continuous Stall Force @ 105ºC*	N	468		702	
Peak Power @ 105ºC	W	4568		6852	
Continuous Power @ 105ºC*	W	285.5		428	
Electrical					
Peak Current	A^{pk}	24.77	43.55	37.16	65.27
Continuous Current @ 105ºC*	A^{pk}	6.19	10.89	9.29	16.32
Continuous Stall Current @ 105ºC*	Arms	4.38	7.70	6.57	11.54
Force Constant	N/A^{pk}	106.8	60.8	106.8	60.8
Back EMF Constant	$V^{pk}/m/s$	122.8	69.9	122.8	69.9
Coil Resistance L-L @ 25ºC	ohm	7.5	2.3	5.0	1.5
Coil Resistance L-L @ 105ºC*	ohm	9.9	3.0	6.6	2.0
Inductance L-L @ 1kHz	mH	97	31	64	20
Motor Constant @ 105ºC*	N/√W	39.1		47.9	
Electrical Cycle Length	mm	48			
Max. Terminal Voltage	Vdc	600			
Thermal					
Thermal Resistance @ 105ºC*	ºC/W	0.28		0.19	
Max. Coil Temperature	ºC	125			
Mechanical					
Coil Weight	kg	10		14	
Attractive Force	N	3143		4663	

Notes: 1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms. 2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%. 4. Peak force and current - 1 second duration.





Standard Magnet Track

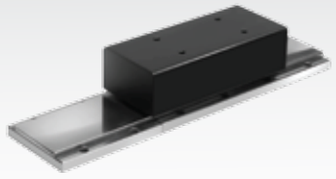
TRACK	L (mm)	WEIGHT(kg)
TL120	120	1.4
TL240	240	2.9
TL480	480	5.8

Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA360-047-085	354	10.00
PIXA530-047-085	522	14.00

PIXA 110

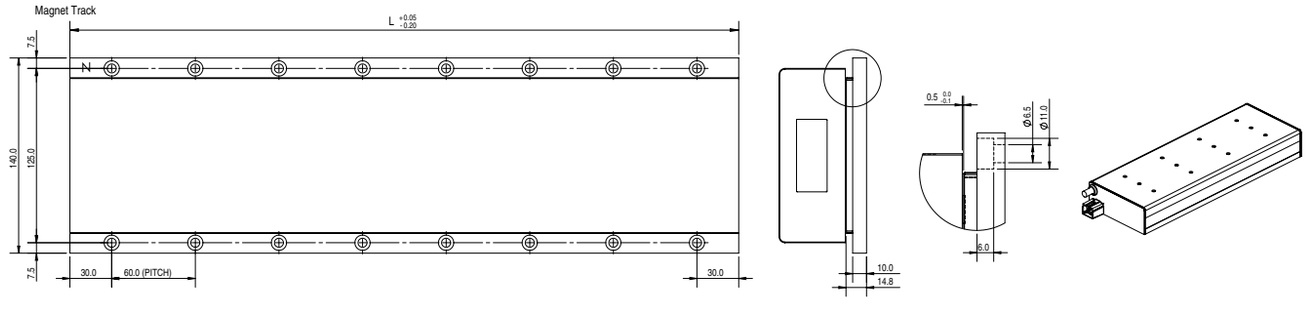
- Ironcore Motor
- Peak force to 6409N, Continuous force to 1602N
- Integrated with Hall Sensor (Optional)
- Ideal for high force

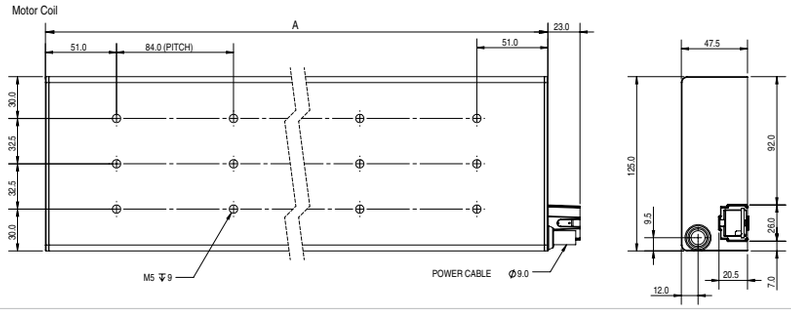


PIXA SERIES
IRONCORE LINEAR MOTOR

SPECIFICATION		MODEL			
		PIXA530-047-110		PIXA690-047-110	
Connection Type		S	P	S	P
Performance	**Unit**				
Peak Force	N	4808		6409	
Continuous Force @ 105ºC*	N	1202		1602	
Continuous Stall Force @ 105ºC*	N	850		1133	
Peak Power @ 105ºC	W	5029		7167	
Continuous Power @ 105ºC*	W	314.3		448	
Electrical					
Peak Current	A^{pk}	45.02	79.18	61.65	82.01
Continuous Current @ 105ºC*	A^{pk}	11.26	19.80	15.41	20.50
Continuous Stall Current @ 105ºC*	Arms	7.96	14.00	10.90	14.50
Force Constant	N/A^{pk}	106.8	60.8	104.0	77.8
Back EMF Constant	$V^{pk}/m/s$	122.8	69.9	119.6	89.5
Coil Resistance L-L @ 25ºC	ohm	2.5	0.8	1.9	1.0
Coil Resistance L-L @ 105ºC*	ohm	3.3	1.1	2.5	1.3
Inductance L-L @ 1kHz	mH	44	15	33	18
Motor Constant @ 105ºC*	N/√W	67.8		75.7	
Electrical Cycle Length	mm	48			
Max. Terminal Voltage	Vdc	600			
Thermal					
Thermal Resistance @ 105ºC*	ºC/W	0.25		0.18	
Max. Coil Temperature	ºC	125			
Mechanical					
Coil Weight	kg	18		25	
Attractive Force	N	5831		7774	

Notes: 1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms. 2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%. 4. Peak force and current - 1 second duration.





Standard Magnet Track

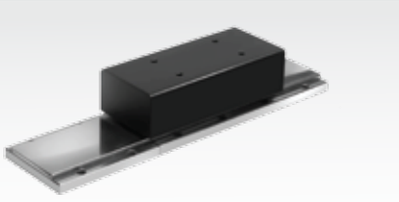
TRACK	L (mm)	WEIGHT(kg)
TL120	120	1.7
TL240	240	3.5
TL480	480	7.0

Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA530-047-110	522	18.00
PIXA690-047-110	690	25.00

PIXA 135 / PIXA 160

- Ironcore Motor
- Peak force to 9827N, Continuous force to 2457N
- Integrated with Hall Sensor (Optional)
- Ideal for high force



PIXA SERIES
IRONCORE LINEAR MOTOR

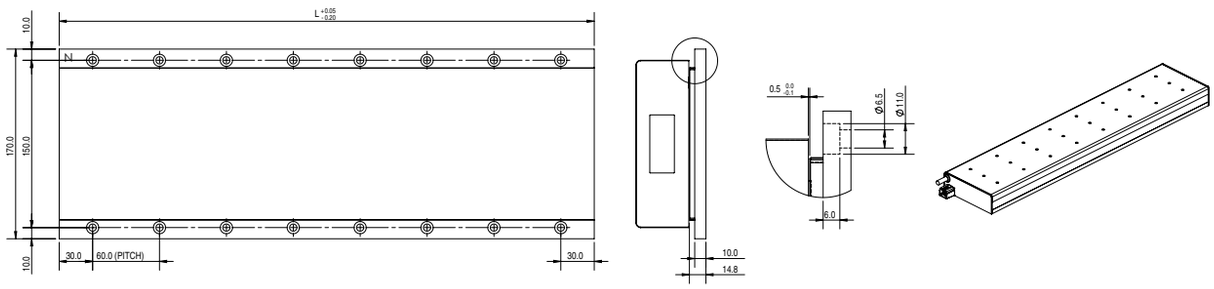
SPECIFICATION		MODEL	
		PIXA690-047-135	PIXA690-047-160
Connection Type		S	S
Performance	**Unit**		
Peak Force	N	8196	9827
Continuous Force @ 105ºC*	N	2049	2457
Continuous Stall Force @ 105ºC*	N	1449	1737
Peak Power @ 105ºC	W	9062	10506
Continuous Power @ 105ºC*	W	566.4	656.6
Electrical			
Peak Current	A^{pk}	76.75	92.02
Continuous Current @ 105ºC*	A^{pk}	19.19	23.01
Continuous Stall Current @ 105ºC*	Arms	13.57	16.27
Force Constant	N/A^{pk}	106.8	106.8
Back EMF Constant	V^{pk}/m/s	122.8	122.8
Coil Resistance L-L @ 25ºC	ohm	1.55	1.25
Coil Resistance L-L @ 105ºC*	ohm	2.05	1.65
Inductance L-L @ 1kHz	mH	29	26
Motor Constant @ 105ºC*	N/√W	86.1	95.9
Electrical Cycle Length	mm	48	48
Max. Terminal Voltage	Vdc	600	600
Thermal			
Thermal Resistance @ 105ºC*	ºC/W	0.14	0.12
Max. Coil Temperature	ºC	125	125
Mechanical			
Coil Weight	kg	31	38
Attractive Force	N	9826	11790

Notes:

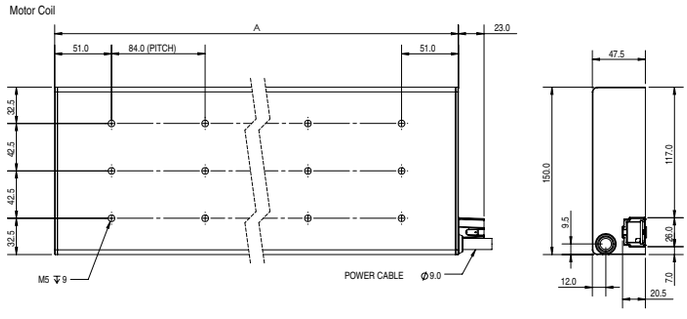
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10%.
4. Peak force and current - 1 second duration.

PIXA 135

Magnet Track



Motor Coil



Standard Magnet Track

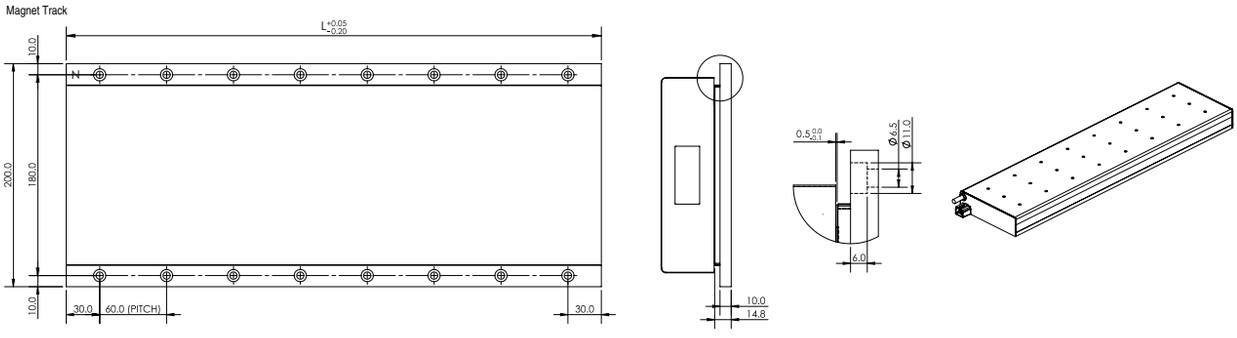
TRACK	L (mm)	WEIGHT(kg)
TL120	120	2.1
TL240	240	4.3
TL480	480	8.6

Motor Coil

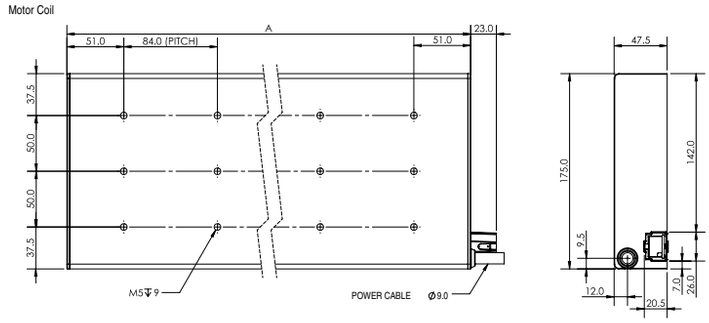
COIL	A (mm)	WEIGHT(kg)
PIXA690-047-135	690	31.00

PIXA 160

Magnet Track



Motor Coil



Standard Magnet Track

TRACK	L (mm)	WEIGHT(kg)
TL120	120	2.5
TL240	240	5.1
TL480	480	10.2

Motor Coil

COIL	A (mm)	WEIGHT(kg)
PIXA690-047-160	690	38.00

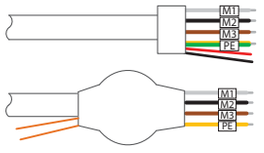
* Technical specifications subject to change without prior notice

STAGE 1 — POWER AND HALL CABLE OPTION

PIXA110-023-030-S-TM-0.5-**9NF**-**HC**-00

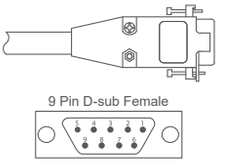
POWER CABLE OPTIONS

NF / FC



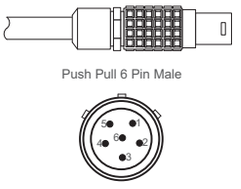
M1	Grey	Grey
M2	Black	Black
M3	Brown	Brown
PE	Yellow / Green	Yellow
Temp sensor 1	Red	Orange / Black
Temp sensor 2	Black	Orange

9NF



P1	M1	Grey
P2	M1	Black(Jumper)
P3	M3	Brown
P4	M3	Black(Jumper)
P5	M2	Black
P6	M2	Black(Jumper)
P7	Temp sensor 1	Red
P8	Temp sensor 2	Black
P9	PE	Yellow & Green

CNF



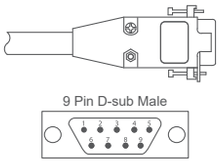
P1	M1	Grey
P2	M2	Black
P3	M3	Brown
P4	Temp sensor 1	Red
P5	Temp sensor 2	Black
P6	PE	Yellow & Green

HALL SENSOR OPTIONS

H

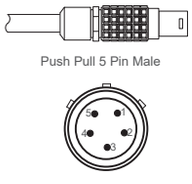
Hall A	Grey
Hall B	Green
Hall C	Pink
5V	Brown
0V	White

HC



P1	Hall A	Grey
P2	Hall B	Green
P3	Hall C	Pink
P4	5V	Brown
P5	0V	White

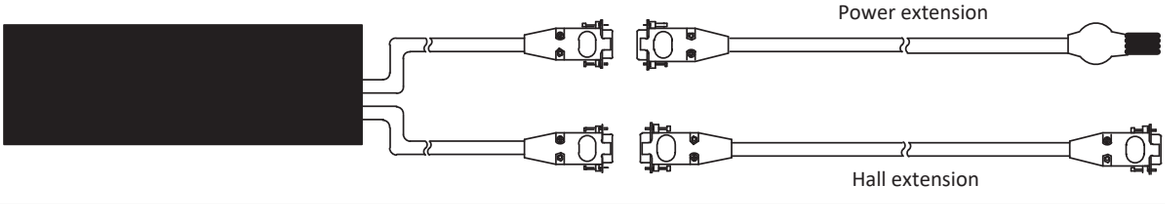
CHC

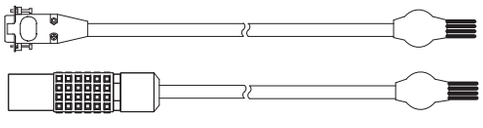
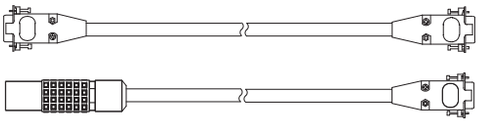
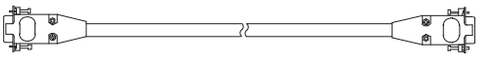


P1	Hall A	Grey
P2	Hall B	Green
P3	Hall C	Pink
P4	5V	Brown
P5	0V	White

STAGE 2 — PIXA SERIES EXTENSION CABLE

Connection example: PIXA110-☐-☐-☐-☐-☐-9NF-HC-00



Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_PIXA_X.X
		CBL_EXT_PWR_PIXA_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_PIXA_X.X
		CBL_EXT_HALL_PIXA_CC_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X
		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X
		CBL_EXT_REN05_X.X
		CBL_EXT_REN05A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Interface Digital
05A	ATOM Ri Interface Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

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

PSM/PSME SERIES

LINEAR SHAFT MOTOR

PBA SYSTEMS

www.pbasystems.com.sg

COMPACT HIGH SPEED SHAFT MOTOR

precise and efficient linear motion system

PSM / PSME SERIES

LINEAR SHAFT MOTOR

RoHS COMPLIANT CE*

Conventional Ballscrew Form Factor Shaft Motors For Precious And Efficient Linear Motion Systems

PBA Linear Shaft motors were designed with similar form factor dimensional outline and Functionality to that of a mechanical ballscrew/nut with the intention to provide to equivalent upgrades to traditionally ballscrews and pneumatic cylinder applications.

The coils of the PSM motor surrounds the magnets allowing for optimal use of magnetic flux which makes the air gap non-critical and allows for max efficiency as the motor requires less current and mass to produce similar force ranges when compared to other brushless linear motors.

Resultant performance characteristics from above design are precision positioning and Minimal speed ripple which makes the range of applications unlimited and highly diverse.

- Zero cogging
- Precise speed and positional capability
- Low torque ripple
- Simple economical construction
- Compact and light weight
- Non critical air gap
- Easy upgrade of existing ballscrew systems

Application

- Z axis IC picking head
- PCB indexer
- SMT alignment
- Biomedical pippetting
- Active dispensing
- Precision Pick & Place
- Scanning
- Leadframe indexing
- Bptech open frame stages

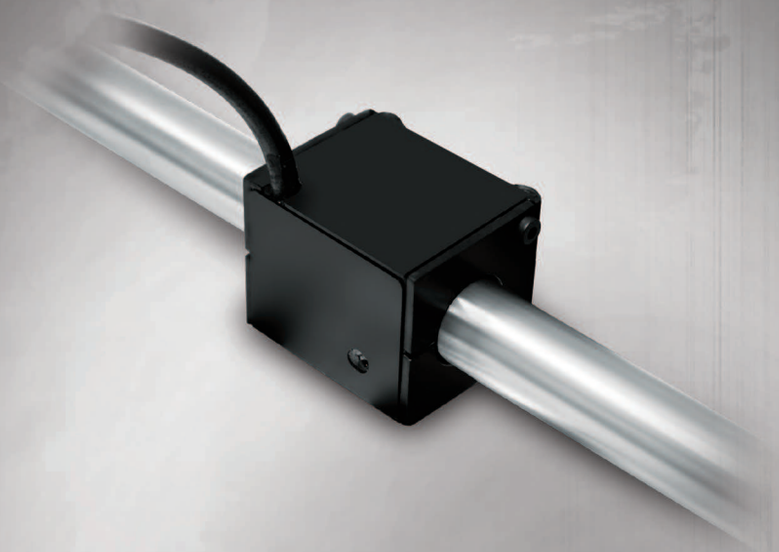
* Technical specifications subject to change without prior notice

* CE pending for PSM

COMPACT HIGH SPEED SHAFT MOTOR

precise and efficient linear motion system

Model	Peak Force (N)	Continuous Force (N)	Peak Current (A^{pk})	Continuous Current (A^{pk})	Coil Length (mm)
PSM12	89.1	17.8	12.37	2.47	34-112
PSM25	513	102.6	21.92	4.38	62-218
PSME06	10.7	3.5	2.35	0.78	46.8
PSME12	27.6	9.2	3.35	1.12	70.0



PSM SERIES

LINEAR SHAFT MOTOR

COMPACT HIGH SPEED SHAFT MOTOR

precise and efficient linear motion system

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PSM25 - C1 - TC - 2.0 - FC - HC - 00

MOTOR MODEL
PSM12
PSM25

MOTOR COIL SIZE
C1
C2
C3
C4

THERMAL PROTECTION	
TC*	PT 100 (Standard)

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
	:

HALL SENSOR AND CONNECTOR OPTIONS	
NH	No Hall Sensor
H	Hall Sensor with Flying Leads (No Connector)
HC	Hall Sensor with 9 pins D Sub Male Connector
CHC	Hall Sensor with 5 pins Circular Quick Lock Male Connector

POWER CABLE OPTIONS	
NF	No Ferrite Core
FC	Ferrite Core (Only for PSM25)
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
** Minimum Bending Radius - 10 times of cable diameter

Magnet Shaft

PSM12 - SL81

MOTOR MODEL
PSM12
PSM25

TOTAL SHAFT LENGTH
Refer to specs table

* Minimum Bending Radius - 10 times of cable diameter

PSM 12

- Linear Shaft Motor
- Peak force to 89N, Continuous force to 17N

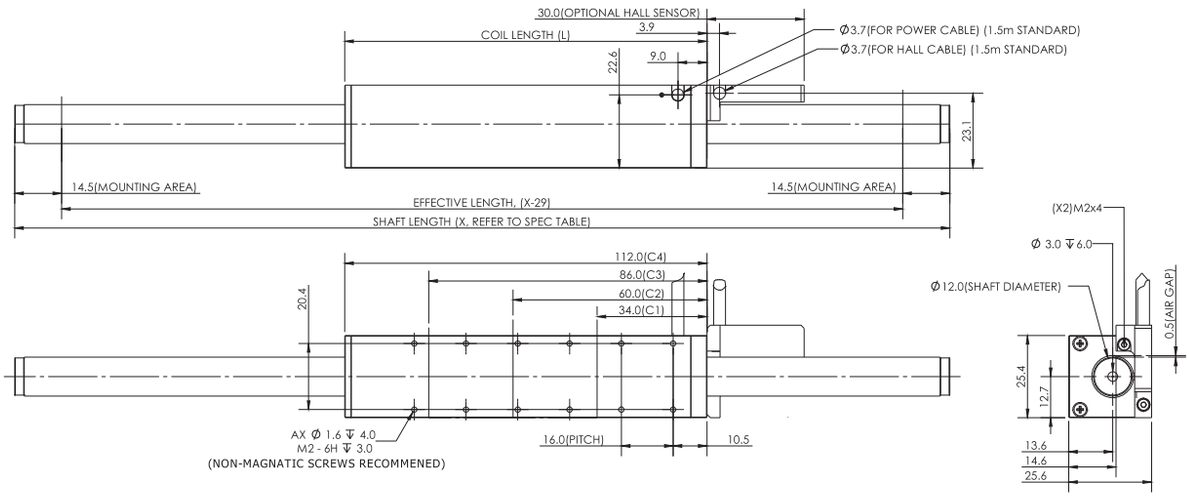
PSM SERIES
LINEAR SHAFT MOTOR

SPECIFICATION		MODEL			
		PSM12-C1	PSM12-C2	PSM12-C3	PSM12-C4
Performance	**Unit**				
Peak Force	N	29.0	50.4	67.8	89.1
Continuous Force @ 120ºC*	N	5.8	10.1	13.6	17.8
Continuous Stall Force @ 120ºC*	N	4.1	7.1	9.6	12.6
Peak Power @ 120ºC	W	438	658	794	1029
Continuous Power @ 120ºC*	W	17.5	26.3	31.8	41.2
Electrical					
Peak Current	A^{pk}	5.30	9.19	12.37	8.13
Continuous Current @ 120ºC*	A^{pk}	1.06	1.84	2.47	1.63
Continuous Stall Current @ 120ºC*	Arms	0.75	1.30	1.75	1.15
Force Constant	N/A^{pk}	5.5			11.0
Back EMF Constant	$V^{pk}/m/s$	6.3			12.6
Coil Resistance L-L @ 25ºC	ohm	15.0	7.5	5.0	15.0
Coil Resistance L-L @ 120ºC*	ohm	20.8	10.4	6.9	20.8
Inductance L-L @ 1kHz	mH	2.43	1.19	0.79	2.35
Motor Constant @ 25ºC*	N/√W	1.63	2.31	2.83	3.27
Motor Constant @ 120ºC*	N/√W	1.4	2.0	2.4	2.8
Max. Terminal Voltage	Vdc	100			
Thermal					
Thermal Resistance @ 120ºC*	ºC/W	5.43	3.61	2.99	2.31
Max. Winding Temperature	ºC	120			
Mechanical					
Coil Weight	kg	0.057	0.11	0.165	0.21
Attractive Force	N	0			
Electrical Cycle Length	mm	26			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 22ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-20%, all others +/-10%.
4. Peak force and current - 1 second duration.

PSM 12



SIZE	NUMBER OF MOUNTING HOLE A
C1	4
C2	8
C3	12
C4	16

SHAFT LENGTH SL (mm)	EFFECTIVE LENGTH (mm)	SHAFT WEIGHT (kg)
SL81	52	0.050
SL107	78	0.072
SL133	104	0.093
SL159	130	0.114
SL185	156	0.135
SL211	182	0.156
SL237	208	0.178
SL263	234	0.199
SL289	260	0.220
SL315	286	0.241
SL341	312	0.262
SL367	338	0.284
SL393	364	0.305
SL419	390	0.326
SL445	416	0.347
SL471	442	0.368
SL497	468	0.390

* Technical specifications subject to change without prior notice

PSM 25

- Linear Shaft Motor
- Peak force to 513N, Continuous force to 102N

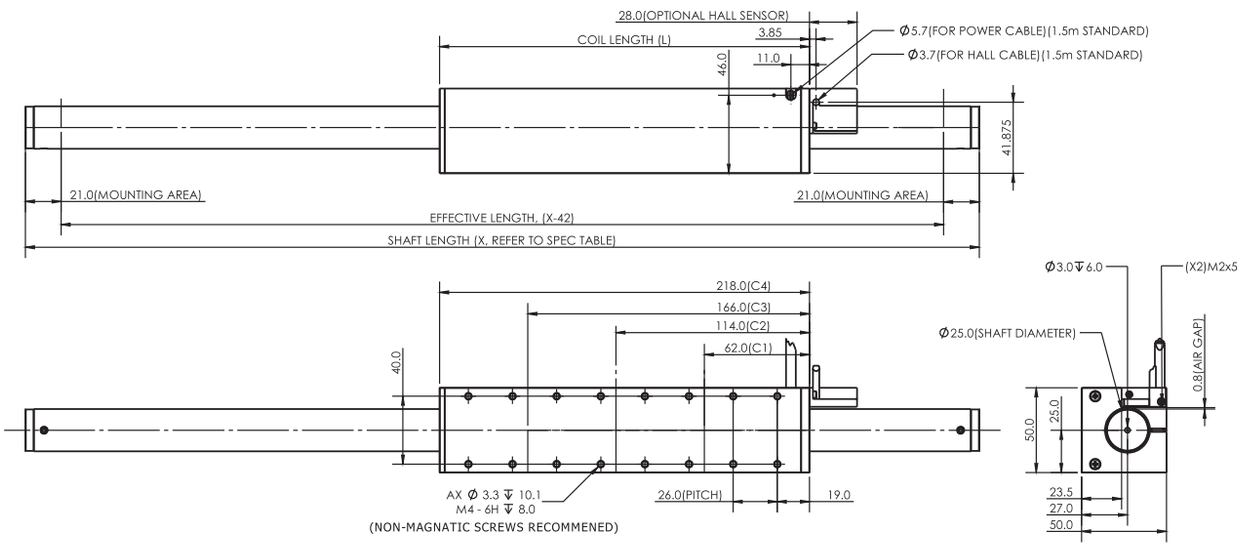
PSMSERIES
LINEAR SHAFT MOTOR

SPECIFICATION		MODEL			
		PSM25-C1	PSM25-C2	PSM25-C3	PSM25-C4
Performance	**Unit**				
Peak Force	N	162.0	279.0	405.0	513.0
Continuous Force @ 120ºC*	N	32.4	55.8	81.0	102.6
Continuous Stall Force @ 120ºC*	N	22.9	39.5	57.3	72.6
Peak Power @ 120ºC	W	1365	2024	2844	3422
Continuous Power @ 120ºC*	W	54.6	81.0	113.7	136.9
Electrical					
Peak Current	A^{pk}	12.73	21.92	10.61	20.15
Continuous Current @ 120ºC*	A^{pk}	2.55	4.38	2.12	4.03
Continuous Stall Current @ 120ºC*	Arms	1.80	3.10	1.50	2.85
Force Constant	N/A^{pk}	12.7		38.2	25.5
Back EMF Constant	V^{pk}/m/s	14.6		43.9	29.3
Coil Resistance L-L @ 25ºC	ohm	8.1	4.1	24.4	8.1
Coil Resistance L-L @ 120ºC*	ohm	11.2	5.6	33.7	11.2
Inductance L-L @ 1kHz	mH	5.89	2.90	17.13	5.70
Motor Constant @ 25ºC*	N/√W	5.16	7.30	8.94	10.32
Motor Constant @ 120ºC*	N/√W	4.4	6.2	7.6	8.8
Max. Terminal Voltage	Vdc	500			
Thermal					
Thermal Resistance @ 120ºC*	ºC/W	1.74	1.17	0.84	0.69
Max. Coil Temperature	ºC	120			
Mechanical					
Coil Weight	kg	0.4	0.84	0.12	0.162
Attractive Force	N	0			
Electrical Cycle Length	mm	52			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 22ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-20%, all others +/-10%.
4. Peak force and current - 1 second duration.

PSM 25



SIZE	NUMBER OF MOUNTING HOLE A
C1	4
C2	8
C3	12
C4	16

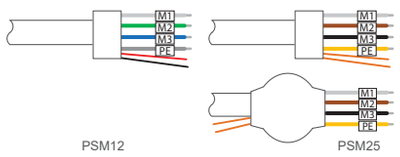
SHAFT LENGTH SL (mm)	EFFECTIVE LENGTH (mm)	SHAFT WEIGHT (kg)
SL146	104	0.45
SL198	156	0.64
SL250	208	0.83
SL302	260	1.02
SL354	312	1.21
SL406	364	1.40
SL458	416	1.59
SL510	468	1.78
SL562	520	1.97
SL614	572	2.16
SL666	624	2.35
SL718	676	2.54
SL770	728	2.73
SL822	780	2.92
SL874	832	3.11
SL926	884	3.30
SL978	936	3.49

STAGE 1 — POWER AND HALL CABLE OPTION

PSM25-C1-TC-2.0-**FC**-**HC**-00

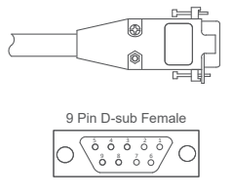
POWER CABLE OPTIONS

NF / FC



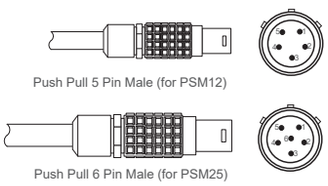
	PSM12	PSM25
M1	White	Grey
M2	Green	Brown
M3	Blue	Black
PE	Shield	Yellow
Temp sensor 1	Red	Orange / Black
Temp sensor 2	Black	Orange

9NF



	PSM12		PSM25	
P1	M1	White	M1	Grey
P2	M2	Green	M1	Black(Jumper)
P3	M3	Blue	M3	Black
P4	TS1	Red	M3	Black(Jumper)
P5	TS2	Black	M2	Brown
P6	-	-	M2	Black(Jumper)
P7	-	-	TS1	Orange/Black
P8	-	-	TS2	Orange
P9	-	-	PE	Yellow&Green

CNF



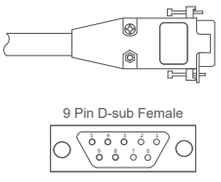
		PSM12	PSM25
P1	M1	White	Grey
P2	M2	Green	Brown
P3	M3	Blue	Black
P4	Temp sensor 1	Red	Orange / Black
P5	Temp sensor 2	Black	Orange
P6	PE	-	Yellow & Green

HALL SENSOR OPTIONS

H

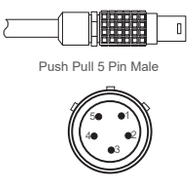
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

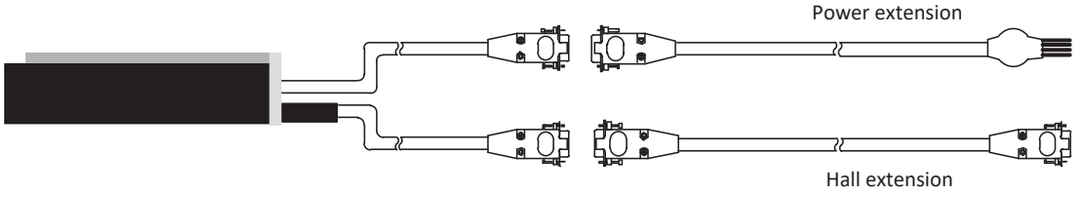
CHC

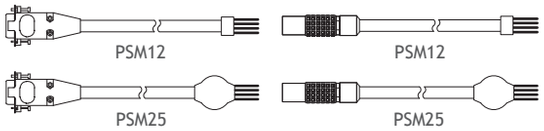
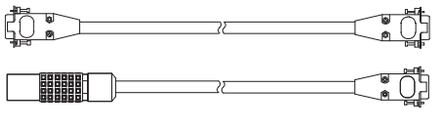
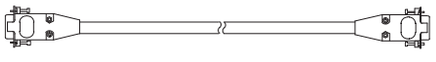


P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

STAGE 2 — PSM SERIES EXTENSION CABLE

Connection example: PSM25-□-□-□-FC-HC-00



Extension Cable		Part Number	
Power Extension Cable		PSM12	CBL_EXT_PWR_PSM12_X.X CBL_EXT_PWR_PSM12_CC_X.X
		PSM25	CBL_EXT_PWR_PSM25_X.X CBL_EXT_PWR_PSM25_CC_X.X
Hall Sensor Extension Cable			CBL_EXT_HALL_PSM_X.X
			CBL_EXT_HALL_PSM_CC_X.X
Encoder Extension Cable			CBL_EXT_REN00_X.X
			CBL_EXT_REN00A_X.X
			CBL_EXT_REN01_X.X
			CBL_EXT_REN01B_X.X
			CBL_EXT_REN05_X.X
			CBL_EXT_REN05A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Interface Digital
05A	ATOM Ri Interface Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

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

PSME SERIES

LINEAR SHAFT MOTOR

BUILT - IN ENCODER

turn key linear motion system

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PSME06 - C1 - NT - 0.26 - NF - H

MOTOR MODEL
PSME06
PSME12

MOTOR COIL SIZE
C1

THERMAL PROTECTION	
NT	No Sensor

HALL SENSOR OPTIONS	
H	Sin/Cos Hall Sensor with Flying Leads

POWER CABLE OPTIONS	
NF	Without Ferrite Core

CABLE LENGTH
0.26m

Magnet Shaft

PSME06 - SL120

MOTOR MODEL
PSME06
PSME12

SHAFT LENGTH
Refer to specs table

PSME 06 / PSME 12

- Built-in encoder
- Ideal for Z-axis
- Small cross-section
- Control mode switching function available

PSME SERIES

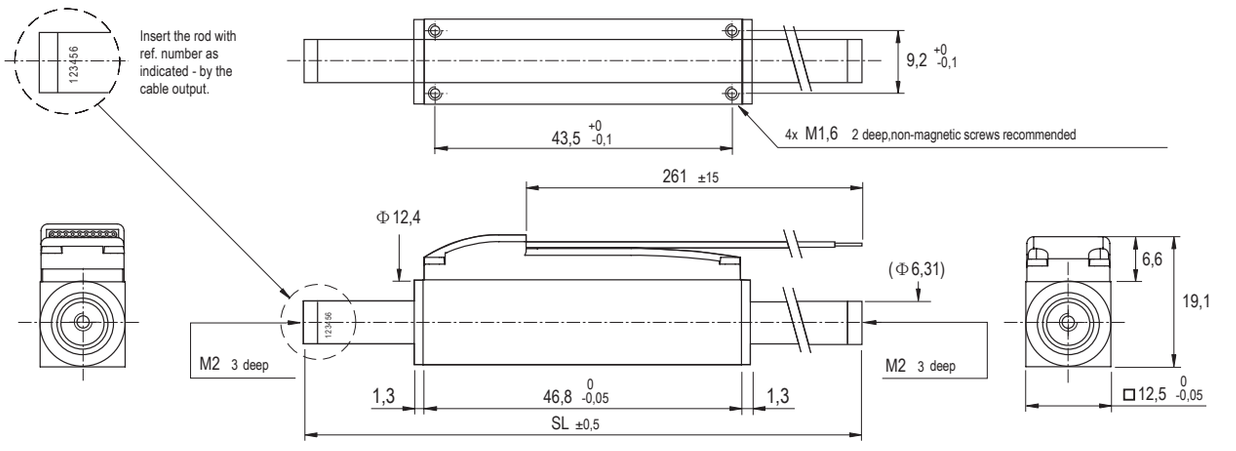
LINEAR SHAFT MOTOR
WITH INTEGRATED ENCODER SYSTEM

SPECIFICATION		MODEL	
		PSME06-C1	PSME12-C1
Performance	**Unit**		
Peak Force	N	10.7	27.6
Continuous Force @ 125ºC*	N	3.5	9.2
Peak Power @ 125ºC	W	77.1	129.2
Continuous Power @ 125ºC*	W	8.5	14.4
Electrical			
Peak Current	A^{pk}	2.35	3.35
Continuous Current @ 125ºC*	A^{pk}	0.78	1.12
Continuous Stall Current @ 125ºC*	Arms	0.55	0.79
Force Constant	N/A^{pk}	4.55	8.23
Back EMF Constant	V^{pk}/m/s	5.23	9.47
Resistance L-L @ 22°C	Ohm	13.2	10.8
Resistance L-L @ 125°C	Ohm	18.7	15.3
Inductance L-L @ 1kHz	mH	0.82	1.13
Motor Constant @ 125°C	N/√W	1.22	2.43
Electrical Cycle Length	mm	18	24
Max. Terminal Voltage	Vdc	75	
Thermal			
Thermal Resistance @ 125°C	°C/W	12.2	7.2
Max. Winding Temperature	ºC	125	
Mechanical			
Coil Weight	kg	0.039	0.138

Notes:

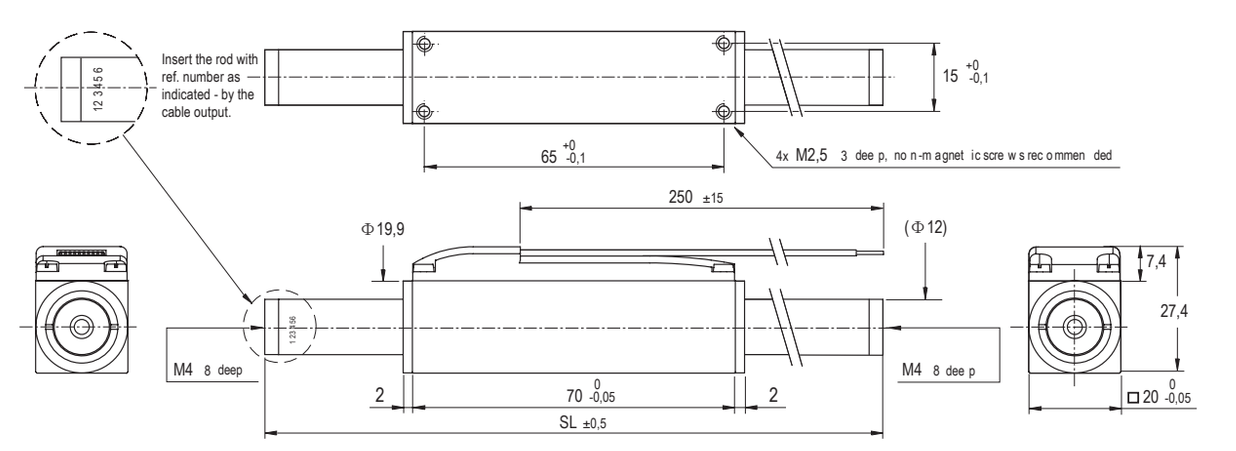
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 22ºC, heat dissipation by natural convection, without heat sink attached.
3. ^ Typical values with integrated Sin/Cos Hall sensors and Technosoft iPOS-3602-BX-CAN/CAT. Values may vary depending on conditions of use.
4. Specifications tolerance – inductance +/-30%, all others +/-10%.
5. Peak force and current - 1 second duration.

PSME 06



SHAFT LENGTH SL (mm)	EFFECTIVE LENGTH (mm)	REPEATABILITY (um)	ACCURACY (um)	WEIGHT (g)
SL82	67	+/-15	+/-200	18
SL109	87		+/-220	24
SL127	107		+/-240	28
SL154	127		+/-260	35
SL172	147		+/-280	39
SL190	167		+/-300	43

PSME 12

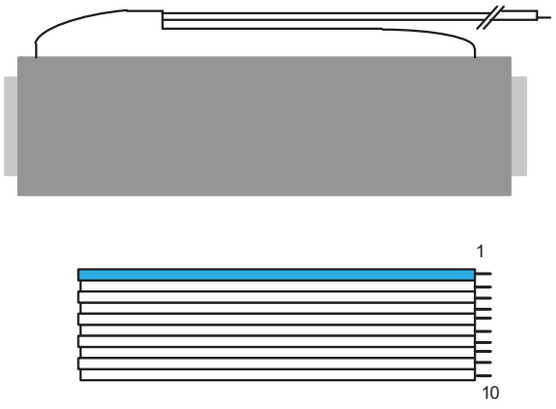


SHAFT LENGTH SL (mm)	EFFECTIVE LENGTH (mm)	REPEATABILITY (um)	ACCURACY (um)	WEIGHT (g)
SL134	110	+/-20	+/-500	98
SL182	150		+/-600	140
SL218	190		+/-700	168
SL254	230		+/-800	200
SL314	290		+/-900	250

* Technical specifications subject to change without prior notice

PSME SERIES PIN OUT

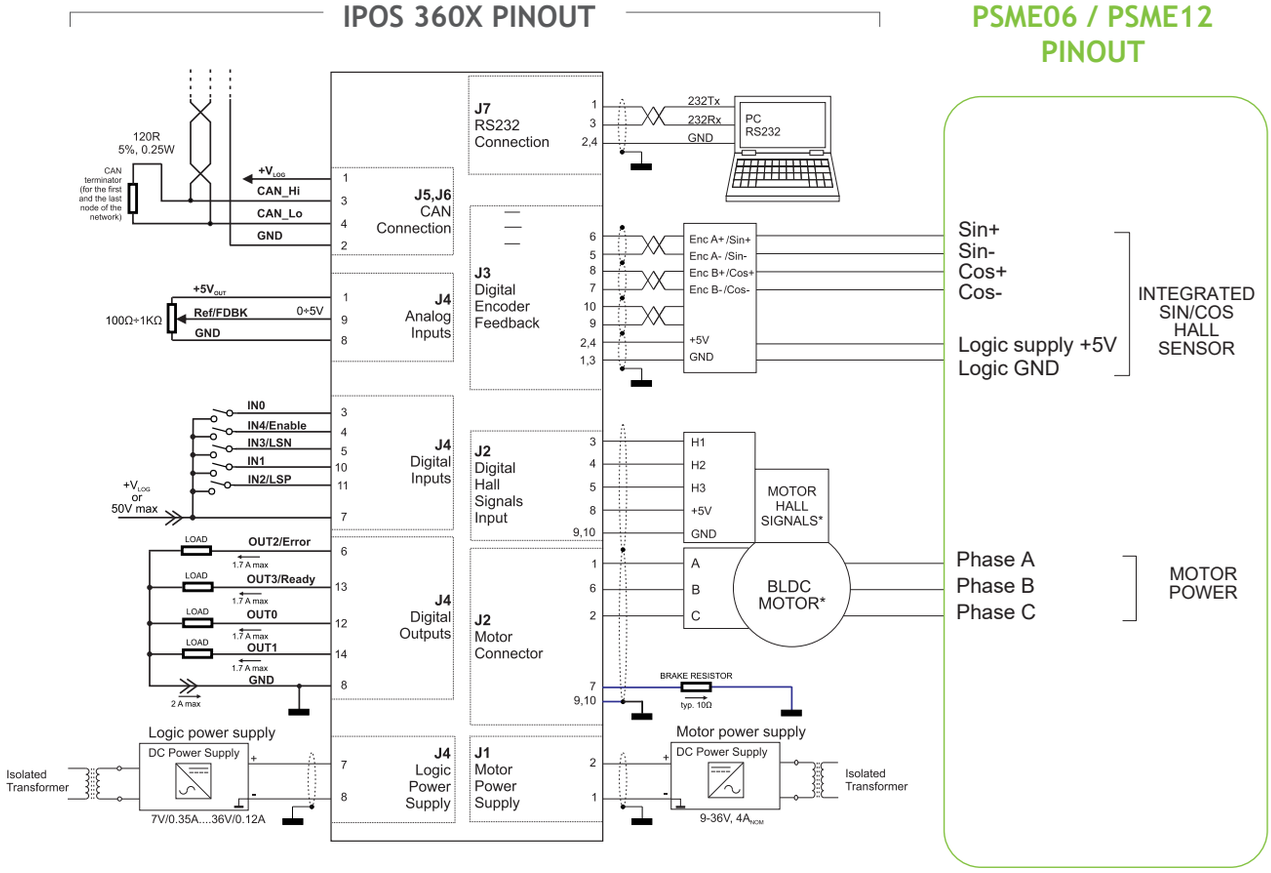
PSME□-C1-NT-0.25-NF-H



PIN FUNCTION	
1	Phase C
2	Phase B
3	Phase A
4	Logic GND
5	Logic Supply +5V
6	Sin+
7	Sin-
8	Cos+
9	Cos-
10	N.C.

Material PVC, 10 conductors, AWG 28, pitch 2mm.
Only 0.26m length is available

Technosoft iPOS360x BX-CAN (Standalone module & step/direction supported)



* Technical specifications subject to change without prior notice

CVC/CVCA/RVCA SERIES

VOICE COIL SYSTEM

PBA SYSTEMS

www.pbasystems.com.sg

ULTRA HIGH FREQUENCY
short stroke motion system

Model	Peak Force (N)	Continuous Force (N)	Peak Current (A)	Continuous Current (A)
CVC16-SF-5	4.04	0.81	5.06	1.011
CVC19-SF-6	5.90	1.18	4.54	0.907
CVC20-SF-10	8.21	1.64	4.28	0.855
CVC24-SF-12	13.52	2.70	4.25	0.850
CVC26-SF-7	17.11	3.42	2.90	0.580
CVC30-SF-15	22.66	4.53	3.13	0.626
CVC35-HF-8	144.00	28.80	4.00	0.800
CVC38-SF-10	42.09	8.42	3.76	0.751
CVC40-SF-5	34.09	6.82	4.41	0.882
CVC40-HF-6.5	92.42	18.48	3.59	0.717
CVC40-SF-20	47.92	9.58	3.13	0.626
CVC44-SF-13	54.32	10.86	5.60	1.120
CVC50-SF-30	74.91	14.98	4.23	0.846
CVC60-SF-25	120.33	24.07	5.85	1.170
CVC60-HF-20	218.50	43.70	4.75	0.950
CVC90-HF-20	640.74	128.15	15.77	3.154

ULTRA HIGH FREQUENCY
powered by circular voice coil

Model	Peak Force (N)	Continuous Force (N)	Peak Current (A)	Continuous Current (A)
CVCA35-HF-8.0-CRX	144	28.8	4.00	0.800
CVCA40-HF-6.5-CRX	92.42	18.48	3.59	0.717
CVCA40-SF-20-CRX	47.92	9.58	3.13	0.626
CVCA50-SF-30-CRX	74.91	14.98	4.23	0.846
CVCA60-SF-25-CRX	120.33	24.07	5.85	1.170
CVCA60-HF-20-CRX	218.50	43.70	4.75	0.950
CVCA90-HF-20-CRX	640.74	128.15	15.77	3.154

ULTRA HIGH FREQUENCY
rectangular voice coil actuators for pick & place motion system

Model	Peak Force (N)	Continuous Force (N)	Peak Current (A)	Continuous Current (A)
RVCA-S20B-CRX	29.5	9.8	3.94	1.31
RVCA-S30B-CRX	81.6	27.2	6.05	2.02
RVCA-S12B-LM	12.6	4.2	3.51	1.17
RVCA-S20B-LM	29.5	9.8	3.94	1.31
RVCA-S30B-LM	81.6	27.2	6.05	2.02

PART NUMBERING SYSTEM

Coil Assembly

CVC

CVC 40 - HF - 6.5 - 0.5 - 00

DIAMETER ∅ (mm)

SPECIAL FEATURE	
SF	Standard Force
HF	High Force

STROKE

DESIGN VERSIONS	
00	Standard
01	Customized Version
:	

CABLE LENGTH	
0.15	0.15m
0.5	0.5m
1.0	1.0m
2.0	2.0m
3.0	3.0m

CVCA

CVCA 40 - HF - 6.5 - CRX - E1.0 - C0.5 - 00

DIAMETER ∅ (mm)

SPECIAL FEATURE	
SF	Standard Force
HF	High Force

STROKE

LINEAR GUIDE	
CRX	Cross Roller

ENCODER RESOLUTION	
E1.0	1.0um
E0.5	0.5um
E0.1	0.1um
EA	Analog

DESIGN VERSIONS	
00	Standard
01	Customized Version
:	

CABLE LENGTH*	
0.2	0.2m
0.5	0.5m
0.8	0.8m
1.0	1.0m
3.0	3.0m

* Encoder & power cable

RVCA

RVCA- S20B - CRX - E1.0 - C0.5 - 00

STROKE (mm)
S12B * only available for LM series
S20B
S30B

LINEAR GUIDE	
CRX	Cross Roller
LM	Linear Guides

ENCODER RESOLUTION	
E1.0	1.0um Atom
E0.5	0.5um Atom
E0.1	0.1um Atom
EA	Analog Atom

DESIGN VERSIONS	
00	Standard
01	Customized Version
:	

CABLE LENGTH*	
0.2	0.2m
0.5	0.5m
0.8	0.8m
1.0	1.0m
3.0	3.0m

* Encoder & power cable

CVC SERIES
VOICE COIL MOTOR

ULTRA HIGH FREQUENCY
short stroke motion system

PBA SYSTEMS

www.pbasystems.com.sg

ULTRA HIGH FREQUENCY

short stroke motion system

CVC SERIES

CIRCULAR VOICE COIL MOTOR

Ultra High Frequency for Short Stroke Motion Systems

PBA's Circular voice coil motors are simple electric linear motors consisting of a Magnetic housing and a lightweight coil. Voice coil motors do not need commutation and are often used for pure frequency oscillation. However, sub-micron positional control is easily achieved when worked in tandem with high resolution linear encoders.

Applying a voltage across the terminals of the motor causes the motor to move to one direction. Reversing the polarity of the applied voltage will move the motor to the opposite direction. The generated force is proportional to the current that flows through the motor coil. This force is almost constant in the specified stroke range of the motor. The non-commutated motor construction increases reliability and the direct coupling of the motor to the load allows for dynamic acceleration/deceleration and resultant high speed operation.

- Zero Cogging, zero backlash and zero hysteresis
- Extremely dynamic and high frequency motion profile
- Negligible speed and force ripple at low speeds
- Multiple Diameter sizes and force options
- Simple operation – Only 2 terminals connections
- High force versions available
- Zero maintenance
- High reliability

Application

- Frequency oscillator
- Force/pressure control
- Camera Lens zoom/ focus
- Syringe dispensing
- Biomed simulators
- Laser mirror steer/tilt
- General automation
- Dynamic Z-axis

* Technical specifications subject to change without prior notice

CVC Series

- Direct Drive
- Peak force to 384.44N, Continuous force to 128.15N
- Fast response, low moving mass
- Non contact between core and coil movement
- Excellent reliability

CVC SERIES
CIRCULAR VOICE COIL MOTOR

SPECIFICATION		MODEL							
		CVC16-SF-5	CVC19-SF-6	CVC20-SF-10	CVC24-SF-12	CVC26-SF-7	CVC30-SF-15	CVC35-HF-8	CVC38-SF-10
Performance	**Unit**								
Stroke	mm	5	6.4	10	11	7	15	8	10
Peak Force	N	4.04	5.90	8.21	13.52	17.11	22.66	144.00	42.09
Continuous Stall Force @ 100ºC*	N	0.71	1.03	1.43	2.39	3.01	3.97	25.20	7.32
Continuous Stall Force @ 125ºC*	N	0.81	1.18	1.64	2.70	3.42	4.53	28.80	8.42
Peak Power @ 125ºC*	W	60.99	81.72	94.18	120.97	131.78	154.89	438.08	204.91
Continuous Power @ 100ºC	W	1.76	2.32	2.66	3.50	3.78	4.41	12.45	5.75
Continuous Power @ 125ºC*	W	2.44	3.27	3.77	4.84	5.27	6.20	17.52	8.20
Electrical									
Peak Current	A	5.06	4.54	4.28	4.25	2.90	3.13	4.00	3.76
Continuous Stall Current @ 100ºC*	A	0.892	0.793	0.746	0.750	0.510	0.548	0.700	0.653
Continuous Stall Current @ 125ºC*	A	1.011	0.907	0.855	0.850	0.580	0.626	0.800	0.751
Force Constant @ Mid Stroke	N/A	0.80	1.30	1.92	3.18	5.90	7.24	36.00	11.21
Back EMF Constant @ Mid Stroke	V/m/s	0.80	1.30	1.92	3.18	5.90	7.24	36.00	11.21
Coil Resistance @ 25ºC	ohm	1.70	2.83	3.67	4.77	11.16	11.26	19.50	10.35
Coil Resistance @ 100ºC*	ohm	2.22	3.69	4.78	6.22	14.54	14.67	25.41	13.49
Coil Resistance @ 125ºC*	ohm	2.39	3.97	5.15	6.70	15.67	15.81	27.38	14.53
Inductance @ 1kHz (Inside fully)	mH	0.14	0.29	0.44	1.20	2.95	2.38	8.24	3.47
Motor Constant @ 125ºC*	N/√W	0.61	0.77	1.00	1.46	1.77	2.16	8.15	3.48
Max. Terminal Voltage	Vdc	48							
Thermal									
Thermal Resistance @ 100ºC*	ºC/W	42.55	32.34	28.18	21.45	19.83	17.02	6.02	13.04
Thermal Resistance @ 125ºC*	ºC/W	40.99	30.59	26.55	20.67	18.97	16.14	5.71	12.20
Max. Coil Temperature	ºC	150							
Mechanical									
Coil Assembly Weight	kg	0.005	0.005	0.01	0.018	0.016	0.025	0.11	0.045
Magnet Assembly Weight	kg	0.01	0.023	0.032	0.045	0.053	0.1	0.39	0.168

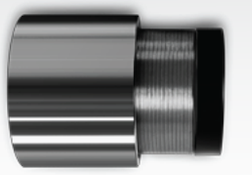
Notes:

1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. Peak force and current - 1 second duration.

* Technical specifications subject to change without prior notice

CVC Series

- Direct Drive
- Peak force to 384.44N, Continuous force to 128.15N
- Fast response, low moving mass
- Non contact between core and coil movement
- Excellent reliability



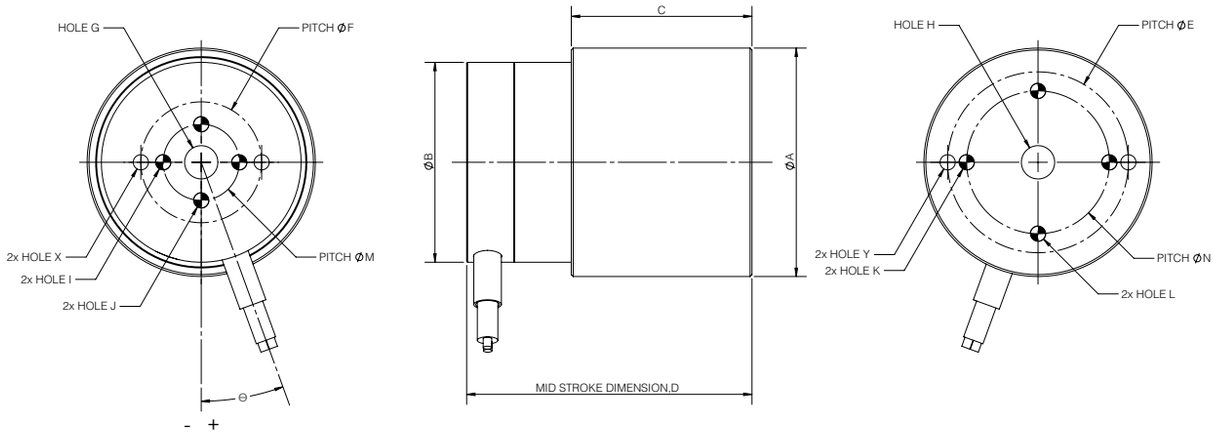
CVC SERIES
CIRCULAR VOICE COIL MOTOR

SPECIFICATION		MODEL							
		CVC40-SF-5	CVC40-HF-6.5	CVC40-SF-20	CVC44-SF-13	CVC50-SF-30	CVC60-SF-25	CVC60-HF-20	CVC90-HF-20
Performance	**Unit**								
Stroke	mm	5	6.5	20	13	30	25	20	20
Peak Force	N	34.09	92.42	47.92	54.32	74.91	120.33	218.50	640.74
Continuous Stall Force @ 100ºC*	N	5.92	16.09	8.34	9.41	13.14	20.90	37.72	111.41
Continuous Stall Force @ 125ºC*	N	6.82	18.48	9.58	10.86	14.98	24.07	43.70	128.15
Peak Power @ 125ºC*	W	140.63	289.27	240.73	264.20	381.62	463.70	760.32	1204.70
Continuous Power @ 100ºC	W	3.94	8.13	6.77	7.36	10.90	12.98	21.03	33.80
Continuous Power @ 125ºC*	W	5.63	11.57	9.63	10.57	15.26	18.55	30.41	48.19
Electrical									
Peak Current	A	4.41	3.59	3.13	5.60	4.23	5.85	4.75	15.77
Continuous Stall Current @ 100ºC*	A	0.766	0.624	0.545	0.970	0.742	1.016	0.820	2.742
Continuous Stall Current @ 125ºC*	A	0.882	0.717	0.626	1.120	0.846	1.170	0.950	3.154
Force Constant @ Mid Stroke	N/A	7.73	25.78	15.31	9.70	17.71	20.57	46.00	40.63
Back EMF Constant @ Mid Stroke	V/m/s	7.73	25.78	15.31	9.70	17.71	20.57	46.00	40.63
Coil Resistance @ 25ºC	ohm	5.15	16.03	17.50	6.00	15.19	9.65	24.00	3.45
Coil Resistance @ 100ºC*	ohm	6.71	20.89	22.80	7.82	19.79	12.57	31.27	4.50
Coil Resistance @ 125ºC*	ohm	7.23	22.51	24.57	8.42	21.33	13.55	33.70	4.84
Inductance @ 1kHz (Inside fully)	mH	1.44	5.52	5.59	1.25	4.14	3.26	15.40	4.88
Motor Constant @ 125ºC*	N/√W	3.41	6.44	3.66	3.96	4.54	6.62	9.39	21.87
Max. Terminal Voltage	Vdc	48						120	
Thermal									
Thermal Resistance @ 100ºC*	ºC/W	19.05	9.22	11.07	10.20	6.88	5.78	3.57	2.22
Thermal Resistance @ 125ºC*	ºC/W	17.78	8.64	10.39	9.46	6.55	5.39	3.29	2.08
Max. Coil Temperature	ºC	150							
Mechanical									
Coil Assembly Weight	kg	0.023	0.075	0.06	0.04	0.1	0.2	0.41	1.19
Magnet Assembly Weight	kg	0.078	0.255	0.23	0.3	0.526	0.668	1.14	2.425

Notes:

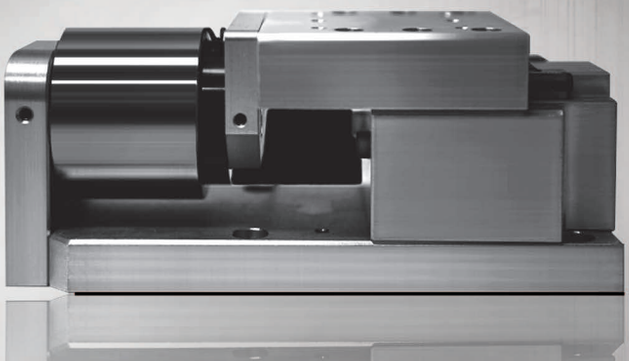
1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. Peak force and current - 1 second duration.

CVC Series



COIL	UNIT	CVC16-SF-5	CVC19-SF-6	CVC20-SF-10	CVC24-SF-12	CVC26-SF-7	CVC30-SF-15	CVC35-HF-8	CVC38-SF-10
A	mm	16.0	19.0	20.0	24.0	26.0	30.0	35.0	38.0
B	mm	13.4	15.7	16.6	21.0	22.0	24.6	30.4	31.2
C	mm	10.8	15.8	19.0	19.0	20.0	24.5	80.8	27.5
D	mm	16.5	24.0	31.0	30.0	27.5	39.0	92.5	39.0
E	mm	7.0	9.0	10.0	19.0	12.0	16.0	27.0	20.0
F	mm	7.0	9.0	10.0	12.7	12.0	12.6	12.6	20.0
G	mm	N/A	N/A	N/A	∅3.5(H7)↧5.0	M3↧THRU	N/A	∅3.0(H7)↧6.0	N/A
H	mm	N/A	N/A	N/A	∅1.6↧1.7	N/A	N/A	N/A	N/A
I	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
J	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
K	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L	mm	N/A	N/A	N/A	N/A	N/A	N/A	∅3.0(H7)↧5.0	N/A
M	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N	mm	N/A	N/A	N/A	N/A	N/A	N/A	27	N/A
X	mm	M2.5↧2.8	M3↧4.7	M3↧6.2	M2↧5.0	M2,M2.5,M3↧4.0	M3↧6.2	M3↧6.0	M4↧6.5
Y	mm	M2.5↧1.8	M3↧2.5	M3↧2.6	M2↧2.0	M3↧2.7	M3↧3.2	M3↧5.0	M4↧3.9
Θ	DEGREE	10°	25°	20°	20°	20°	20°	-25°	20°

COIL	UNIT	CVC40-SF-5	CVC40-HF-6.5	CVC40-SF-20	CVC44-SF-13	CVC50-SF-30	CVC60-SF-25	CVC60-HF-20	CVC90-HF-20
A	mm	40.0	40.0	40.0	44.0	50.0	60.0	60.0	90.0
B	mm	34.0	34.8	33.2	37.2	42.4	50.6	52.0	81.6
C	mm	12.0	40.5	32.5	31.8	43.0	43.5	90.0	90.0
D	mm	17.5	49.3	49.8	44.5	67.6	66.1	118.0	109.4
E	mm	20.0	20.0	20.0	25.4	20.0	30.0	44.0	48.0
F	mm	20.0	20.0	20.0	19.1	20.0	30.0	44.0	40.0
G	mm	N/A	N/A	N/A	∅6.5(H7)↧6.2	∅4.0(H7)↧7.6	N/A	∅8.0(H7)THRU	∅12.0(H7)THRU
H	mm	N/A	N/A	N/A	N/A	∅4.0↧3.8	N/A	∅8.0 THRU	∅12.0 THRU
I	mm	N/A	N/A	N/A	N/A	N/A	N/A	∅3.0(H7)↧5.0	N/A
J	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	∅4.0(H7)↧6.0
K	mm	N/A	N/A	N/A	N/A	N/A	N/A	∅3.0(H7)↧5.0	N/A
L	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	∅4.0(H7)↧5.0
M	mm	N/A	N/A	N/A	N/A	N/A	N/A	32	40
N	mm	N/A	N/A	N/A	N/A	N/A	N/A	32	34
X	mm	M4↧2.7	M4↧5.2	M4↧6.2	M4↧6.2	M4↧7.6	M5↧10.0	M5↧10.0	M6↧7.9
Y	mm	M4↧2.7	M4↧3.7	M4↧3.7	M4↧4.0	M4↧3.8	M5↧4.5	M5↧10.0	M6↧9.0
Θ	DEGREE	20°	-25°	20°	20°	30°	20°	20°	-55°



CVCA SERIES

VOICE COIL ACTUATOR

ULTRA HIGH FREQUENCY

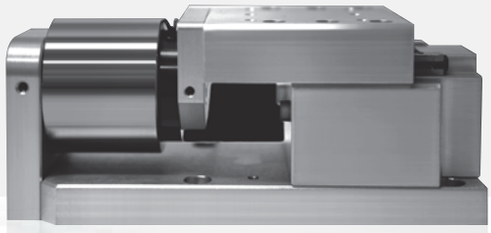
powered by circular voice coil

PBA SYSTEMS

www.pbasystems.com.sg

ULTRA HIGH FREQUENCY
powered by circular voice coils

CVCA SERIES
VOICE COIL ACTUATOR



Ultra High Frequency CVC Voice Coil Actuator

PBA's Circular Voice Coil Positioning Stage is a compact stage ideal for closed loop short stroke positioning applications where precision, repeatability and low speed/force ripple are of utmost importance.

CVCA stages are built with precision cross roller guides that provides high rigidity to complement the high acceleration capability of the CVC module which has very low electrical/mechanical time constants and zero hysteresis.

A perfect combination for majority voice coil applications requiring precise quick oscillation at high accelerations of light payloads.

- Cross roller bearing for excellent precision and rigidity
- Zero cogging , zero backlash and zero hysteresis
- Low moving mass, fast response
- Integrated linear encoder
- Ease of use, plug and play
- Excellent reliability
- Sub-micron resolution possibilities

* Technical specifications subject to change without prior notice

CVCA Series

- Direct Drive, cogging free
- Peak force to 384.44N, Continuous force to 128.15N
- Fast response, low moving mass
- Non contact between core and coil movement
  Excellent reliability

CVCA SERIES
VOICE COIL ACTUATOR

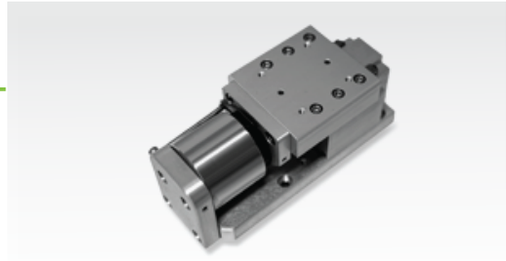
SPECIFICATION		MODEL			
		CVCA35-HF-8.0-CRX	CVCA40-HF-6.5-CRX	CVCA40-SF-20-CRX	CVCA50-SF-30-CRX
Performance	**Unit**				
Stroke	mm	8	6.5	20	30
Peak Force	N	144.00	92.42	47.92	74.91
Continuous Stall Force @ 100ºC*	N	25.2	16.09	8.34	13.14
Continuous Stall Force @ 125ºC*	N	28.8	18.48	9.58	14.98
Peak Power @ 125ºC*	W	438.08	289.27	240.73	381.62
Continuous Power @ 100ºC	W	12.45	8.13	6.77	10.90
Continuous Power @ 125ºC*	W	17.52	11.57	9.63	15.26
Electrical					
Peak Current	A	4.00	3.59	3.13	4.23
Continuous Stall Current @ 100ºC*	A	0.7	0.624	0.545	0.742
Continuous Stall Current @ 125ºC*	A	0.8	0.717	0.626	0.846
Force Constant @ Mid Stroke	N/A	36	25.78	15.31	17.71
Back EMF Constant @ Mid Stroke	V/m/s	36	25.78	15.31	17.71
Coil Resistance @ 25ºC	ohm	19.5	16.03	17.50	15.19
Coil Resistance @ 100ºC*	ohm	25.41	20.89	22.80	19.79
Coil Resistance @ 125ºC*	ohm	27.38	22.51	24.57	21.33
Inductance @ 1kHz (Inside fully)	mH	8.24	5.52	5.59	4.14
Motor Constant @ 125ºC*	N/√W	8.15	6.44	3.66	4.54
Max. Terminal Voltage	Vdc	48			
Thermal					
Thermal Resistance @ 100ºC*	ºC/W	6.02	9.22	11.07	6.88
Thermal Resistance @ 125ºC*	ºC/W	5.71	8.64	10.39	6.55
Max. Coil Temperature	ºC	150			
Mechanical					
Moving Mass	g	280	250	215	347
Total Mass	g	1230	902	916	1404
Specifications					
Repeatability**	um	±1.5			
Accuracy***	um	±3um/25mm			
Straightness***	um	±3um/25mm			
Flatness***	um	±3um/25mm			

Notes:

1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. ** Depend on encoder resolution.
4. *** Specific accuracy, straightness and flatness requirement, contact PBA for more information.
5. Peak force and current - 1 second duration.

CVCA Series

- Direct Drive, cogging free
- Peak force to 384.44N, Continuous force to 128.15N
- Fast response, low moving mass
- Non contact between core and coil movement
- Excellent reliability



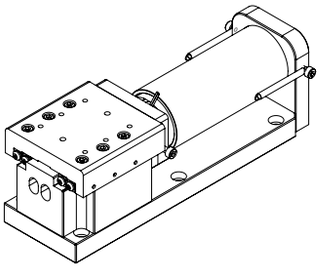
CVCA SERIES
VOICE COIL ACTUATOR

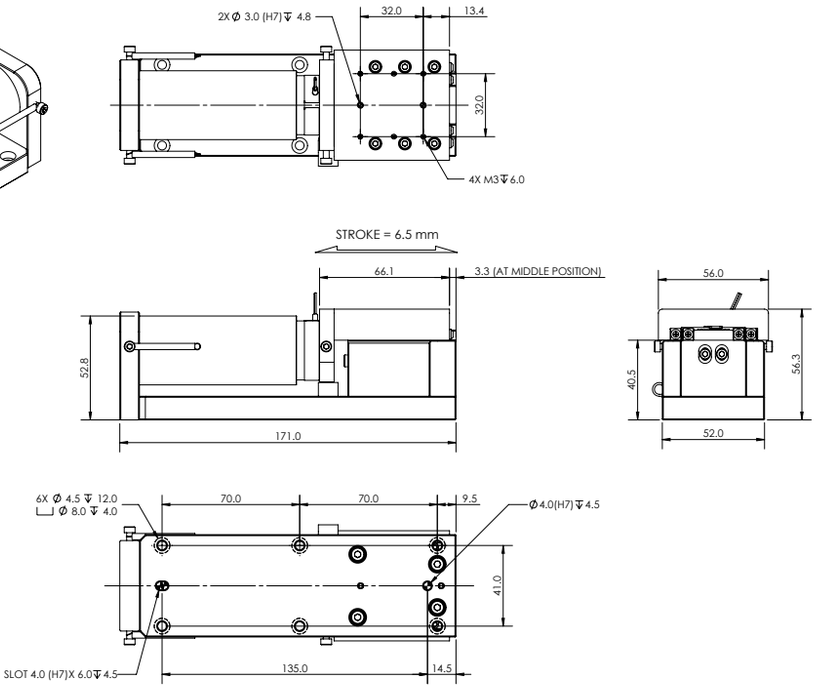
SPECIFICATION		MODEL		
		CVCA60-SF-25-CRX	CVCA60-HF-20-CRX	CVCA90-HF-20-CRX
Performance	**Unit**			
Stroke	mm	25	20	
Peak Force	N	120.33	218.50	640.74
Continuous Stall Force @ 100ºC*	N	20.90	37.72	111.41
Continuous Stall Force @ 125ºC*	N	24.07	43.70	128.15
Peak Power @ 125ºC*	W	463.70	760.32	1204.70
Continuous Power @ 100ºC	W	12.98	21.03	33.80
Continuous Power @ 125ºC*	W	18.55	30.41	48.19
Electrical				
Peak Current	A	5.85	4.75	15.77
Continuous Stall Current @ 100ºC*	A	1.016	0.820	2.742
Continuous Stall Current @ 125ºC*	A	1.170	0.950	3.154
Force Constant @ Mid Stroke	N/A	20.57	46.00	40.63
Back EMF Constant @ Mid Stroke	V/m/s	20.57	46.00	40.63
Coil Resistance @ 25ºC	ohm	9.65	24.00	3.45
Coil Resistance @ 100ºC*	ohm	12.57	31.27	4.50
Coil Resistance @ 125ºC*	ohm	13.55	33.70	4.48
Inductance @ 1kHz (Inside fully)	mH	3.26	15.40	4.88
Motor Constant @ 125ºC*	N/√W	6.62	9.39	21.87
Max. Terminal Voltage	Vdc	48	120	
Thermal				
Thermal Resistance @ 100ºC*	ºC/W	5.78	3.57	2.22
Thermal Resistance @ 125ºC*	ºC/W	5.39	3.29	2.08
Max. Coil Temperature	ºC		150	
Mechanical				
Moving Mass	g	474	679	1850
Total Mass	g	2035	2817	6900
Specifications				
Repeatability**	um		±1.5	
Accuracy***	um		±3um/25mm	
Straightness***	um		±3um/25mm	
Flatness***	um		±3um/25mm	

Notes:

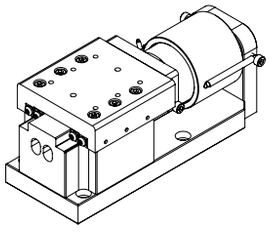
1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. ** Depend on encoder resolution.
4. *** Specific accuracy, straightness and flatness requirement, contact PBA for more information.
5. Peak force and current - 1 second duration.

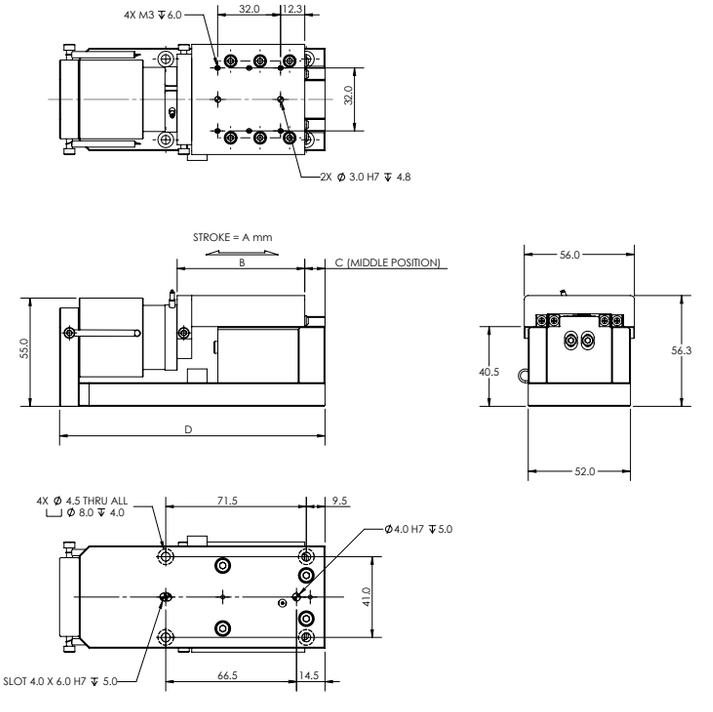
CVCA 35





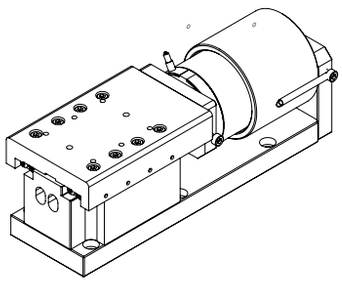
CVCA 40

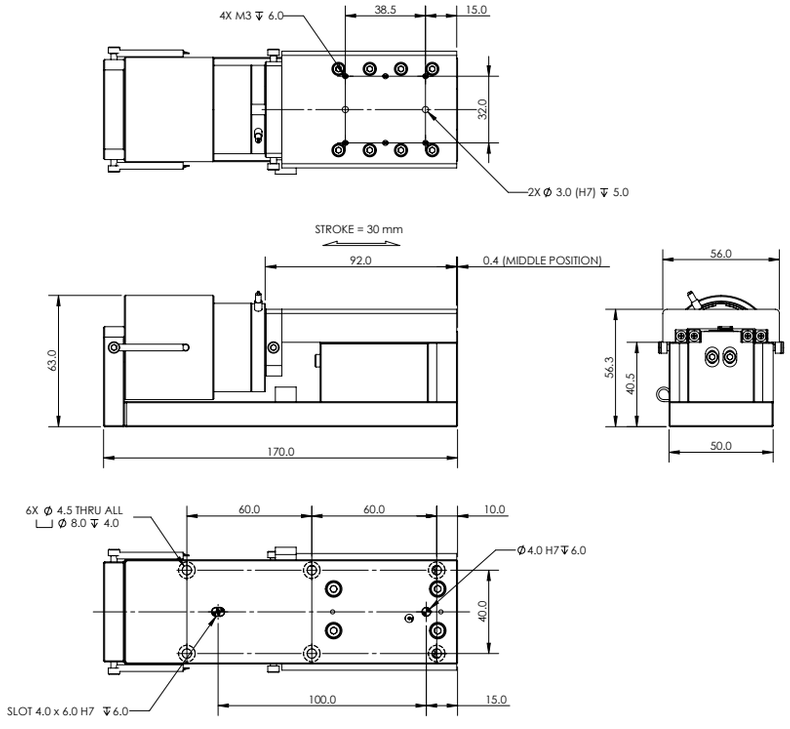




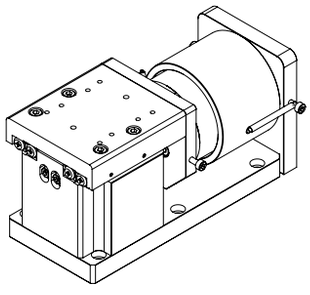
PART NUMBER	A	B	C	D
CVCA40-SF-20-CRX	20.0	64.9	10.3	135.0
CVCA40-HF-6.5-CRX	6.5	65.4	3.3	128.0

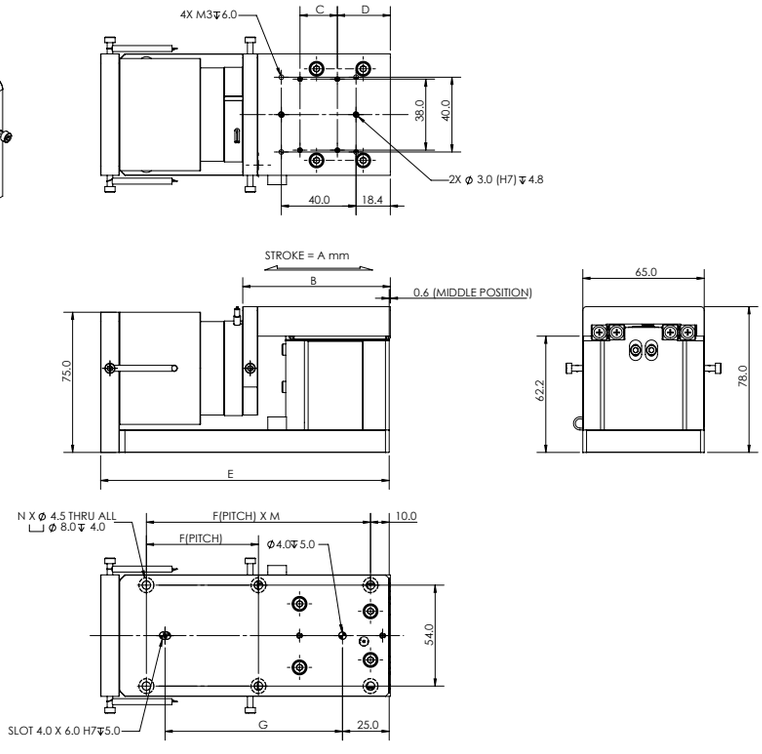
CVCA 50





CVCA 60

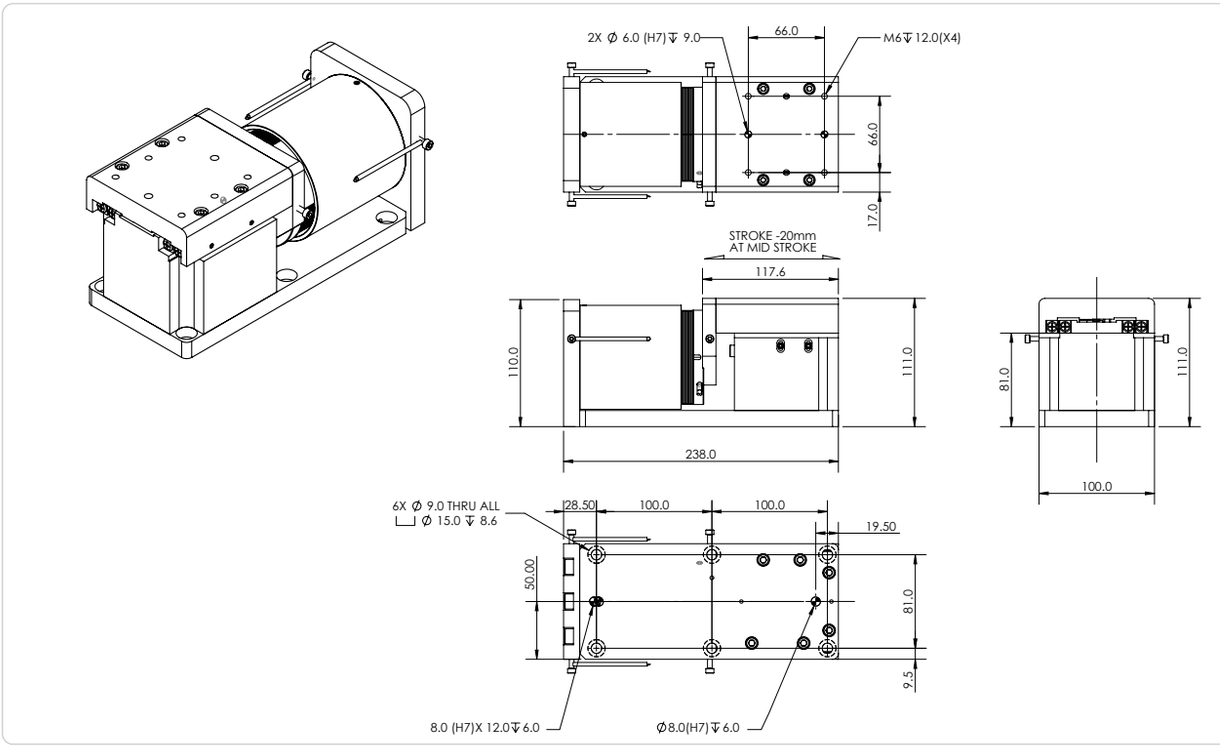




PART NUMBER	A	B	C	D	E	F	G	M	N
CVCA60-SF-25-CRX	25.0	79.0	20.0	28.4	154.5	60.0	95.0	2	6
CVCA60-HF-20-CRX	20.0	76.5	24.5	27.0	203.9	58.0	135.0	3	8

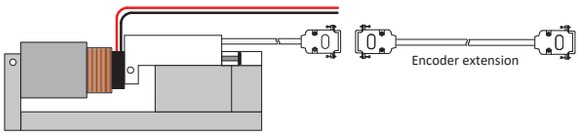
* Technical specifications subject to change without prior notice

CVCA 90



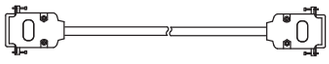
CVCA SERIES EXTENSION CABLE

Connection example:
CVCA☐-☐-CRX-E☐-C☐-00

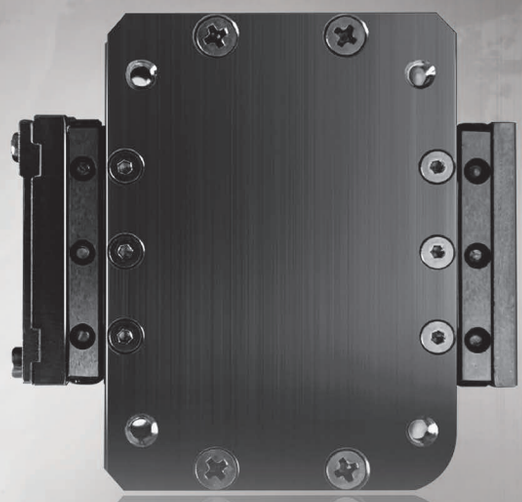


Renishaw ATOM Ri Interface Connector Pin Out

15 pin D Sub Male Connector	ENCODER (DIGITAL)	ENCODER (ANALOG)
1	-	COSINE-
2	GND	SINE-
3	-	Z+
4	Z-	+5V
5	B-	+5V
6	A-	-
7	+5V	-
8	+5V	-
9	GND	COSINE+
10	-	SINE+
11	-	Z-
12	Z+	GND
13	B+	GND
14	A+	-
15	-	-
Case	Shield	Shield

Extension Cable			Part Number
Encoder Extension Cable			CBL_EXT_REN05_X.X
	CABLE	CABLE LENGTH (X.X)	CBL_EXT_REN05A_X.X
	05 ATOM Ri Interface Digital	0.5 0.5 meter	
	05A ATOM Ri Interface Analog	1.0 1.0 meter	
		2.0 2.0 meter	
		3.0 3.0 meter (standard)	

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



RVCA SERIES

RECTANGULAR VOICE COIL ACTUATOR

ULTRA HIGH FREQUENCY
for pick & place motion system

PBA SYSTEMS

www.pbasystems.com.sg

ULTRA HIGH FREQUENCY

rectangular voice coil actuators for pick & place motion system

RVCA SERIES

RECTANGULAR VOICE COIL ACTUATOR

RoHS COMPLIANT

Ultra High Frequency for Short Stroke Motion Systems

Rectangular Voice Coil Actuators (RVCA) actuators are preferred to circular versions especially in designs where space constraints are critical in linear motion applications. The flat rectangular voice coil design has similar characteristics to the normal common circular voice coil assemblies.

RVCA stages are built with precision cross roller guides that provides high rigidity to complement the high acceleration capability of the CVC module which has very low electrical/mechanical time constants and zero hysteresis. The actuator is especially developed for high precision frequency motion of short strokes (<50mm).

- Compact and streamline form factor
- Cross roller bearing for excellent precision and rigidity
- Zero cogging , zero backlash and zero hysteresis
- Low moving mass, fast response
- Integrated linear encoder
- Ease of use, plug and play
- Excellent reliability
- Sub-micron Resolution possibilities

* Technical specifications subject to change without prior notice

RVCA Series

- Ideal for high speed pick-and-place applications
- Cross roller bearing for excellent precision and rigidity
- Direct drive, cogging free
- Low moving mass, fast response
- Integrated linear encoder
- Ease of use, plug and play
- Excellent reliability

RVCA SERIES

RECTANGULAR VOICE COIL ACTUATOR

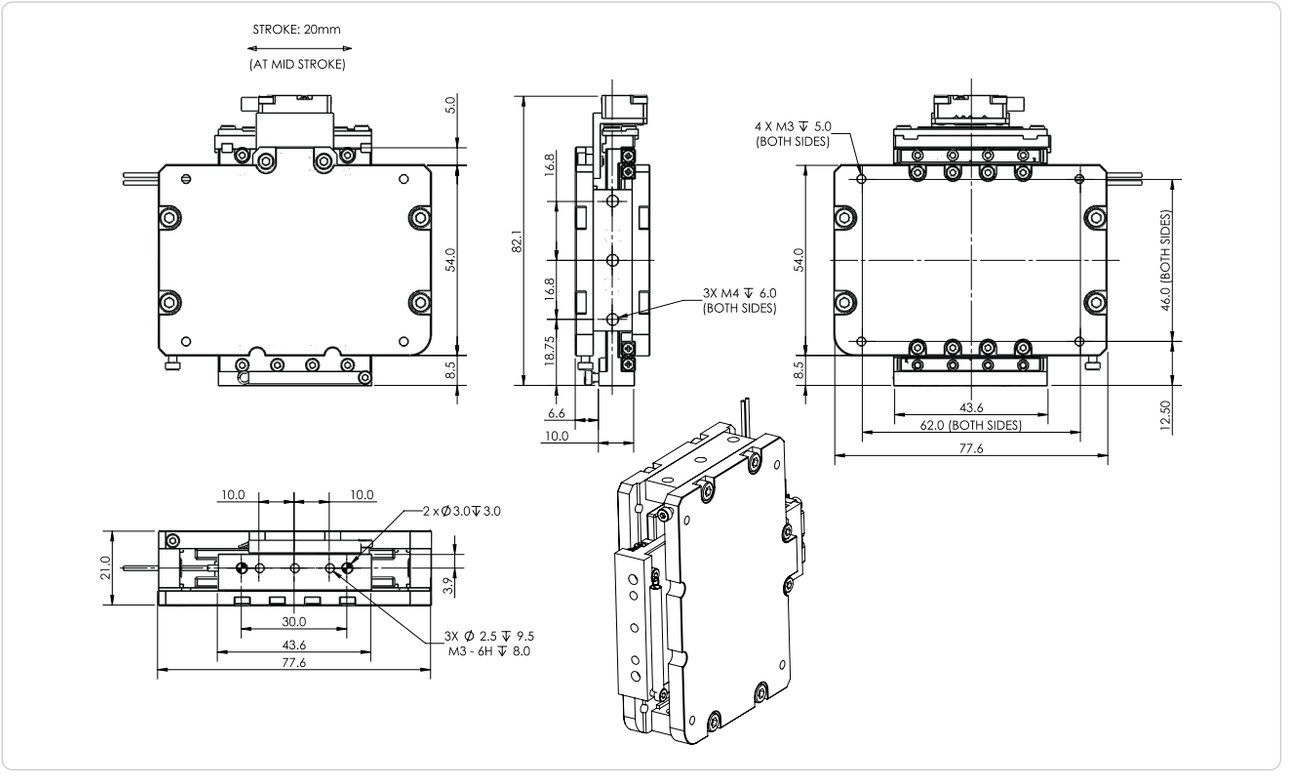
LINEAR GUIDEWAY

SPECIFICATION		MODEL	
		RVCA-S20B-CRX	RVCA-S30B-CRX
Performance	**Unit**		
Stroke	mm	20	30
Peak Force	N	29.5	81.7
Continuous Stall Force @ 100ºC*	N	8.6	24.0
Continuous Stall Force @ 125ºC*	N	9.8	27.3
Peak Power @ 125ºC*	W	91.4	226.1
Continuous Power @ 100ºC	W	7.3	18.2
Continuous Power @ 125ºC*	W	10.2	25.2
Electrical			
Peak Current	A	3.94	6.1
Continuous Stall Current @ 100ºC*	A	1.15	1.8
Continuous Stall Current @ 125ºC*	A	1.31	2.0
Force Constant @ Mid Stroke	N/A	7.50	13.5
Back EMF Constant @ Mid Stroke	V/m/s	7.50	13.5
Coil Resistance @ 25ºC	ohm	4.20	4.4
Coil Resistance @ 100ºC	ohm	5.47	5.7
Coil Resistance @ 125ºC	ohm	5.90	6.2
Inductance @ 1kHz (Inside fully)	mH	1.03	1.9
Motor Constant @ 125ºC	N/√W	3.09	5.4
Max. Terminal Voltage	Vdc	48	100
Thermal			
Thermal Resistance @ 100ºC	ºC/W	10.31	4.1
Thermal Resistance @ 125ºC	ºC/W	9.85	4.0
Max. Coil Temperature	ºC	125	
Mechanical			
Moving Mass	g	70	250
Total Mass	g	557	1885

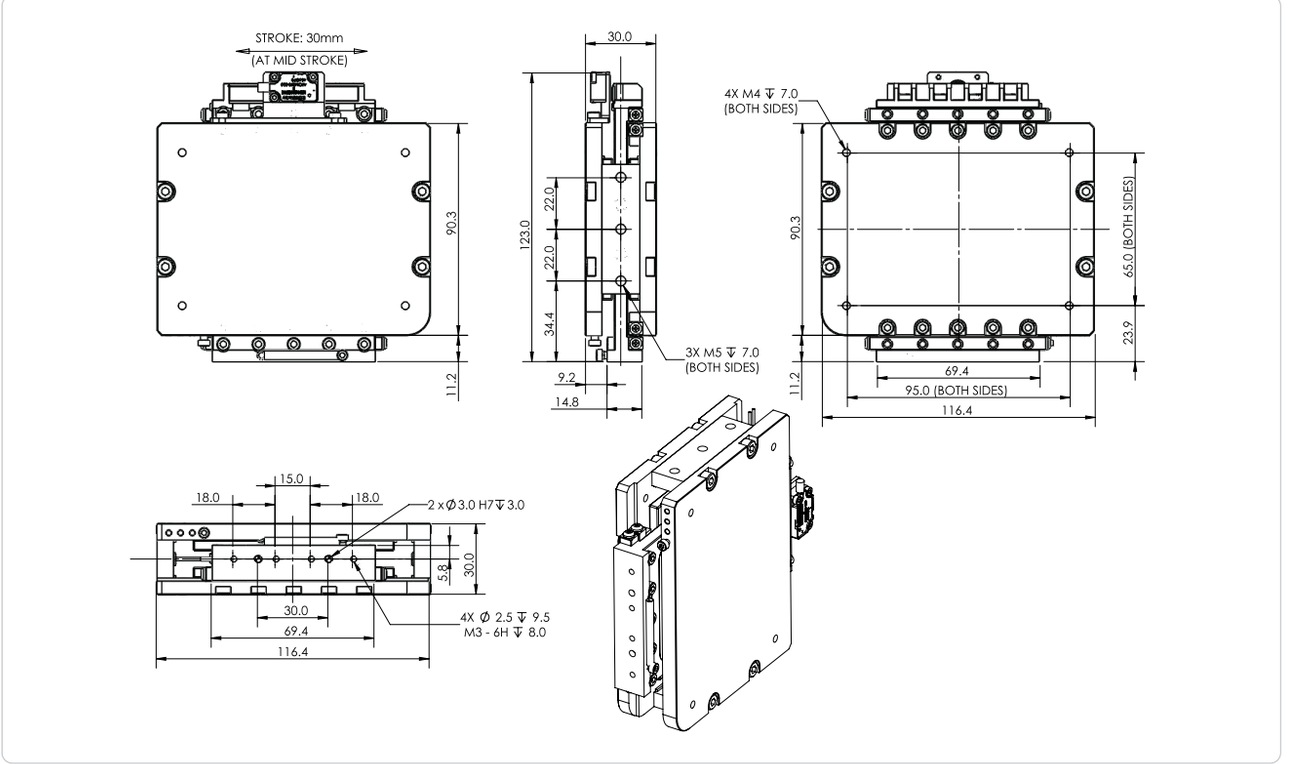
Notes:

1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. Peak force and current - 1 second duration.

RVCA-S20B-CRX



RVCA-S30B-CRX



* Technical specifications subject to change without prior notice

RVCA Series

- Ideal for high speed pick-and-place applications
- Peak force to 81.6N, Continuous force to 27.2N
- Direct drive, cogging free
- Low moving mass, fast response
- Integrated linear encoder
- Ease of use, plug and play
- Excellent reliability

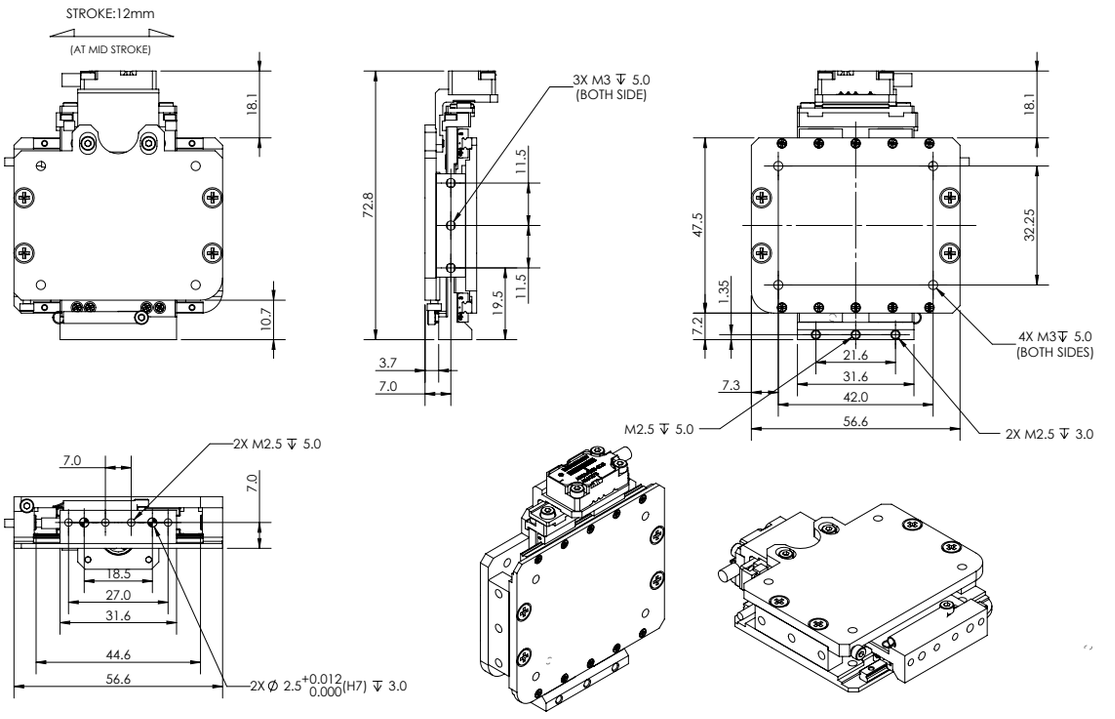
RVCA SERIES
RECTANGULAR VOICE COIL ACTUATOR
LINEAR GUIDEWAY

SPECIFICATION		MODEL		
		RVCA-S12B-LM	RVCA-S20B-LM	RVCA-S30B-LM
Performance	**Unit**			
Stroke	mm	12	20	30
Peak Force	N	12.6	29.5	81.7
Continuous Stall Force @ 100ºC*	N	3.7	8.6	24.0
Continuous Stall Force @ 125ºC*	N	4.2	9.8	27.3
Peak Power @ 125ºC*	W	51.9	91.4	226.1
Continuous Power @ 100ºC	W	4.2	7.3	18.2
Continuous Power @ 125ºC*	W	5.8	10.2	25.2
Electrical				
Peak Current	A	3.51	3.94	6.1
Continuous Stall Current @ 100ºC*	A	1.04	1.15	1.8
Continuous Stall Current @ 125ºC*	A	1.17	1.31	2.0
Force Constant @ Mid Stroke	N/A	3.60	7.50	13.5
Back EMF Constant @ Mid Stroke	V/m/s	3.60	7.50	13.5
Coil Resistance @ 25ºC	ohm	3.00	4.20	4.4
Coil Resistance @ 100ºC	ohm	3.91	5.47	5.7
Coil Resistance @ 125ºC	ohm	4.21	5.90	6.2
Inductance @ 1kHz (Inside fully)	mH	0.32	1.03	1.9
Motor Constant @ 125ºC	N/√W	1.75	3.09	5.4
Max. Terminal Voltage	Vdc	48		100
Thermal				
Thermal Resistance @ 100ºC	ºC/W	17.88	10.31	4.1
Thermal Resistance @ 125ºC	ºC/W	17.34	9.85	4.0
Max. Coil Temperature	ºC	125		
Mechanical				
Moving Mass	g	40	81	251
Total Mass	g	235	586	1960

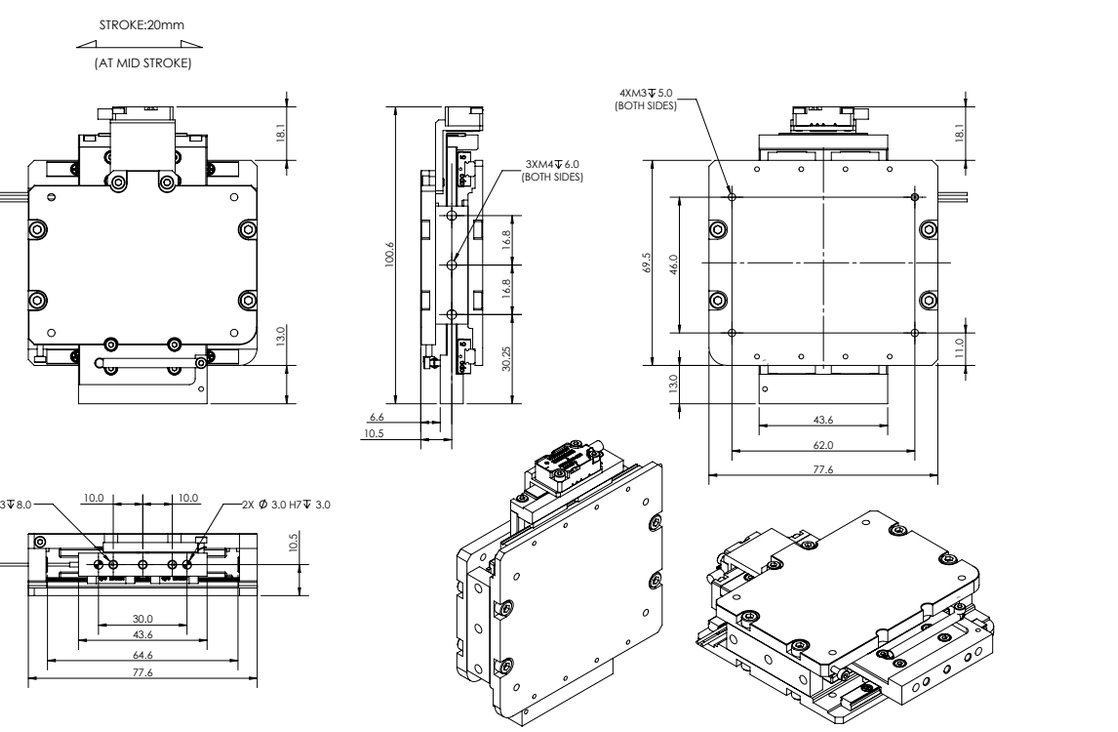
Notes:

1. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
2. Specifications tolerance – inductance +/-30%, all others +/-10%.
3. Peak force and current - 1 second duration.

RVCA-S12B-LM

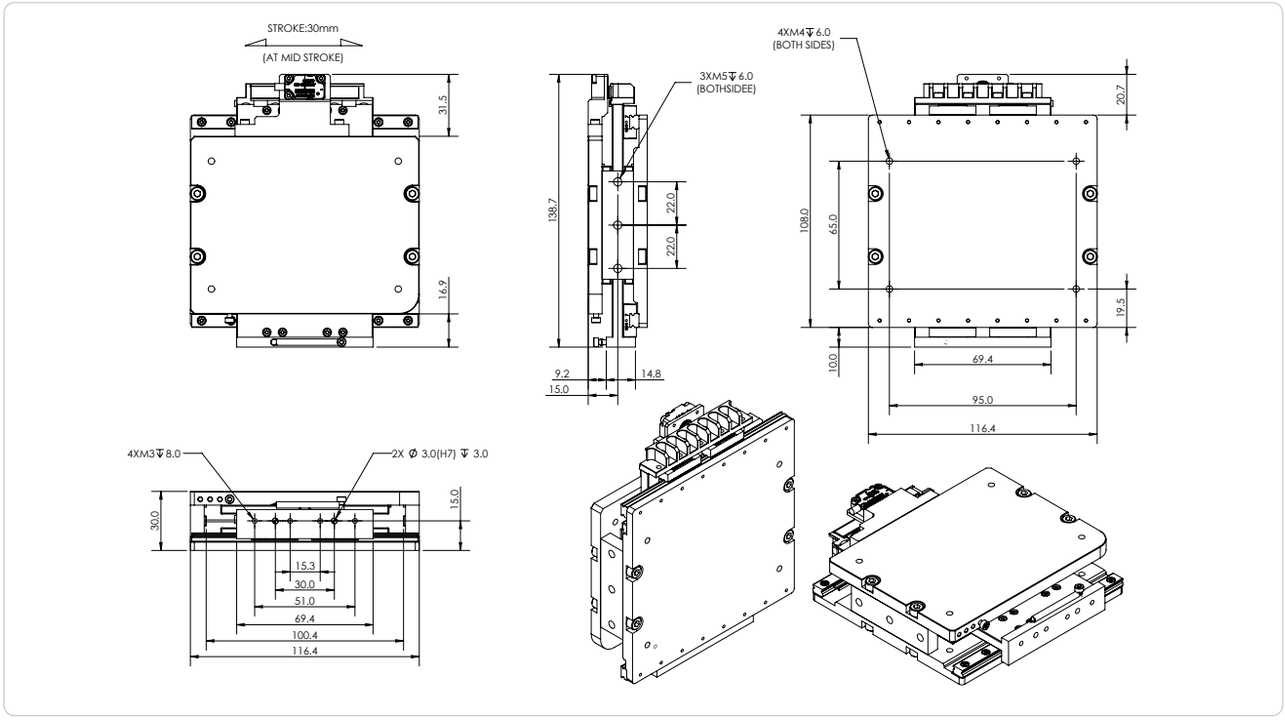


RVCA-S20B-LM



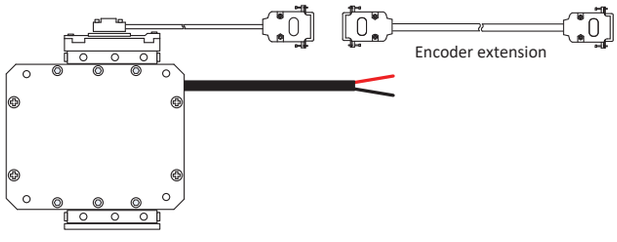
** Technical specifications subject to change without prior notice*

RVCA-S30B-LM



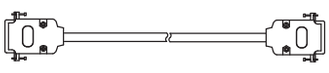
RVCA SERIES EXTENSION CABLE

Connection example:
RVCA-S☐B-CRX-E☐-C☐-00

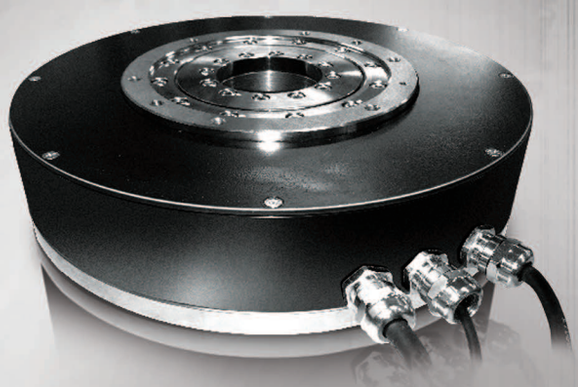


Renishaw ATOM Ri Interface Connector Pin Out

15 pin D Sub Male Connector	ENCODER (DIGITAL)	ENCODER (ANALOG)
1	-	COSINE-
2	GND	SINE-
3	-	Z+
4	Z-	+5V
5	B-	+5V
6	A-	-
7	+5V	-
8	+5V	-
9	GND	COSINE+
10	-	SINE+
11	-	Z-
12	Z+	GND
13	B+	GND
14	A+	-
15	-	-
Case	Shield	Shield

Extension Cable			Part Number
Encoder Extension Cable			CBL_EXT_REN05_X.X
	CABLE: 05 — ATOM Ri Interface Digital 05A — ATOM Ri Interface Analog	CABLE LENGTH (X.X): 0.5 — 0.5 meter; 1.0 — 1.0 meter; 2.0 — 2.0 meter; 3.0 — 3.0 meter (standard)	CBL_EXT_REN05A_X.X

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



PDDR SERIES

DIRECT DRIVE ROTARY MOTOR

HIGH R P M + TORQUE + ACCURACY

high speed precise rotary motion system

PBA SYSTEMS

www.pbasystems.com.sg

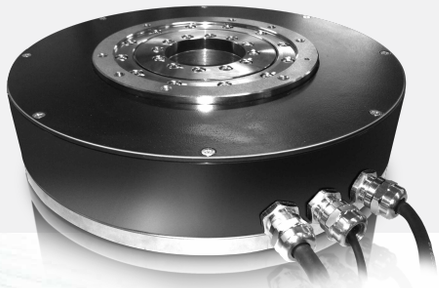
HIGH RPM + TORQUE + ACCURACY

high speed precise rotary motion system

PDDR SERIES

DIRECT DRIVE ROTARY MOTOR

RoHS COMPLIANT



Optimally designed for high speed precise rotary applications

The PDDR's built in hi-res encoder design enables high performance resolution, repeatability, accuracy motion profile with direct mounting of rotary table/load without additional mechanical power transmission mechanisms that eventually lead to accuracy loss due to gearing backlash, slippage or coupling compliance errors. This results in a compact size solution which allows for significant amount of space saving and simplifies machine design process.

The PDDR's special iron core construction design enables the motor to achieve a very high torque with almost negligible cogging forces, which is most favorable for constant speed precision applications.

- Excellent for dynamic motion profile
- High positional repeatability and accuracy
- Compact design
- High torque Vs size ratio
- Optimal high and low speed control
- Zero maintenance
- Easy integration

Application

- Radars
- Scanners
- Rotary indexing table
- Robots
- Lathes
- Wafer handling
- DVD handler
- Packaging
- Turret inspection station
- Direction change conveyors
- General automation

* Technical specifications subject to change without prior notice

HIGH RPM + Torque + Accuracy

high speed precise rotary motion systems

Model	Peak Torque (N.m)	Max Speed (RPS)	Repeatability (arcsec)	Accuracy (arcsec)
PDDR110-06-I	6.0	10.0	+/-2.5	+/-30
PDDR110-12-I	12.0	8.0	+/-2.5	+/-30
PDDR150-T-I	4.3	10.0	+/-2	+/-30
PDDR150-15-O	15.7	5.0	+/-2	+/-30
PDDR150-30-O	32.2	5.0	+/-2	+/-30
PDDR150-50-O	54.4	5.0	+/-2	+/-30
PDDR150-80-O	86.6	5.0	+/-2	+/-30
PDDR160-40-I	40.0	8.0	+/-4	+/-30
PDDR160-80-I	81.0	9.0	+/-4	+/-30
PDDR240-30-I	30.7	5.0	+/-2	+/-30
PDDR240-80-I	80.6	4.5	+/-2	+/-30
PDDR240-132-I	132.0	2.8	+/-2	+/-30
PDDR300-150-I	150.1	2.9	+/-2	+/-30
PDDR300-300-I	299.7	3.0	+/-2	+/-30
PDDR300-450-I	450.9	2.0	+/-2	+/-30

PART NUMBERING SYSTEM

Coil Assembly

PDDR150 - 15 - O - A - A - 00

OUTER DIAMETER Ø (MM)
PDDR110
PDDR150
PDDR160
PDDR240
PDDR300

PEAK TORQUE (NM)
T
6
12
15
...
450

ROTOR	
I	Inner Rotor
O	Outer Rotor

Notes: Cable length 0.5m

ENCODER SPECIFICATIONS	
A	Analog
B	x80 (Standard)
C	x200
D	x400
E	x1000

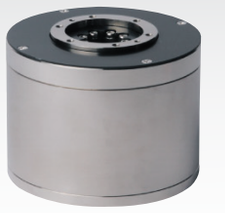
VERSION	
Accuracy +/-30 arcsec*	
00	20um (Run-out)
01	10um
02	5um
Accuracy +/-15 arcsec*	
10	20um (Run-out)
11	10um
12	5um
Accuracy +/-30 arcsec**	
00 [1]	20um (Run-out)
01 [1]	10um
20 [2]	20um
21 [2]	10um

* Exclude PDDR160
** Only for PDDR160
XX [1] Cable output from bottom
XX [2] Cable output from side

FLANGE OPTION	
A	Without Flange
	Exclude PDDR150T-I
F	With Flange
	Only for PDDR150T-I & PDDR300-I

PDDR110

- High RPM, speed and precision
- Peak torque 12Nm



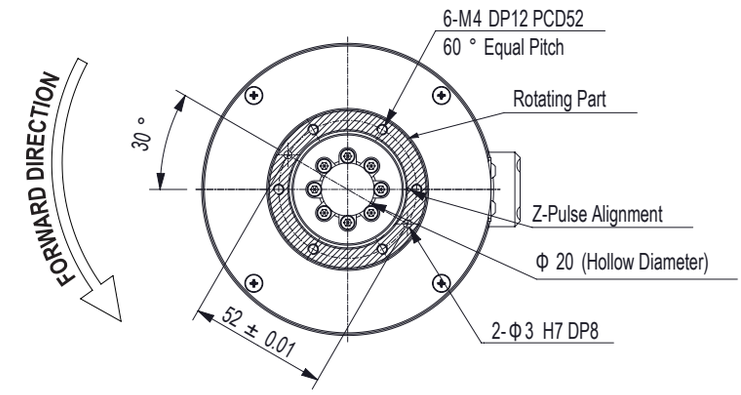
PDDR SERIES
Direct Drive Rotary Motor

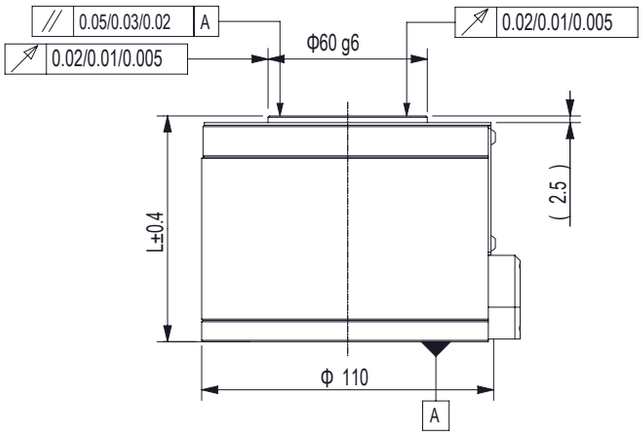
SPECIFICATION		MODEL				
		PDDR110-06-I			PDDR110-12-I	
Performance	**Unit**					
Peak Torque	N.m	6.0			12.0	
Continuous Torque @ 100ºC*	N.m	2.0			4.0	
Peak Power @ 100ºC	W	188.2			327.1	
Continuous Power @ 100ºC*	W	20.9			36.3	
Electrical						
Peak Current	A^{pk}	4.2				
Continuous Current @ 100ºC*	A^{pk}	1.4				
Continuous Stall Current @ 100ºC*	Arms	1.0				
Torque Constant	$N.m/A^{pk}$	1.4			2.8	
Back EMF Constant	V^{pk}/rad/s	1.6			3.3	
Resistance L-L @ 25°C	Ohm	10.7			18.6	
Resistance L-L @ 100°C	Ohm	13.9			24.2	
Inductance L-L @ 1kHz	mH	18.9			37.8	
Motor Constant @ 100°C	N.m/√W	0.4			0.7	
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	3.59			2.06	
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.0007			0.0012	
Motor Weight	kg	3.9			5.4	
Number of Pole Pairs	N-S	10.0				
Max. Speed*	RPS	10.0			8.0	
Max. Axial Load	kg	90.0				
Max. Moment Load	N.m	12.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	50/30/20				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		6,480	518,400	1,296,000	2,592,000	6,480,000
Repeatability**	arcsec	+/-2.5				
Accuracy	arcsec	+/-30 / +/-15				

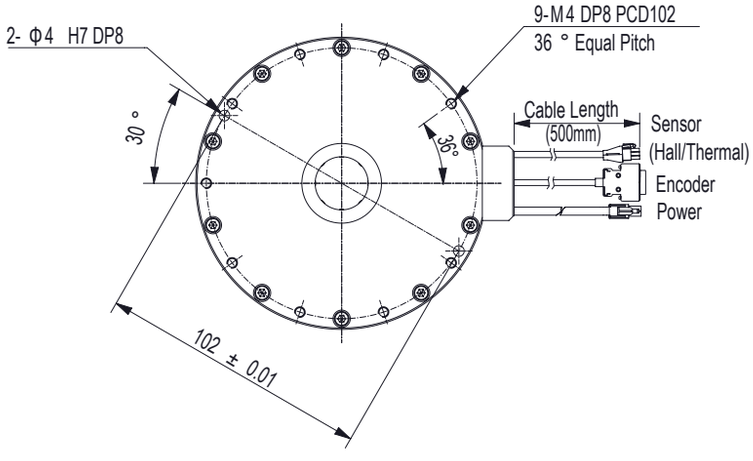
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 50um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

PDDR110





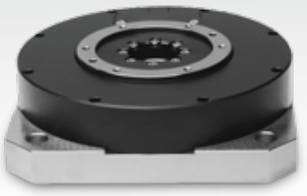


* Forward direction = CCW

MODEL	PDDR110-6-I	PDDR110-12-I
L (mm)	85	116

PDDR150-T

- High RPM, speed and precision
- Peak torque up to 4.3N.m



PDDR SERIES

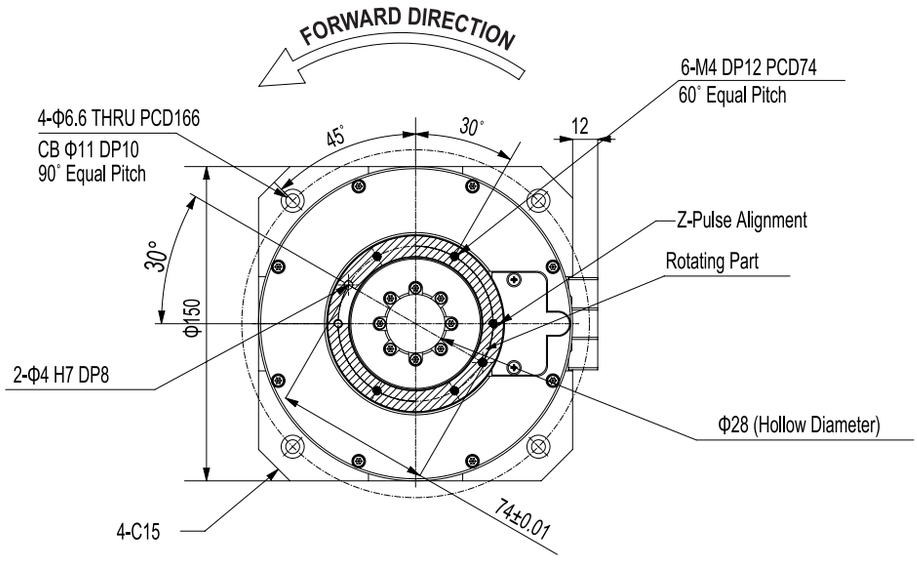
Direct Drive Rotary Motor

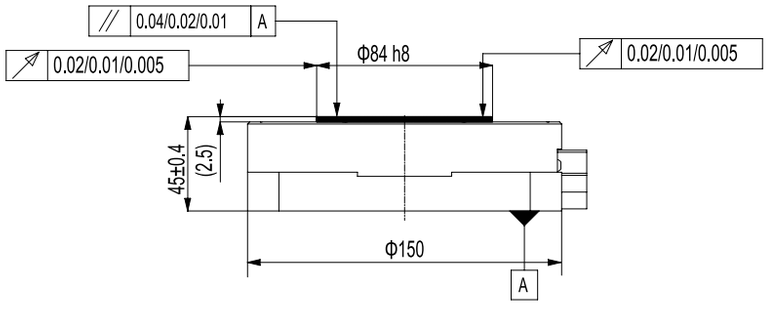
SPECIFICATION		MODEL				
		PDDR150-T-I				
Performance	**Unit**					
Peak Torque	N.m	4.3				
Continuous Torque @ 100ºC*	N.m	1.4				
Peak Power @ 100ºC	W	263.4				
Continuous Power @ 100ºC*	W	29.3				
Electrical						
Peak Current	A^{pk}	5.1				
Continuous Current @ 100ºC*	A^{pk}	1.7				
Continuous Stall Current @ 100ºC*	Arms	1.2				
Torque Constant	$N.m/A^{pk}$	0.8				
Back EMF Constant	V^{pk}/rad/s	1.0				
Resistance L-L @ 25°C	Ohm	10.4				
Resistance L-L @ 100°C	Ohm	13.6				
Inductance L-L @ 1kHz	mH	8.3				
Motor Constant @ 100°C	N.m/√W	0.3				
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	2.56				
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.00226				
Motor Weight	kg	4.4				
Number of Pole Pairs	N-S	8.0				
Max. Speed*	RPS	10.0				
Max. Axial Load	kg	120.0				
Max. Moment Load	N.m	15.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	40/20/10				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		8,192	655,360	1,638,400	3,276,800	8,192,000
Repeatability**	arcsec	+/-2				
Accuracy	arcsec	+/-30 / +/-15				

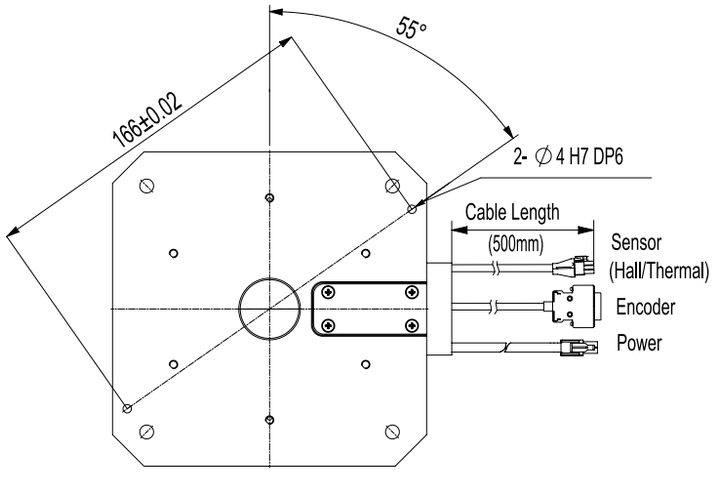
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 40um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

PDDR150-T







* Forward direction = CCW

PDDR150

- High RPM, speed and precision
- Peak torque up to 86N.m

PDDR SERIES

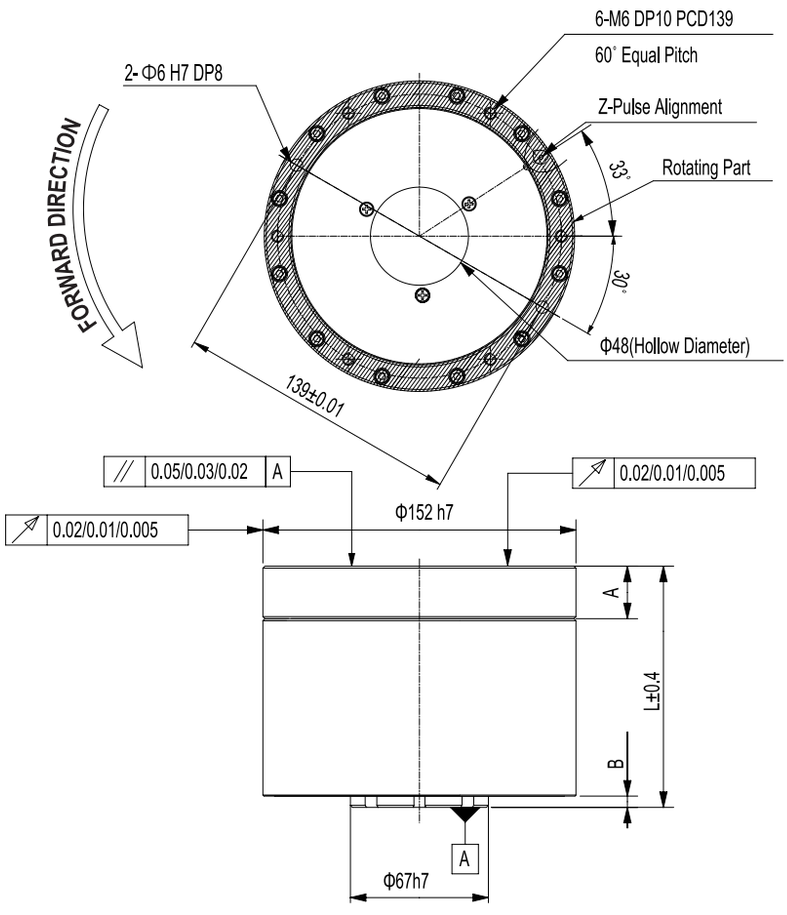
Direct Drive Rotary Motor

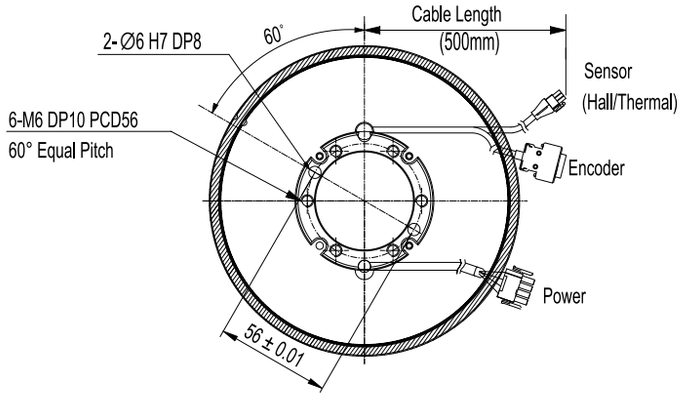
SPECIFICATION		MODEL				
		PDDR150-15-O	PDDR150-30-O	PDDR150-50-O	PDDR150-80-O	
Performance	**Unit**					
Peak Torque	N.m	15.7	32.2	54.4	86.6	
Continuous Torque @ 100ºC*	N.m	5.2	10.7	18.1	28.9	
Peak Power @ 100ºC	W	359.0	601.9	794.5	1155.6	
Continuous Power @ 100ºC*	W	39.9	66.9	88.3	128.4	
Electrical						
Peak Current	A^{pk}	7.6	15.7			
Continuous Current @ 100ºC*	A^{pk}	2.5	5.2			
Continuous Stall Current @ 100ºC*	Arms	1.8	3.7			
Torque Constant	$N.m/A^{pk}$	2.1		3.5	5.5	
Back EMF Constant	V^{pk}/rad/s	2.4		4.0	6.3	
Resistance L-L @ 25°C	Ohm	6.3	2.5	3.3	4.8	
Resistance L-L @ 100°C	Ohm	8.2	3.3	4.3	6.3	
Inductance L-L @ 1kHz	mH	31.8	15.9	26.8	39.7	
Motor Constant @ 100°C	N.m/√W	0.8	1.3	1.9	2.5	
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	1.88	1.12	0.85	0.58	
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.012	0.021	0.024	0.029	
Motor Weight	kg	6.4	9.8	12.2	15.6	
Number of Pole Pairs	N-S	10.0				
Max. Speed*	RPS	5.0				
Max. Axial Load	kg	530.0				
Max. Moment Load	N.m	96.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	50/30/20				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		8,192	655,360	1,638,400	3,276,800	8,192,000
Repeatability**	arcsec	+/-2				
Accuracy	arcsec	+/-30 / +/-15				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 50um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

PDDR150





* Forward direction = CCW

MODEL	PDDR150-15-O	PDDR150-30-O	PDDR150-50-O	PDDR150-80-O
L (mm)	85	117	139	171
A (mm)	24.5	25.5	25.5	25.5
B (mm)	2	5.5	5.5	5.5

PDDR160

- High RPM, speed and precision
- Peak torque up to 81N.m

PDDR SERIES

Direct Drive Rotary Motor

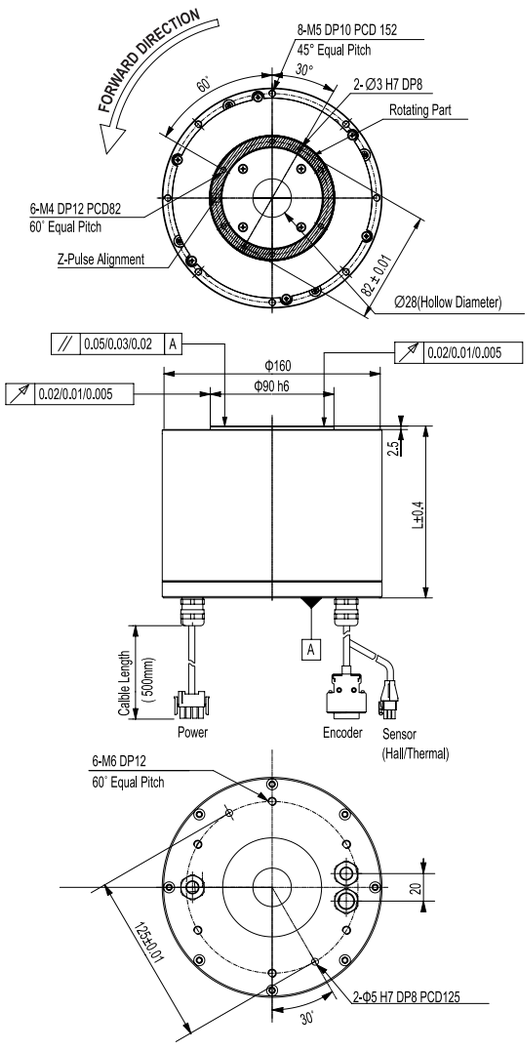
SPECIFICATION		MODEL				
		PDDR160-40-I			PDDR160-80-I	
Performance	**Unit**					
Peak Torque	N.m	40.0			81.0	
Continuous Torque @ 100ºC*	N.m	13.3			27.0	
Peak Power @ 100ºC	W	975.5			1851.8	
Continuous Power @ 100ºC*	W	108.4			205.8	
Electrical						
Peak Current	A^{pk}	18.2			38.2	
Continuous Current @ 100ºC*	A^{pk}	6.1			12.7	
Continuous Stall Current @ 100ºC*	Arms	4.3			9.0	
Torque Constant	$N.m/A^{pk}$	2.2			2.1	
Back EMF Constant	V^{pk}/rad/s	2.5			2.4	
Resistance L-L @ 25°C	Ohm	3.0			1.3	
Resistance L-L @ 100°C	Ohm	3.9			1.7	
Inductance L-L @ 1kHz	mH	10.4			4.6	
Motor Constant @ 100°C	N.m/√W	1.3			1.9	
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	0.69			0.36	
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.0031			0.0052	
Motor Weight	kg	13.2			19.0	
Number of Pole Pairs	N-S	10.0				
Max. Speed*	RPS	8.0			9.0	
Max. Axial Load	kg	100.0				
Max. Moment Load	N.m	20.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	50/30/20				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		4,096	327,680	819,200	1,638,400	4,096,000
Repeatability**	arcsec	+/-4				
Accuracy	arcsec	+/-30				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 50um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

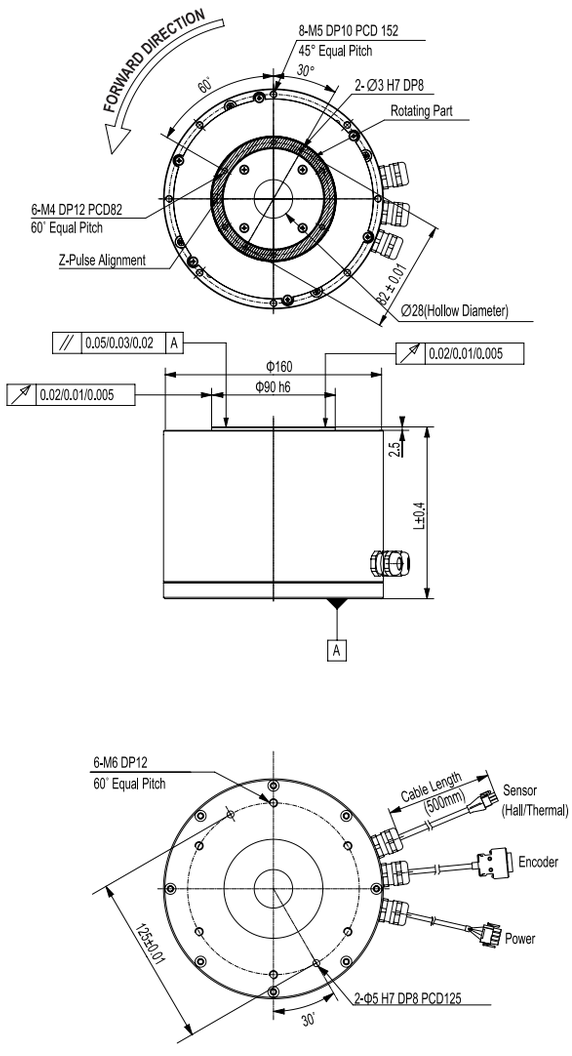
PDDR160

Bottom Type



* Forward direction = CCW

Side Type



MODEL	PDDR160-40-I	PDDR160-80-I
L (mm)	125	187

PDDR240

- High RPM, speed and precision
- Peak torque up to 132N.m

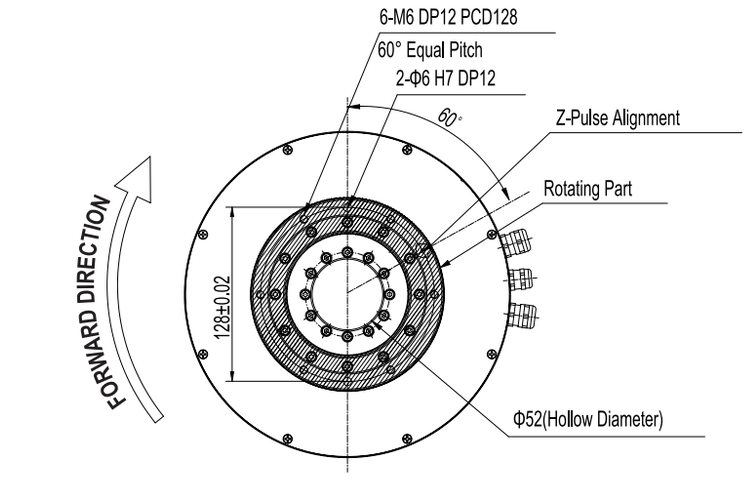
PDDR SERIES
Direct Drive Rotary Motor

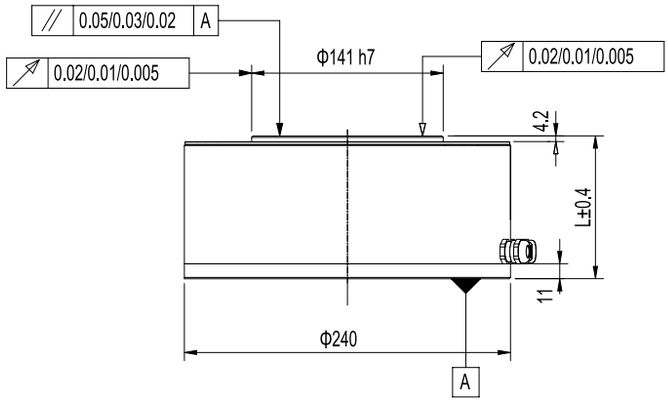
SPECIFICATION		MODEL				
		PDDR240-30-I	PDDR240-80-I	PDDR240-132-I		
Performance	**Unit**					
Peak Torque	N.m	30.7	80.6	132.0		
Continuous Torque @ 100ºC*	N.m	10.2	26.9	44.0		
Peak Power @ 100ºC	W	760.5	1333.9	1800.8		
Continuous Power @ 100ºC*	W	84.5	148.2	200.1		
Electrical						
Peak Current	A^{pk}	13.2	17.8	17.0		
Continuous Current @ 100ºC*	A^{pk}	4.4	5.9	5.7		
Continuous Stall Current @ 100ºC*	Arms	3.1	4.2	4.0		
Torque Constant	$N.m/A^{pk}$	2.3	4.5	7.8		
Back EMF Constant	$V^{pk}/rad/s$	2.7	5.2	8.9		
Resistance L-L @ 25°C	Ohm	4.5	4.3	6.4		
Resistance L-L @ 100°C	Ohm	5.9	5.6	8.3		
Inductance L-L @ 1kHz	mH	30.0	32.0	30.0		
Motor Constant @ 100°C	N.m/√W	1.1	2.2	3.1		
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	0.89	0.51	0.37		
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.0092	0.0143	0.0203		
Motor Weight	kg	10.7	14.7	19.7		
Number of Pole Pairs	N-S	16.0				
Max. Speed*	RPS	5.0	4.5	2.8		
Max. Axial Load	kg	410.0				
Max. Moment Load	N.m	80.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	50/30/20				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		8,192	655,360	1,638,400	3,276,800	8,192,000
Repeatability**	arcsec	+/-2				
Accuracy	arcsec	+/-30 / +/-15				

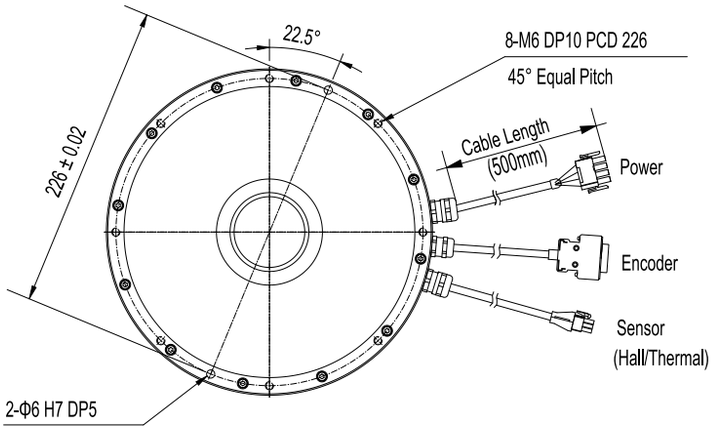
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 50um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

PDDR240







* Forward direction = CCW

MODEL	PDDR240-30-I	PDDR240-80-I	PDDR240-132-I
L (mm)	59	80	105

PDDR300

- High RPM, speed and precision
- Peak torque up to 450N.m

PDDR SERIES
Direct Drive Rotary Motor

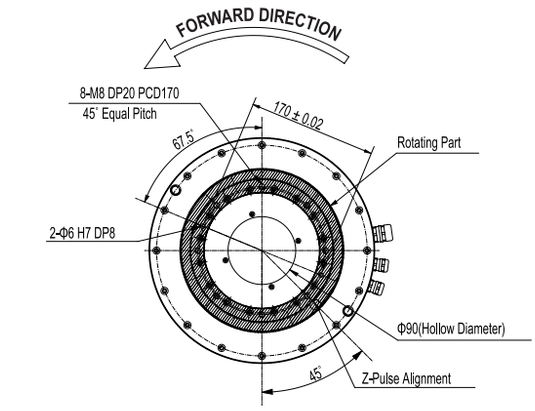
SPECIFICATION		MODEL				
		PDDR300-150-I	PDDR300-300-I		PDDR300-450-I	
Performance	**Unit**					
Peak Torque	N.m	150.1	299.7		450.9	
Continuous Torque @ 100ºC*	N.m	50.0	99.9		150.3	
Peak Power @ 100ºC	W	1566.8	3133.9		4131.0	
Continuous Power @ 100ºC*	W	174.1	348.2		459.0	
Electrical						
Peak Current	A^{pk}	17.4	38.2			
Continuous Current @ 100ºC*	A^{pk}	5.8	12.7			
Continuous Stall Current @ 100ºC*	Arms	4.1	9.0			
Torque Constant	$N.m/A^{pk}$	8.6	7.9		11.8	
Back EMF Constant	V^{pk}/rad/s	9.9	9.0		13.6	
Resistance L-L @ 25°C	Ohm	5.3	2.2		2.9	
Resistance L-L @ 100°C	Ohm	6.9	2.9		3.8	
Inductance L-L @ 1kHz	mH	43.4	19.6		26.9	
Motor Constant @ 100°C	N.m/√W	3.8	5.4		7.0	
Max. Terminal Voltage	Vdc	400.0				
Thermal						
Thermal Resistance @ 100°C	°C/W	0.43	0.22		0.16	
Max. Winding Temperature	ºC	120.0				
Mechanical						
Rotor Inertia	kg.m^2	0.1004	0.1288		0.1576	
Motor Weight	kg	45.0	55.0		65.0	
Number of Pole Pairs	N-S	16.0				
Max. Speed*	RPS	2.9	3.0		2.0	
Max. Axial Load	kg	1100.0				
Max. Moment Load	N.m	250.0				
Axial Run-out (no load)***	um	20/10/5				
Radial Run-out (no load)***	um	20/10/5				
Parallelism****	um	50/30/20				
Resolution (after quadrature)	CPR	A	B (x80)	C (x200)	D (x400)	E (x1000)
		10,800	864,000	2,160,000	4,320,000	10,800,000
Repeatability**	arcsec	+/-2				
Accuracy	arcsec	+/-30 / +/-15				

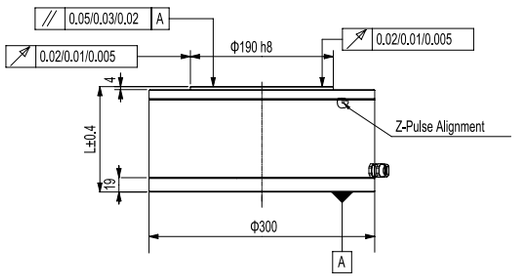
Notes:

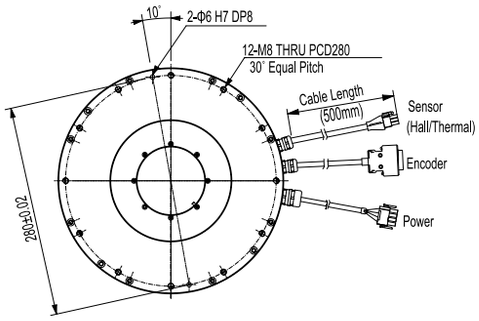
1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. *** Standard run-out 20um. Contact PBA for 10um and 5um.
5. **** Standard parallelism 50um. Contact PBA for 30um and 20um.
6. Specifications tolerance – inductance +/-30%, all others +/-10%.

PDDR300

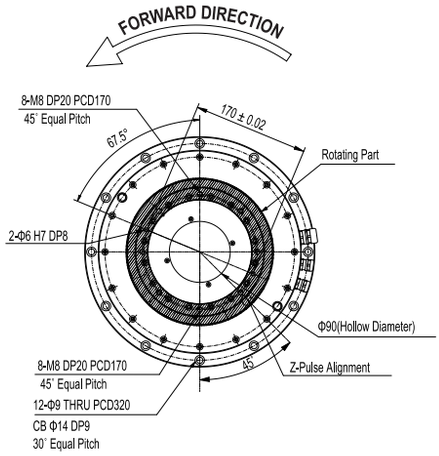
Flangeless Type

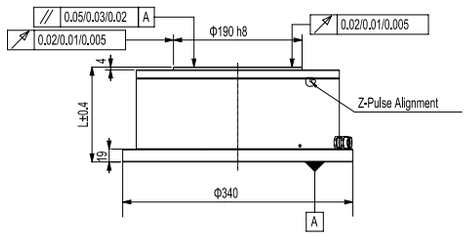


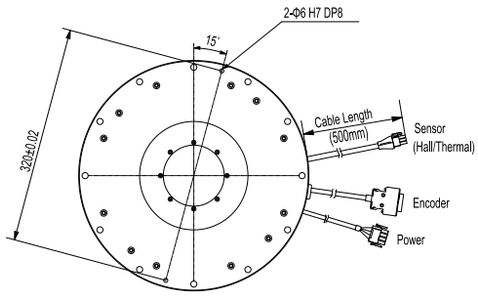




Flange Type



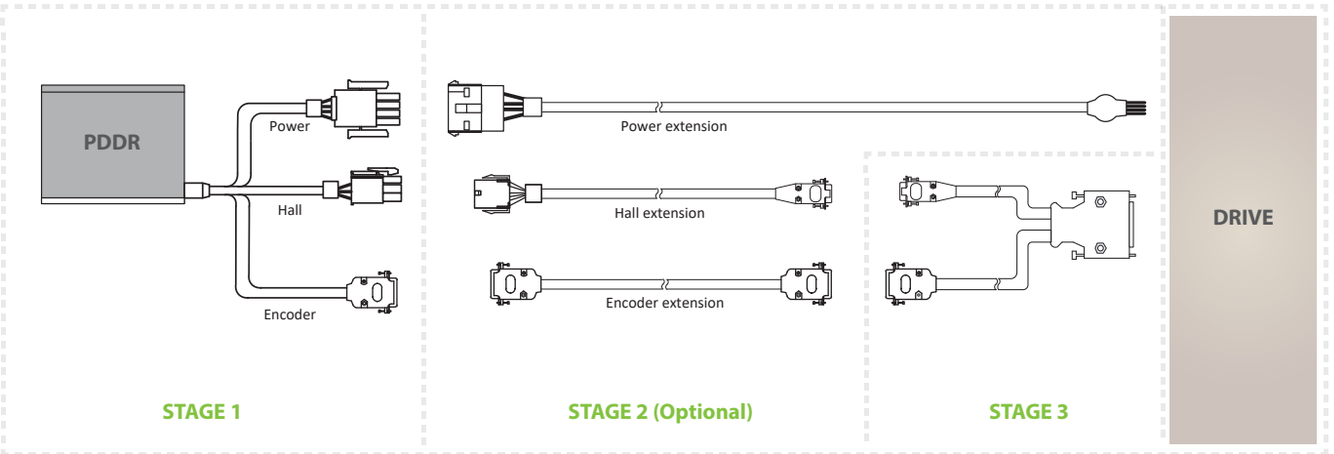




* Forward direction = CCW

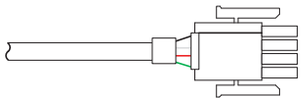
MODEL	PDDR300-150-I	PDDR300-300-I	PDDR300-450-I
L (mm)	140	173	207

CABLE OPTION



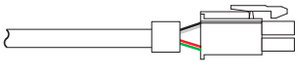
STAGE 1 — PDDR SERIES CABLE COLOR CODE AND PIN OUT

MOTOR PHASE PIN OUT



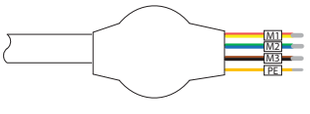
1	U	Black
2	V	White
3	W	Red
4	PE	Green

(PDDR150 / PDDR160 / PDDR240 /PDDR300)



1	U	Black
2	V	White
3	W	Red
4	PE	Green

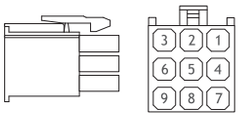
(PDDR110 / PDDR150-T)



M1	Yellow & Pink
M2	Green & Blue
M3	Brown & Black
PE	Yellow

(Ferrite Core Type)

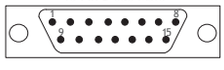
HALL SENSOR PIN OUT



1	VCC	Black
2	GND	White
3	HA	Red
4	HB	Green
5	HC	Black
6	Thermal sensor	White
7	N.C.	Red
8	N.C.	Green
9	Shield	Green

ENCODER CONNECTOR PIN OUT

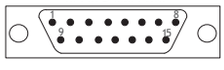
15 Pin D-sub Male



Digital Standard Resolution

1	N.C.
2	GND
3	N.C.
4	Z-
5	B-
6	A-
7	5V
8	N.C.
9	N.C.
10	N.C.
11	N.C.
12	Z+
13	B+
14	A+
15	N.C.
Case	Shield

15 Pin D-sub Male

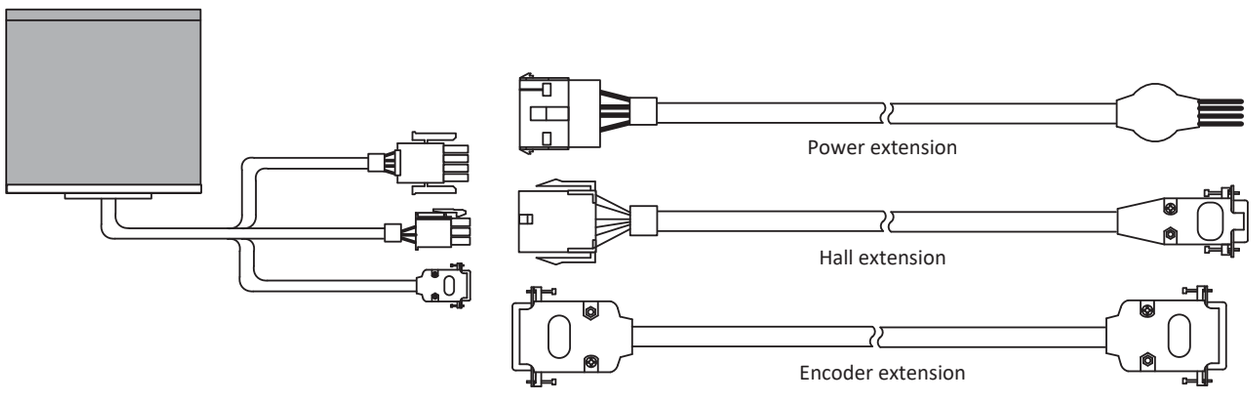


Analog

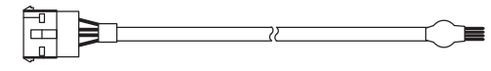
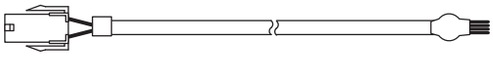
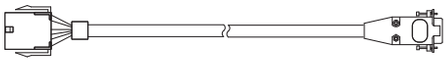
1	COSINE-
2	SINE-
3	Index+
4	5V
5	N.C.
6	N.C.
7	N.C.
8	N.C.
9	COSINE+
10	SINE+
11	Index-
12	GND
13	N.C.
14	N.C.
15	N.C.
Case	Shield

STAGE 2 | PDDR SERIES EXTENSION CABLE

Connection example: PDDR160-□-□-□-□-00



PDDR SERIES EXTENSION CABLE

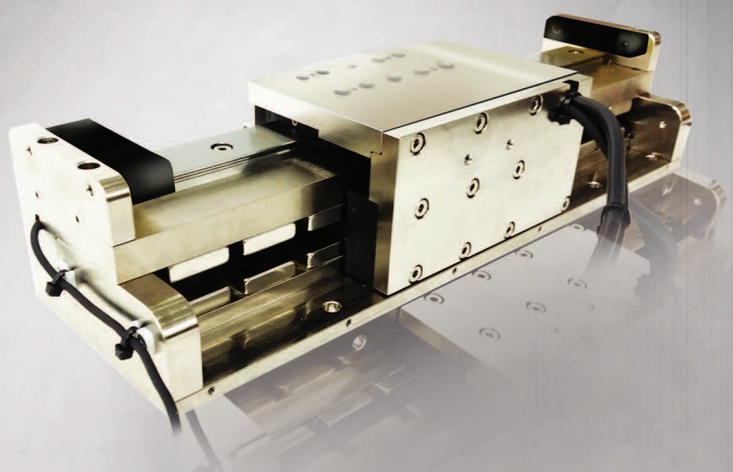
Extension Cable		Part Number
Power Extension Cable		**CBL_EXT_PWR1_PDDR_X.X** (PDDR150 / PDDR160 / PDDR240 /PDDR300)
		**CBL_EXT_PWR2_PDDR_X.X** (PDDR110 / PDDR150-T)
Hall Sensor Extension Cable		**CBL_EXT_HALL_PDDR_X.X**
Encoder Extension Cable	 Standard encoder	**CBL_EXT_SENC_PDDR_X.X**
	 Analog encoder	**CBL_EXT_AENC_PDDR_X.X**

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

PRECISION MODULAR SYSTEMS

PBA SYSTEMS

www.pbasystems.com.sg



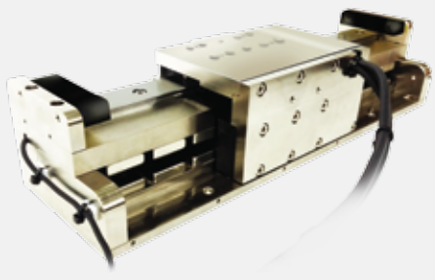
PCA SERIES
COMPACT ACTUATOR

PBA SYSTEMS

www.pbasystems.com.sg

HIGHEST SPEED
smooth minimal ripple motion

PCA SERIES
COMPACT ACTUATOR



PCA Compact Actuator - Cost Effective Solution

Compact Modular actuators assembled onto the magnet tracks of DX20 , DX30 and DX50 series product. Its space saving and compact design offers clients a cost effective solution to fit into spaces where a standard linear servo actuator would not fit before.

Due to its lightweight nature, this actuator is highly suitable for use in multi-axis configurations where mass is of concern, especially suitable for Z axis applications.

Configurable with either digital or analogue encoders, PCA systems can achieve 80nm resolution in tandem with PBA Maxtune drives.

Application

- Semiconductor and Electronics
- Medical and Life Sciences
- Optics and Photonics
- Scanning and
- Digital Fabrication
- Packaging and Material Handling
- Automated Assembly

* Technical specifications subject to change without prior notice

PART NUMBERING SYSTEM

Coil Assembly

PCA - D5 - C2 - S - TM - 1.0 - FC - HC - E1.0 - 495 - 00

MOTOR MODEL

D2	DX20B
D3	DX30B
D5	DX50B

MOTOR SIZE

C1	Not available for DX20
C2	
C3	
C4	Not available for DX30
C5	Not available for DX30 & 50

CONNECTION TYPE

S	Series
P	Parallel

THERMAL PROTECTION

TC*	PT 100 Sensor
TM**	Thermostat Not available for DX20B

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

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

HALL SENSOR CONNECTOR OPTIONS

H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector

ENCODER RESOLUTION

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

EFFECTIVE STROKE (mm)

60-360	D2 (DX20B) Min 60; Max 360 Increment by 60
60-480	D3 (DX30B) Min 60; Max 480 Increment by 60
75-495	D5 (DX50B) Min 75; Max 495 Increment by 60

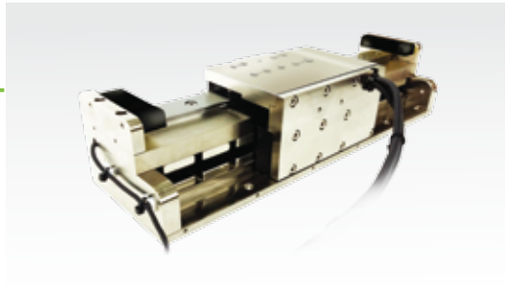
DESIGN VERSIONS

00	Standard
01	Customized Version
	:

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

PCA - D2

- Compact Actuator
- Peak force to 137N, Continuous force to 27N

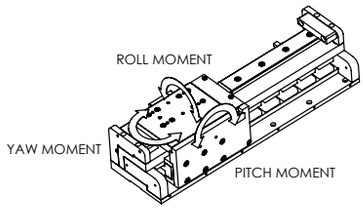


PCA SERIES
Compact Actuator

SPECIFICATION		MODEL			
		PCA-D2-C2		PCA-D2-C3	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	92		137	
Continuous Force @ 120ºC*	N	18		27	
Peak Power @ 120ºC	W	744		1116	
Continuous Power @ 120ºC*	W	30		45	
Peak Current	A^{pk}	10.5	21	10.5	21
Continuous Current @ 120ºC*	A^{pk}	2.1	4.2	2.1	4.2
Continuous Stall Current @ 120ºC*	Arms	1.40	2.80	1.40	2.80
Force Constant	N/A^{pk}	8.7	4.4	13.1	6.5
Back EMF Constant	$V^{pk}/m/s$	10	5	15	7.5
Coil Resistance L-L @ 25ºC	Ohm	6.5	1.6	9.8	2.4
Coil Resistance L-L @ 120ºC*	Ohm	9.0	2.2	13.5	3.4
Inductance L-L @ 1kHz	mH	1.53	0.38	2.3	0.57
Motor Constant @ 25ºC*	N/√W	3.95		4.84	
Motor Constant @ 120ºC*	N/√W	3.36		4.11	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	3.19		2.13	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	30			
Specifications					
Effective Stroke (S)	mm	60 120 180 240 300 360	60 120 180 240 300 360	60 120 180 240 300 360	60 120 180 240 300 360
Repeatability**	um	±1.5			
Accuracy***	um	±15	±25	±15	±25	±15	±25	±15	±25
Straightness***	um	±8	±15	±8	±15	±8	±15	±8	±15
Flatness***	um	±8	±10	±8	±10	±8	±10	±8	±10
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		2			
Maximum bearing load	kN	7.2			
Pitch moment	Nm	68.2			
Yaw moment	Nm	68.2			
Roll moment	Nm	66.4			

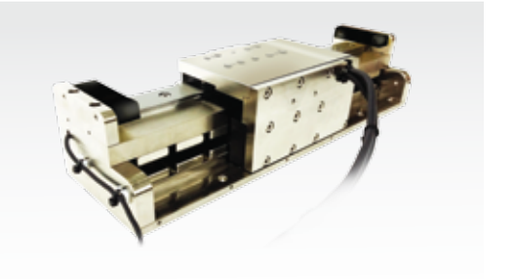
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PCA - D2

- Compact Actuator
- Peak force to 229N, Continuous force to 46N

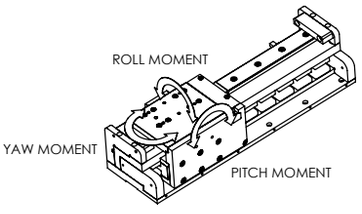


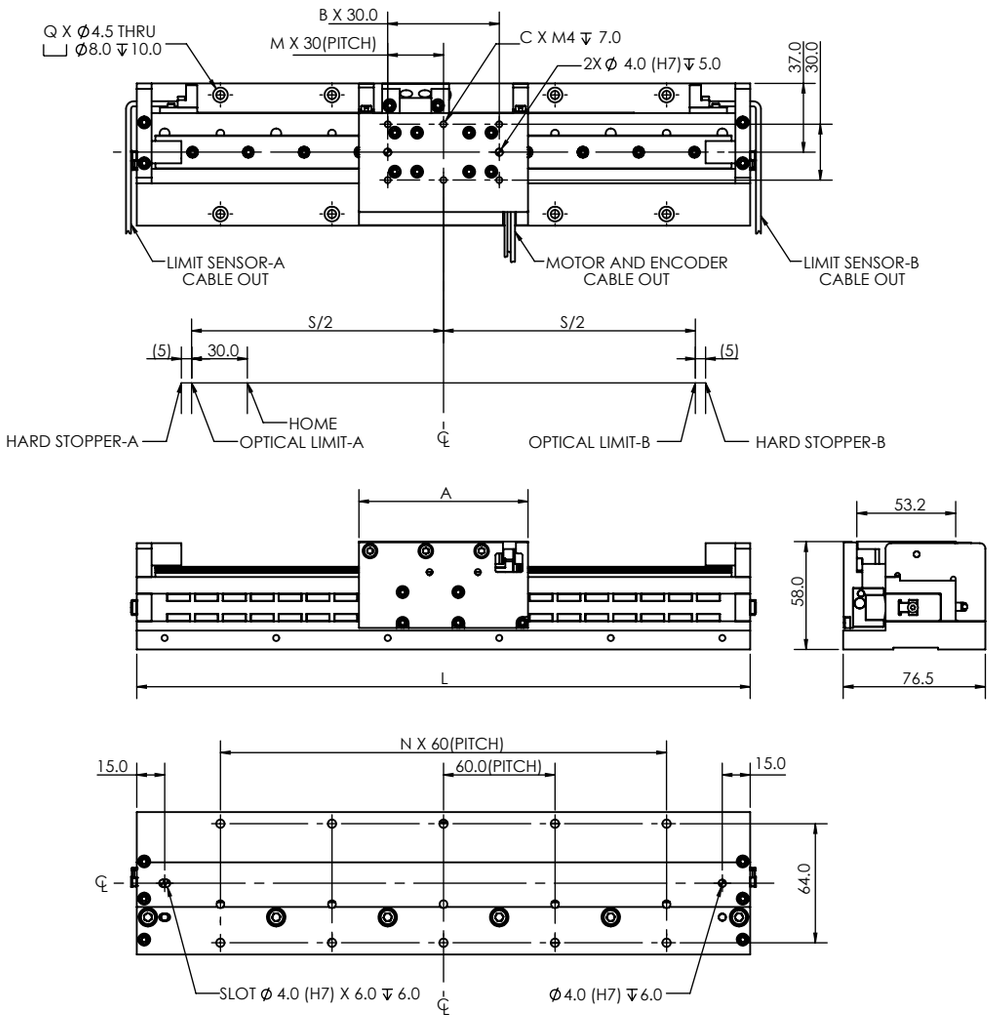
PCA SERIES
Compact Actuator

SPECIFICATION		MODEL			
		PCA-D2-C4		PCA-D2-C5	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	183		229	
Continuous Force @ 120ºC*	N	37		46	
Peak Power @ 120ºC	W	1488		1860	
Continuous Power @ 120ºC*	W	60		74	
Peak Current	A^{pk}	10.5	21	10.5	21
Continuous Current @ 120ºC*	A^{pk}	2.1	4.2	2.1	4.2
Continuous Stall Current @ 120ºC*	Arms	1.40	2.80	1.40	2.80
Force Constant	N/A^{pk}	17.4	8.7	21.8	10.9
Back EMF Constant	V^{pk}/m/s	20.1	10	25.1	12.5
Coil Resistance L-L @ 25ºC	Ohm	13	3.3	16.3	4.1
Coil Resistance L-L @ 120ºC*	Ohm	18.0	4.5	22.5	5.6
Inductance L-L @ 1kHz	mH	3.06	0.77	3.83	0.96
Motor Constant @ 25ºC*	N/√W	5.59		6.24	
Motor Constant @ 120ºC*	N/√W	4.75		5.31	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	1.60		1.28	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	30			
Specifications					
Effective Stroke (S)	mm	60 120 180 240 300	60 120 180 240 300	60 120 180 240	60 120 180 240
Repeatability**	um	±1.5			
Accuracy***	um	±15	±25 ±15 ±25	±15 ±25	±15 ±25
Straightness***	um	±8	±15 ±8 ±15	±8 ±15	±8 ±15
Flatness***	um	±8	±10 ±8 ±10	±8 ±10	±8 ±10
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		2			
Maximum bearing load	kN	10.8		14.4	
Pitch moment	Nm	170.4		322.3	
Yaw moment	Nm	170.4		322.3	
Roll moment	Nm	99.6			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.

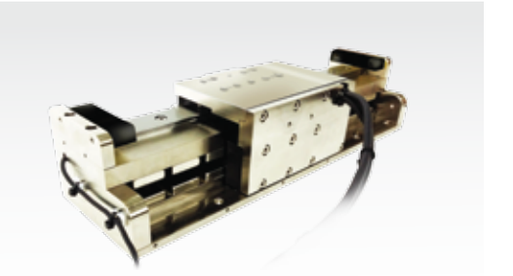




MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	N	Q	M	B	C	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS kg
C2	60	180	2	6	0	1	2	61	0.4	2.7
	120	240	2	6						3.4
	180	300	4	10						4.2
	240	360	4	10						4.8
	300	420	6	14						5.6
	360	480	6	14						6.4
C3	60	210	2	6	1	2	6	91	0.5	3.2
	120	270	4	10						4.0
	180	330	4	10						4.7
	240	390	6	14						5.4
	300	450	6	14						6.2
	360	510	8	18						6.9
C4	60	240	2	6	1	2	6	121	0.6	3.7
	120	300	4	10						4.5
	180	360	4	10						5.2
	240	420	6	14						6.0
	300	480	6	14						6.7
C5	60	270	4	10	2	4	10	151	0.8	4.1
	120	330	4	10						4.8
	180	390	6	14						5.5
	240	450	6	14						6.3

PCA - D3

- Compact Actuator
- Peak force to 145N, Continuous force to 29N



PCA SERIES
Compact Actuator

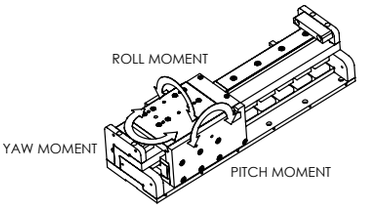
SPECIFICATION		MODEL	
		PCA-D3-C1	
Motor Parameters	**Unit**	S	P
Peak Force	N	145	
Continuous Force @ 120ºC*	N	29	
Peak Power @ 120ºC	W	695	
Continuous Power @ 120ºC*	W	28	
Peak Current	A^{pk}	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73
Continuous Stall Current @ 120ºC*	Arms	1.75	3.50
Force Constant	N/A^{pk}	12.3	6.1
Back EMF Constant	V^{pk}/m/s	14.1	7.0
Coil Resistance L-L @ 25ºC	Ohm	4.8	1.2
Coil Resistance L-L @ 120ºC*	Ohm	6.6	1.7
Inductance L-L @ 1kHz	mH	3.00	0.75
Motor Constant @ 25ºC*	N/√W	6.46	
Motor Constant @ 120ºC*	N/√W	5.49	
Max. Terminal Voltage	Vdc	400	
Thermal Resistance @ 120ºC*	ºC/W	3.42	
Max. Coil Temperature	ºC	120	
Electrical Cycle Length	mm	60	

Specifications																	
Effective Stroke (S)	mm	60	120	180	240	300	360	420	480	60	120	180	240	300	360	420	480
Repeatability**	um	±1.5															
Accuracy***	um	±15			±25					±15			±25				
Straightness***	um	±8			±15					±8			±15				
Flatness***	um	±8			±10					±8			±10				

Linear Guide Rated Load and Static Moment		
Model Code		LM Guide
Block Quantity		2
Maximum bearing load	kN	10.4
Pitch moment	Nm	128.2
Yaw moment	Nm	128.2
Roll moment	Nm	132

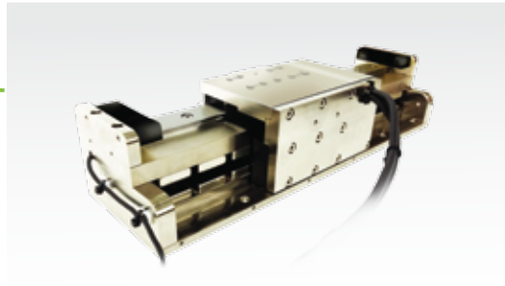
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PCA - D3

- Compact Actuator
- Peak force to 434N, Continuous force to 87N

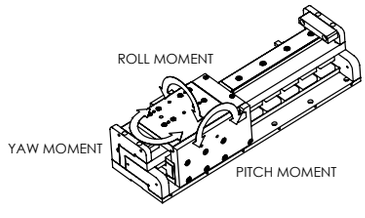


PCA SERIES
Compact Actuator

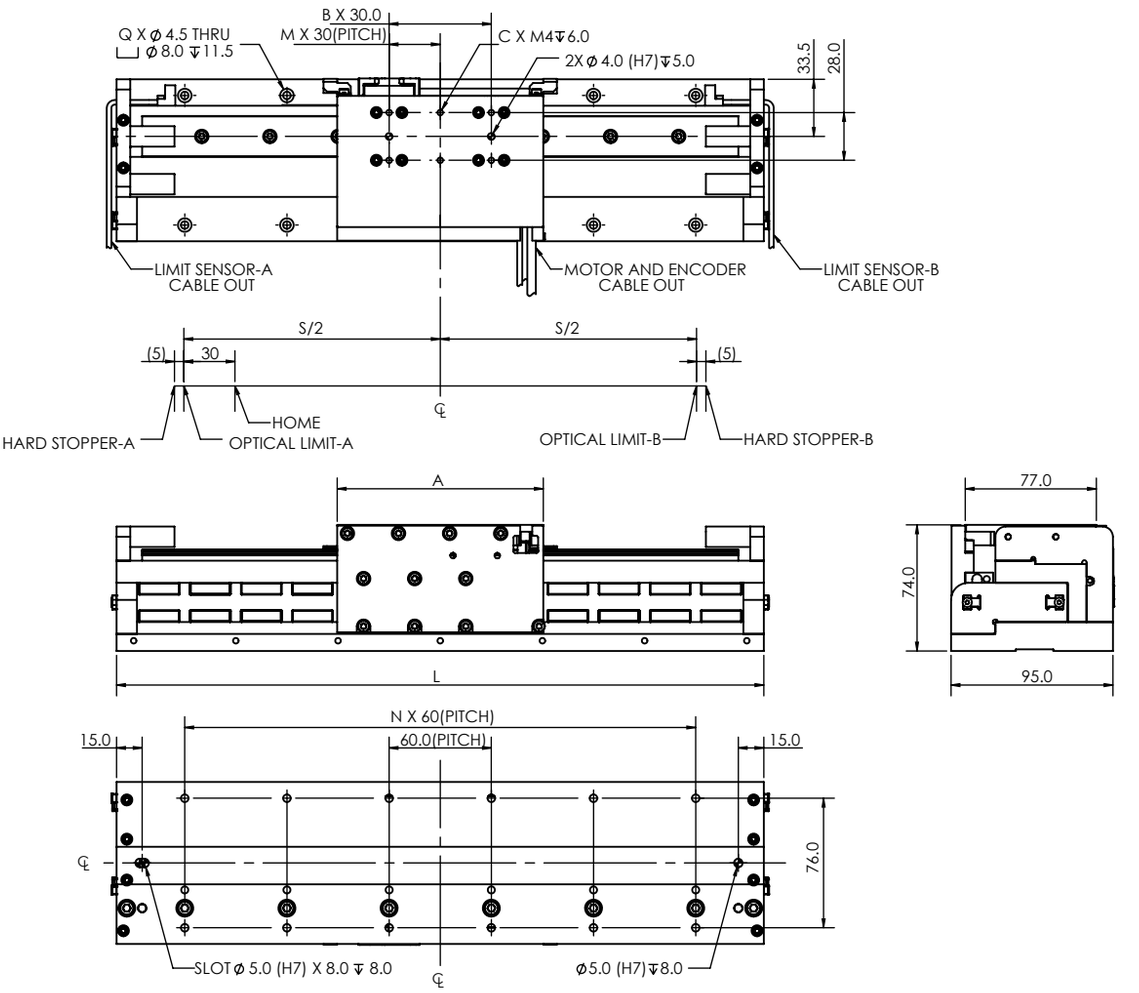
SPECIFICATION		MODEL			
		PCA-D3-C2		PCA-D3-C3	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	289		434	
Continuous Force @ 120ºC*	N	58		87	
Peak Power @ 120ºC	W	1390		2086	
Continuous Power @ 120ºC*	W	56		83	
Peak Current	A^{pk}	11.81	23.63	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73	2.36	4.73
Continuous Stall Current @ 120ºC*	Arms	1.75	3.50	1.75	3.50
Force Constant	N/A^{pk}	24.5	12.3	36.8	18.4
Back EMF Constant	V^{pk}/m/s	28.2	14.1	42.3	21.1
Coil Resistance L-L @ 25ºC	Ohm	9.6	2.4	14.4	3.6
Coil Resistance L-L @ 120ºC*	Ohm	13.3	3.3	19.9	5.0
Inductance L-L @ 1kHz	mH	6.00	1.50	9.00	2.25
Motor Constant @ 25ºC*	N/√W	9.13		11.18	
Motor Constant @ 120ºC*	N/√W	7.76		9.51	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	1.71		1.14	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	60			
Specifications					
Effective Stroke (S)	mm	60 120 180 240 300 360 420 480	60 120 180 240 300 360 420 480	60 120 180 240 300 360 420	60 120 180 240 300 360 420
Repeatability**	um	±1.5			
Accuracy***	um	±15	±25	±15 ±25	±15 ±25
Straightness***	um	±8	±15	±8 ±15	±8 ±15
Flatness***	um	±8	±10	±8 ±10	±8 ±10
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		2			
Maximum bearing load	kN	10.4		15.6	
Pitch moment	Nm	128.2		345.5	
Yaw moment	Nm	128.2		345.5	
Roll moment	Nm	132		195	

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PCA - D3



MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	N	Q	M	B	C	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS kg
C1	60	200	1	4	0	1	2	61	0.6	5.0
	120	260	3	8						6.5
	180	320	3	8						8.1
	240	380	5	12						9.9
	300	440	5	12						11.9
	360	500	7	16						14.0
	420	560	7	16						16.3
	480	620	9	20						18.7
C2	60	260	3	8	1	2	6	121	1.1	6.9
	120	320	3	8						8.5
	180	380	5	12						10.3
	240	440	5	12						12.3
	300	500	7	16						14.4
	360	560	7	16						16.7
	420	620	9	20						19.1
	480	680	9	20						21.6
C3	60	320	3	8	2	4	10	181	1.6	8.8
	120	380	5	12						10.6
	180	440	5	12						12.5
	240	500	7	16						14.6
	300	560	7	16						16.9
	360	620	9	20						19.3
	420	680	9	20						21.9

* Technical specifications subject to change without prior notice

PCA - D5

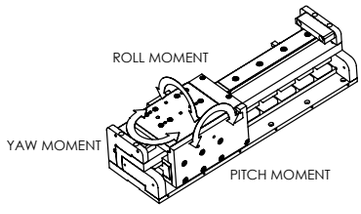
- Compact Actuator
- Peak force to 446N, Continuous force to 89N

PCA SERIES
Compact Actuator

SPECIFICATION		MODEL			
		PCA-D5-C1		PCA-D5-C2	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	223		446	
Continuous Force @ 120ºC*	N	45		89	
Peak Power @ 120ºC	W	751		1502	
Continuous Power @ 120ºC*	W	30		60	
Peak Current	A^{pk}	13.13	26.25	13.13	26.25
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	2.63	5.25
Continuous Stall Current @ 120ºC*	Arms	2.10	4.20	2.10	4.20
Force Constant	N/A^{pk}	17	8.5	34	17
Back EMF Constant	V^{pk}/m/s	19.6	9.8	39.1	19.6
Coil Resistance L-L @ 25ºC	Ohm	4.2	1.1	8.4	2.1
Coil Resistance L-L @ 120ºC*	Ohm	5.8	1.5	11.6	2.9
Inductance L-L @ 1kHz	mH	3.11	0.78	6.22	1.56
Motor Constant @ 25ºC*	N/√W	9.58		13.55	
Motor Constant @ 120ºC*	N/√W	8.14		11.51	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	3.16		1.58	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	60			
Specifications					
Effective Stroke (S)	mm	75 135 195 255 315 375 435 495	75 135 195 255 315 375 435 495	75 135 195 255 315 375 435 495	75 135 195 255 315 375 435 495
Repeatability**	um	±1.5			
Accuracy***	um	±15	±25 ±15 ±25	±15	±25 ±15 ±25
Straightness***	um	±8	±15 ±8 ±15	±8	±15 ±8 ±15
Flatness***	um	±8	±10 ±8 ±10	±8	±10 ±8 ±10
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		2			
Maximum bearing load	kN	39.5			
Pitch moment	Nm	674			
Yaw moment	Nm	674			
Roll moment	Nm	636			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PCA - D5

- Compact Actuator
- Peak force to 893N, Continuous force to 179N

PCA SERIES
Compact Actuator

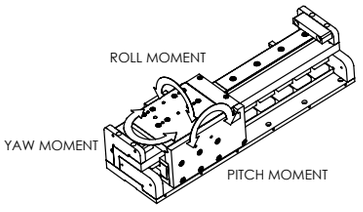
SPECIFICATION		MODEL			
		PCA-D5-C3		PCA-D5-C4	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	669		893	
Continuous Force @ 120ºC*	N	134		179	
Peak Power @ 120ºC	W	2253		3004	
Continuous Power @ 120ºC*	W	90		120	
Peak Current	A^{pk}	13.13	26.25	13.13	26.25
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	2.63	5.25
Continuous Stall Current @ 120ºC*	Arms	2.10	4.20	2.10	4.20
Force Constant	N/A^{pk}	51	25.5	68	34
Back EMF Constant	$V^{pk}/m/s$	58.7	29.3	78.2	39.1
Coil Resistance L-L @ 25ºC	Ohm	12.6	3.2	16.8	4.2
Coil Resistance L-L @ 120ºC*	Ohm	17.4	4.4	23.2	5.8
Inductance L-L @ 1kHz	mH	9.33	2.33	12.44	3.11
Motor Constant @ 25ºC*	N/√W	16.59		19.16	
Motor Constant @ 120ºC*	N/√W	14.10		16.28	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	1.05		0.79	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	60			

Specifications																														
Effective Stroke (S)	mm	75	135	195	255	315	375	435	495	75	135	195	255	315	375	435	495	75	135	195	255	315	375	435	75	135	195	255	315	375	435
Repeatability**	um	±1.5																													
Accuracy***	um	±15		±25		±15		±25		±15		±25		±15		±25															
Straightness***	um	±8		±15		±8		±15		±8		±15		±8		±15															
Flatness***	um	±8		±10		±8		±10		±8		±10		±8		±10															

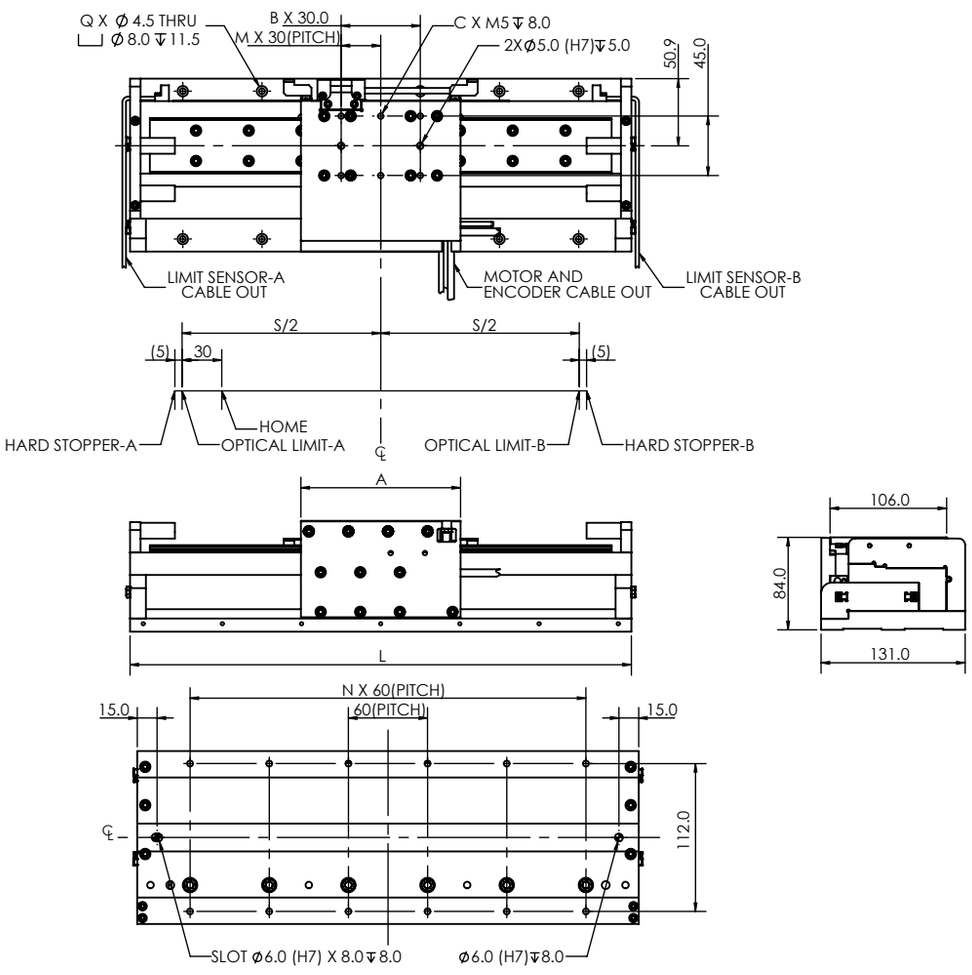
Linear Guide Rated Load and Static Moment			
Model Code		LM Guide	
Block Quantity		2	
Maximum bearing load	kN	39.5	
Pitch moment	Nm	1081	1489
Yaw moment	Nm	1081	1489
Roll moment	Nm	636	

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



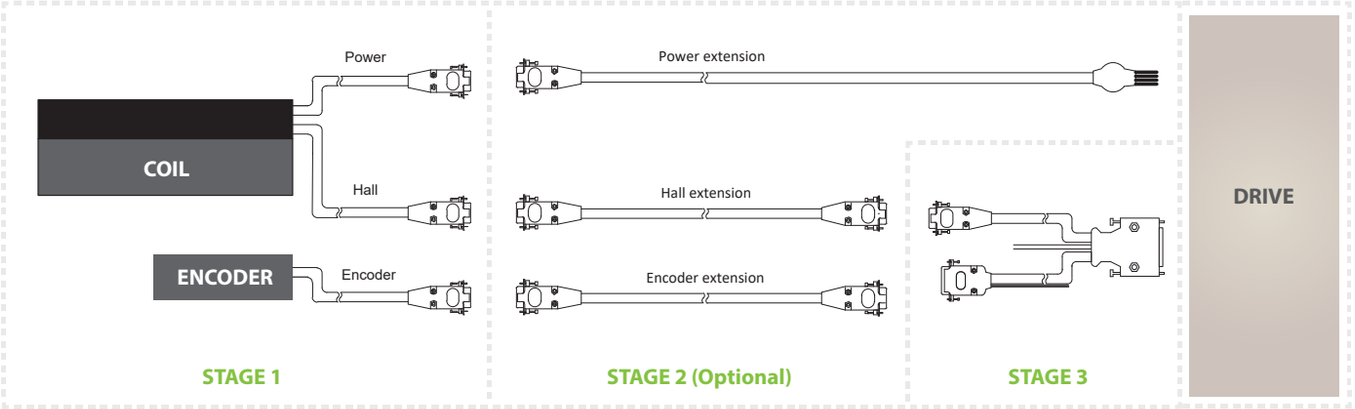
PCA - D5



MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	N	Q	M	B	C	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS kg
C1	60	200	1	4	0	1	2	61	0.8	8.5
	120	260	3	8						10.6
	180	320	3	8						12.8
	240	380	5	12						15.0
	300	440	5	12						17.1
	360	500	7	16						19.3
	420	560	7	16						21.5
	480	620	9	20						23.6
C2	60	260	3	8	1	2	6	121	1.5	11.2
	120	320	3	8						13.3
	180	380	5	12						15.5
	240	440	5	12						17.7
	300	500	7	16						19.8
	360	560	7	16						22.0
	420	620	9	20						24.1
	480	680	9	20						26.3
C3	60	320	3	8	2	4	10	181	2.1	13.8
	120	380	5	12						15.9
	180	440	5	12						18.1
	240	500	7	16						20.3
	300	560	7	16						22.4
	360	620	9	20						24.6
	420	680	9	20						26.7
	480	740	11	24						28.9
C4	60	380	5	12	3	6	14	241	2.9	16.4
	120	440	5	12						18.6
	180	500	7	16						20.7
	240	560	7	16						22.9
	300	620	9	20						25.0
	360	680	9	20						27.2
	420	740	11	24						29.4

* Technical specifications subject to change without prior notice

CABLE OPTION

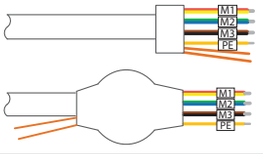


STAGE 1 — POWER AND HALL CABLE OPTION

PCA-D5-C2-S-TM-1.0-FC-HC-E1.0-495-00

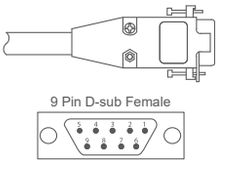
POWER CABLE OPTIONS

NF / FC



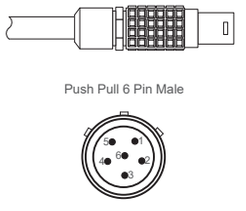
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Pink
P2	M1	Yellow
P3	M3	Black
P4	M3	Brown
P5	M2	Blue
P6	M2	Green
P7	Temp sensor 1	Orange/Black
P8	Temp sensor 2	Orange
P9	PE	White

CNF



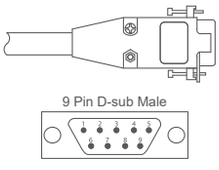
P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

HALL SENSOR OPTIONS

H

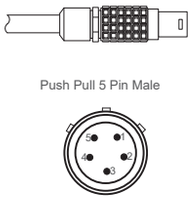
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

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

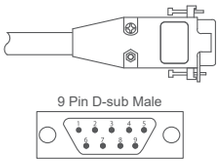
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX20B	PT100	See Note 1
DX30B	Thermostat	100°C
DX50B	Thermostat	100°C

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.

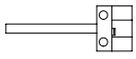
PCA CABLE PIN OUT

ENCODER CONNECTOR - 9 PIN D-SUB MALE



	RH200X / RH200Z	RH200B
P1	0V DC	0V DC
P2	A+	Sine+
P3	Z+	Z+
P4	B+	Cosine+
P5	+5V DC	+5V DC
P6	A-	Sine-
P7	Z-	Z-
P8	B-	Cosine-
P9	Inner	Inner
Casing	Outer	Outer

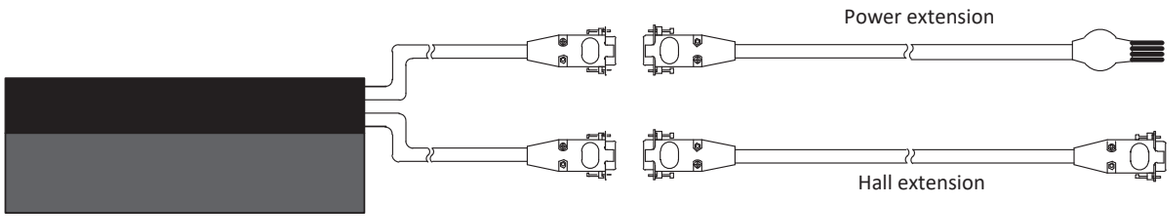
OPTICAL LIMIT SWITCH (PM-L24)



+5V dc	Brown
GND	Blue
LIGHT-ON	Black
DARK-ON	White

STAGE 2 PCA EXTENSION CABLE

Connection example: PCA-D5-C2-S-TM-1.0-FC-HC-E1.0-495-00



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_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X

CABLE	
01	RH200 Digital
01B	RH200 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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

PLA SERIES

LINEAR SERVO MOTOR ACTUATOR

PBA SYSTEMS

www.pbasystems.com.sg

PLA SERIES

LINEAR SERVO MOTOR ACTUATOR

Faster Settling, Accuracy and Highly Repeatable Positioning

PBA's PLA series linear servo motor actuators are "plug and play" center driven linear solutions that combine ironless and iron core linear motor technology to offer 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.

PLA actuators is configurable as open frame systems for basic applications as well as partially enclosed and fully sealed bellow covers.

- Velocity to 3 m/sec
- Acceleration up to 5Gs
- Encoder Resolution to 0.8nm (Depends on drive)
- Effective stroke up to 2m

* Technical specifications subject to change without prior notice

PART NUMBERING SYSTEM

Coil Assembly

PLA - D2 - C2 - S - TC - 1.0 - FC - HC - E1.0 - O - 740 - 00

MOTOR MODEL

D2	DX20B

MOTOR SIZE

C2
C3
C4
C5

CONNECTION TYPE

S	Series
P	Parallel

THERMAL PROTECTION

TC*	PT 100 Sensor

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

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

DESIGN VERSIONS

00	Standard
01	Customized Version
	:

EFFECTIVE STROKE (mm)

140
200
260
320
380
440
500
560
620
680
740

COVER

O	Open
C	Covered

ENCODER RESOLUTION

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

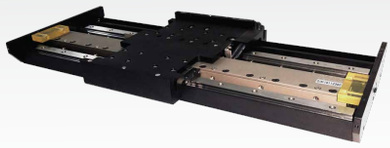
HALL SENSOR CONNECTOR OPTIONS

H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector

* TC - Sensor output to temperature controller
** Encoder, power & hall cable

PLA-D2

- Linear Actuator
- Peak force to 137N, Continuous force to 27N

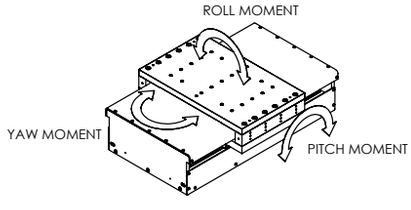


PLA SERIES
MULTI-AXIS ACTUATOR

SPECIFICATION		MODEL			
		PLA-D2-C2		PLA-D2-C3	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	92		137	
Continuous Force @ 120ºC*	N	18		27	
Peak Power @ 120ºC	W	24		36	
Continuous Power @ 120ºC*	W	744		1116	
Peak Current	A^{pk}	10.5	21	10.5	21
Continuous Current @ 120ºC*	A^{pk}	2.1	4.2	2.1	4.2
Continuous Stall Current @ 120ºC*	Arms	1.40	2.80	1.40	2.80
Force Constant	N/A^{pk}	8.7	4.4	13.1	6.5
Back EMF Constant	V^{pk}/m/s	10	5	15	7.5
Coil Resistance L-L @ 25ºC	Ohm	6.5	1.6	9.8	2.4
Coil Resistance L-L @ 120ºC*	Ohm	9.0	2.2	13.5	3.4
Inductance L-L @ 1kHz	mH	1.53	0.38	2.3	0.57
Motor Constant @ 25ºC*	N/√W	3.95		4.84	
Motor Constant @ 120ºC*	N/√W	3.36		4.11	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	3.19		2.13	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	30			
Specifications					
Repeatability**	um	±2.0			
Accuracy***	um	±30um/300mm			
Straightness***	um	±10um/300mm			
Flatness***	um	±20um/300mm			
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		4			
Maximum bearing load	kN	3.1			
Pitch moment	Nm	191		287	
Yaw moment	Nm	191		287	
Roll moment	Nm	218			

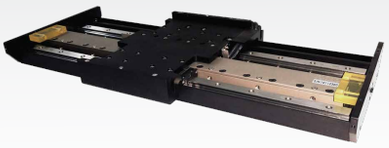
Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PLA-D2

- Linear Actuator
- Peak force to 137N, Continuous force to 27N

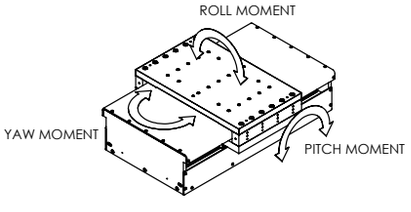


PLA SERIES
MULTI-AXIS ACTUATOR

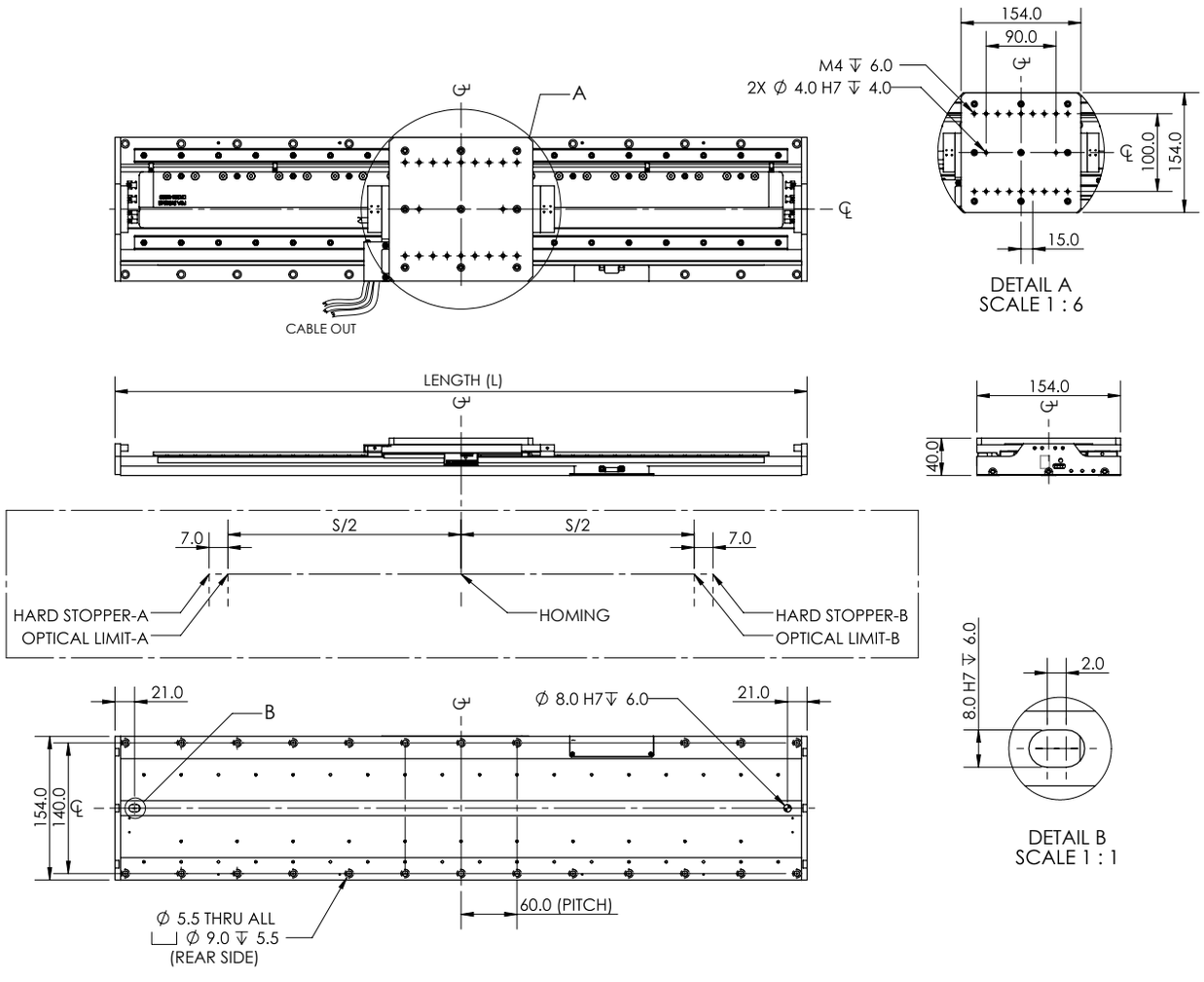
SPECIFICATION		MODEL			
		PLA-D2-C4		PLA-D2-C5	
Motor Parameters	**Unit**	S	P	S	P
Peak Force	N	183		229	
Continuous Force @ 120ºC*	N	37		46	
Peak Power @ 120ºC	W	48		60	
Continuous Power @ 120ºC*	W	1488		1860	
Peak Current	A^{pk}	10.5	21	10.5	21
Continuous Current @ 120ºC*	A^{pk}	2.1	4.2	2.1	4.2
Continuous Stall Current @ 120ºC*	Arms	1.40	2.80	1.40	2.80
Force Constant	N/A^{pk}	17.4	8.7	21.8	10.9
Back EMF Constant	$V^{pk}/m/s$	20.1	10	25.1	12.5
Coil Resistance L-L @ 25ºC	Ohm	13	1.6	16.3	4.1
Coil Resistance L-L @ 120ºC*	Ohm	18.0	4.5	22.5	5.6
Inductance L-L @ 1kHz	mH	3.06	0.77	3.83	0.96
Motor Constant @ 25ºC*	N/√W	5.59		6.24	
Motor Constant @ 120ºC*	N/√W	4.75		5.31	
Max. Terminal Voltage	Vdc	400			
Thermal Resistance @ 120ºC*	ºC/W	1.60		1.28	
Max. Coil Temperature	ºC	120			
Electrical Cycle Length	mm	30			
Specifications					
Repeatability**	um	±2.0			
Accuracy***	um	±30um/300mm			
Straightness***	um	±10um/300mm			
Flatness***	um	±20um/300mm			
Linear Guide Rated Load and Static Moment					
Model Code		LM Guide			
Block Quantity		4			
Maximum bearing load	kN	3.1			
Pitch moment	Nm	287			
Yaw moment	Nm	287			
Roll moment	Nm	218			

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



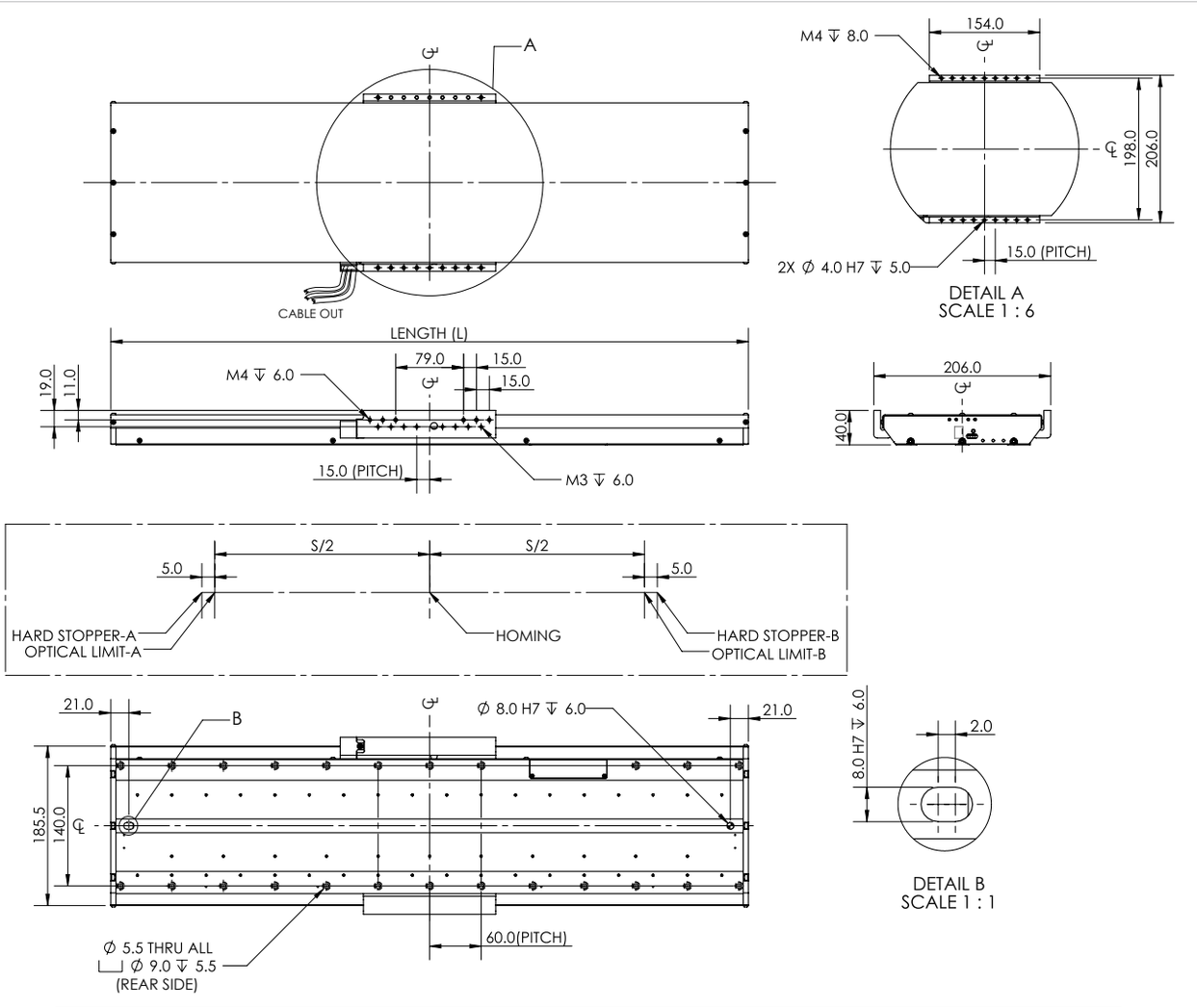
PLA - OPEN TYPE



MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS kg
C2 & C3	140	352	124	1.6	4.6
	200	412			5.2
	260	472			5.8
	320	532			6.4
	380	592			7.0
	440	652			7.6
	500	712			8.2
	560	772			8.8
	620	832			9.4
	680	892			10.0
	740	952			10.6
C4 & C5	140	382	154	1.9	5.1
	200	442			5.7
	260	502			6.3
	320	562			6.9
	380	622			7.5
	440	682			8.1
	500	742			8.7
	560	802			9.3
	620	862			9.9
	680	922			10.5
	740	982			11.1

Notes: 1. Slider Mass = Coil Mass + Carriage Mass

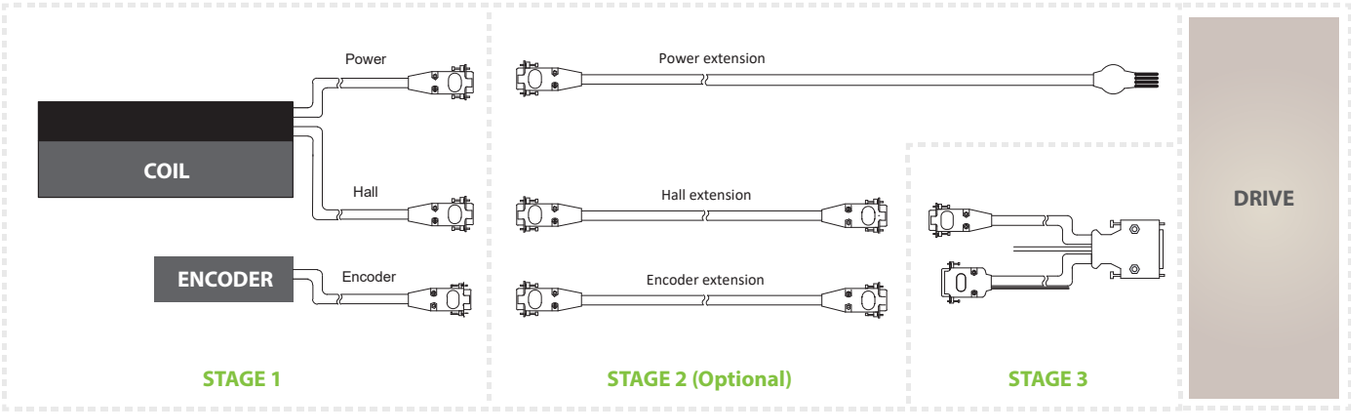
PLA - COVERED TYPE



MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS kg
C2 & C3	140	352	124	1.7	5.1
	200	412			5.9
	260	472			6.7
	320	532			7.5
	380	592			8.3
	440	652			9.1
	500	712			9.9
	560	772			10.7
	620	832			11.5
	680	892			12.3
	740	952			13.1
C4 & C5	140	382	154	2.0	5.6
	200	442			6.4
	260	502			7.2
	320	562			8.0
	380	622			8.8
	440	682			9.6
	500	742			10.4
	560	802			11.2
	620	862			12.0
	680	922			12.8
	740	982			13.6

Notes: 1. Slider Mass = Coil Mass + Carriage Mass

CABLE OPTION

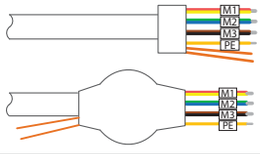


STAGE 1 — POWER AND HALL CABLE OPTION

PLA-D2-C1-S-TC-1.0-FC-HC-E1.0-O-740-00

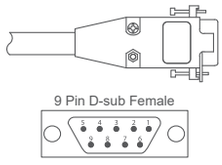
POWER CABLE OPTIONS

NF / FC



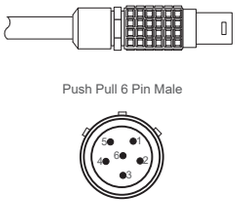
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Pink
P2	M1	Yellow
P3	M3	Black
P4	M3	Brown
P5	M2	Blue
P6	M2	Green
P7	Temp sensor 1	Orange/Black
P8	Temp sensor 2	Orange
P9	PE	White

CNF



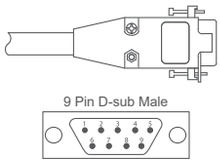
P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

HALL SENSOR OPTIONS

H

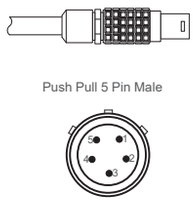
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

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

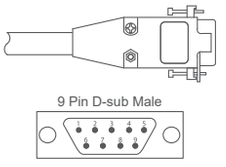
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX20B	PT100	See Note 1

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.

PLA CABLE PIN OUT

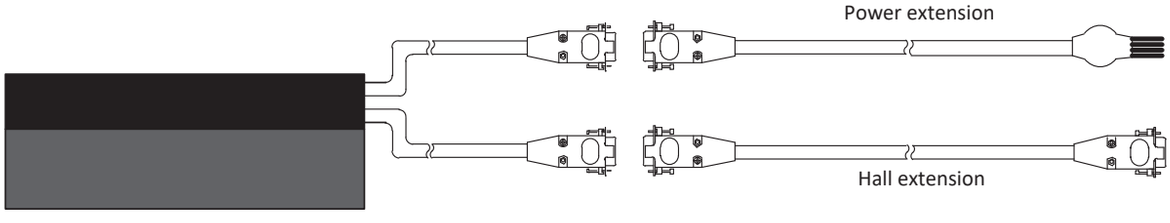
ENCODER CONNECTOR - 9 PIN D-SUB MALE

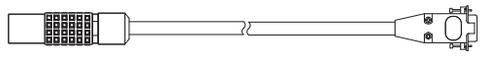
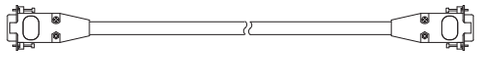


	RH200X / RH200Z	RH200B
P1	0V DC	0V DC
P2	A+	Sine+
P3	Z+	Z+
P4	B+	Cosine+
P5	+5V DC	+5V DC
P6	A-	Sine-
P7	Z-	Z-
P8	B-	Cosine-
P9	Inner	Inner
Casing	Outer	Outer

STAGE 2 PLA EXTENSION CABLE

Connection example: PLA-D2-C2-S-TC-1.0-FC-HC-E1.0-O-740-00

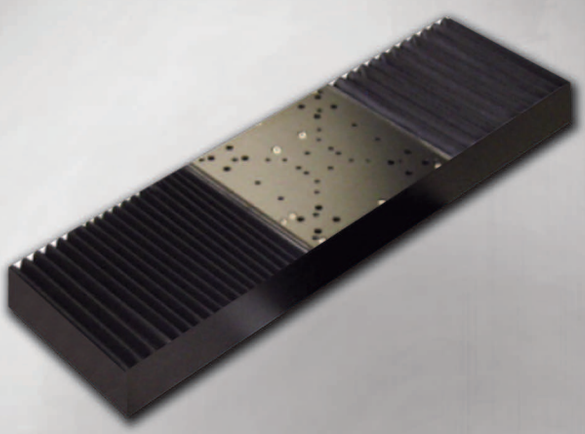


Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_DX_X.X
		CBL_EXT_PWR_DX_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X

CABLE	
01	RH200 Digital
01B	RH200 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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



PDAB SERIES

LINEAR SERVO MOTOR ACTUATOR
IRONLESS

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PDAB- D5 - C1 - S - TM - 1.0 - FC - HC - E1.0 - O - 1600 - 00

MOTOR MODEL

D3	DX30B
D3T	DX30BT
D5	DX50B
D5T	DX50BT

COIL SIZE

C1
C2
C3
C4
C5

CONNECTION TYPE

S	Series
P	Parallel

THERMAL PROTECTION

TC*	PT 100 Sensor
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

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

DESIGN VERSIONS

00	Standard
01	Customized Version
	:

EFFECTIVE STROKE (mm)

100-1600	Open Type
100-1600	Covered Type
100-1000	Bellow Type

ACTUATOR SIZE

O	Open
C	Covered
B	Bellow

ENCODER RESOLUTION

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

HALL SENSOR CONNECTOR OPTIONS

H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector

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

PDAB-D3/D3T

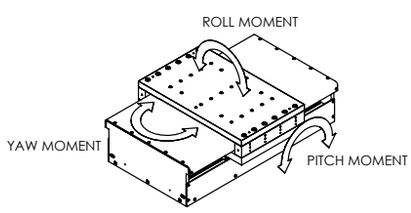
- Ironless Linear Motor
- Peak force to 434N, Continuous force to 87N

PDAB SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL							
		DX30B/BT							
		PDAB-D3-C1		PDAB-D3-C2		PDAB-D3T-C2	PDAB-D3-C3		
Motor Parameters	**Unit**	S	P	S	P	P	S	P	
Peak Force	N	145		289			434		
Continuous Force @ 120ºC*	N	29		58			87		
Peak Power @ 120ºC	W	695		1390			2086		
Continuous Power @ 120ºC*	W	28		56			83		
Peak Current	A^{pk}	11.81	23.63	11.81	23.63	47.25	11.81	23.63	
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73	2.36	4.73	9.45	2.36	4.73	
Continuous Stall Current @ 120ºC*	Arms	1.75	3.5	1.75	3.5	7	1.75	3.5	
Force Constant	N/A^{pk}	12.3	6.1	24.5	12.3	6.1	36.8	18.4	
Back EMF Constant	V^{pk}/m/s	14.1	7	28.2	14.1	7	42.3	21.1	
Coil Resistance L-L @ 25ºC	Ohm	4.8	1.2	9.6	2.4	0.6	14.4	3.6	
Coil Resistance L-L @ 120ºC*	Ohm	6.6	1.7	13.3	3.3	0.8	19.9	5	
Inductance L-L @ 1kHz	mH	3	0.75	6	1.5	0.38	9	2.25	
Motor Constant @ 25ºC*	N/√W	6.46		9.13			11.18		
Motor Constant @ 120ºC*	N/√W	5.49		7.76			9.51		
Max. Terminal Voltage	Vdc	400							
Thermal Resistance @ 120ºC*	ºC/W	3.42		1.71			1.14		
Max. Coil Temperature	ºC	120							
Electrical Cycle Length	mm	60							
Specifications									
Repeatability**	um	±2.0							
Accuracy***	um	±20um/300mm							
Straightness***	um	±8um/300mm							
Flatness***	um	±8um/300mm							
Linear Guide Rated Load and Static Moment									
Model Code		LM Guide							
Block Quantity		4							
Maximum bearing load	kN	3.1							
Pitch moment	Nm	104		191			287		
Yaw moment	Nm	104		191			287		
Roll moment	Nm	218							

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PDAB-D3/D3T

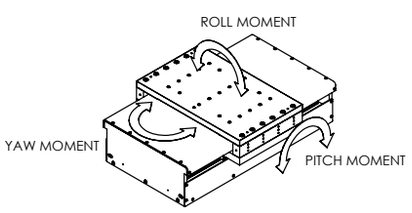
- Ironless Linear Motor
- Peak force to 724N, Continuous force to 145N

PDAB SERIES
IRONLESS LINEAR MOTOR

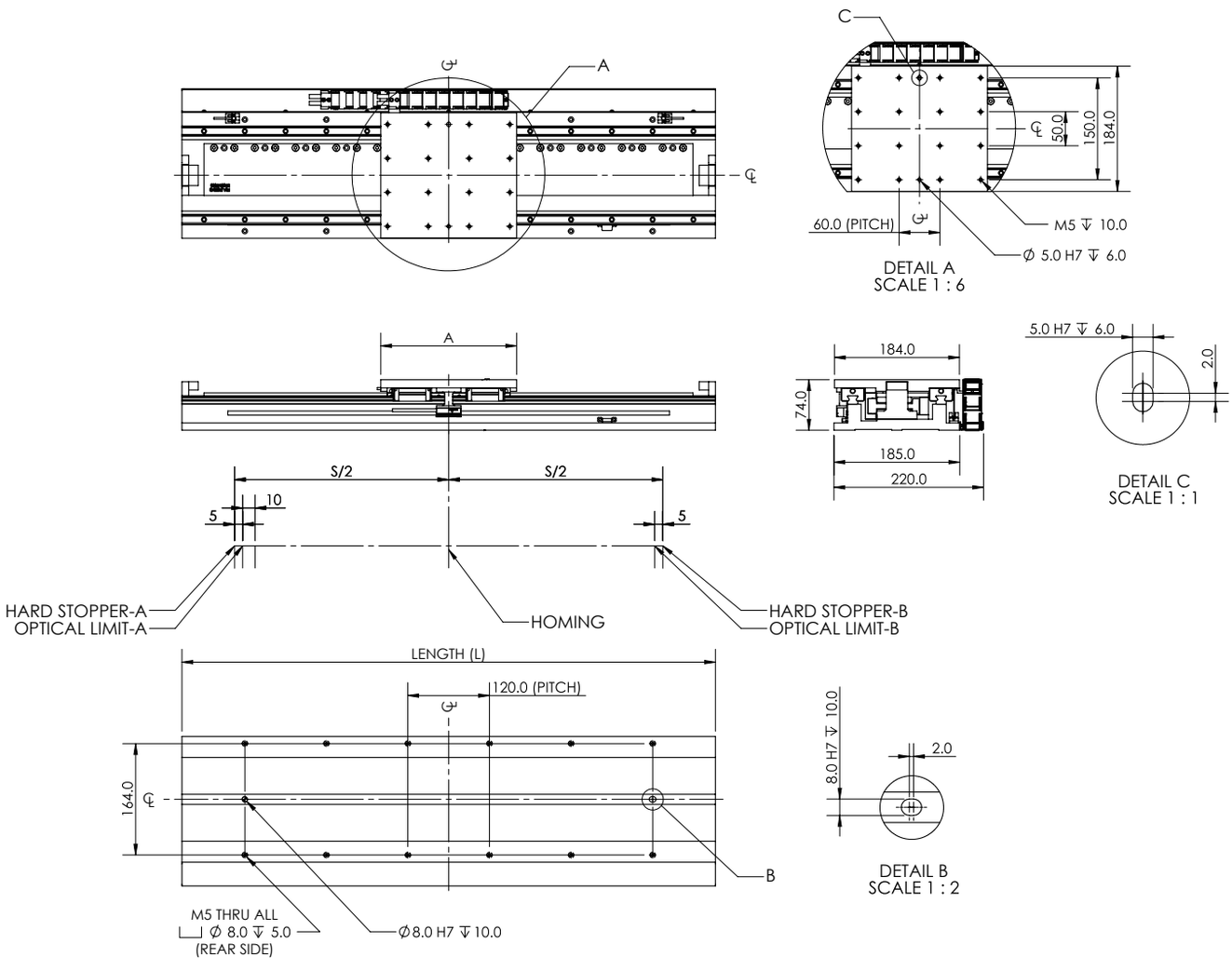
SPECIFICATION		MODEL				
		DX30B/BT				
		PDAB-D3-C4		PDAB-D3T-C4	PDAB-D3-C5	
Motor Parameters	**Unit**	S	P	P	S	P
Peak Force	N	579			724	
Continuous Force @ 120ºC*	N	116			145	
Peak Power @ 120ºC	W	2781			3476	
Continuous Power @ 120ºC*	W	111			139	
Peak Current	A^{pk}	11.81	23.63	47.25	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73	9.45	2.36	4.73
Continuous Stall Current @ 120ºC*	Arms	1.75	3.5	7	1.75	3.5
Force Constant	N/A^{pk}	49	24.5	12.3	61.3	30.6
Back EMF Constant	$V^{pk}/m/s$	56.4	28.2	14.1	70.4	35.2
Coil Resistance L-L @ 25ºC	Ohm	19.2	4.8	1.2	24	6
Coil Resistance L-L @ 120ºC*	Ohm	26.6	6.6	1.7	33.2	8.3
Inductance L-L @ 1kHz	mH	12	3	0.75	15	3.75
Motor Constant @ 25ºC*	N/√W	12.91			14.44	
Motor Constant @ 120ºC*	N/√W	10.98			12.27	
Max. Terminal Voltage	Vdc	400				
Thermal Resistance @ 120ºC*	ºC/W	0.85			0.68	
Max. Coil Temperature	ºC	120				
Electrical Cycle Length	mm	60				
Specifications						
Repeatability**	um	±2.0				
Accuracy***	um	±20um/300mm				
Straightness***	um	±8um/300mm				
Flatness***	um	±8um/300mm				
Linear Guide Rated Load and Static Moment						
Model Code		LM Guide				
Block Quantity		4				
Maximum bearing load	kN	3.1				
Pitch moment	Nm	287				
Yaw moment	Nm	287				
Roll moment	Nm	218				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PDAB-D3/D3T (OPEN TYPE)

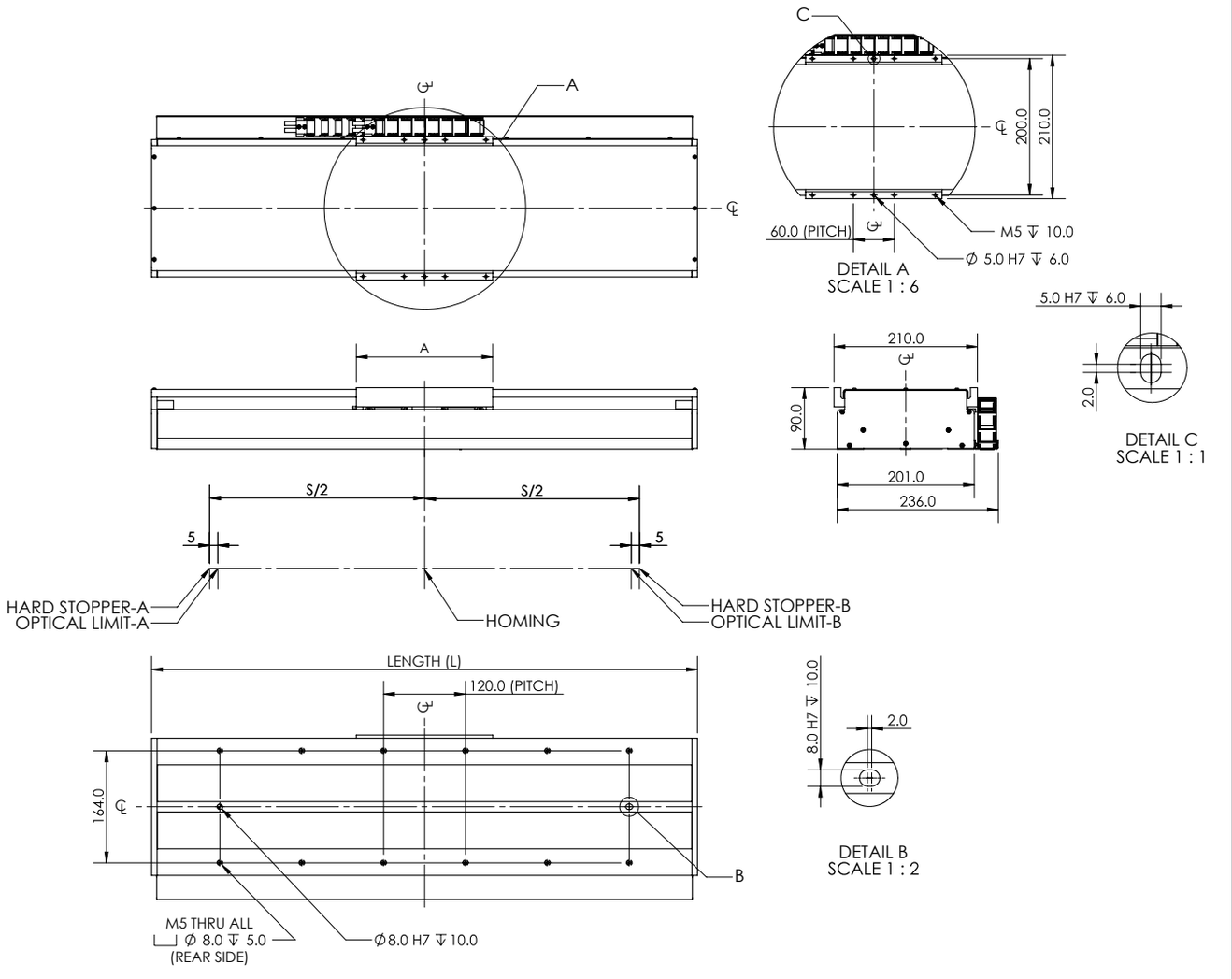


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1600	MIN : 225 MAX: 1725	S=100+(Multiple of 60mm) L=S+A+(65mm)	80	1.2	MIN : 5.1 MAX: 50.1	W=5.1 + (Multiple of 1.8kg)
C2		MIN : 285 MAX: 1785		140	1.6	MIN : 6.9 MAX: 51.9	W=6.9 + (Multiple of 1.8kg)
C3		MIN : 345 MAX: 1845		200	1.9	MIN : 8.7 MAX: 53.7	W=8.7 + (Multiple of 1.8kg)
C4		MIN : 405 MAX: 1905		260	2.3	MIN : 10.5 MAX: 55.5	W=10.5 + (Multiple of 1.8kg)
C5		MIN : 465 MAX: 1965		320	2.7	MIN : 12.3 MAX: 57.3	W=12.3 + (Multiple of 1.8kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 1.8kg per 60mm

PDAB-D3/D3T (COVERED TYPE)

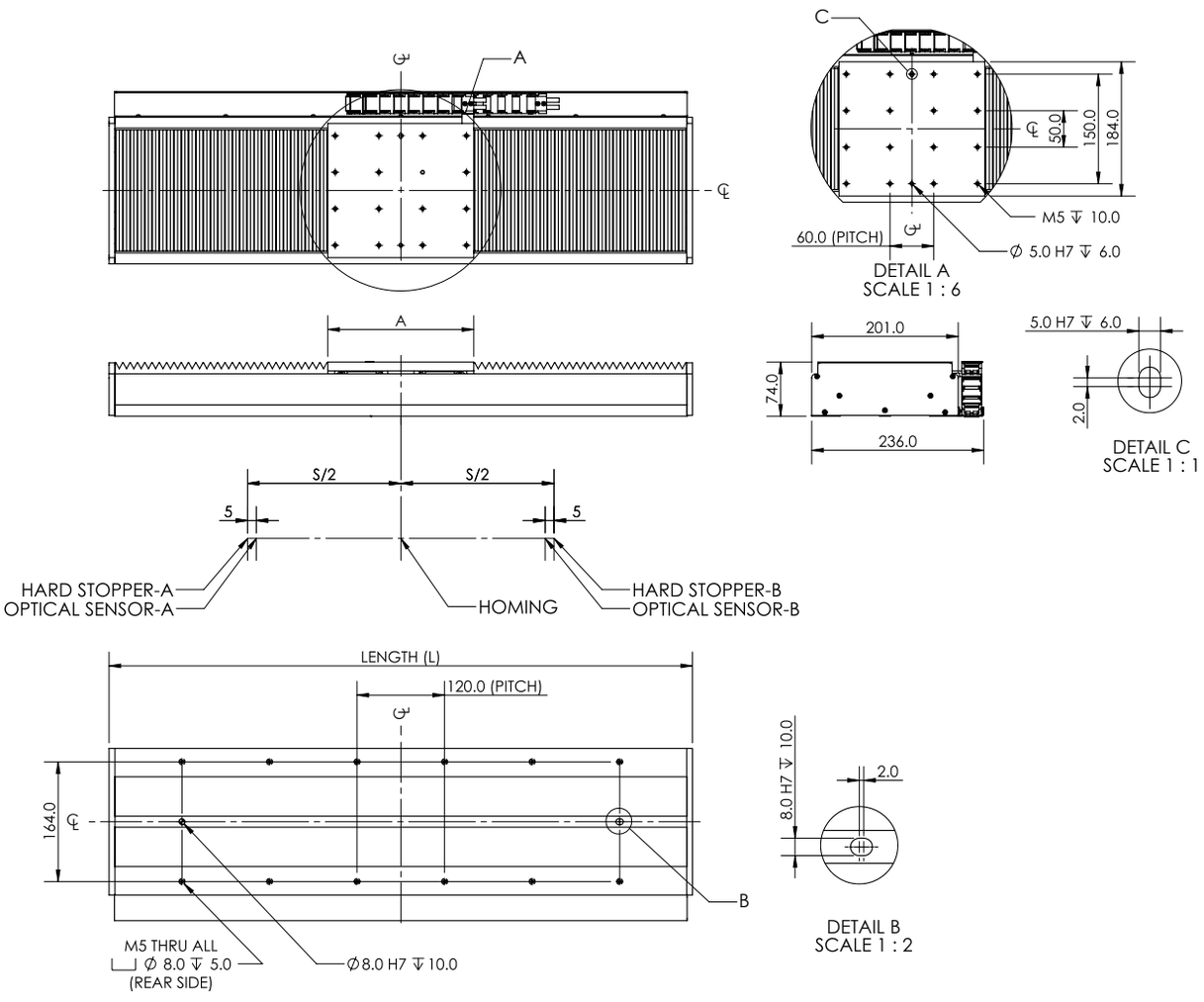


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1600	MIN : 240 MAX: 1740	S=100+(Multiple of 60mm) L=S+A+(80mm)	80	1.4	MIN : 6.6 MAX: 61.6	W=6.6 + (Multiple of 2.2kg)
C2		MIN : 300 MAX: 1800		140	1.9	MIN : 8.8 MAX: 63.8	W=8.8 + (Multiple of 2.2kg)
C3		MIN : 360 MAX: 1860		200	2.3	MIN : 11.0 MAX: 66.0	W=11.0 + (Multiple of 2.2kg)
C4		MIN : 420 MAX: 1920		260	2.8	MIN : 13.2 MAX: 68.2	W=13.2 + (Multiple of 2.2kg)
C5		MIN : 480 MAX: 1980		320	3.3	MIN : 15.4 MAX: 70.4	W=15.4 + (Multiple of 2.2kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 2.2kg per 60mm

PDAB-D3/D3T (BELLOW TYPE)



MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1000	MIN : 300 MAX: 1650	S=100+(Multiple of 60mm) L=S+A+(170mm)	80	1.3	MIN : 7.6 MAX: 45.1	W=7.6 + (Multiple of 2.5kg)
C2		MIN : 360 MAX: 1710		140	1.6	MIN : 10.1 MAX: 47.6	W=10.1 + (Multiple of 2.5kg)
C3		MIN : 420 MAX: 1770		200	2.0	MIN : 12.6 MAX: 50.1	W=12.6 + (Multiple of 2.5kg)
C4		MIN : 480 MAX: 1830		260	2.4	MIN : 15.1 MAX: 52.6	W=15.1 + (Multiple of 2.5kg)
C5		MIN : 540 MAX: 1890		320	2.8	MIN : 17.6 MAX: 55.1	W=17.6 + (Multiple of 2.5kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 2.5kg per 60mm

PDAB-D5/D5T

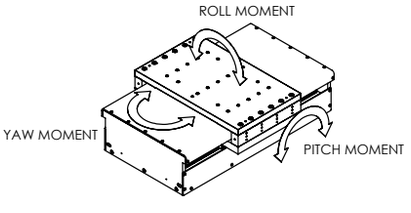
- Ironless Linear Motor
- Peak force to 446N, Continuous force to 89N

PDAB SERIES
IRONLESS LINEAR MOTOR

SPECIFICATION		MODEL				
		DX50B/BT				
		PDAB-D5-C1		PDAB-D5-C2		PDAB-D5T-C2
Motor Parameters	**Unit**	S	P	S	P	P
Peak Force	N	223		446		
Continuous Force @ 120ºC*	N	45		89		
Peak Power @ 120ºC	W	751		1502		
Continuous Power @ 120ºC*	W	30		60		
Peak Current	A^{pk}	13.13	26.25	13.13	26.25	52.5
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	2.63	5.25	10.5
Continuous Stall Current @ 120ºC*	Arms	2.1	4.2	2.1	4.2	8.4
Force Constant	N/A^{pk}	17	8.5	34	17	8.5
Back EMF Constant	V^{pk}/m/s	19.6	9.8	39.1	19.6	9.8
Coil Resistance L-L @ 25ºC	Ohm	4.2	1.1	8.4	2.1	0.5
Coil Resistance L-L @ 120ºC*	Ohm	5.8	1.5	11.6	2.9	0.7
Inductance L-L @ 1kHz	mH	3.11	0.78	6.22	1.56	0.39
Motor Constant @ 25ºC*	N/√W	9.58		13.55		
Motor Constant @ 120ºC*	N/√W	8.14		11.51		
Max. Terminal Voltage	Vdc	400				
Thermal Resistance @ 120ºC*	ºC/W	3.16		1.58		
Max. Coil Temperature	ºC	120				
Electrical Cycle Length	mm	60				
Specifications						
Repeatability**	um	±2.0				
Accuracy***	um	±20um/300mm				
Straightness***	um	±8um/300mm				
Flatness***	um	±8um/300mm				
Linear Guide Rated Load and Static Moment						
Model Code		LM Guide				
Block Quantity		4				
Maximum bearing load	kN	3.1				
Pitch moment	Nm	104		191		
Yaw moment	Nm	104		191		
Roll moment	Nm	218				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PDAB-D5/D5T

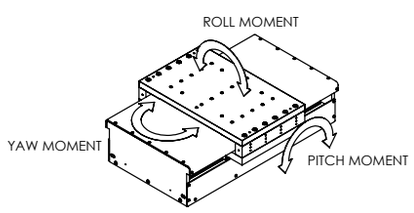
- Ironless Linear Motor
- Peak force to 116N, Continuous force to 223N

PDAB SERIES
IRONLESS LINEAR MOTOR

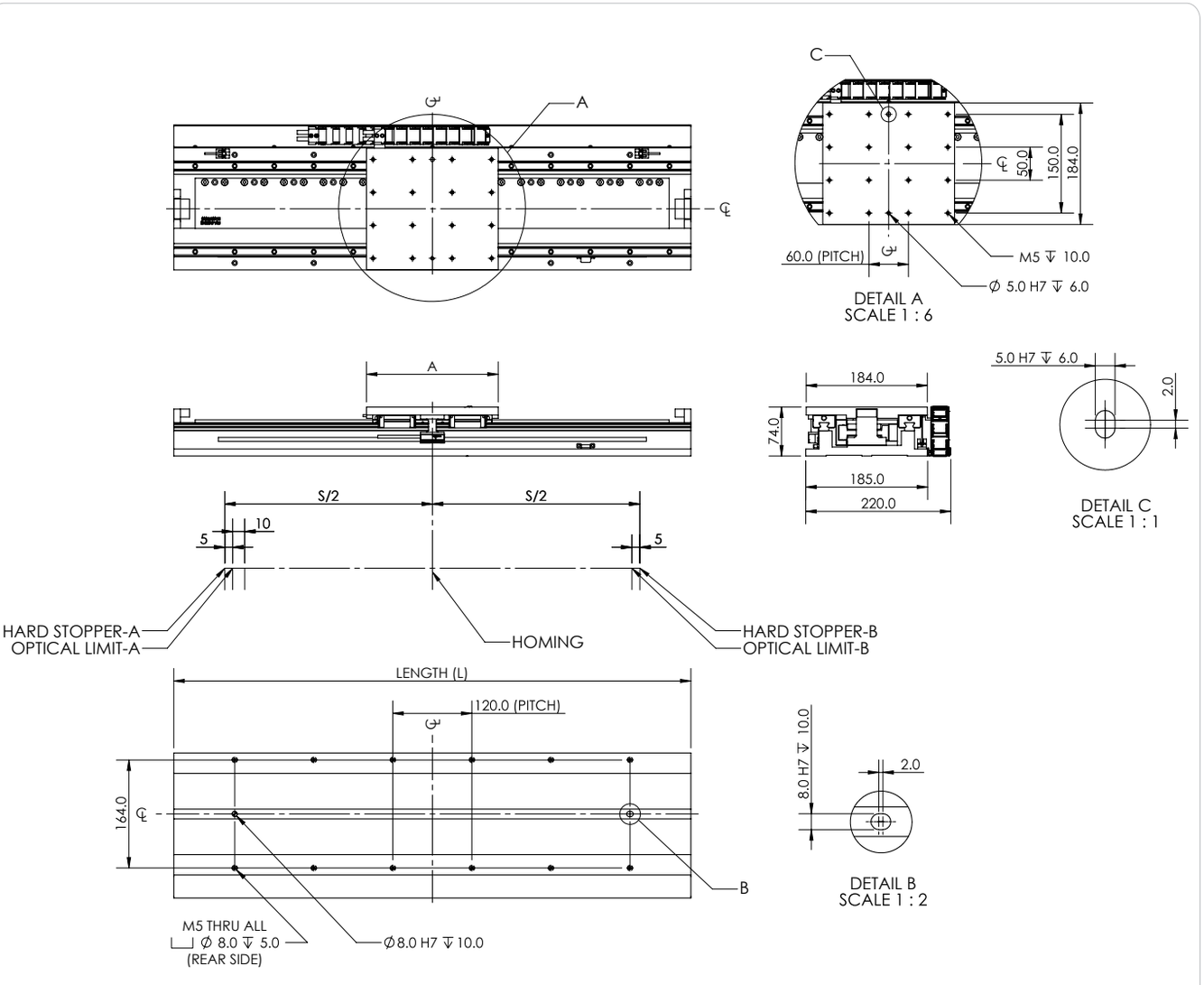
SPECIFICATION		MODEL						
		DX50B/BT						
		PDAB-D5-C3		PDAB-D5-C4		PDAB-D5T-C4	PDAB-D5-C5	
Motor Parameters	**Unit**	S	P	S	P	P	S	P
Peak Force	N	669		893			1116	
Continuous Force @ 120ºC*	N	134		179			223	
Peak Power @ 120ºC	W	2253		3004			3755	
Continuous Power @ 120ºC*	W	90		120			150	
Peak Current	A^{pk}	13.13	26.25	13.13	26.25	52.5	13.13	26.25
Continuous Current @ 120ºC*	A^{pk}	2.63	5.25	2.63	5.25	10.5	2.63	5.25
Continuous Stall Current @ 120ºC*	Arms	2.1	4.2	2.1	4.2	8.4	2.1	4.2
Force Constant	N/A^{pk}	51	25.5	68	34	17	85	42.5
Back EMF Constant	V^{pk}/m/s	58.7	29.3	78.2	39.1	19.6	97.8	48.9
Coil Resistance L-L @ 25ºC	Ohm	12.6	3.2	16.8	4.2	1.1	21	5.3
Coil Resistance L-L @ 120ºC*	Ohm	17.4	4.4	23.2	5.8	1.5	29.1	7.3
Inductance L-L @ 1kHz	mH	9.33	2.33	12.44	3.11	0.78	15.55	3.89
Motor Constant @ 25ºC*	N/√W	16.59		19.16			21.42	
Motor Constant @ 120ºC*	N/√W	14.1		16.28			18.21	
Max. Terminal Voltage	Vdc	400						
Thermal Resistance @ 120ºC*	ºC/W	1.05		0.79			0.63	
Max. Coil Temperature	ºC	120						
Electrical Cycle Length	mm	60						
Specifications								
Repeatability**	um	±2.0						
Accuracy***	um	±20um/300mm						
Straightness***	um	±8um/300mm						
Flatness***	um	±8um/300mm						
Linear Guide Rated Load and Static Moment								
Model Code		LM Guide						
Block Quantity		4						
Maximum bearing load	kN	3.1						
Pitch moment	Nm	287						
Yaw moment	Nm	287						
Roll moment	Nm	218						

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, 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 - 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.



PDAB-D5/D5T (OPEN TYPE)

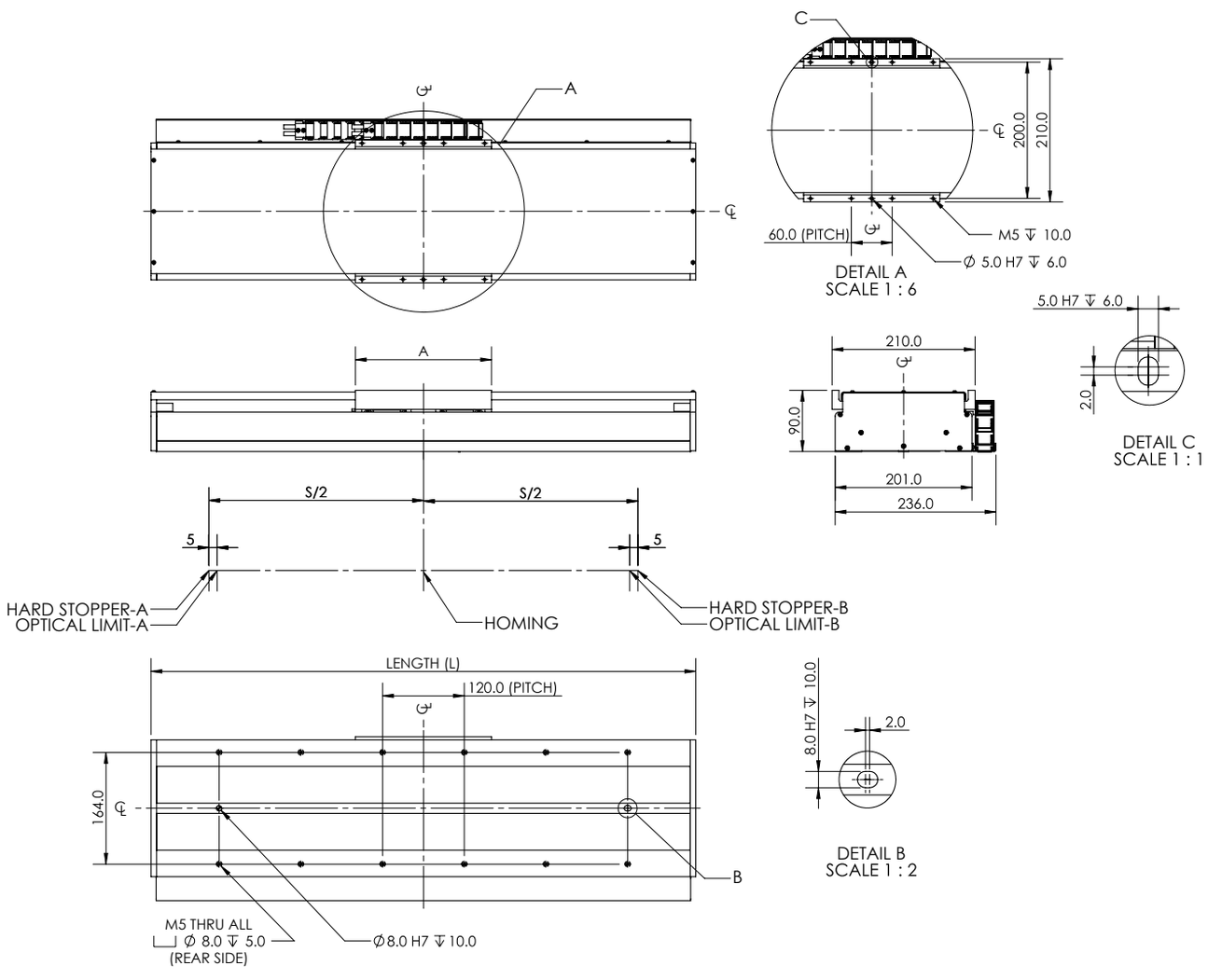


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1600	MIN : 225 MAX: 1725	S=100+(Multiple of 60mm) L=S+A+(65mm)	80	1.3	MIN : 6.0 MAX: 58.5	W=6.0 + (Multiple of 2.1kg)
C2		MIN : 285 MAX: 1785		140	1.7	MIN : 8.1 MAX: 60.6	W=8.1 + (Multiple of 2.1kg)
C3		MIN : 345 MAX: 1845		200	2.1	MIN : 10.2 MAX: 62.7	W=10.2 + (Multiple of 2.1kg)
C4		MIN : 405 MAX: 1905		260	2.5	MIN : 12.3 MAX: 64.8	W=12.3 + (Multiple of 2.1kg)
C5		MIN : 465 MAX: 1965		320	2.9	MIN : 14.4 MAX: 66.9	W=14.4 + (Multiple of 2.1kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 2.1kg per 60mm

PDAB-D5/D5T (COVERED TYPE)

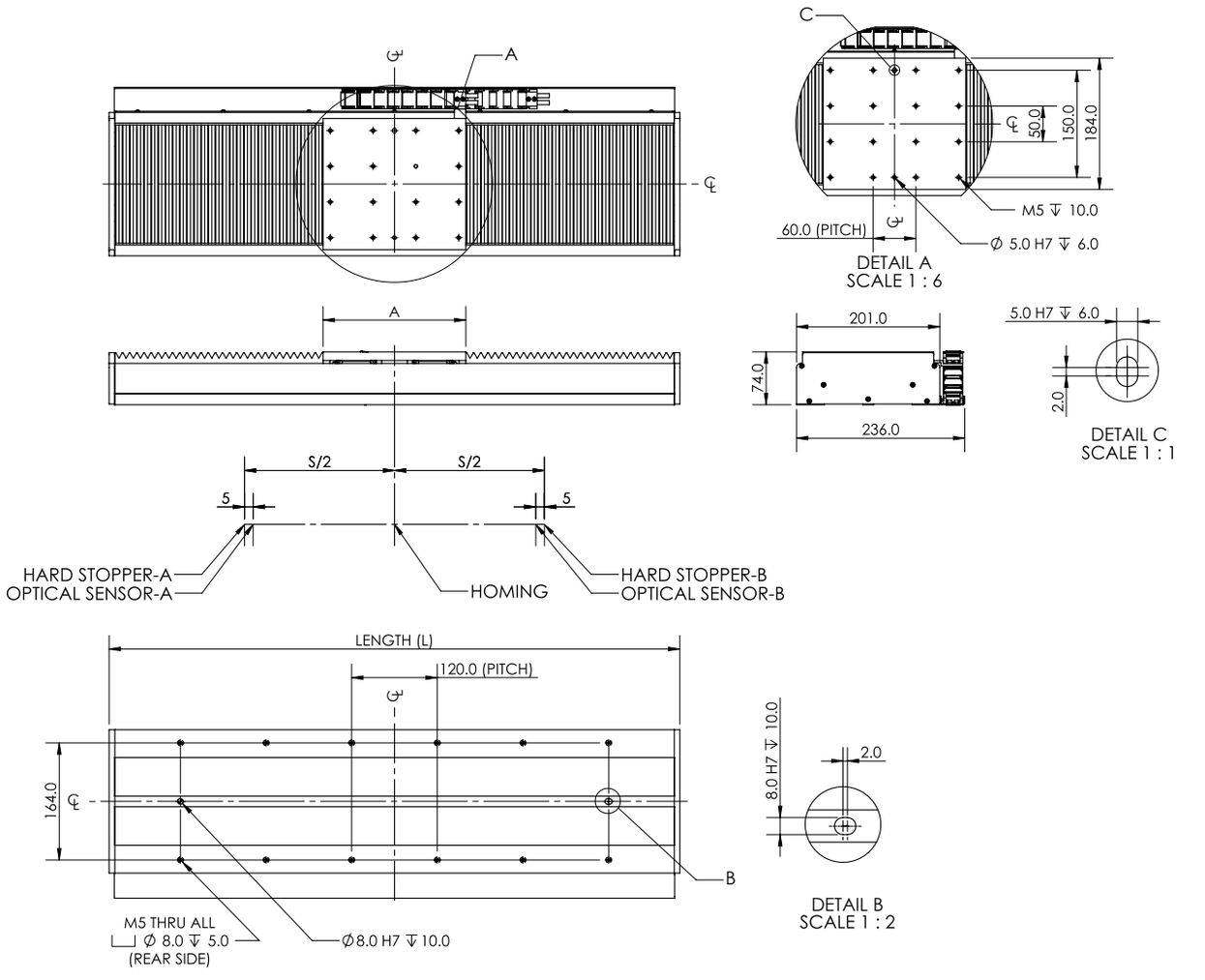


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1600	MIN : 240 MAX: 1740	S=100+(Multiple of 60mm) L=S+A+(80mm)	80	1.5	MIN : 7.5 MAX: 70.0	W=6.6 + (Multiple of 2.5kg)
C2		MIN : 300 MAX: 1800		140	2.0	MIN : 10.0 MAX: 72.5	W=8.8 + (Multiple of 2.5kg)
C3		MIN : 360 MAX: 1860		200	2.5	MIN : 12.5 MAX: 75.0	W=11.0 + (Multiple of 2.5kg)
C4		MIN : 420 MAX: 1920		260	3.0	MIN : 15.0 MAX: 77.5	W=13.2 + (Multiple of 2.5kg)
C5		MIN : 480 MAX: 1980		320	3.5	MIN : 17.5 MAX: 80.0	W=15.4 + (Multiple of 2.5kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 2.5kg per 60mm

PDAB-D5/D5T (BELLOW TYPE)

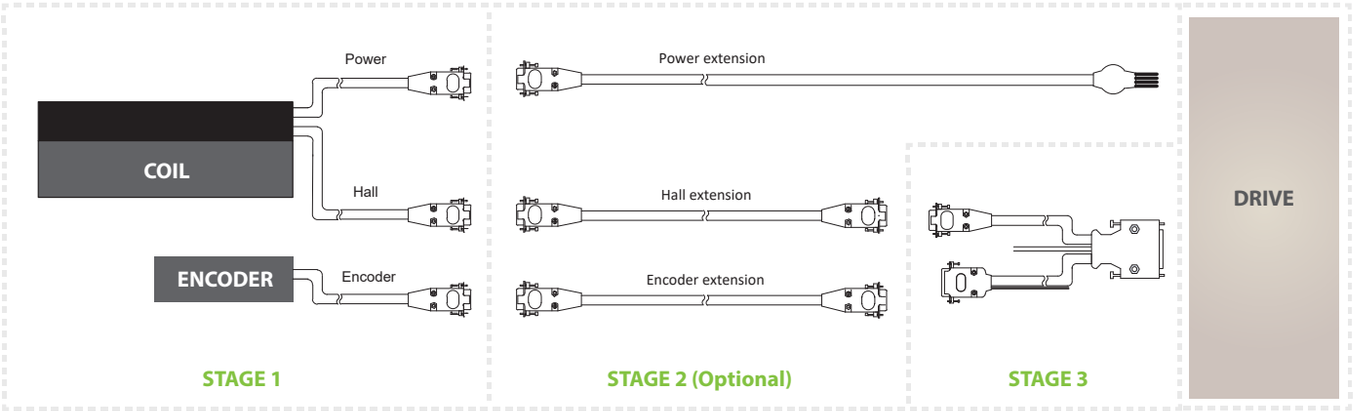


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C1	MIN:100 MAX:1000	MIN : 300 MAX: 1650	S=100+(Multiple of 60mm) L=S+A+(170mm)	80	1.4	MIN : 8.5 MAX: 50.5	W=8.5 + (Multiple of 2.8kg)
C2		MIN : 360 MAX: 1710		140	1.7	MIN : 11.3 MAX: 53.3	W=11.3 + (Multiple of 2.8kg)
C3		MIN : 420 MAX: 1770		200	2.2	MIN : 14.1 MAX: 56.1	W=14.1 + (Multiple of 2.8kg)
C4		MIN : 480 MAX: 1830		260	2.6	MIN : 16.9 MAX: 58.9	W=16.9 + (Multiple of 2.8kg)
C5		MIN : 540 MAX: 1890		320	3.0	MIN : 19.7 MAX: 61.7	W=19.7 + (Multiple of 2.8kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 2.8kg per 60mm

CABLE OPTION

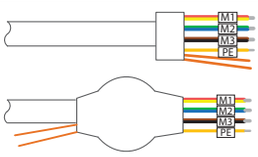


STAGE 1 — POWER AND HALL CABLE OPTION

PDAB-D5-C1-S-TM-1.0-**FC**-**HC**-E1.0-O-1600-00

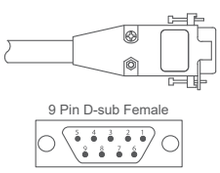
POWER CABLE OPTIONS

NF / FC



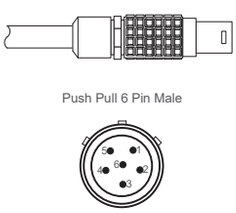
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Pink
P2	M1	Yellow
P3	M3	Black
P4	M3	Brown
P5	M2	Blue
P6	M2	Green
P7	Temp sensor 1	Orange/Black
P8	Temp sensor 2	Orange
P9	PE	White

CNF



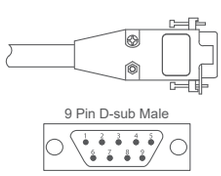
P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

HALL SENSOR OPTIONS

H

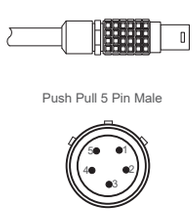
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

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

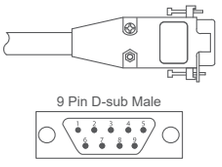
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX30B	PT100	See Note 1
DX30B	Thermostat	100°C
DX50B	Thermostat	100°C

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.

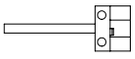
PDAB CABLE PIN OUT

ENCODER CONNECTOR - 9 PIN D-SUB MALE



	RH200X / RH200Z	RH200B
P1	0V DC	0V DC
P2	A+	Sine+
P3	Z+	Z+
P4	B+	Cosine+
P5	+5V DC	+5V DC
P6	A-	Sine-
P7	Z-	Z-
P8	B-	Cosine-
P9	Inner	Inner
Casing	Outer	Outer

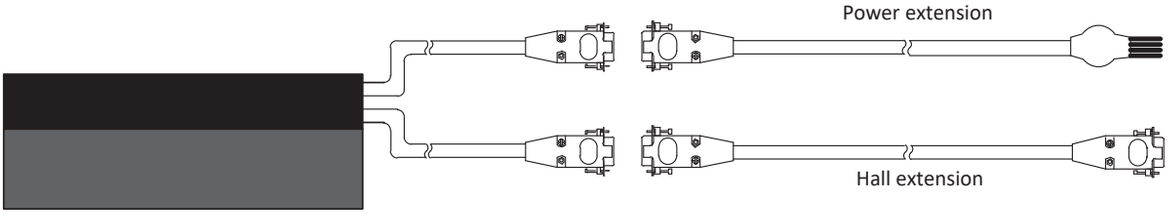
OPTICAL LIMIT SWITCH (PM-L24)

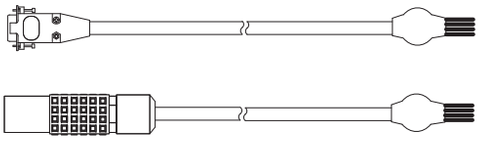
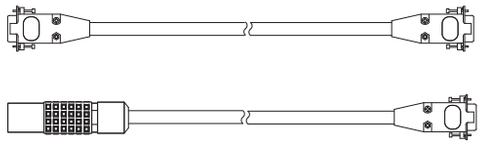
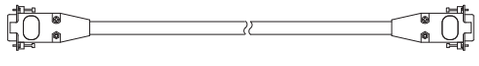


+5V dc	Brown
GND	Blue
LIGHT-ON	Black
DARK-ON	White

STAGE 2 PDAB EXTENSION CABLE

Connection example: PDAB-D5-C1-S-TM-1.0-FC-HC-E1.0-O-1600-00

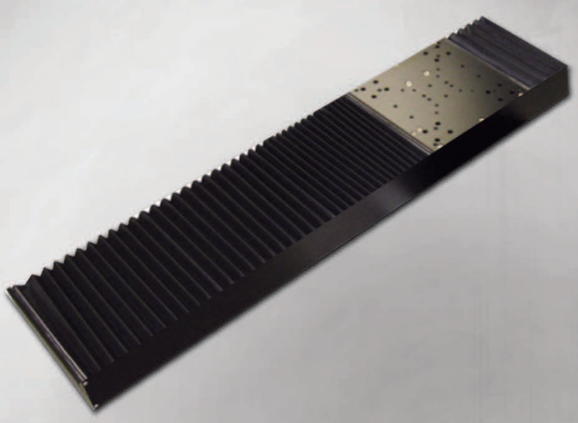


Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_DX_X.X
		CBL_EXT_PWR_DX_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X

CABLE	
01	RH200 Digital
01B	RH200 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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



PIAB SERIES

LINEAR SERVO MOTOR ACTUATOR
IRON CORE

PBA SYSTEMS

www.pbasystems.com.sg

PART NUMBERING SYSTEM

Coil Assembly

PIAB - P1 - S - TM - 1.0 - FC - HC - E1.0 - O - 1060 - 00

MOTOR MODEL	
P1	PIX200-027-030
P2	PIX200-027-050
P3	PIX200-040-050

CONNECTION TYPE	
S	Series
P	Parallel

THERMAL PROTECTION	
TC*	PT 100 Sensor
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

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

DESIGN VERSIONS	
00	Standard
01	Customized Version
	:

EFFECTIVE STROKE (mm)	
100-1700	Open Type
100-1700	Covered Type
100-1060	Bellow Type

COVER	
O	Open
C	Covered
B	Bellow

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

HALL SENSOR AND CONNECTOR OPTIONS	
NH	No Hall Sensor
H	Hall Sensor with Flying Leads (No Connector)
HC	Hall Sensor with 9 pins D Sub Male Connector
CHC	Hall Sensor with 5 pins Circular Quick Lock Male Connector

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

PIAB-P1

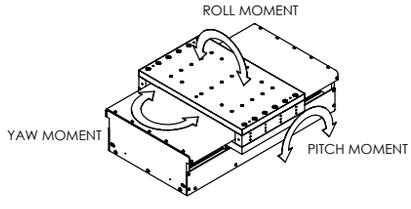
- Iron Core Actuator
- Peak force to 542N, Continuous force to 108N

PIAB SERIES
Iron Core Actuator

SPECIFICATION		MODEL	
		PIAB-P1	
Motor Parameters	**Unit**	S	P
Peak Force	N	542	
Continuous Force @ 105ºC*	N	108	
Continuous Stall Force @ 105ºC*	N	77	
Peak Power @ 105ºC	W	1823	
Continuous Power @ 105ºC*	W	73	
Peak Current	A^{pk}	30.4	60.8
Continuous Current @ 105ºC*	A^{pk}	6.1	12.2
Continuous Stall Current @ 105ºC*	Arms	4.3	8.6
Force Constant	N/A^{pk}	17.8	8.9
Back EMF Constant	$V^{pk}/m/s$	20.5	10.3
Coil Resistance L-L @ 25ºC	Ohm	1.9	0.5
Coil Resistance L-L @ 120ºC*	Ohm	2.6	0.7
Inductance L-L @ 1kHz	mH	4.9	1.2
Motor Constant @ 25ºC*	N/√W	14.9	
Motor Constant @ 120ºC*	N/√W	12.7	
Max Terminal Voltage	Vdc	600	
Accuracy			
Repeatability **	um	± 2um	
Accuracy ***	um	± 20um / 300mm	
Straightness ***	um	± 8um / 300mm	
Flatness ***	um	± 8um / 300mm	
Linear Guide Rated Load and Static Moment			
Model Code		LM Guide	
Block Quantity		4	
Maximum bearing load	kN	3.1	
Pitch moment	Nm	287	
Yaw moment	Nm	287	
Roll moment	Nm	218	

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. Specifications tolerance – inductance +/-15%, all others +/-10%.
3. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.



PIAB-P2

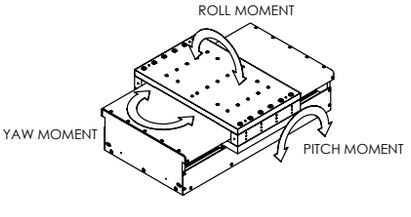
- Iron Core Actuator
- Peak force to 893N, Continuous force to 179N

PIAB SERIES
Iron Core Actuator

SPECIFICATION		MODEL	
		PIAB-P2	
Motor Parameters	**Unit**	S	P
Peak Force	N	893	
Continuous Force @ 105ºC*	N	179	
Continuous Stall Force @ 105ºC*	N	126	
Peak Power @ 105ºC	W	2323	
Continuous Power @ 105ºC*	W	93	
Peak Current	A^{pk}	29.3	88.7
Continuous Current @ 105ºC*	A^{pk}	5.9	11.7
Continuous Stall Current @ 105ºC*	Arms	4.15	8.30
Force Constant	N/A^{pk}	30.4	15.2
Back EMF Constant	$V^{pk}/m/s$	35	17.5
Coil Resistance L-L @ 25ºC	Ohm	2.6	0.7
Coil Resistance L-L @ 120ºC*	Ohm	3.6	0.9
Inductance L-L @ 1kHz	mH	7.1	1.8
Motor Constant @ 25ºC*	$N/\sqrt{W}$	21.8	
Motor Constant @ 120ºC*	$N/\sqrt{W}$	18.5	
Max Terminal Voltage	Vdc	600	
Accuracy			
Repeatability **	mm	± 2um	
Accuracy ***	mm	± 20um / 300mm	
Straightness ***	um	± 8um / 300mm	
Flatness ***	um	± 8um / 300mm	
Linear Guide Rated Load and Static Moment			
Model Code		LM Guide	
Block Quantity		4	
Maximum bearing load	kN	3.1	
Pitch moment	Nm	287	
Yaw moment	Nm	287	
Roll moment	Nm	218	

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. Specifications tolerance – inductance +/-15%, all others +/-10%.
3. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.



PIAB-P3

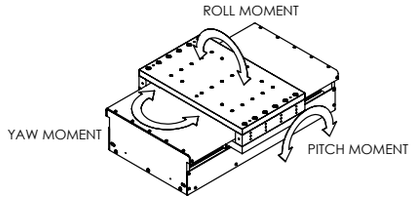
- Iron Core Actuator
- Peak force to 943N, Continuous force to 189N

PIAB SERIES
Iron Core Actuator

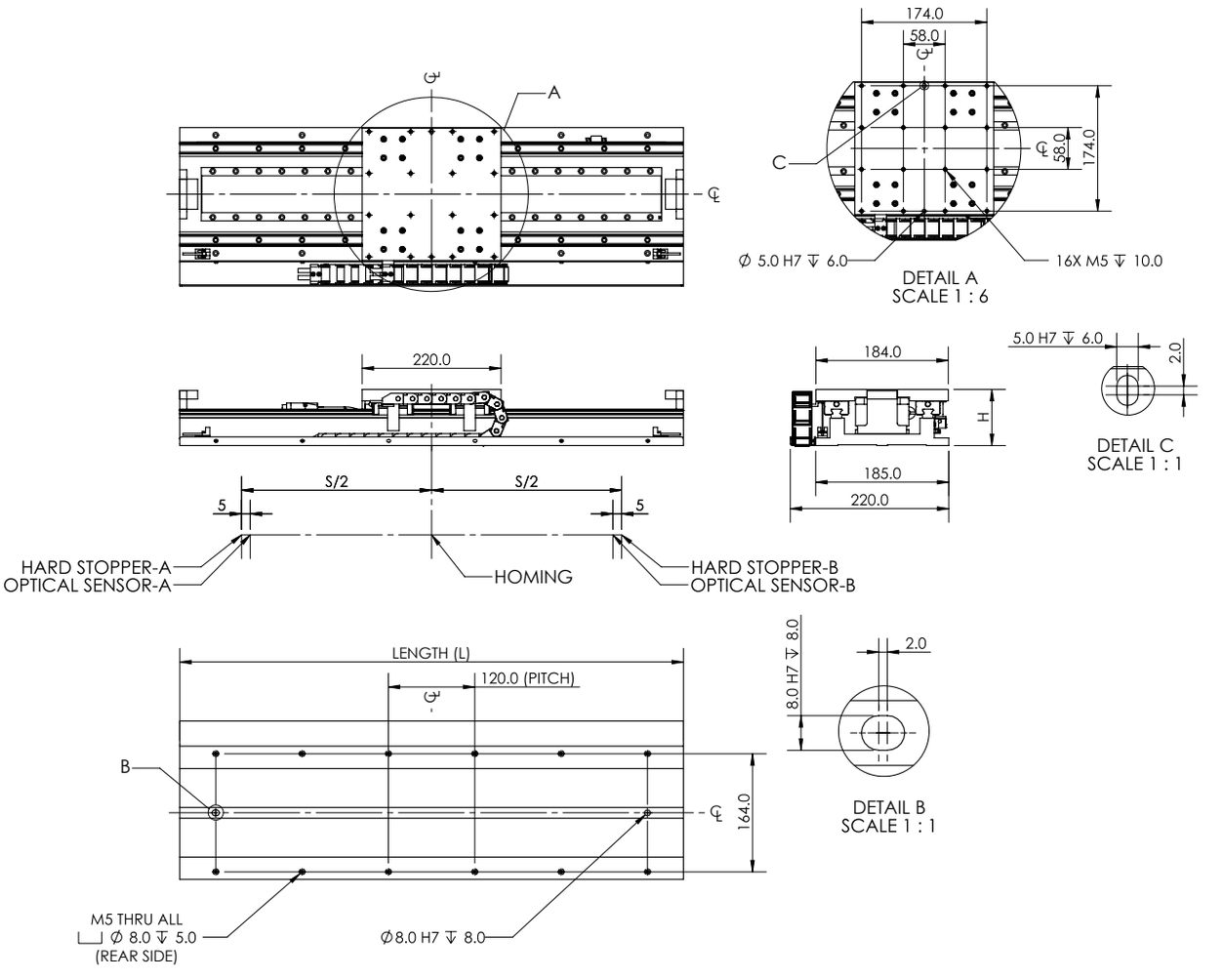
SPECIFICATION		MODEL	
		PIAB-P3	
Motor Parameters	**Unit**	S	P
Peak Force	N	1515	
Continuous Force @ 105ºC*	N	303	
Continuous Stall Force @ 105ºC*	N	214	
Peak Power @ 105ºC	W	2662	
Continuous Power @ 105ºC*	W	106	
Peak Current	A^{pk}	20.5	41.0
Continuous Current @ 105ºC*	A^{pk}	4.1	8.2
Continuous Stall Current @ 105ºC*	Arms	2.9	5.8
Force Constant	N/A^{pk}	73.9	37.0
Back EMF Constant	$V^{pk}/m/s$	85.0	42.5
Coil Resistance L-L @ 25ºC	Ohm	6.1	1.5
Coil Resistance L-L @ 105ºC*	Ohm	8.4	2.1
Inductance L-L @ 1kHz	mH	60.6	15.1
Motor Constant @ 25ºC*	N/√W	34.6	
Motor Constant @ 120ºC*	N/√W	29.4	
Max Terminal Voltage	Vdc	600	
Accuracy			
Repeatability **	mm	± 2um	
Accuracy ***	mm	± 20um / 300mm	
Straightness ***	um	± 8um / 300mm	
Flatness ***	um	± 8um / 300mm	
Linear Guide Rated Load and Static Moment			
Model Code		LM Guide	
Block Quantity		4	
Maximum bearing load	kN	3.1	
Pitch moment	Nm	287	
Yaw moment	Nm	287	
Roll moment	Nm	218	

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. Specifications tolerance – inductance +/-15%, all others +/-10%.
3. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.



PIAB - OPEN TYPE

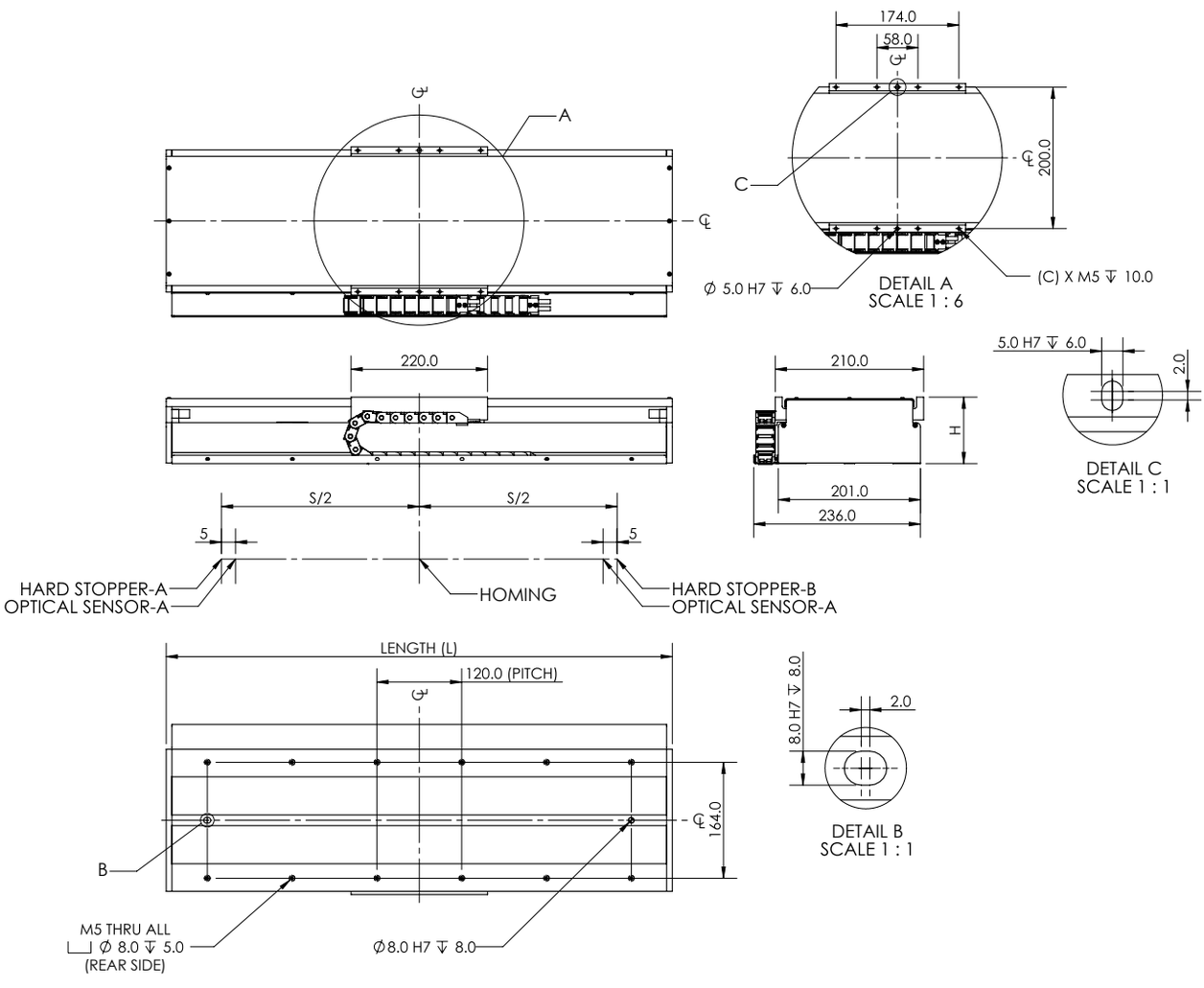


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	65	MIN:100 MAX:1700	MIN:380 MAX:1980	S=100+(Multiple of 64mm) L=S+220+(60mm)	3.1	MIN : 8.6 MAX: 40.5	W=8.6 + (Multiple of 1.2kg)
PIX200-027-050					3.8	MIN : 9.8 MAX: 41.8	W=9.8 + (Multiple of 1.2kg)
PIX200-040-050	78				4.9	MIN : 11.0 MAX: 42.9	W=11.0 + (Multiple of 1.2kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 1.2kg per 64mm

PIAB - COVERED TYPE

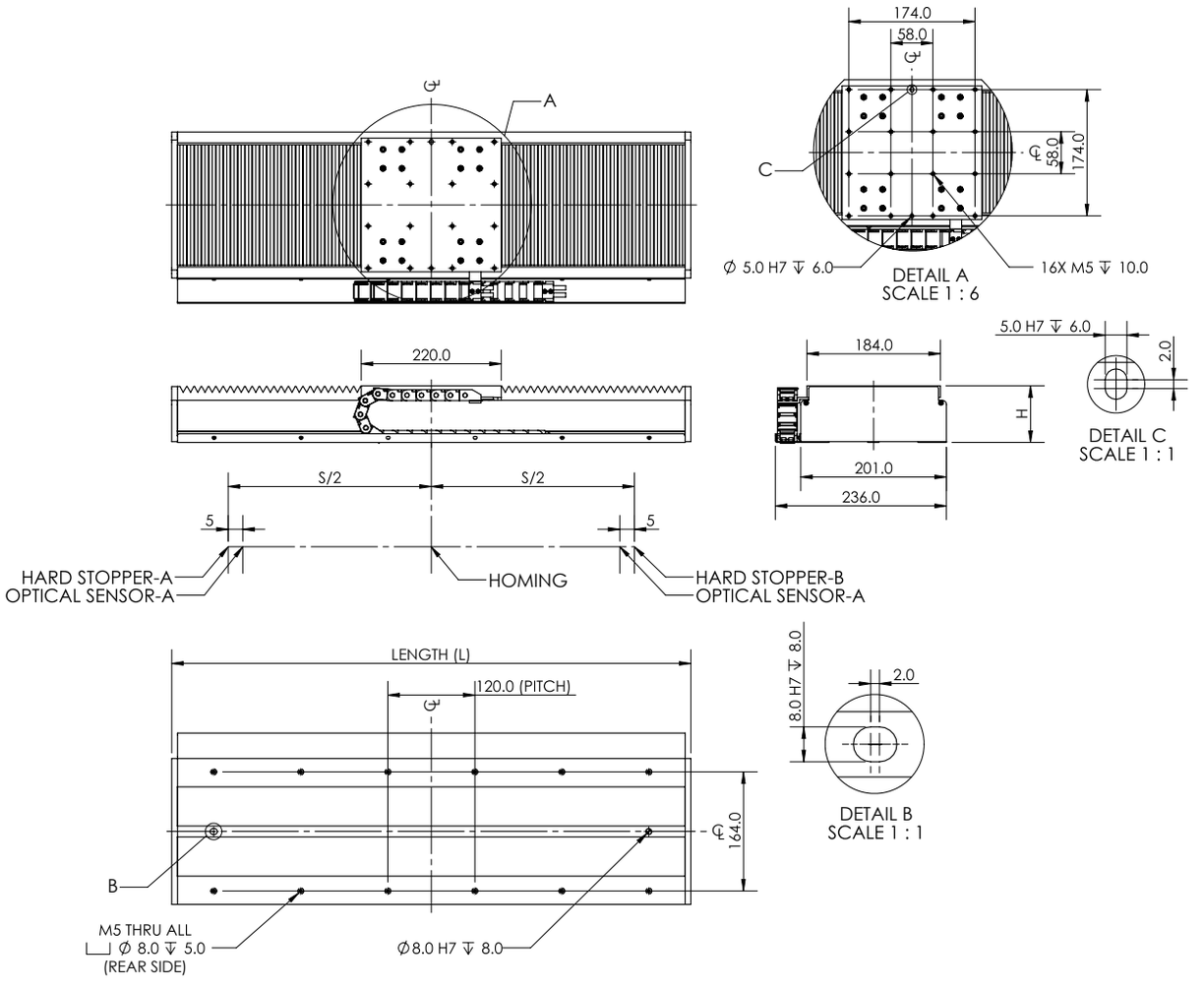


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	80	MIN:100 MAX:1700	MIN:396 MAX:1996	S=100+(Multiple of 64mm) L=S+220+(76mm)	3.5	MIN : 11.2 MAX: 46.2	W=11.2 + (Multiple of 1.4kg)
PIX200-027-050					4.2	MIN : 12.5 MAX: 47.5	W=12.5 + (Multiple of 1.4kg)
PIX200-040-050	95				5.3	MIN : 13.6 MAX: 48.6	W=13.6 + (Multiple of 1.4kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 1.4kg per 64mm

PIAB - BELLOW TYPE

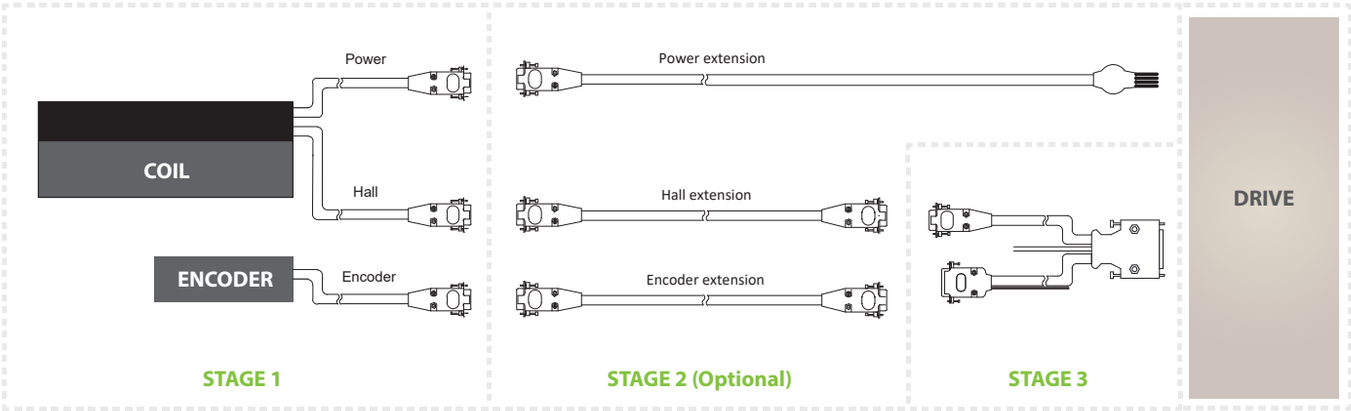


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	65	MIN:100 MAX:1060	MIN:428 MAX:1868	S=100+(Multiple of 64mm) L=S+220+(200mm)	3.3	MIN : 10.5 MAX: 30.0	W=10.5 + (Multiple of 1.3kg)
PIX200-027-050					4.0	MIN : 11.7 MAX: 31.2	W=11.7 + (Multiple of 1.3kg)
PIX200-040-050	78				5.1	MIN : 12.9 MAX: 32.4	W=12.9 + (Multiple of 1.3kg)

Notes:

1. Slider Mass = Coil Mass + Carriage Mass
2. Module mass increment of 1.3kg per 64mm

CABLE OPTION

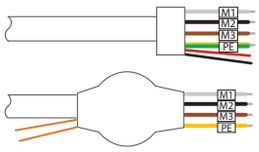


STAGE 1 — POWER AND HALL CABLE OPTION

PIAB-P1-S-TM-1.0-**FC**-**HC**-E1.0-O-1060-00

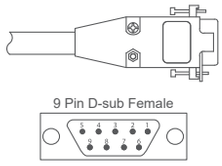
POWER CABLE OPTIONS

NF / FC



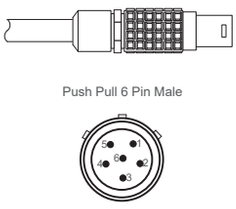
M1	Grey
M2	Brown
M3	Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Grey
P2	M1	Black(Jumper)
P3	M3	Brown
P4	M3	Black(Jumper)
P5	M2	Black
P6	M2	Black(Jumper)
P7	Temp sensor 1	Red
P8	Temp sensor 2	Black
P9	PE	Yellow & Green

CNF



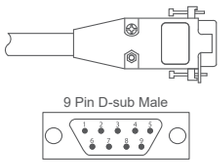
P1	M1	Grey
P2	M2	Black
P3	M3	Brown
P4	Temp sensor 1	Red
P5	Temp sensor 2	Black
P6	PE	Yellow & Green

HALL SENSOR OPTIONS

H

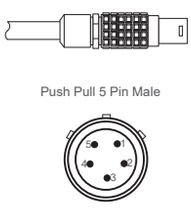
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

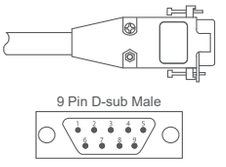
CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

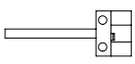
PIAB CABLE PIN OUT

ENCODER CONNECTOR - 9 PIN D-SUB MALE



	RH200X / RH200Z	RH200B
P1	0V DC	0V DC
P2	A+	Sine+
P3	Z+	Z+
P4	B+	Cosine+
P5	+5V DC	+5V DC
P6	A-	Sine-
P7	Z-	Z-
P8	B-	Cosine-
P9	Inner	Inner
Casing	Outer	Outer

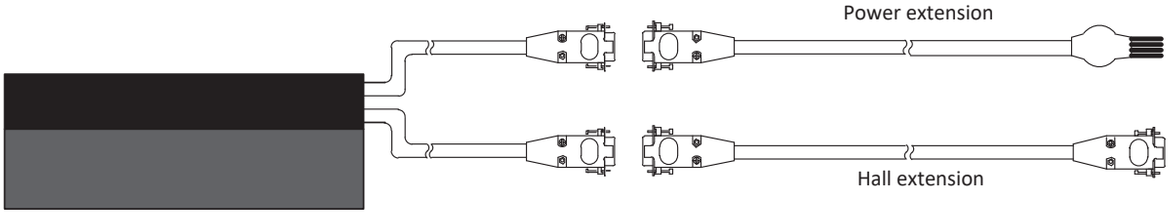
OPTICAL LIMIT SWITCH (PM-L24)

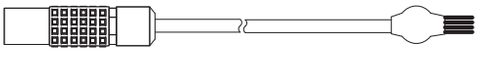
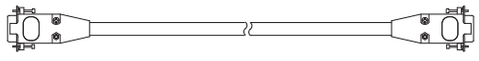
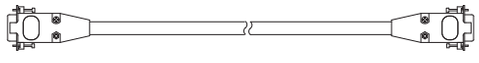


+5V dc	Brown
GND	Blue
LIGHT-ON	Black
DARK-ON	White

STAGE 2 PIAB EXTENSION CABLE

Connection example: PIAB-P1-S-TM-1.0-FC-HC-E1.0-O-1060-00

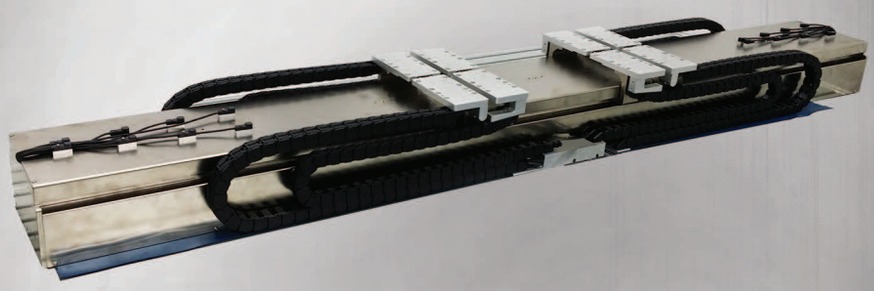


Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_PIXA_X.X
		CBL_EXT_PWR_PIXA_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_PIXA_X.X
		CBL_EXT_HALL_PIXA_CC_X.X
Encoder Extension Cable		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X

CABLE	
01	RH200 Digital
01B	RH200 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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



OCTO SERIES

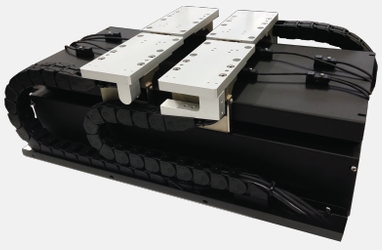
MULTI-HEAD LINEAR ACTUATOR

PBA SYSTEMS

www.pbasystems.com.sg

OCTO

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

Coil Assembly

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

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 Sensor
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 (mm)

350
650
950
1250
1550
1850
2150
2450

ENCODER RESOLUTION

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

HALL SENSOR CONNECTOR OPTIONS

H	Flying Leads (No Connector)
HC	9 pins D Sub Male Connector
CHC	5 pins Circular Quick Lock Male Connector

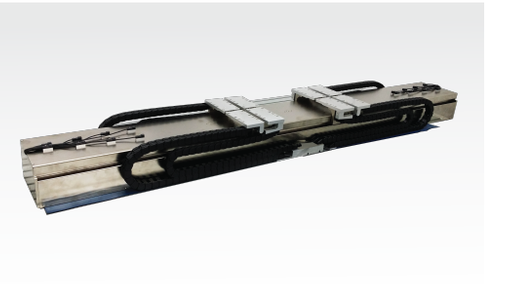
POWER CABLE OPTIONS

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

PBA OCTO ACTUATOR

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

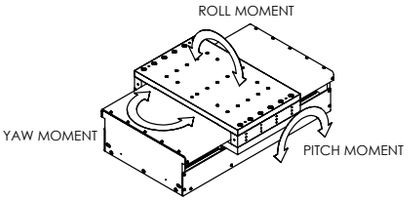


OCTO SERIES
MULTI-AXIS ACTUATOR

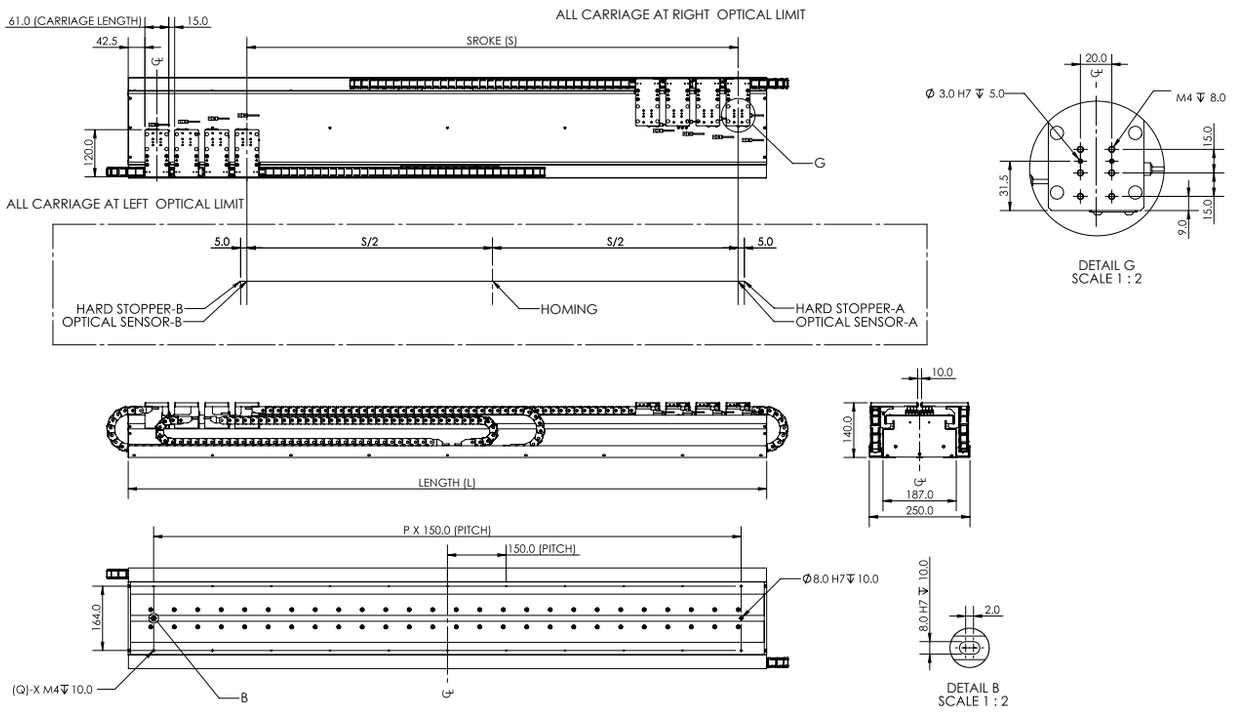
SPECIFICATION		MODEL	
		OCTO-LXX-D3-C1	
Motor Parameters	**Unit**	S	P
Peak Force	N	145	
Continuous Force @ 120ºC*	N	29	
Peak Power @ 120ºC	W	695	
Continuous Power @ 120ºC*	W	28	
Peak Current	A^{pk}	11.81	23.63
Continuous Current @ 120ºC*	A^{pk}	2.36	4.73
Continuous Stall Current @ 120ºC*	Arms	1.75	3.50
Force Constant	N/A^{pk}	12.3	6.1
Back EMF Constant	$V^{pk}/m/s$	14.1	7
Coil Resistance L-L @ 25ºC	Ohm	4.8	1.2
Coil Resistance L-L @ 120ºC*	Ohm	6.6	1.7
Inductance L-L @ 1kHz	mH	3.00	0.75
Motor Constant @ 25ºC*	N/√W	6.46	
Motor Constant @ 120ºC*	N/√W	5.49	
Max. Terminal Voltage	Vdc	400	
Thermal Resistance @ 120ºC*	ºC/W	3.42	
Max. Coil Temperature	ºC	120	
Electrical Cycle Length	mm	60	
Specifications			
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. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-30%, all others +/-10% (for motor parameters).
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.



PBA OCTO ACTUATOR

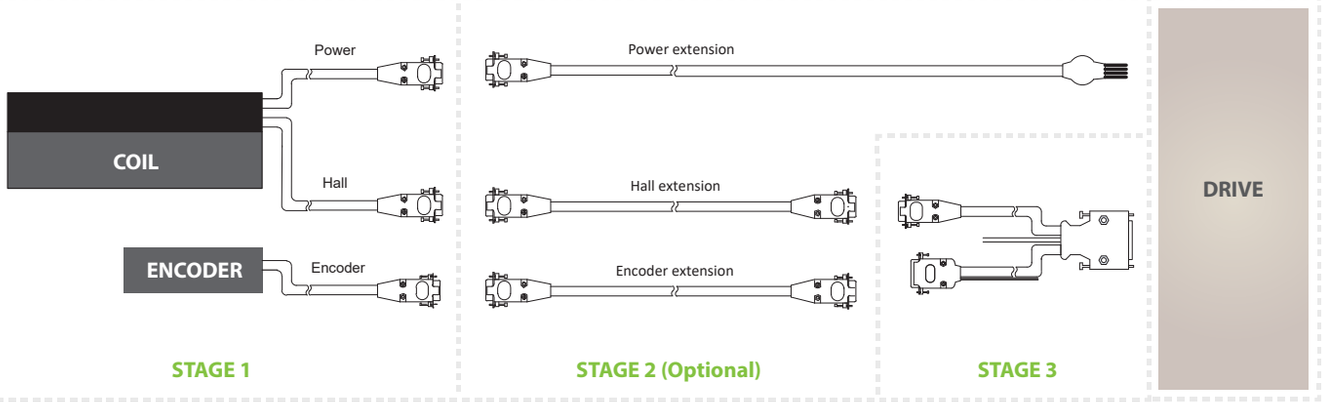


MOTOR MODEL	STROKE (S) mm	ACTUATOR LENGTH (L) mm	P	Q	SLIDER MASS kg	MODULE MASS kg
C1	350	728	04	10	0.8	10.4
	650	1028	06	14		19.8
	950	1328	08	18		29.2
	1250	1628	10	22		38.6
	1550	1928	12	26		48.0
	1850	2228	14	30		57.4
	2150	2528	16	34		66.8
	2450	2828	18	38		76.2

Notes:

1. Slider Mass = Coil Mass + Carriage Mass

CABLE OPTION

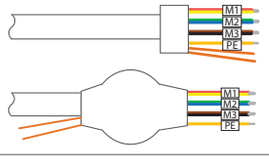


STAGE 1 — POWER AND HALL CABLE OPTION

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

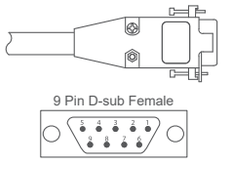
POWER CABLE OPTIONS

NF / FC



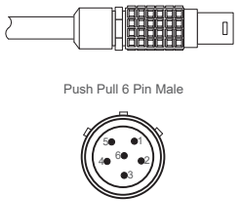
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Pink
P2	M1	Yellow
P3	M3	Black
P4	M3	Brown
P5	M2	Blue
P6	M2	Green
P7	Temp sensor 1	Orange/Black
P8	Temp sensor 2	Orange
P9	PE	White

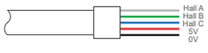
CNF



P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

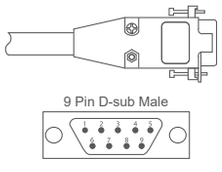
HALL SENSOR OPTIONS

H



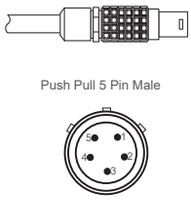
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

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

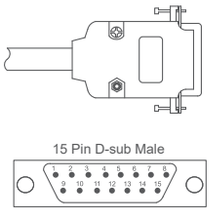
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX30B	PT100	See Note 1
DX30B	Thermostat	100°C

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.

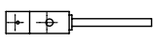
OCTO CABLE PIN OUT

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	V_P/ V_X
P8		V_Q
P9	0V	$V1^+$
P10	Q	$V2^+$
P11	E+/P	$V0^-$
P12	Z+	0V
P13	B+	
P14	A+	DIR
P15	Shield	Shield

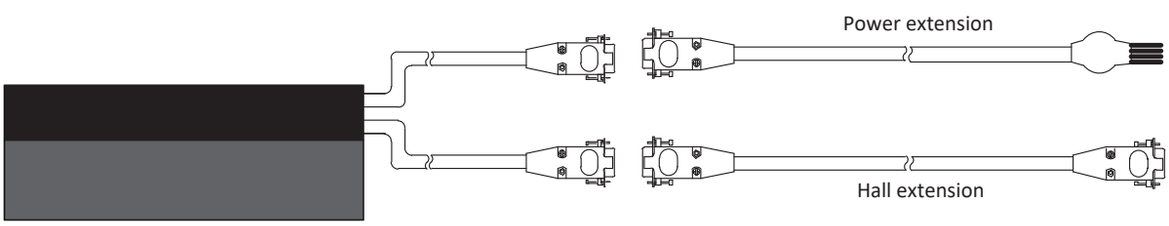
PROXIMITY SENSOR (GL-8FX10)

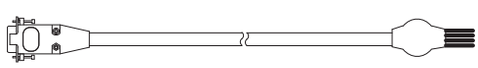
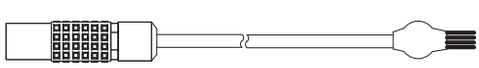
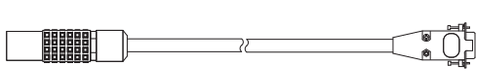
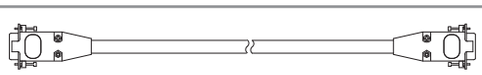


+5V dc	Brown
GND	Blue
LIGHT-ON	Black
DARK-ON	White

STAGE 2 OCTO EXTENSION CABLE

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

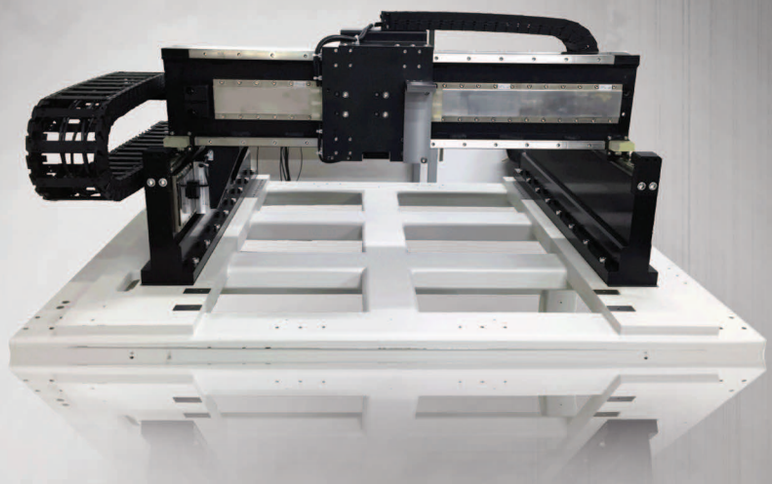


Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_DX_X.X
		CBL_EXT_PWR_DX_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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



GANTRY

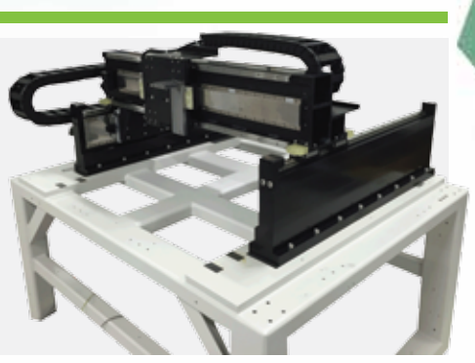
MULTI-AXIS PRECISION MODULES

PBA SYSTEMS

www.pbasystems.com.sg

PRG

MULTI-AXIS PRECISION MODULES



T and H configuration precision gantry

PBA's Rigid Gantry systems was designed for high precision/speed pick-and-place, vision inspection, dispensing stations and high-accuracy placement machines inspection.

PBA's Rigid gantries are available with choice of PBA IronCore or Ironless Direct drive motors in T or H gantry configuration with linear encoder resolutions of up to 0.8nm resolution when used with PBA Maxtune drives.

H-config with dual encoders on the bottom axes available as well for better positional accuracy and repeatability.

PRG gantries look to solve the most demanding of applications through the use of precision assembly methods and high performance motion controllers to achieve stable and consistent motion performance with short settling time, thus improving machine throughput and performance.

Application

- Optical inspection
- Precision placement
- Lens bonding
- Die sorting

* Technical specifications subject to change without prior notice

PART NUMBERING SYSTEM

Coil Assembly

PRG - T - IC - T1 - B1 - 500 - 500 - E0.5 - 00

GANTRY SERIES

GANTRY TYPE

T
H

MOTOR TYPE

IC	Iron Core

MOTOR MODEL
TOP AXIS

T1	PIX200-027-050
T2	PIX200-027-080

MOTOR MODEL
BOTTOM AXIS

B1	PIX200-027-080
B2	PIX200-040-050
B3	PIX200-040-080

DESIGN VERSIONS

00	Standard
01	Customized Version
	:

ENCODER RESOLUTION

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

EFFECTIVE STROKE
BOTTOM AXIS (mm)

372
500
628
756
884

EFFECTIVE STROKE
TOP AXIS (mm)

372
500
628
756
884

Motor Configuration

S - TM - 5.0 - FC - HC

CONNECTION TYPE

S	Series
P	Parallel

THERMAL PROTECTION

TC*	PT100 Sensor
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

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

HALL SENSOR AND CONNECTOR OPTIONS

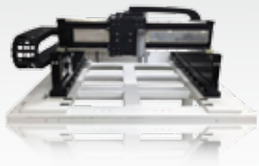
NH	No Hall Sensor
H	Hall Sensor with Flying Leads (No Connector)
HC	Hall Sensor with 9 pins D Sub Male Connector
CHC	Hall Sensor with 5 pins Circular Quick Lock Male Connector

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

NOTE : For T and B Motor Models Configuration shall be advised by Customer. Standard Configuration (00) "S-TM-5.0-FC-HC"

PRG-PIX-TOP AXIS

- Iron Core Linear Motor
- Peak force to 1393N, Continuous force to 279N



PRG SERIES
MULTI-AXIS PRECISION MODULES

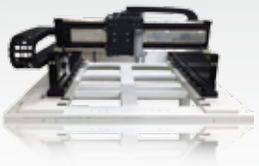
SPECIFICATION		MODEL (TOP AXIS)					
		PIX200-027-050			PIX200-027-080		
Motor Parameters	**Unit**	S	P		S	P	
Peak Force	N	893			1393		
Continuous Force @ 105ºC	N	179			279		
Continuous Stall Force @ 105ºC	N	126			197		
Peak Power @ 105ºC	W	2323			2932		
Continuous Power @ 105ºC	W	93			117		
Peak Current	A^{pk}	29.3	88.7		27.9	55.7	
Continuous Current @ 105ºC	A^{pk}	5.9	11.7		5.6	11.1	
Continuous Stall Current @ 105ºC	Arms	4.15	8.3		3.94	7.88	
Force Constant	N/Apk	30.4	15.2		50	25	
Back EMF Constant	V^{pk}/m/s	35	17.5		57.5	28.8	
Coil Resistance L-L @ 25ºC	Ohm	2.6	0.7		3.6	0.9	
Coil Resistance L-L @ 120ºC	Ohm	3.6	0.9		5	1.3	
Inductance L-L @ 1kHz	mH	7.1	1.8		10.5	2.6	
Motor Constant @ 25ºC	N/√W	21.8			30.3		
Motor Constant @ 120ºC	N/√W	18.5			25.7		
Max Terminal Voltage	Vdc	600					
Stage Parameters							
Effective Stroke (X-Axis)	mm	372	500	628	756	884	
Effective Stroke (Y-Axis)	mm	372	500	628	756	884	
Repeatability**	um	±3um					
Accuracy***	um	±40um/500mm					
Straigtness***	um	±10um/500mm					
Flatness***	um	±10um/500mm					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-15%, all others +/-10% (for motor parameters).
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.

PRG-PIX-BOTTOM AXIS

- Iron Core Linear Motor
- Peak force to 2307N, Continuous force to 461N



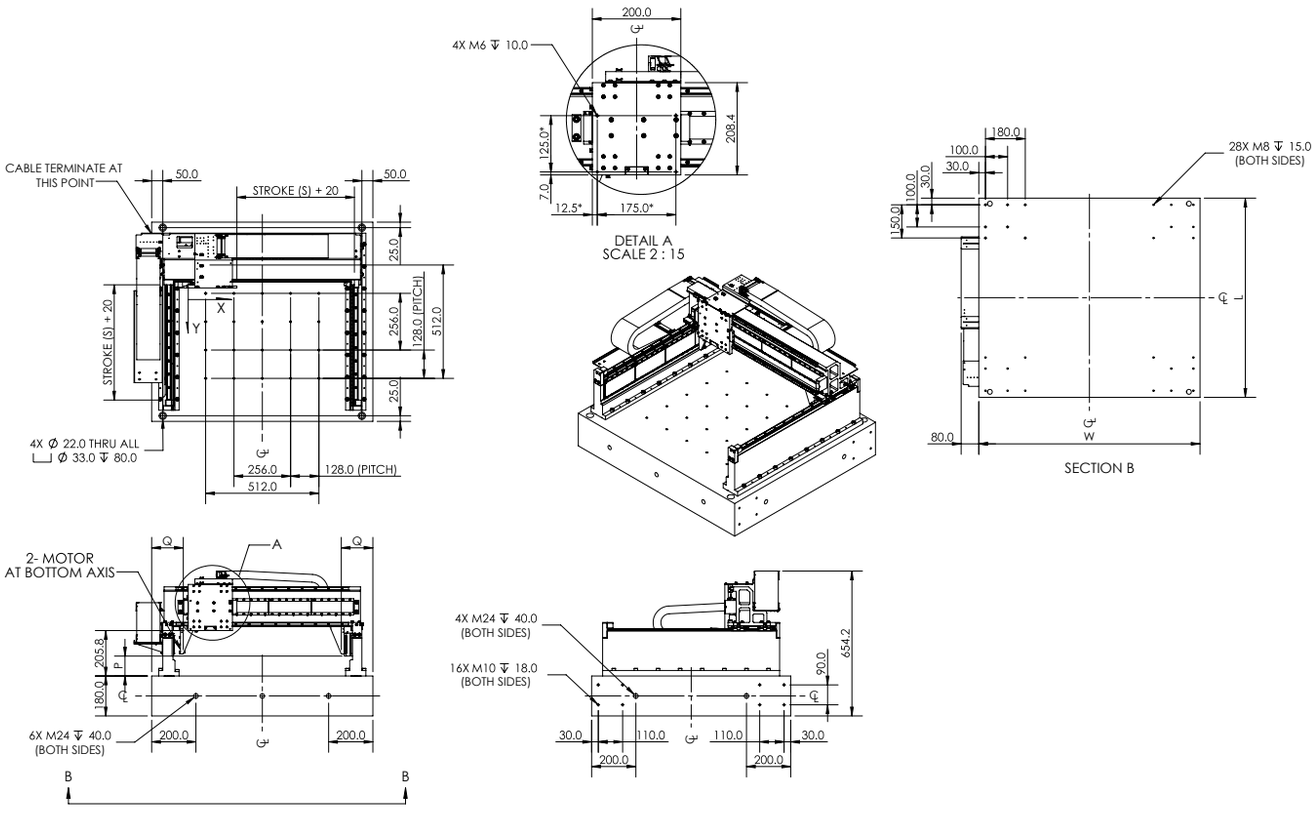
PRG SERIES
MULTI-AXIS PRECISION MODULES

SPECIFICATION		MODEL (BOTTOM AXIS)					
		PIX200-027-080		PIX200-040-050		PIX200-040-080	
Motor Parameters	**Unit**	S	P	S	P	S	P
Peak Force	N	1393		1515		2307	
Continuous Force @ 105ºC	N	279		303		461	
Continuous Stall Force @ 105ºC	N	197		214		326	
Peak Power @ 105ºC	W	2932		2662		3457	
Continuous Power @ 105ºC	W	117		106		138	
Peak Current	A^{pk}	27.9	55.7	20.5	41	19.8	39.6
Continuous Current @ 105ºC	A^{pk}	5.6	11.1	4.1	8.2	4	7.9
Continuous Stall Current @ 105ºC	Arms	3.94	7.88	2.9	5.8	2.8	5.6
Force Constant	N/Apk	50	25	73.9	37	116.5	58.3
Back EMF Constant	V^{pk}/m/s	57.5	28.8	85	42.5	134	67
Coil Resistance L-L @ 25ºC	Ohm	3.6	0.9	6.1	1.5	8.5	2.1
Coil Resistance L-L @ 120ºC	Ohm	5	1.3	8.4	2.1	11.8	2.9
Inductance L-L @ 1kHz	mH	10.5	2.6	60.6	15.1	88.7	22.2
Motor Constant @ 25ºC	N/√W	30.3		34.6		46.1	
Motor Constant @ 120ºC	N/√W	25.7		29.4		39.2	
Max Terminal Voltage	Vdc	600					
Stage Parameters							
Effective Stroke (X-Axis)	mm	372	500	628	756	884	
Effective Stroke (Y-Axis)	mm	372	500	628	756	884	
Repeatability**	um	±3um					
Accuracy***	um	±40um/500mm					
Straigtness***	um	±10um/500mm					
Flatness***	um	±10um/500mm					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. Specifications tolerance – inductance +/-15%, all others +/-10% (for motor parameters).
4. ** Depend on encoder resolution.
5. Peak force and current - 1 second duration.
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.

H CONFIGURATION PRECISION GANTRY



TOP MOTOR	* TOP SLIDER MASS kg	BOTTOM MOTOR	** BOTTOM SLIDER MASS kg	STROKE (S) mm	TOTAL GANTRY MASS kg
T1	5.7	B1 & B2	35.3	372	488.4
			41.2	500	534.8
			47.2	628	653.5
			53.0	756	809.2
			59.0	884	981.7
		B3	38.3	372	491.4
			44.2	500	537.8
			50.1	628	656.5
			56.0	756	812.2
			62.0	884	984.7
T2	6.8	B1 & B2	37.2	372	490.2
			43.3	500	536.9
			49.5	628	655.9
			55.7	756	811.8
			61.9	884	984.6
		B3	40.1	372	493.2
			46.3	500	539.9
			52.5	628	658.9
			58.7	756	814.8
			64.9	884	987.6

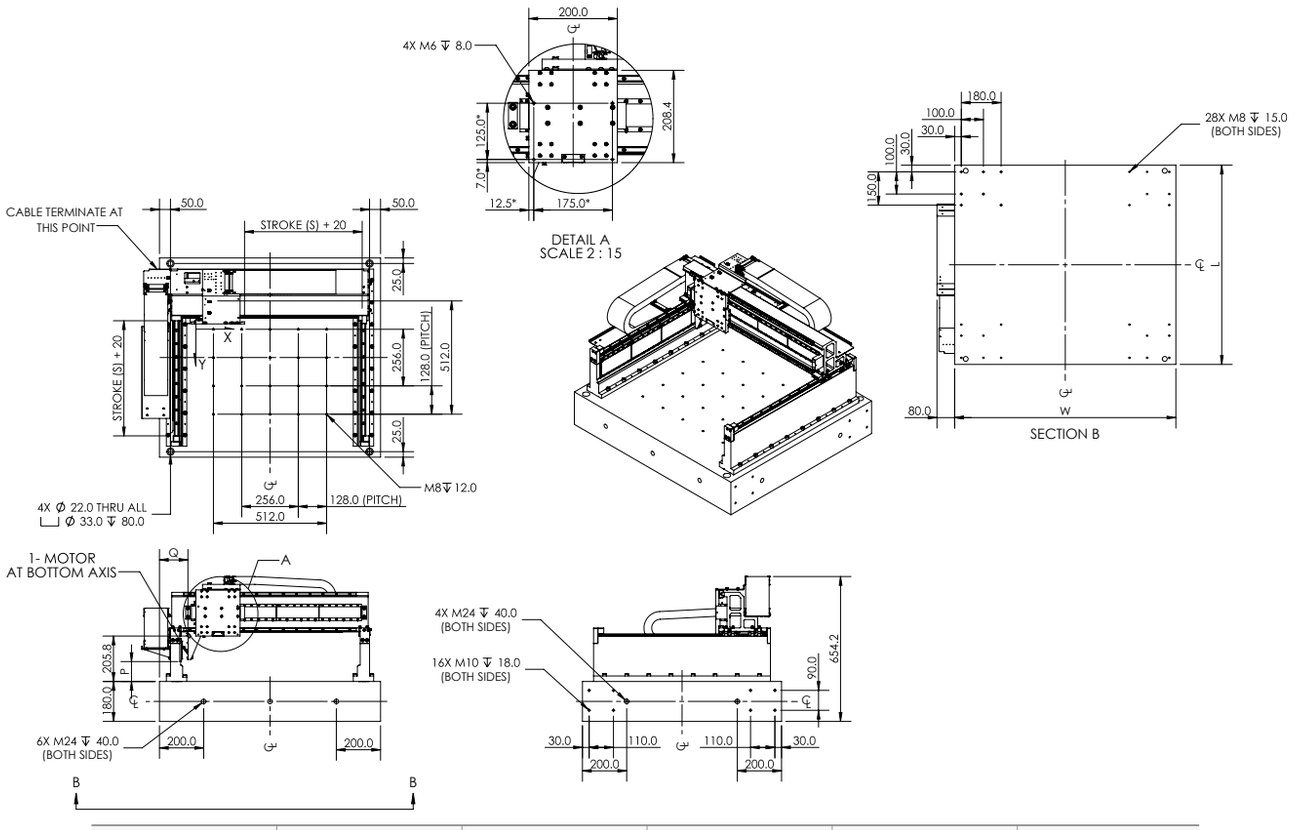
GANTRY SIZE		
STROKE X&Y (mm)	W (mm)	L (mm)
372	772	872
500	900	1000
628	1028	1128
756	1156	1256
884	1284	1384

MOTOR MASS	
MOTOR MODEL	MASS (kg)
PIX200-027-050 (T1)	2.0
PIX200-027-080 (T2)	3.1
PIX200-027-080 (B1)	3.1
PIX200-040-050 (B2)	3.1
PIX200-040-080 (B3)	4.6

MOTOR MOUNT REFERENCE		
BOTTOM MOTOR	P (mm)	Q (mm)
PIX200-027-080	90	129
PIX200-040-050	75	142
PIX200-040-080	90	142

Notes: * Top Slider Mass = Coil Mass + Carriage Mass ** Bottom Slider Mass = (Top Axis Mass) + 2 x (Bottom (Coil Mass + Carriage Mass))

T CONFIGURATION PRECISION GANTRY



TOP MOTOR	* TOP SLIDER MASS kg	BOTTOM MOTOR	** BOTTOM SLIDER MASS kg	STROKE (S) mm	TOTAL GANTRY MASS kg
T1	5.69	B1 & B2	33.2	372	481.1
			38.1	500	529.6
			44.1	628	647.7
			49.9	756	802.8
			55.9	884	974.7
		B3	33.7	372	485.3
			39.6	500	531.1
			45.5	628	649.2
			51.4	756	804.3
			57.4	884	976.2
T2	6.79	B1 & B2	34.1	372	484.9
			40.2	500	530.7
			46.4	628	648.8
			52.6	756	803.9
			58.8	884	975.8
		B3	35.5	372	486.4
			41.7	500	532.2
			47.9	628	650.3
			54.1	756	805.4
			60.3	884	977.3

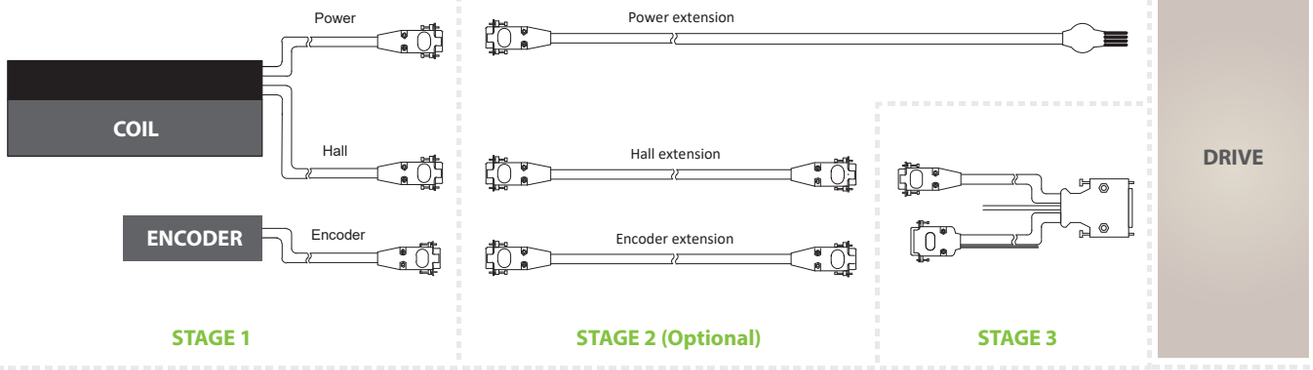
GANTRY SIZE		
STROKE X&Y (mm)	W (mm)	L (mm)
372	772	872
500	900	1000
628	1028	1128
756	1156	1256
884	1284	1384

MOTOR MASS	
MOTOR MODEL	MASS (kg)
PIX200-027-050 (T1)	2.0
PIX200-027-080 (T2)	3.1
PIX200-027-080 (B1)	3.1
PIX200-040-050 (B2)	3.1
PIX200-040-080 (B3)	4.6

MOTOR MOUNT REFERENCE		
BOTTOM MOTOR	P (mm)	Q (mm)
PIX200-027-080	90	129
PIX200-040-050	75	142
PIX200-040-080	90	142

Notes: * Top Slider Mass = Coil Mass + Carriage Mass ** Bottom Slider Mass = (Top Axis Mass) + (Bottom (Coil Mass + Carriage Mass))

CABLE OPTION

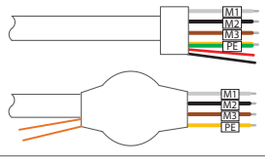


STAGE 1 — POWER AND HALL CABLE OPTION

S-TM-5.0-FC-HC

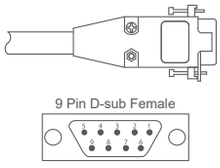
POWER CABLE OPTIONS

NF / FC



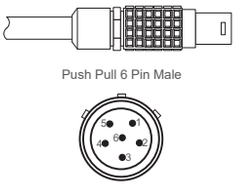
M1	Grey
M2	Brown
M3	Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



P1	M1	Grey
P2	M1	Black(Jumper)
P3	M3	Brown
P4	M3	Black(Jumper)
P5	M2	Black
P6	M2	Black(Jumper)
P7	Temp sensor 1	Red
P8	Temp sensor 2	Black
P9	PE	Yellow & Green

CNF



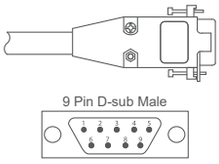
P1	M1	Grey
P2	M2	Black
P3	M3	Brown
P4	Temp sensor 1	Red
P5	Temp sensor 2	Black
P6	PE	Yellow & Green

HALL SENSOR OPTIONS

H

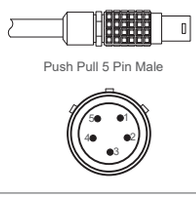
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

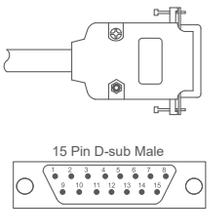
CHC



P1	Hall A	White
P2	Hall B	Green
P3	Hall C	Blue
P4	5V	Red
P5	0V	Black

ENCODER CABLE PIN OUT

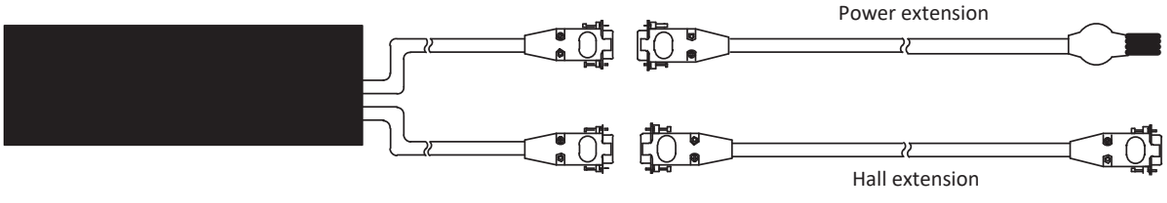
ENCODER - RGH41

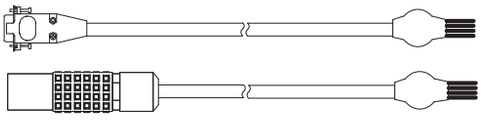
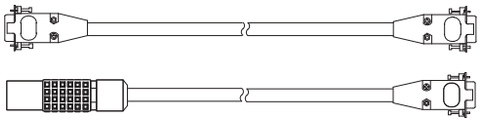
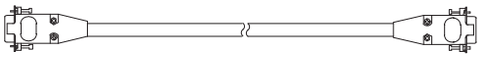


15 Pin D-sub Male	Digital	Analog
1	X	$V1^-$
2	0V	$V2^-$
3	E-	$V0^+$
4	Z-	5V
5	B-	
6	A-	BID
7	5V	V_P/ V_X
8		V_Q
9	0V	$V1^+$
10	Q	$V2^+$
11	E+/P	$V0^-$
12	Z+	0V
13	B+	
14	A+	DIR
15	Shield	Shield

STAGE 2 — PRG EXTENSION CABLE

Connection example: S-TM-5.0-FC-HC



Extension Cable		Part Number
Power Extension Cable		CBL_EXT_PWR_PIXA_X.X
		CBL_EXT_PWR_PIXA_CC_X.X
Hall Sensor Extension Cable		CBL_EXT_HALL_PIXA_X.X
		CBL_EXT_HALL_PIXA_CC_X.X
Encoder Extension Cable		CBL_EXT_REN00_X.X
		CBL_EXT_REN00A_X.X

CABLE	
00	RGH41 Digital
00A	RGH41 Analog

CABLE LENGTH (X.X)	
0.5	0.5 meter
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter
4.0	4.0 meter
5.0	5.0 meter

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

LINEAR ENCODER

PBA SYSTEMS

www.pbasystems.com.sg

LINEAR ENCODER

RH200
ENCODER SYSTEM

RoHS COMPLIANT

PBA RH200 linear encoder system is a non-contact optical encoder designed for position feedback solutions

The system uses a common reflective tape scale scanned by a readhead chosen from a range of options offering industry standard digital square wave or analogue sinusoidal output signal formats. Its unique patented optical scheme is used in all readhead series to provide high tolerance to scale contamination. RH200 is an ideal feedback solution wherever precision controlled movement is required. The RH200 readheads compact size and low mass makes the system ideal for small XY stages and actuators. An integral set-up LED enables quick and easy installation. Common applications include semiconductor/ electronics manufacturing and inspection, coordinate measuring and layout machines, height gauges, linear motors, pre-press printing and a variety of custom linear motion solutions.

Digital Range

- RH200X - 1µm resolution
- RH200Z - 0.5µm resolution

Analogue Range

- RH200B - 1Vpp differential

* Only sold together with PBA linear products. Not available for individual sales

RH200 PART NUMBERING SYSTEM

RH200 X15 A 00A

Readhead series

Digital / Cable Length		Analog / Cable Length	
X15	1µm / 1500mm	B15	Ivpp / 1500mm
Z15	0.5µm / 1500mm		

Connector

RH200 - L XXX

Readhead series

Tape Scale Length	
XXX	Length in mm

* Technical specifications subject to change without prior notice

RH200 PIN ASSIGNMENT, SPECIFICATIONS & INSTALLATION DRAWING

RH200B Analog	Signal	Colour	9 pin D type (A) (B and C outputs)
Power	5 V	Brown	5
	0 V	White	1
Incremental Signals	V_1+/I_1+	Green	2
	V_1-/I_1-	Yellow	6
	V_2+/I_2+	Blue	4
	V_2-/I_2-	Red	8
Reference Mark	V_0+/I_0+	Pink	3
	V_0-/I_0-	Grey	7
Shield	Inner	-	9
	Outer	-	Case

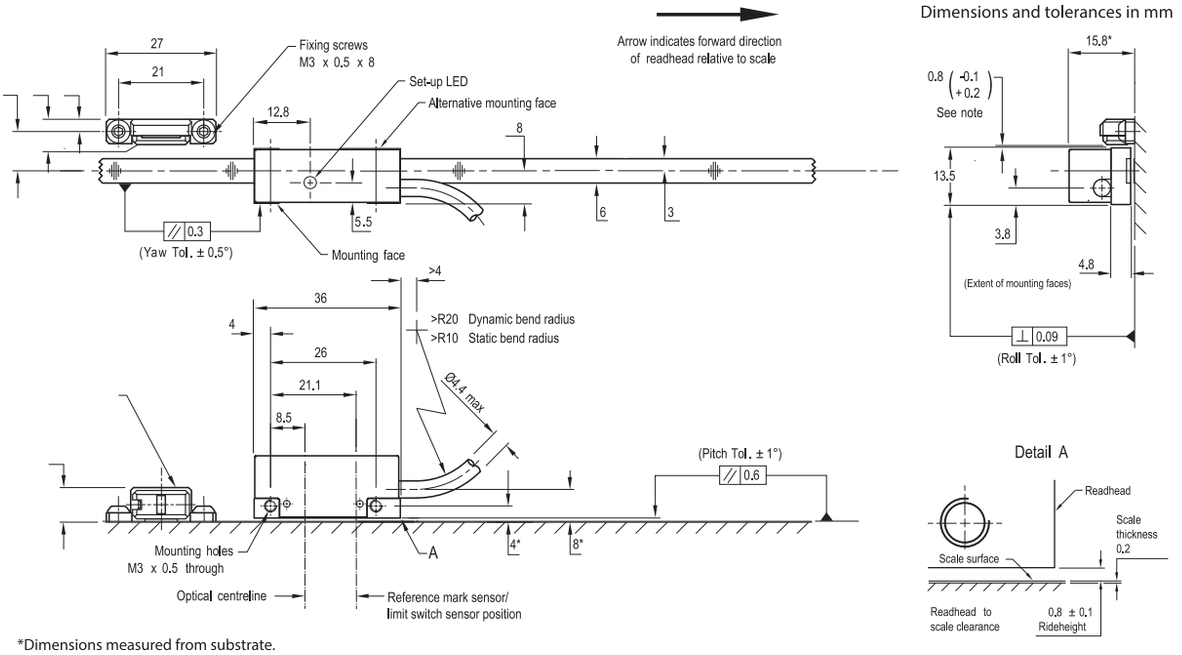
RH200X/RH200Z Digital	Signal		Colour	9 pin D type (A)
Power	5 V		Brown	5
	0 V		White	1
Incremental Signals	A	+	Green	2
		-	Yellow	6
	B	+	Blue	4
		-	Red	8
Reference mark/ Limit switch	Z+/Q-		Pink	3
	Z-/Q+		Grey	7
Shield	Inner		Inner Shield	9
	Outer		Outer Shield	Case
Remote LED Driver	Green		N/A	N/A
	Red		N/A	N/A

Operating and electrical specifications

Maximum speed	1 µm resolutiom = 5 m/s 0.5 µm resolutiom = 3 m/s
Power supply	5 V± 5% 120 mA (typical)
Temperature	Storage -20 °C to +70 °C Operating 0 °C to +55 °C
Sealing	IP40
Shock (non-operating)	1000 m/s2, 6 ms, ½ sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)
Vibration (operating) Mass	100 m/s² max @ 55 Hz to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)
	Readhead 11 g Cable 34g/m
EMC compliance (system)	BS EN 613236-1: 2006
Cable	Flex life >20 x 106 cycles at 20mm bend radius
Cable length	0.5 m or 1.5 m
Connector	9 pin 'D' type plug

Technical specifications

Analogue output period	20 µm
Digital output resolution	1µm, 0.5 µm
Scale type	Reflective gold plated steel tape with protective lacquer or polyester coating and self-adhe sive backing
Scale pitch	20 µm
Scale length	Up to 9 m in 0.5 m increments
Scale accuracy	±15 µm/m without end clamp fixing or calibration
Expansion coefficient	Matches that of substrate material with scale ends fixed by epoxy mounted end clamps
End fixing	Epoxy mounted end clamps Part Number: A-9523-4015 using 2 part epoxy adhesive Part Number: A-9531-0342
Reference mark/limit switch	Part Number: A-9541-0037
Type	Magnetic actuator
Position	One or more at user selected locations



*Dimensions measured from substrate.

NOTE: Required nominal 0.8 gap can be set using readhead spacer (supplied) positioned between readhead and actuator when positioning/fixing the actuator.

LINEAR ENCODER

ATOM MINIATURE
ENCODER SYSTEM

ATOM is the world's first miniature encoder with filtering optics, providing improvements in dirt immunity, signal stability and reliability for linear and rotary applications

ATOM features a number of other advances that help maintain signal stability, including integral Auto Gain Control and Auto Offset Control, along with a highly reliable IRED light source, making the product suitable for use in applications demanding quality and dependability.

The miniature readhead is available in 2 formats: hi-flex cable output or Flexible-Printed Circuit (FPC) output. The FPC version helps reduce overall package size, with a reduced Z-height and easy cable routing.

ATOM is available with a range of high-accuracy optical linear and rotary scales, including conventional glass spars, 'unbreakable' stainless steel tape scales and glass discs. Installation has been simplified by an intuitive set-up LED on the readhead that indicates signal level. Optical reference mark phasing and incremental signal optimisation can be achieved with the simple press of a button.

ATOM is suitable for use in a variety of applications that require compact size, including laser scanners, CMM arms, semiconductor manufacturing, compact linear motors/motion stages, small DDR torque motors, galvanometers and microscope stages.

ATOM – miniaturisation without compromise.

- Miniature package: 8.35 mm x 12.7 mm x 20.5 mm (7.3 mm x 12.7 mm x 20.5 mm for FPC version)
- Highest signal stability and dirt immunity in its class due to filtering optics
- Long-term stability provided by integral Auto Gain Control and Auto Offset Control
- Low Sub-Divisional Error (SDE) and jitter
- Easy installation and diagnostics using the set-up LED on the readhead
- Fast, simple calibration at the push of a button
- Auto-phase optical reference mark
- Available in 20 µm and 40 µm scale pitch versions
- Analogue output direct from the readhead
- Multiple interpolation options, with resolutions to 1 nm
- Range of high accuracy rotary and linear scales

* Technical specifications subject to change without prior notice

READHEAD PART NUMBERING SYSTEM

ATOM – 4 – F – 0 – 000

ATOM READHEAD

SCALE PERIOD

2	20µm
4	40µm

HEAD TYPE

F	FPC
T	Cabled: interboard connector (for use with ACi, Ri and Ti interfaces)
D	Cabled: D-type connector

CABLE LENGTH

000	FPC
020	0.2 m
050	0.5 m
080	0.8 m
100	1.0 m
150	1.5 m
300	3.0 m

HEAD GAIN SETTING

Head gain setting	RTLF (tape scale)	RCLC (glass scale)	40 µm rotary discs (mm)				20 µm rotary discs (mm)			
			<20	20	25, 27, 30	>30	30	36	50, 56, 68	108
0	✓	–	–	–	–	–	–	–	–	–
1	–	✓	–	–	–	✓	–	–	–	✓
2	–	–	–	–	✓	–	–	–	✓	–
3	–	–	–	✓	–	–	–	✓	–	–
4	–	–	✓	–	–	–	✓	–	–	–

SCALE PART NUMBERING SYSTEM

RTLF tape scale

Scale type	Length	Increments	Part number (where xxxx is the length in cm)	Head gain setting
40 µm (high accuracy)	10 mm to 90 mm	10 mm	A-9408-xxxx	0
	100 mm to 10 mm	50 mm		
40 µm	10 mm to 90 mm	10 mm	A-9407-xxxx	0
	100 mm to 10 mm	50 mm		
20 µm	10 mm to 90 mm	10 mm	A-9406-xxxx	0
	100 mm to 10 mm	50 mm		

RCLC glass scale

Length (mm)	20 µm	40 µm	Head gain setting
18	A-9404-2018	A-9404-4018	1
30	A-9404-2030	A-9404-4030	1
55	A-9404-2055	A-9404-4055	1
80	A-9404-2080	A-9404-4080	1
100	A-9404-2100	A-9404-4100	1
105	A-9404-2105	A-9404-4105	1
130	A-9404-2130	A-9404-4130	1

* Technical specifications subject to change without prior notice

INTERFACE PART NUMBERING SYSTEM

ACi interface

ACi - 0020 - A - 04 - A

Series

Interpolation factor		
Interpolation factor	Resolution	
	20 µm system	40 µm system
0020	1 µm	2 µm
0040	0.5 µm	1 µm
0080	0.25 µm	0.5 µm
0100	0.2 µm	0.4 µm
0200	0.1 µm	0.2 µm
0400	50 nm	0.1 µm
1000	20 nm	40 nm
2000	10 nm	20 nm

Options	
A	Standard

Clocked output option	
40	40 MHz (0020, 0040, 0080, 0100 and 0200 interpolation factors only)
20	20 MHz (0020, 0040, 0080, 0100 and 0200 interpolation factors only)
12	12 MHz (0400, 1000 and 2000 interpolation factors only)
10	10 MHz (0020, 0040, 0080, 0100 and 0200 interpolation factors only)
06	6 MHz (0400, 1000 and 2000 interpolation factors only)
05	5 MHz(0020, 0040, 0080, 0100 and 0200 interpolation factors only)
04	4 MHz (0400, 1000 and 2000 interpolation factors only)

PCB type			
A	FPC input connector	B	Cable input connector

Ri interface

Analogue: Ri - 0000 - A - 00 - A

Digital: Ri - 0400 - A - 12 - B

Ri Series

Interpolation factor		
Interpolation factor	Resolution	
	20µm system	40µm system
0004	5 µm	10 µm
0008	2.5 µm	5 µm
0020	1 µm	2 µm
0040	0.5 µm	1 µm
0100	0.2 µm	0.4 µm
0200	0.1 µm	0.2 µm
0400	50 nm	0.1 µm

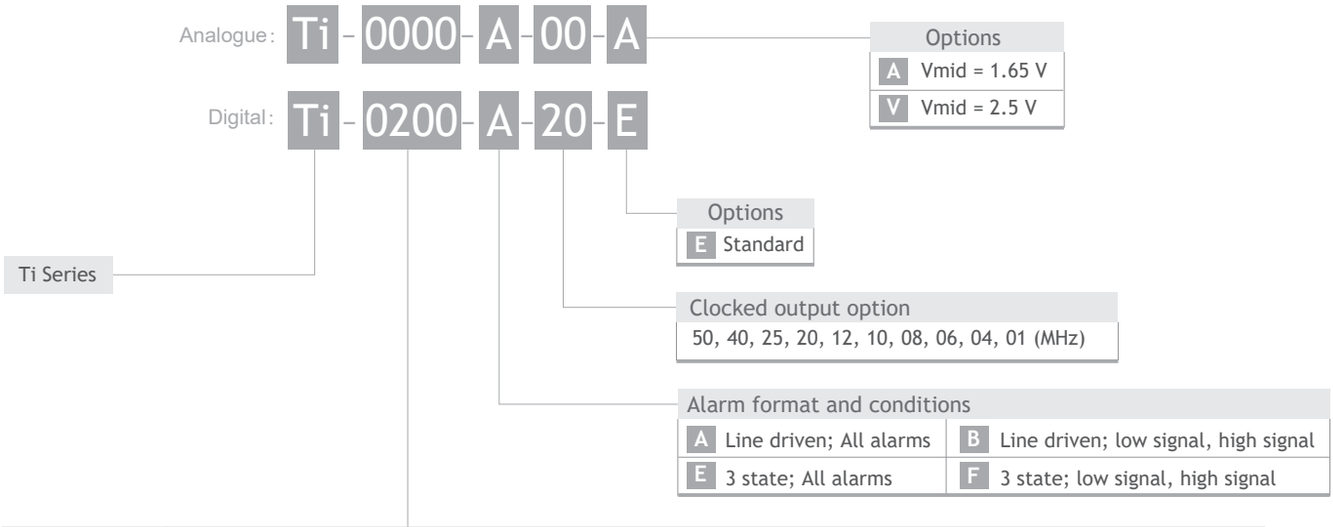
Options	
B	Standard

Clocked output option	
12	12 MHz (0200 and 0400 interpolation factors only)
10	10 MHz (0200 and 0400 interpolation factors only)
06	6 MHz (0100, 0200 and 0400 interpolation factors only)
04	4 MHz (0100, 0200 and 0400 interpolation factors only)
00	Non-clocked (0004, 0008, 0020 and 0040 interpolation factors only)

Alarm format			
A	Line driven	E	3-state

SPECIFICATIONS

Ti interface



Resolution	Interpolation factor										
	0004	0020	0040	0100	0200	0400	1000	2000	4000	10KD	20KD
20 µm system	5 µm	1 µm	0.5 µm	0.2 µm	0.1 µm	50 µm	20 µm	10 µm	5 µm	2 µm	1 µm
40 µm system	10 µm	2 µm	1 µm	0.4 µm	0.2 µm	0.1 µm	40 µm	20 µm	10 µm	4 µm	2 µm

SPECIFICATIONS

Data sheet
ATOM encoder system

General specifications

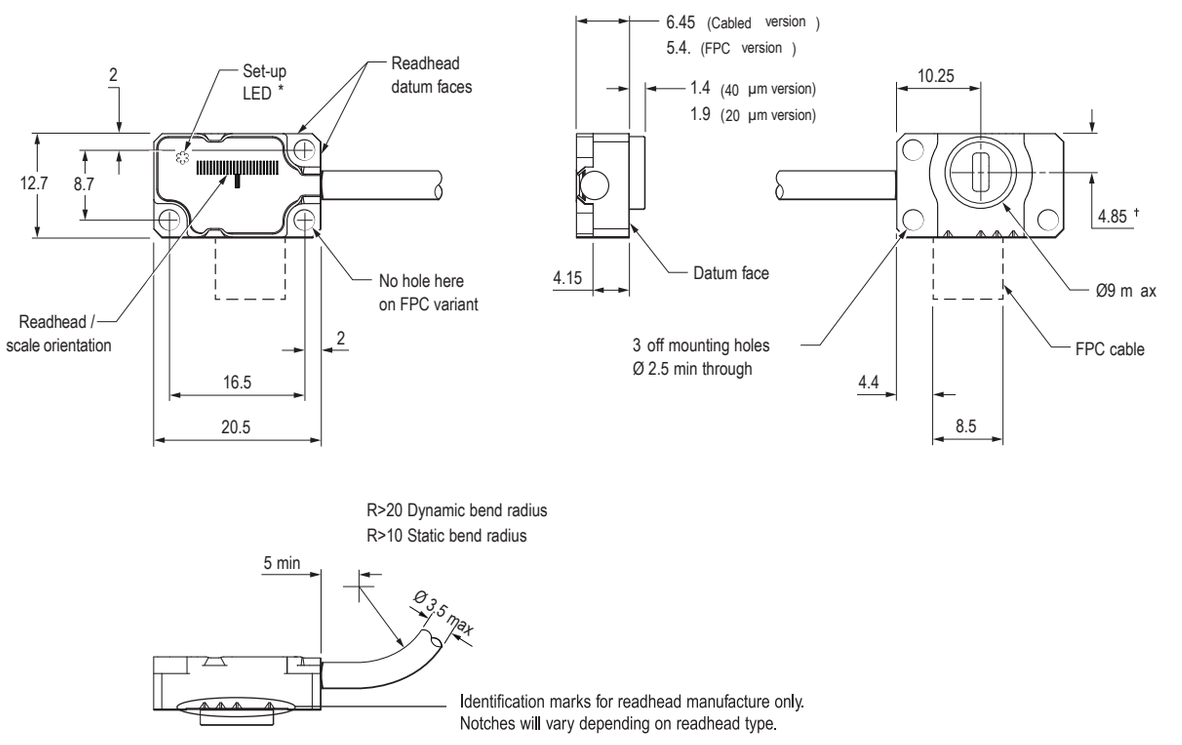
Power supply	5 V ±10%	ATOM readhead typically <50 mA ATOM with ACi typically <100 mA ATOM with Ri typically <100 mA ATOM with Ti typically <200 mA NOTE: Current consumption figures refer to unterminated systems. For analogue outputs a further 10 mA in total will be drawn when terminated with 120R For digital outputs a further 25 mA per channel pair (eg A+, A-) will be drawn when terminated with 120R. Power from a 5 V dc supply complying with the requirements for SELV or standard IEC/BS/EN 60950-1
	Ripple	200 mVpp maximum@frequency up to 500 kHz
Temperature	Storage	-20 °C to +70 °C
	Operating	0 °C to +60 °C
Humidity		Rated up to 40°C, 95% relative humidity (non-condensing)
Sealing		Cable variant IP40 Ri interface IP20 FPC variant IP20 (with lid fitted) Ti interface IP20
Acceleration (scale and readhead)	Operating	400 m/s², 3 axes BS EN 60068-2-27: 2009
Shock (scale and readhead)	Operating	1000 m/s², 6 ms, ½ sine, 3 axes BS EN 60068-2-27: 2009
Vibration	Operating	100 m/s² max @ 55 Hz to 2000 Hz, 3 axes BS EN 60068-2-6: 2008
Mass		FPC readhead 2.3 g Cable readhead 4 g Cable 18 g/m ACi 4 g Ri 70 g Ti 100 g
EMC compliance	Cable variant	BS EN 61326-1: 2013
	FPC variant and ACi	Designed as system components and to be compliant with EMC regulations for products of their type. Care must be taken with shielding and grounding arrangements to ensure EMC performance once installed. It is the system integrator's responsibility to implement, test and prove EMC compliance for the whole machine.
Environmental		Compliant with EU Directive 2011/65/EU (RoHS)
Readhead cable		10 core, high flex, EMI screened cable, outside diameter 3.5 mm maximum Flex life >20 x 10^6 cycles at 20 mm bend radius, maximum length 1.5 m. (Extension cable up to 25 m when using Renishaw approved extension cable) UL recognised
FPC cable		16 core, 0.5 mm pitch, maximum exposed conductor length 2.5 mm, maximum length 1 m
Connector options	Cable variants	Interboard connector compatible with the Ri, Ti and ACi (cable variant) interfaces 15 way, D-type connector
	FPC	16 core, 0.5 mm pitch, compatible with ACi (FPC variant)
Typical SDE (analogue)		40 µm version <±120 nm 20µm version <±75 nm

ATOM READHEAD DIMENSIONS

Data sheet
ATOM encoder system

ATOM readhead dimensions

Dimensions and tolerances in mm

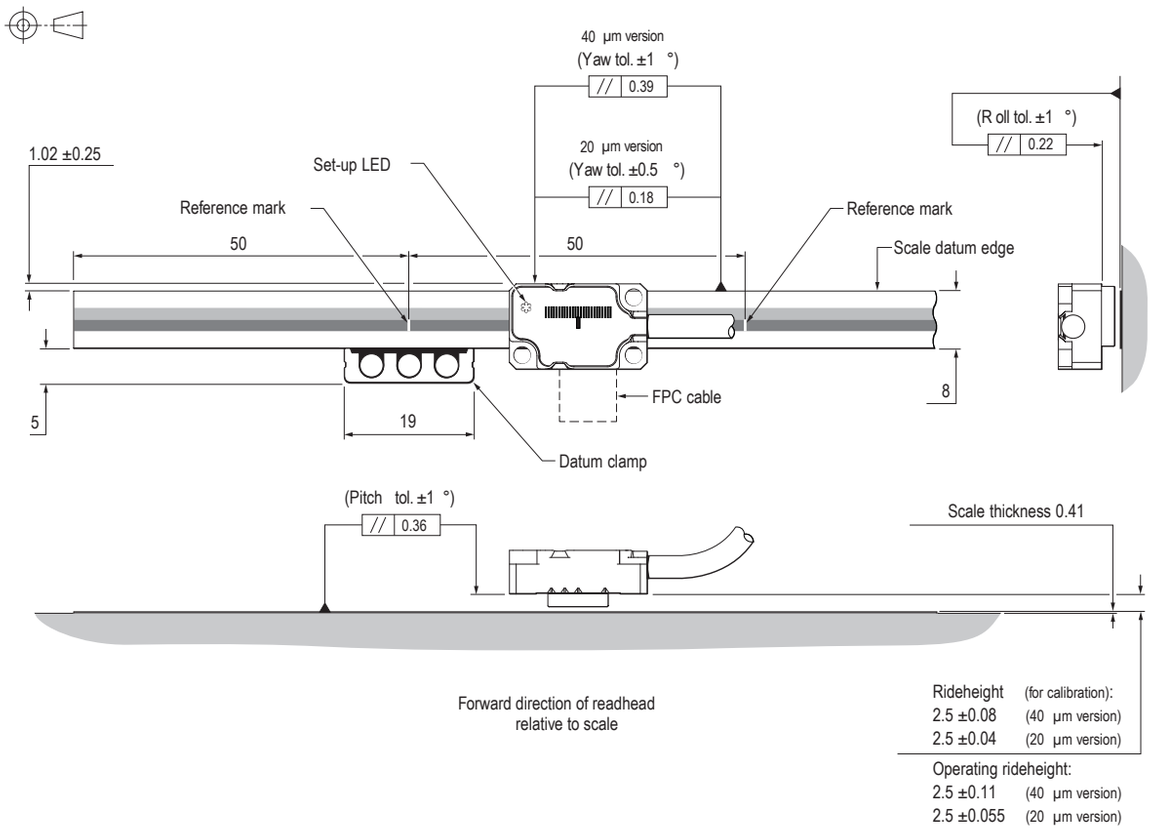


*On FPC variants the Set-up LED cut-out is circular.
†Not optical centreline.

Maximum speed	40 µm system – 20 m/s 20 µm system – 10 m/s

RTLF TAPE SCALE INSTALLATION DRAWING

Dimensions and tolerances in mm



For detailed installation drawings refer to www.renishaw.com.

Technical specifications

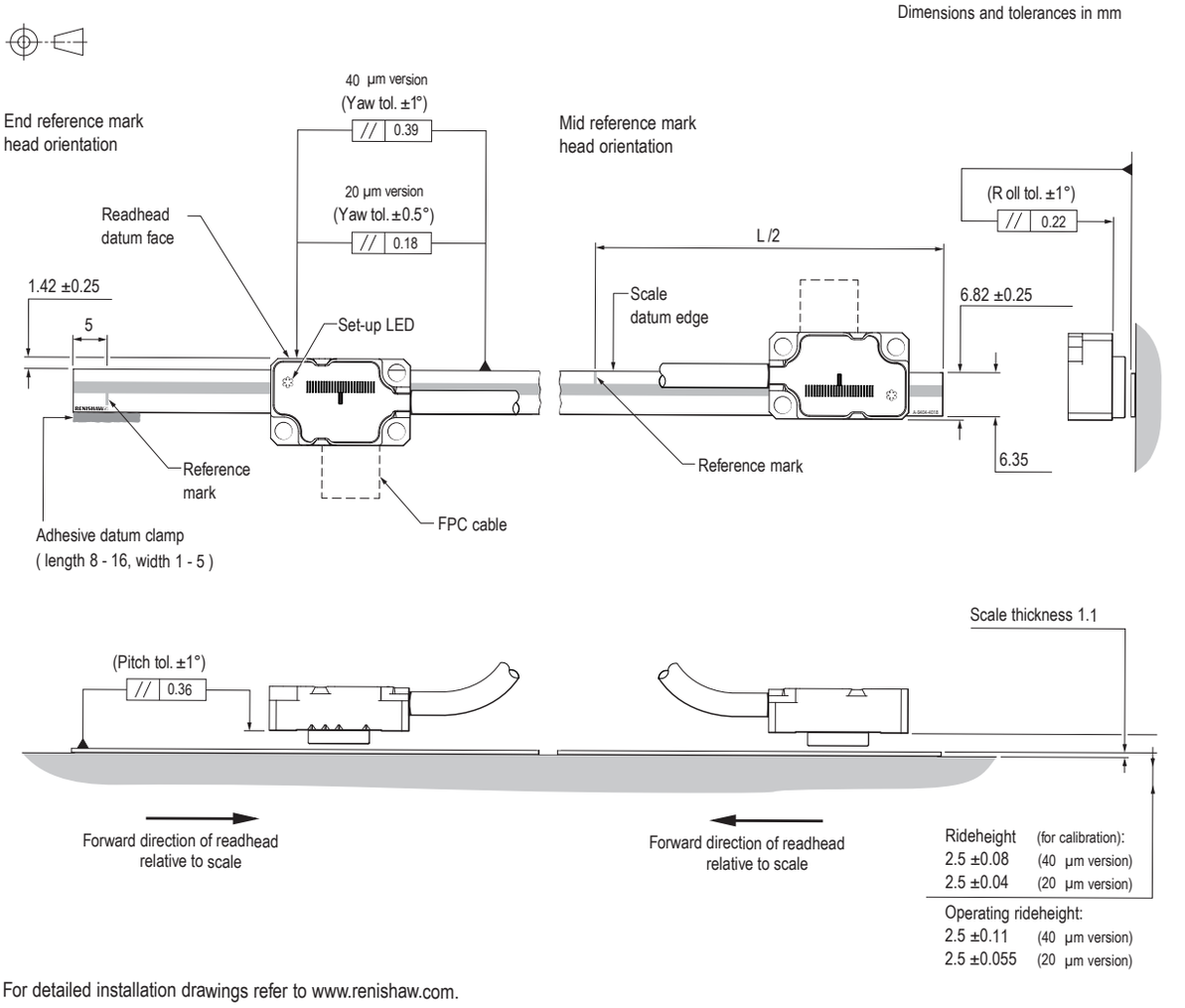
Material	Hardened and tempered martensitic stainless steel fitted with a self-adhesive backing tape
Form	0.41 mm x 8 mm (H x W) (including adhesive)
Scale pitch	20 µm and 40 µm
Datum fixing	Adhesive datum clamp (A-9585-0028) secured with Loctite® 435
Reference mark	Auto-phase optical reference mark repeatable to unit of resolution throughout specified speed and temperature range Customer de-selectable reference marks at 50 mm spacing Reference mark in the centre of scale for lengths <100 mm
Accuracy (at 20 °C)	40 µm (high accuracy) ±5 µm/m 40 µm ±15 µm/m 20 µm ±5 µm/m
Coefficient of thermal expansion	~10.6 µm/m/°C*
Length	10 mm to 90 mm in 10 mm increments 100 mm to 10 m in 50 mm increments Measuring length = Overall length - 3 mm
Mass	12.2 g/m

*Substrate coefficient of thermal expansion does not need to match that of the scale.

Maximum recommended axis length 1 m for 20µm systems.

RCLC GLASS SPAR INSTALLATION DRAWING

Dimensions and tolerances in mm



For detailed installation drawings refer to www.renishaw.com.

Technical specifications

Material	Soda lime glass fitted with a self-adhesive backing tape
Form	1.1 mm x 6.35 mm (H x W) (including adhesive)
Scale pitch	20 µm and 40 µm
Datum fixing	Fillet of adhesive (A-9531-0342) on one side of the scale
Reference mark	Auto-phase optical reference mark repeatable to unit of resolution throughout specified speed and temperature range Either mid or one end of travel, determined by orientation of the readhead
Accuracy (at 20 °C)	±3 µm
Coefficient of thermal expansion	~8 µm/m/° C
Length (mm)	

Overall length (L)	18	30	55	80	100	105	130
Measuring length	15	27	52	77	97	102	127

Mass	13.9 g/m

LINEAR ENCODER

RGH41 SERIES

READHEAD

Renishaw's 40 µm RGH41 series readheads offer all the benefits of the established 20 µm RG2 linear encoder system, such as reflective tape scale, patented filtering optics, set-up LED, good dirt immunity and high speed.

These compact readheads with integral interpolation provide an increased range of resolutions to match the demands of a wide range of applications, whilst their high speed enables an increase in the productivity of the end-user's system.

The 40 µm RGH41 increases the already generous set-up tolerances of the RG2, whilst maintaining Renishaw's famous contamination immunity.

For added flexibility, dual limit switch sensing is included as standard to enable dedicated signals for each end-of-axis indication, along with a repeatable reference or datum mark.

These benefits give the RGH41 greater flexibility complementing the breadth of applications in which the RG2 is already used, from co-ordinate measuring and layout machines to electronics assembly and test, linear motors and a host of custom linear motor solutions.

- **Digital range**
  - RGH41T - 10 µm resolution
  - RGH41D - 5 µm resolution
  - RGH41G - 2 µm resolution
  - RGH41X - 1 µm resolution
  - RGH41N - 0.4 µm resolution
  - RGH41W - 0.2 µm resolution
  - RGH41Y - 0.1 µm resolution
  - RGH41H - 50 nm resolution
- **Analogue range**
  - RGH41B - 1 Vpp differential (single limit)
  - RGH41A - 1 Vpp differential (dual limit)
- Non-contact open optical system
- Large installation tolerances
- High speed operation up to 15 m/s
- Industry standard digital and analogue output options
- Resolutions from 10 µm to 50nm
- Integral reference and dual limit sensors
- Integral set-up LED
- Uses Renishaw RGS40-S self-adhesive scale

* Technical specifications subject to change without prior notice

READHEAD PART NUMBERING SYSTEM

RGH41 - B - 15 - L - 00A

Options	
00A	analogue output 1 Vpp (RGH41A and B only)
03A	digital head, single limit sensing, differential alarm signal (RGH41D, G, T and X only)
04A	digital head, single limit sensing, 3 state alarm signal (RGH41D, G, T and X only)
05A	digital head, dual limit sensing, single ended alarm signal (RGH41D, G, T and X only)
06A	digital head, dual limit sensing, 3 state alarm signal (RGH41D, G, T and X only)
17A	analogue output 1 Vpp, V termination with BID/DIR (RGH41B only)
18A	analogue output 1 Vpp, W termination with BID/DIR (RGH41B only)
61	20 MHz customer clock (RGH41H, N, W and Y only)
62	10 MHz customer clock (RGH41H, N, W and Y only)
63	5 MHz customer clock (RGH41H, N, W and Y only)

Termination	
D	15 pin D type plug (RGH41D, G, H, N, T, W, X and Y only)
F	unterminated cable
L	15 pin D type plug (RGH41A and B only)
S	to be used in conjunction with option 17A and 18A (RGH41B only -limits not available)
V	12 pin circular plug for analogue (RGH41B only - limits not available)
W	12 pin circular coupling (RGH41B only - limits not available)
X	16 pin in-line connector

Cable length	
05	0.5 m
10	1 m
15	1.5 m
30	3 m
50	5 m

Output Analogue	
A	1 Vpp (Dual limit version)
B	1 Vpp (Single limit version)

Digital			
T	10 µm	N	0.4 µm
D	5 µm	W	0.2 µm
G	2 µm	Y	0.1 µm
X	1 µm	H	50 nm

Readhead series

* Technical specifications subject to change without prior notice

OPERATING AND ELECTRICAL SPECIFICATIONS

Power supply	5 V± 5% 120 mA (typical), 175 mA (RGH41N, W, Y, H) NOTE: For digital outputs, current consumption figures refer to unterminated readheads/interfaces. A further 25 mA per channel pair (eg A+, A-) will be drawn when terminated with 120 Ω. Renishaw encoder systems must be powered from a 5 V dc supply complying with the requirements for SELV of standard EN (IEC) 60950. Ripple <200 mVpp maximum @ frequency up to 500 kHz maximum
Temperature	Storage -20 °C to +70 °C Operating 0 °C to +55 °C
Humidity	Storage 95% maximum relative humidity (non-condensing) Operating 80% maximum relative humidity (non-condensing)
Sealing	IP50
Acceleration	Operating 500 m/s^2 BS EN 60068-2-7:1993 (IEC 68-2-7:1983)
Shock (non-operating)	1000 m/s^2, 6 ms, ½ sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)
Vibration (operating)	100 m/s^2 max @ 55 Hz to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)
Mass	Readhead 50 g Cable 38 g/m
EMC compliance (system)	BS EN 61000 BS EN 55011
Cable	12 core, double-shielded, maximum outside diameter 4.7 mm Flex life >20 x 10^6 cycles at 50 mm bend radius

Connector options

Code - connector type	Application
D - 15 pin 'D' type plug	RGH41T, D, G, X, N, W, Y, H
L - 15 pin 'D' type plug	RGH41A, B
V - 12 pin circular plug	RGH41B
W - 12 pin circular coupling plug	RGH41B
F - Flying lead	All readheads
X - 16 pin in line connector	All readheads

Technical specifications

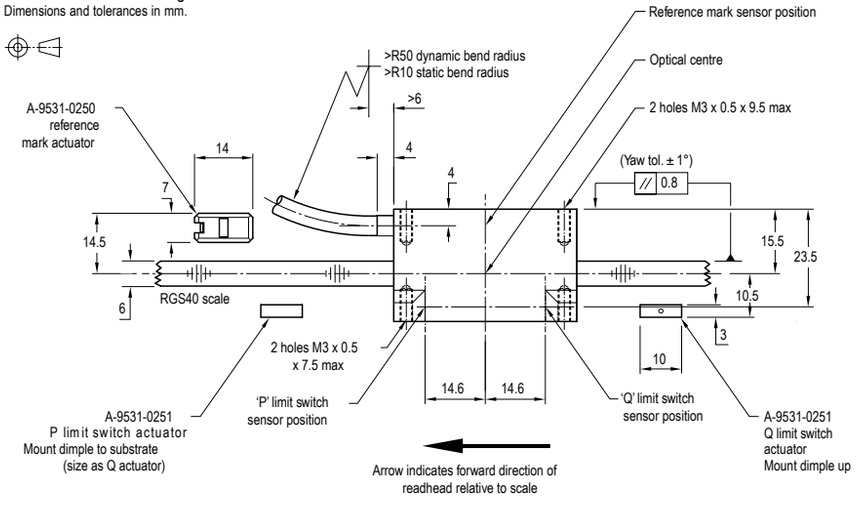
Scale

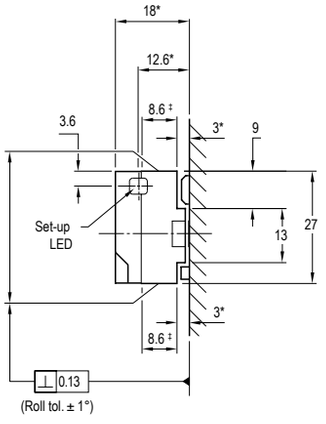
Type	Reflective gold plated steel tape with protective lacquer coating or tough polyester coating option for applications using harsh solvents and self-adhesive backing
Scale pitch	RGS40-S, RGS40-PC = 40 µm
Linearity	RGS40-S = ± 3 µm/m, ± 1 µm/60 mm RGS40-PC = ±5 µm/m, ±1.5 µm/60 mm
Scale length	100 mm - 50 m (>50 m by special order)
Substrate materials	Metals, ceramics and composites with expansion coefficients between 0 and 22 µm/m/°C (steel, aluminium, invar, granite, ceramic etc.)
Expansion coefficient	Matches that of substrate material with scale ends fixed by epoxy mounted end clamps
End fixing	Epoxy mounted end clamps (A-9523-4015) using 2 part epoxy adhesive (A-9531-0342) Scale end movement <1 µm over temperature range -20 to 50 °C
Operating specification	Temperature: -10 to 120 °C (Scale only, also refer to readhead Data sheet) Minimum installation temperature 10 °C Humidity: 80% maximum RH (non-condensing)

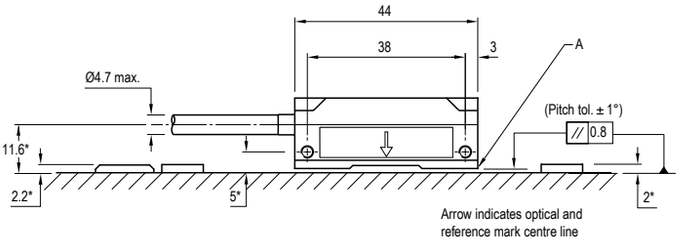
* Technical specifications subject to change without prior notice

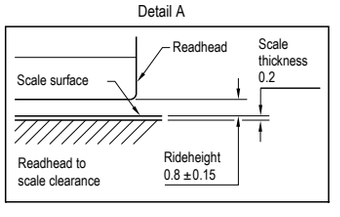
READHEAD PART NUMBERING SYSTEM

RGH41 Installation drawing
Dimensions and tolerances in mm.









*Dimension measured from substrate
‡Alternative mounting faces

SERVO AMPLIFIER

MX

DELTA

MELSERVO J4

TECHNOSOFT
MOTION TECHNOLOGY

PBA
SYSTEMS

www.pbasystems.com.sg

MAX TUNE

INTELLIGENT SERVO DRIVE

MX MaxTune

USER MANUAL

120/240 VAC 400/480VAC

Document Revision: 4.01
DOC-MaxTune-UM-EN

PBA SYSTEMS

www.pbasystems.com.sg

DIGITAL SERVO CONTROL

MAXTUNE

INTELLIGENT SERVO DRIVE

PBA Systems introduces MaxTune, the next-generation high performance servo drive. MaxTune features hardware and software design innovations that deliver superior servo performance, industry-leading power density, and extensive versatility at a competitive price.

Supports a wide range of applications and requirements

MaxTune supports a wide range of applications, covering a variety of industries. It can be coupled with any servo motor type, including rotary and linear brushless DC motors, as well as DC brush motors.

High Servo Update Rates

32kHz in the Current Loop, 8kHz in the Velocity Loop and 4kHz in the Position Loop. This is far higher than most servo drives in the market.

High Performance with your Analog Motion Control Card

The high update rate of 32kHz in the Current Loop as well as the implementation of Field Oriented Control (FOC) with modern hardware enables an industry leading current loop bandwidth of 3kHz. This means that running Maxtune with your Analog Current Motion Control Card (+/- 10V command) will achieve high performance motions. Expect low running position error and settling times.

High Performance with your Pulse and Direction or Field Bus Motion Control Card

A special Non-linear Control Algorithm coupled with 4kHz position loop update rate gives extremely low settling times when running in Position mode (eg. Pulse and Direction, Up/Down or CANOpen, EtherCAT). Maxtune able to run in this NLC mode as well as conventional PID.

Easy to Configure

Auto-tuning and Auto-phasing (for commutation) functions enable fast configuration of the servo drive. Get your motor moving in minutes.

* Technical specifications subject to change without prior notice

DIGITAL SERVO CONTROL

Run Without Hall Effect Sensor

Advanced Phase Finding Algorithm enables phase-initialization without Hall Effect Sensors.

High power density in one of the smallest footprints in the market

The automation industry has been accustomed to the inherent tradeoff between power density levels of servo drives and their reliability and performance. MaxTune has brought an end to this equation. Its innovative hardware design and software algorithms offer the highest performance and reliability in one of the industry's smallest footprint drives.

- Supports virtually any motor and feedback type
- Handles any I/O requirement
- Feature-rich with product functionality to cover most of an application's servo control needs
- Fast modifications to address any requirement
- New current loop design, industry leading frequency response up to 3kHz
- Advanced auto-tune function reducing position error and settling time to almost zero
- Anti-vibration algorithm mechanical resonance is eliminated

PART NUMBERING SYSTEM

MT - 8/25 - 230 AP 1

CONTINUOUS CURRENT (A^{PK}) / PEAK CURRENT (A^{PK})

230 Model		
2/6	8/25	18/39
4/12^	11/39	28/67
6/25	14/39	33/67
400 Model		
4/12	8/25	16/33	33/67

POWER SUPPLY

230	Input Single Phase 120-230VAC +10% -15% 50/60Hz Input Three Phase 120-230VAC +10% -15% 50/60Hz
400	Input Three Phase 380-480VAC +10% -15% 50/60Hz

ANALOG INPUT

1	One Analog Input, 16-Bit
2	Two Analog Input, 14-bit each

INTERFACE OPTIONS

AP*	Analog Voltage, Pulse & Direction Ref, RS232
AF*	Analog Voltage, Pulse & Direction, CANOpen, RS232, USB
EC**	EtherCAT, USB, RS232

* Standard Configuration with one analog input

** Standard Configuration with two analog input

Notes:

^ Model 4/12 Drive is applicable for DC Version. Available DC Version Part Number:
1) MT-4/12-100DCAP1
2) MT-4/12-100DCEC2

Supply Voltage
Logic Power Input : Single Phase 120-230VAC Bus Voltage : Min 40VDC, Max 100VDC

MOTOR & DRIVE CONFIGURATION

Maxtune Model	Unit	2/6	4/12	6/25	8/25	11/39	14/39	18/39	28/67	33/67	4/12	8/25	16/33	33/67
Supply Voltage	VAC	230 Model									400 Model			
Continuous Current	A^{pk}	2	4	6	8	11	14	18	28	33	4	8	16	33
Peak Current	A^{pk}	6	12	25	25	39	39	39	67	67	12	25	33	67
Linear Motor DX Model														
DX10B		■	■	■							■	■	■	
DX20B		■	■	■							■	■	■	
DX30B		■	■	■	■						■	■	■	
DX30BT		■	■	■	■	■	■	■	■		■	■	■	■
DX50B		■	■	■	■	■					■	■	■	
DX50BT		■	■	■	■	■	■	■	■		■	■	■	■
DX65B		■	■	■	■	■					■	■	■	
DX65BT		■	■	■	■	■	■	■	■		■	■	■	■
DX90B		■	■	■	■	■					■	■	■	
DX90BT		■	■	■	■	■	■	■	■		■	■	■	■
Linear Motor PIX Model														
PIX200-027-030	S	■	■	■	■	■					■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
PIX200-027-050	S	■	■	■	■	■					■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
PIX200-027-080	S	■	■	■	■	■					■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
PIX200-040-030	S	■	■	■	■						■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
PIX200-040-050	S	■	■	■	■						■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
PIX200-040-080	S	■	■	■	■						■	■	■	
	P	■	■	■	■	■	■	■	■		■	■	■	■
Linear Motor PIXA Model														
PIXA110-023-030		■									■			
PIXA190-023-030		■	■								■	■		
PIXA110-023-050		■	■								■	■		
PIXA190-023-050		■	■	■							■	■	■	
PIXA190-047-065		■	■	■							■	■	■	
PIXA360-047-065		■	■	■	■	■					■	■	■	
PIXA360-047-085		■	■	■	■	■	■	■	■		■	■	■	■
PIXA530-047-085		■	■	■	■	■	■	■	■		■	■	■	■
PIXA530-047-110		■	■	■	■	■	■	■	■		■	■	■	■
PIXA690-047-110		■	■	■	■	■	■	■	■		■	■	■	■
PIXA690-047-135		■	■	■	■	■	■	■	■		■	■	■	■
PIXA690-047-160		■	■	■	■	■	■	■	■		■	■	■	■
Direct Drive Motor PDDR Model														
PDDR 110/PDDR 150-T-I		■									■			
PDDR 150	15-O	■	■								■			
	30-O / 50-O / 80-O	■	■	■							■	■	■	
PDDR 160	40-I	■	■	■							■	■	■	
	80-I	■	■	■	■	■	■				■	■	■	
PDDR 240	30-I	■	■	■							■	■	■	
	80-I	■	■	■							■	■	■	
	132-I	■	■	■							■	■	■	
PDDR 300	150-I	■	■	■							■	■	■	
	300-I / 450-I	■	■	■	■	■	■				■	■	■	
Linear Shaft Motor PSM Model														
PSM12		■	■											
PSM25		■	■											
Voice Coil Motor Model														
CVC		■	■											
CVCA		■	■											
RVCA		■	■											

* Maxtune drive able to configure as DC drive for linear shaft motor & voice coil motor up to 100 Vdc bus voltage.

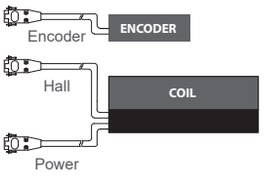
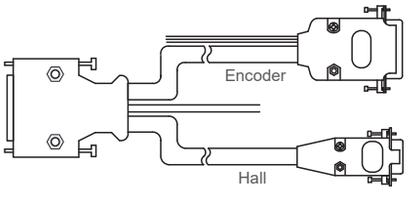
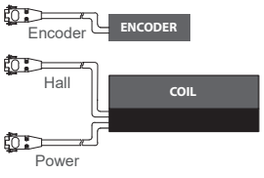
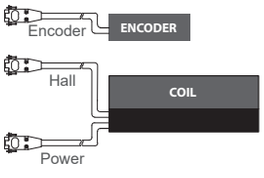
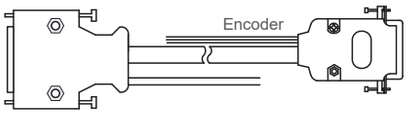
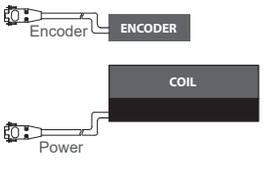
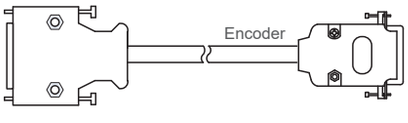
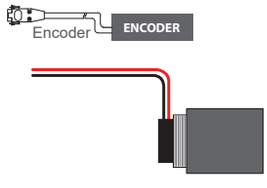
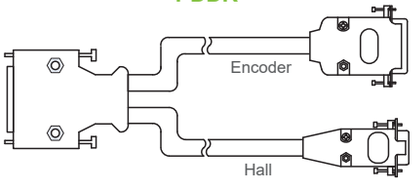
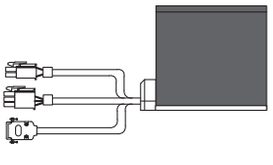
DRIVE SPECIFICATIONS

Ratings	UNITS	2/6	4/12	6/25	8/25	11/39	14/39	16/33	18/39	28/67	33/67
Supply Voltage 120/230	VAC	1 Phase	1 Phase	1 Phase 3 Phase	1 Phase 3 Phase	1 Phase 3 Phase	1 Phase 3 Phase	N/A	3 Phase	3 Phase	3 Phase
Supply Voltage 380/480	VAC	N/A	3 Phase	N/A	3 Phase	N/A	N/A	3 Phase	N/A	N/A	3 Phase
Continuous Current	A^{pk}	2.1	4.2	6.3	8.4	11.3	14.1	16.9	18.3	28.2	33.9
Peak Current	A^{pk}	6.3	12.7	25.4	25.4	39.5	39.5	33.9	39.5	67.8	67.8
Basic Specifications											
Motors		DC Brushless, DC Brush			Rotary servomotors, Linear servomotors						
Current (Torque) Control		Performance			Update rate 31.25 µs (32 kHz), Output waveform sinusoidal						
		Step Response Time Control Loop			Actual current reaches command in two cycles, 62.5 µs (up to 3k Hz) DQ, PI, Feed-forward						
Velocity Control		Performance			Update rate 125 µs (8 kHz)						
		Selectable Velocity Control Loops			PI, PDFF, Standard pole placement, Advance pole placement, Standard pole placement high frequency, Pole placement with active dumping						
		Filters			First order low pass filter, Double first order low pass filter, Notch, High pass filter, Band pass filter, User defined polynomial filter						
Position Control		Performance Control loop			Update rate 250 µs (4 kHz) PID and feed-forward						
HD Control (Position & Velocity or Velocity)		Performance			Update rate 250 µS (4 kHz)						
		Control loop			Non-linear control algorithm provides very low tracking error, zero or minimum settling time and smooth movement; includes an adaptive feed-forward feature that is applied at end of movement to achieve zero or minimum settling time						
		Filters			One second order low pass, two notch filters, and other filters to handle flexible andresonant systems						
Reference Command		Current/Velocity Command			Analog Voltage ±10 VDC, Serial RS232 or USB*, CANopen®*, EtherCAT®*						
		Position Command			Pulse & Direction with electronic gearing, Serial RS232 or USB*, CANopen®*, EtherCAT®*						
Auto Tuning		Method			loop, automatic inertia load measurement Automatic self-configuration optimization of motor phasing, wires, current loop, HD						
Brake		Method			Control stops: several dynamic brake and active disable options						
Display		Method			7-segment LED (green), display drive status						
GUI		User Interface			MaxLink Windows-based application, Setting, Drive, Motor, Feedback, I/O motion information selection/configuration, Fault history/display, Setup wizard, Expert view						
Protective Functions		Partial list, under and over-voltage, over-current, drive and motor over-temperature, motor foldback, drive foldback, feedback lost, not configured									
Compliance Standard		UL - UL508c (compliance testing in progress by TUV), STO - Safe Torque Off (compliance testing in progress), RoHS									
		CE - EMC Directive 2004/108/EC, standard IEC61800-3, CE Low Voltage Directive 73/23/EEC IEC61800-5-1									
Environment		Ambient temperature: Operation 0-45°C, Storage 0-70°C, Humidity: 10-90% Altitude: < 1000m. If >1000m, derate 5% per 330m, Vibration: 0.5g									
Protection / Pollution		Protection class: IP20, pollution degree: 2 as per IEC 60664-1									
Communications											
CAN*		CANopen® – CiA 301 application layer and the CiA 402 device profile for drives and motion control, Baud rate 0.5M 1M bit/s									
EtherCAT®*		CiA 301 application layer and the CiA 402 device profile for drives and motion control									
RS232		ASCII-based, MaxLink, HyperTerminal, Baud rate 115200 bit/s									
USB*		ASCII-based, MaxLink, HyperTerminal, Baud rate 115200 bit/s									
Daisy Chain		Up to 8 axes, Axis address setting from 0-99 using two Rotary switches									
I/Os											
First Analog Input		Voltage Range			Analog ±10 VDC differential, Resolution 16 bit						
Second Analog Input*		Voltage Range			Analog ±10 VDC differential, Resolution 14 bit (each first and second)						
Pulse & Direction		Signal			RS 422, Max Input Frequency 4 MHz						
Equivalent Encoder Output		Signal			A-quad-B and index differential, RS 422, Max Output Frequency 4 MHz						
11x Digital Inputs		Signal			24 V, Configurable opto-isolated						
6x Digital Output		Signal			24 V, Configurable open collector, opto-isolated						
Analog Output		Signal			0-10 V Resolution 8 bit, Configurable						
Secondary Feedback		Signal			A-quad-B and index differential, RS 422, Max. Input frequency 4 MHz						
Fault Output Relay		Signal			24 V, 1 A, Configurable dry contacts						
Motor Feedback											
From Drive		Supply Voltage			5 VDC (7 VDC*)						
Incremental Encoder		Signal			A-quad-B with or without index/Halls, Tamagawa, RS 422/485, Max Input Frequency 4 MHz						
Hall Sensor		Signal			Open collector single-ended (optional differential-ended)						
Resolver		Signal			Sine/Cosine differential, Transformation Ratio 0.45-1.6						
Sine Encoder		Signal			Sine/Cosine differential, with or without Halls, 1 Vpp @ 2.5 V, EnDat® 2.1, Hiperface®						
Absolute Encoder		Signal			Data and clock, can be supported upon request EnDat 2.2, BiSS-C, other SSI						
Motor Temperature		Signal			Thermal resistor PTC or NTC, User-defined fault threshold						

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.
2. * Some features are not available on all models.

CABLE SELECTION

Stage 3 (Y-CABLE)	Motor Type Power / Hall & Encoder
	DX LINEAR MOTOR 
DX / PIX / PIXA / PSM MOTOR WITH HALL  CBL_MT_C4_HALL_**REN00***_TS_**X.X***	**PIX / PIXA LINEAR MOTOR** 
	PSM MOTOR WITH HALL 
PSM / PIX / PIXA MOTOR WITHOUT HALL  CBL_MT_C4_**REN00***_TS_**X.X***	**PSM / PIX / PIXA MOTOR WITHOUT HALL** 
CVC / CVCA / RVCA  CBL_MT_C4_**REN05***_**X.X***	**CVC / CVCA / RVCA** 
PDDR  CBL_MT_C4_HALL_**PDDRD***_TS_**X.X***	**PDDR** 

1. * Refer to next page for cable selection.
2. For detailed extension cable, refer to the product page.

FEEDBACK CABLE FOR PBA MAXTUNE DRIVE

DX / PIX / PIXA / PSM12 / PSM25

CBL_MT_C4_HALL_REN [00] _TS_ [X.X]

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Digital
05A	ATOM Ri Analog

PIX / PIXA / PSM12 / PSM25

CBL_MT_C4_REN [05] _TS_ [X.X]

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
00	RGH41 Digital
00A	RGH41 Analog
01	RH200 Digital
01B	RH200 Analog
05	ATOM Ri Digital
05A	ATOM Ri Analog

CVC / CVCA / RVCA

CBL_MT_C4_REN [05] _ [X.X]

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
05	ATOM Ri Digital
05A	ATOM Ri Analog

PDDR

CBL_MT_C4_HALL_PDDR [D] _TS_ [X.X]

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
PDDR D	Standard/High Resolution
PDDR A	Analog

I/O & RS232 CABLE FOR PBA MAXTUNE DRIVE

CBL_MT_C2_PND_ I/O_OPEN _ [X.X]

CBL_MT_RS232 _ [X.X]

CABLE LENGTH	
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

DELTA

Delta ASDA-A2R

PBA SYSTEMS

www.pbasystems.com.sg

ASDA-A2R

DELTA AC SERVO DRIVE

The ASDA-A2R series is an innovative and high precision linear drive system that optimally performs the tasks of linear motors with high prevision, high rigidity, high response and it is backlash free. This not only increases the work efficiency of the motion control system, but also expands the applications of the servo system.

Delta's high-performance ASDA-A2R series offers high frequency response, auto notch filters, vibration suppression, flexible position register control PR mode, build-in electronic cam (E-Cam) and advanced gantry control, and it supports DMCNET and CANopen communication interfaces as well. The ASDA-A2R harmonizes linear motion and servo drive to satisfy demanding high precision requirements.

The ASDA-A2R provides more choices and allows users to drive not only Delta's but also other brands of linear motors and permanent magnet synchronous servo motors. When the ASDA-A2R is connected to an optional ADS-IF-EN0A20 Signal Converter Box through a motor encoder interface, the square waves and sine waves of feedback signals from the linear scale, linear motor and encoder can be converted to communication signals into the ASDA-A2R. The distortion provides more accurate signal transmission that is essential for fast and optimum communications.

Good stability, high reliability and excellent performance are the features of Delta's ASDA-A2R series linear motion drive.

PART NUMBERING SYSTEM

ASD - A2R - 01 21 - U

AC SERVO DRIVE

SERIES: A2R

RATED OUTPUT POWER

01	100W	10	1kW
02	200W	15	1.5kW
04	400W	20	2kW
07	750W	30	3kW

MODEL TYPE

TYPE	Full-closed Loop	CANopen	DMCNET	E-CAM	Expansion Slot for Digital Input
M	Yes	Yes	No	Yes	No
U	Yes	No	No	Yes	Yes
F	Yes	No	Yes	No	No
L	Yes	No	No	No	No

M: Support CANopen U : Without CANopen F : For DMCNET
L : Without E-Cam

INPUT VOLTAGE AND PHASE

21	220V 1-phase
23	220V 3-phase

* Technical specifications subject to change without prior notice

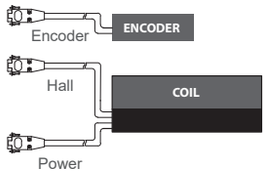
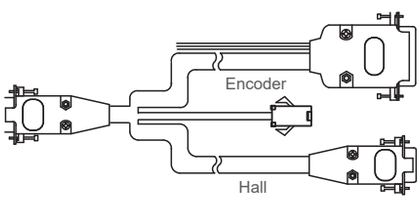
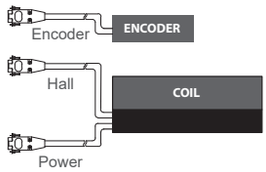
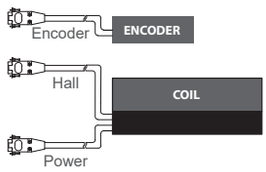
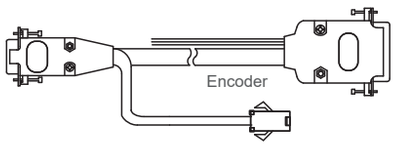
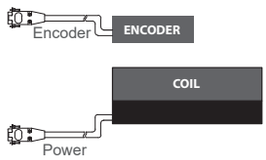
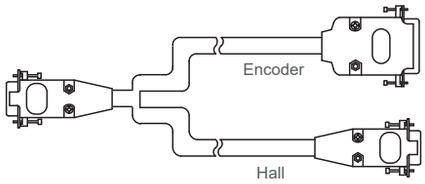
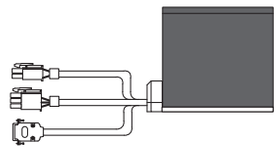
DRIVE SPECIFICATIONS

Ratings	UNITS	100W	200W	400W	750W	1kW	1.5kW	2kW	3kW
Phase Voltage	V	Single Phase/Three Phase 220VAC						Three phase 220 VAC	
Continuous Output Current	A^{pk}	1.3	2.2	3.7	7.2	10.3	11.7	18.9	27.4
Continuous Max Output Current	A^{pk}	3.8	6.5	11	21.6	30.9	35.2	56.8	82.2
Basic Specifications									
Motors		Linear Motors							
Encoder resolution/ Feedback resolution		A-quad-B, Max Input Frequency 4 MHz							
Main circuit ontrol		SVPWM control							
Control Mode		Manual / Auto							
Dynamic Brake		N/A			Built-in				
Position Control mode		Max. input pulse frequency			Differential: 500K/4Mpps, Open Collector:200Kpps				
		Pulse type			Pulse + symbol; A phase + B phase; CCW pulse + CW pulse				
		Command source			External pulse/Register				
		Smoothing strategy			Low-pass and P-curve filter				
		E-gear ratio			E-gear ratio: N/M time, limitation: (1/50<N/M<25600)				
Speed/Torque Control Mode		Analog command Voltage Range			0 ~ +/- 10Vdc				
		Analog command Input Resistance			10Kohm				
		Analog command time constant			2.2us				
		Speed control range			1:5000				
		Command Source			External analog command/Register				
		Smoothing strategy			Low-pass and S-curve filter				
Internal Position		Up to 63 Position or Speed							
Auto Tuning		Available							
Brake		Method			Build-in				
Display		Method			Position/Speed/Position Error				
Software		User Interface			ASDA Soft , Setting drive, I/O motion informatio n selection, Configuration, Fault history/display, Setup wizard				
Protective Functions		Over Current, Overvoltage, Undervoltage, Overheat, Regeneration error, Overload, Excessive speed deviation, Excessive position deviation, Encoder error, Adjustment error, Emergency stop, Negative/positive limit error, Excessive deviation of full-closed loop control, Serial communication error, Rst leak phase, Serial communication timeout, Short-circuit protection of U,V,W and CN1, CN2 CN3							
Compliance Standard		IEC/EN 61800-5-1, UL 508C, C-tick							
Environtment		Ambient temperature: Operation 0'C to 55'C, Storage -20'C to 65'C, Humidity: 90% RH							
Protection/Pollution		Protection class: Natural cooling (IP20)							
Communication/Control Method									
USB		RS-232,Up to 115200 baud rate for setup							
Full-closed Loop		Available							
CANopen		Available							
DMCNET		Available							
E-CAM		Available							
Expansion Slot for Digital Input		Available							
I/Os									
Encoder Output		Signal			Compatible (A/B/Z-phase pulse)				
8x Digital Inputs		Signal			24V NPN/PNP Programmable				
5x Digital Output		Signal			24V NPN/PNP Programmeble				
Analog monitor Output		Signal			Monitor Signal set via parameters (Output voltage range:+/- 8V)				
Motor Feedback									
From Drive		Supply Voltage			5Vdc				
Incremental Encoder		Signal			Quad Encoder, RS-422 Differential Encoder				

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.

CABLE SELECTION

Stage 3 (Y-CABLE)	Motor Type Power / Hall & Encoder
	DX LINEAR MOTOR 
DX / PIX / PIXA / PSM25 MOTOR WITH HALL  CBL_DLT_A2R_CN5_HALL_**REN00***_TS_**X.X***	**PIX / PIXA LINEAR MOTOR** 
	PSM25 MOTOR WITH HALL 
PIX / PIXA / PSM MOTOR WITHOUT HALL  CBL_DLT_A2R_CN5_**REN00***_TS_**X.X***	**PIX / PIXA / PSM MOTOR WITHOUT HALL** 
PDDR  CBL_DLT_A2R_CN5_HALL_**PDDRD***_TS_**X.X***	**PDDR** 

1. * Refer to next page for cable selection.
2. For detailed extension cable, refer to the product page.

FEEDBACK CABLE FOR DELTA DRIVE

DX / PIX / PIXA / PSM25

CBL_DLT_A2R_CN5_HALL_REN **00** _TS_ **X.X**

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
00	RGH41 Digital
01	RH200 Digital
05	ATOM Digital

PIX / PIXA / PSM25

CBL_DLT_A2R_CN5_REN **05** _TS_ **X.X**

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
00	RGH41 Digital
01	RH200 Digital
05	ATOM Digital

PDDR

CBL_DLT_A2R_CN5_HALL_PDDR **D** _TS_ **X.X**

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
D	Digital Encoder

I/O CABLE FOR DELTA DRIVE

CBL_DLT_CN1_PND_IO_OPEN_ **X.X**

CABLE LENGTH	
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO J4

MITSUBISHI ELECTRIC
Changes for the Better

PBA SYSTEMS

www.pbasystems.com.sg

MITSUBISHI
SERVO DRIVE

As a recognized leader in factory automation,Mitsubishi Electric is committed to maintaining a world-class level

Production/ Development System

For more than 80 years from the start of operations in 1924, Mitsubishi Electric Nagoya Works has manufactured various universal devices including motors, programmable controllers and inverters. The history of AC servo production at Nagoya Works spans over 30 years. We have expanded our production system based on the technology and tradition amassed during this time, and have incorporated world-class research and development to create high-performance, high-quality products that can be supplied for a long time.

Production System

To guarantee the high quality and performance of MELSERVO, Mitsubishi Electric has built a cooperative system of three facilities- Shinshiro Factory, a branch factory of Nagoya Works; Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd., a manufacturing base; and Nagoya Works at the core. Mitsubishi Electric responds to various needs throughout the world by uniting technologies and know-how of these facilities. Mitsubishi Electric's FA energy solutions, "e&eco-F@ctory", are at work in the servo motor factory at the Nagoya Works. They are being used to boost capacity utilization and product quality, and reduce energy consumption.

Development System

To spread advanced servo systems to the world as quickly as possible, Mitsubishi Electric has established FA-related development centers at its Nagoya Works, and in North America and Europe. Furthermore, we have established strong connections between our Advanced Technology R&D Center, which pushes technology development beyond the limits of FA, and Information Technology R&D Center. We are moving forward with the development of new products that reflect the latest technological directions and customer input.

SSCNET Partner Association (SNP)

The SSCNET Partner Association (SNP) carries activities to introduce the advanced servo system controller network "SSCNET" and compatible products to many users. In cooperation with partner corporations, SNP widely promotes the performance attainable with SSCNET. In recent years, SNP holds partner meetings in Japan and other countries such as Taiwan and India. SNP aims to make SSCNET a more global servo system controller network.

PART NUMBERING SYSTEM

MR-J4 - 10 B □ - RJJ001

Mitsubishi General-Purpose AC Servo Amplifier MELSERVO-J4 Series

RATED OUTPUT POWER	
10	0.1
20	0.2
40	0.4
60	0.6
70	0.75
100	1
200	2
350	3.5
500	5
700	7

POWER SUPPLY	
BLANK	3-phase 200V AC or 1-phase 200V AC
4	3-phase 400V AC

INTERFACE	
B	SSCNET III / H

DRIVE SPECIFICATIONS

Ratings	UNITS	10B	20B	40B	60B	70B	100B	200B	350B	500B	700B
Supply Voltage 200-240	VAC	3-Phase/1-Phase					3-phase				
Output Capacity		100W	200W	400W	600W	750W	1KW	2KW	3.5KW	5KW	7KW
Continuous Current	A^{pk}	1.6	2.2	4.0	4.5	8.2	8.5	15.6	24.0	39.6	52.3
Peak Current	A^{pk}	5.0	7.5	13.5	14.5	29.0	27.3	48.0	73.1	130.7	164.3

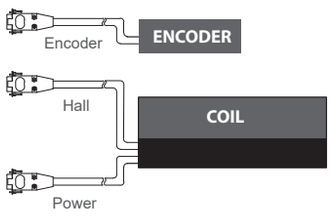
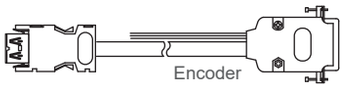
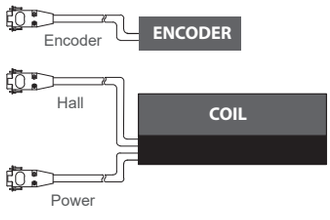
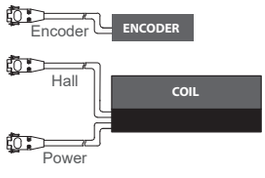
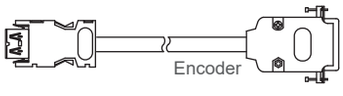
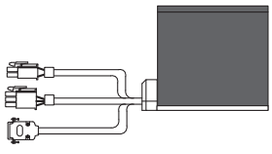
Ratings	UNITS	60B4	100B4	200B4	350B4	500B4	700B4
Supply Voltage 380-480	VAC	3-Phase					
Continuous Current	A^{pk}	2.1	4.0	7.6	12.2	16.7	25.3
Peak Current	A^{pk}	6.8	12.6	24.4	38.9	53.6	81.2

Basic Specifications		
Motors	Linear Motors (Through partner software to setup motor coil parameter.)	
Auto Tuning	Method	Automatically adjusts the gain to optimum value if load applied to the servo motor shaft varies. Higher in performance than MR-J3 series servo amplifier
Brake	Method	Build-in
Software	User Interface	MR-Configurator , Setting drive, I/O motion information selection, Configuration, Fault history/display, Setup wizard
Position / Torque / Speed Mode	Available	
Servo Functions	Advanced vibration suppression control II, Adaptive filter II, Robust filter, Auto tuning, One touch tuning, Tough drive function, Drive recorder function, Tightening & press-fit control, Machine diagnosis function, Power monitoring function, Master-slave operation function, Scale measurement function, J3 compatibility mode, super trace control, Lost motion compensation.	
Protective Functions	Overcurrent shut-off, Regenerative overvoltage shut-off, Overload shut-off, Servo motor overheat protection, Encoder error protection, Regenerative error protection, Undervoltage protection, Instantaneous power failure protection, Overspeed protection, Error excessive protection, Magnetic pole detection, Linear servo fault protection	
Compliance Standard	CE Marking	LVD EN 61800-5-1, EMC: EN 61800-3, MD:EN ISO 13849-1, EN 61800-5-2,EN62061
	UL Standard	UL 508C
Environment	Ambient temperature: Operation 0'C to 55'C, Storage -20'C to 65'C,Humidity: 90% RH or less, Altitude: Max.1000m above sea level,Vibration 5.9m/s2 or less at 10Hz (directions of X,Y and Z axes)	
Protection/Pollution	Protection class: Natural cooling (IP20)	
Safety Function	STO (IEC/EN 61800-5-2)	
Communication/Control Method		
USB SSCNET III /	Connection to a personal computer or others (MR Configurator2-compatible)	
H communication cycle	0.222ms,0.444ms,0.888ms	
I/Os		
Equivalent Encoder Output	Signal	Differential (A/B/Z-phase pulse)
No.Digital Inputs	Signal	3 - (24V NPN/PNP)
No.Digital Output	Signal	3 - (24V NPN/PNP)
Analog Monitor	Signal	2- Channels
Emergency Input	Signal	Input - N/C
Motor Feedback		
From Drive	Supply Voltage	5Vdc
Incremental Encoder	Signal	Quad Encoder - (4Mhz)
Absolute Optical Encoder	Signal	Mitsubishi serial interface compatible (Renishaw,Heidenhain,Mitutoyo)

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.

Mitsubishi

Stage 3 (Y-CABLE)	Motor Type Power / Hall & Encoder
	DX LINEAR MOTOR 
DX / PIX / PIXA/ PSM25 Y-CABLE  CBL_MSB_CN2L_**REN00***_**X.X***	**PIX / PIXA LINEAR MOTOR** 
	PSM25 MOTOR WITH HALL 
PDDR  CBL_MSB_CN2L_**PDDRD***_**X.X***	**PDDR** 

1. * Refer to next page for cable selection.
2. For detailed extension cable, refer to the product page.
3. Mitsubishi driver not support hall sensor.

FEEDBACK CABLE FOR MITSUBISHI DRIVE

DX / PIX / PIXA / PSM25

CBL_MSB_CN2L_REN **00** _ **X.X**

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
00	RGH41 Digital
01	RH200 Digital
05	ATOM Ri Digital

PDDR

CBL_MSB_CN2L_ PDDR**D** _ **X.X**

CABLE LENGTH	
0.5	0.5 meter (standard)
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter

CABLE	
PDDR D	Standard/High Resolution

I/O CABLE FOR MITSUBISHI DRIVE

CBL_MSB_CN3_IO_OPEN_ **X.X**

CABLE LENGTH	
1.0	1.0 meter
2.0	2.0 meter
3.0	3.0 meter (standard)

To: PBA (S) Pte Ltd.

DD MM YYYY
19 / 08 / 2015

Motor Partner Maker ID Number Registration Certification

Your company's Maker ID and Password that are necessary to connect with MITSUBISHI's servo amplifiers have been assigned.

Maker ID : 11

Signature: Yasushi Ikawa

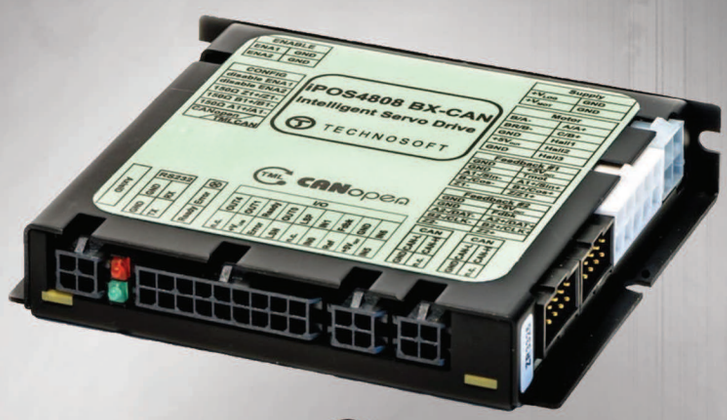
Yasushi Ikawa
General Manager, Drive System Department
Mitsubishi Electric Corporation, Nagoya Works

Ref. No. 009

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

* Technical specifications subject to change without prior notice



CANopen TML

TECHNOSOFT

PBA SYSTEMS

www.pbasystems.com.sg

iPOS

LINE OF INTELLIGENT DRIVES

CANopen TML

Cost-effective, compact, modular solutions to the position, speed and torque control of rotary or linear brushless, DC brush, and step motors.

Technosoft's iPOS line of intelligent drives is based on a new design concept that has resulted in cost-effective, compact, modular solutions to the position, speed and torque control of rotary or linear brushless, DC brush, and step motors.

Designed to cover both low-volume and high-volume applications, the iPOS intelligent drives integrate all basic motor control functions and motion control features in a single module.

With the development of the new iPOS intelligent drives family, Technosoft has also extended the concept of distributed motion control. Now you can split the motion application between the iPOS drives and the EtherCAT or CANopen master. Using TML (Technosoft's motion programming language), you can build complex motion applications locally, on each drive, leaving only the high level of motion application on the EtherCAT or CANopen master, and thus reducing the network master's complexity. The master supervises the entire motion application, while the specific tasks are executed by the iPOS drives.

PART NUMBERING SYSTEM & DRIVE SPECIFICATIONS

PART NUMBER	MODEL	FIELDBUS	CONTINUOUS CURRENT (A^{pk})	PEAK CURRENT (A^{pk})	MAX BUS VOLTAGE (VDC)
P028.001.E201	iPOS3602 BX-CAN	CAN	2A	3.2	36V
P028.002.E201	iPOS3604 BX-CAN	CAN	4A	10	36V
P027.214.E201	iPOS4808 BX-CAN v1.0	CAN	8A	20	48V
P027.214.E221	iPOS4808 BX-CAT v1.0	EtherCAT	8A	20	48V
P029.025.E201	iPOS8010 BX-CAN	CAN	10A	20	80V
P029.025.E221	iPOS8010 BX-CAT	EtherCAT	10A	20	80V

* All models above compatible with differential encoder

DRIVE SPECIFICATIONS

Ratings	UNITS	3602	3604	4808	8010
Supply Voltage Min	VDC	12	12	12	12
Supply Voltage Max	VDC	36	36	48	80
Continuous Current	A^{pk}	2	4	8	10
Peak Current	A^{pk}	3.2	10	20	20
Basic Specifications					
Motors DC Brushless		DC Brush, Step Motors, Linear Servo			
PWM Switching frequency		20 - 100 kHz			
Logic Supply		9-36V			
Software		Easy Motion/ Easy Motion Studio, Setting Drive, Motor Feedback, I/O selection, Motor configure, Fault history/display, Setup wizard			
Protective Functions		Over-current, Short-circuit, Earth fault, Over- / under-voltage, I2t, control error, Drive over temperature			
Mode		Torque / Speed / Position			
Motion Profile		PVT, S-curve, Electronic CAM, Interpolation			
Operation Language		Motion Programming via TML (Technosoft Motion Language), Visual C/VB/LabVIEW/ Linux and PLC			
Operation		Standalone operation with stored motion sequences			
Compliance Standard		TIA/EIA-232-C, ISO11898, CiA 301v4.2, CiA WD 305 v2.2.13, CiA DSP402v3.0"			
Environment		Ambient temperature: Operation 0'C to 40'C, Storage -40'C to 100'C, Humidity: 90% RH			
Protection/Pollution		Protection class: Natural cooling (IP20)			
Communication					
CAN-Bus		TML CAN			
CANopen		Available			
EtherCAT		Not Available		Available	
Multi-Axes Synchronous		Available			
I/Os					
Analog Input		1 - 12Bit 0-5V		2 - 12Bit 0-5V	
Pulse & Direction		Available			
Equivakent Encoder Output		Compatible (A/B/Z-phase pulse)			
No. Digital Inputs		5 - NPN/PNP	5 - NPN/PNP	6 - NPN/PNP	4 - NPN/PNP
No. Digital Output		4 - NPN 0.5A Open Collector		5	4
Motor Feedback					
From Drive		Supply Voltage		5Vdc	
Incremental Encoder		Signal		Quad Encoder	
Analogue		Signal		Sine / Cosine Differential 1Vpp	
Hall		Signal		Digital Hall Sensors	
Resolver		N/A		External Extension Module	
SSI					
EnDAT					
BiSS absolute					

Notes:

1. A^{pk} = 1.414 * Arms; V^{pk} = 1.414 * Vrms.

Application Form - Linear Motor Selection

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

PBA LINEAR MOTOR SELECTION QUESTIONAIRE

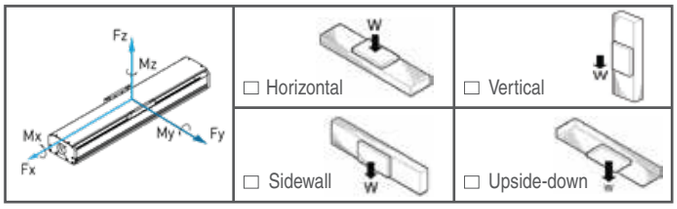
1. Application Description

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



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	

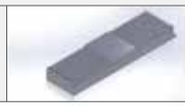
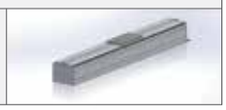
8. Working Environment

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		BELLOW		STRIP SEAL		

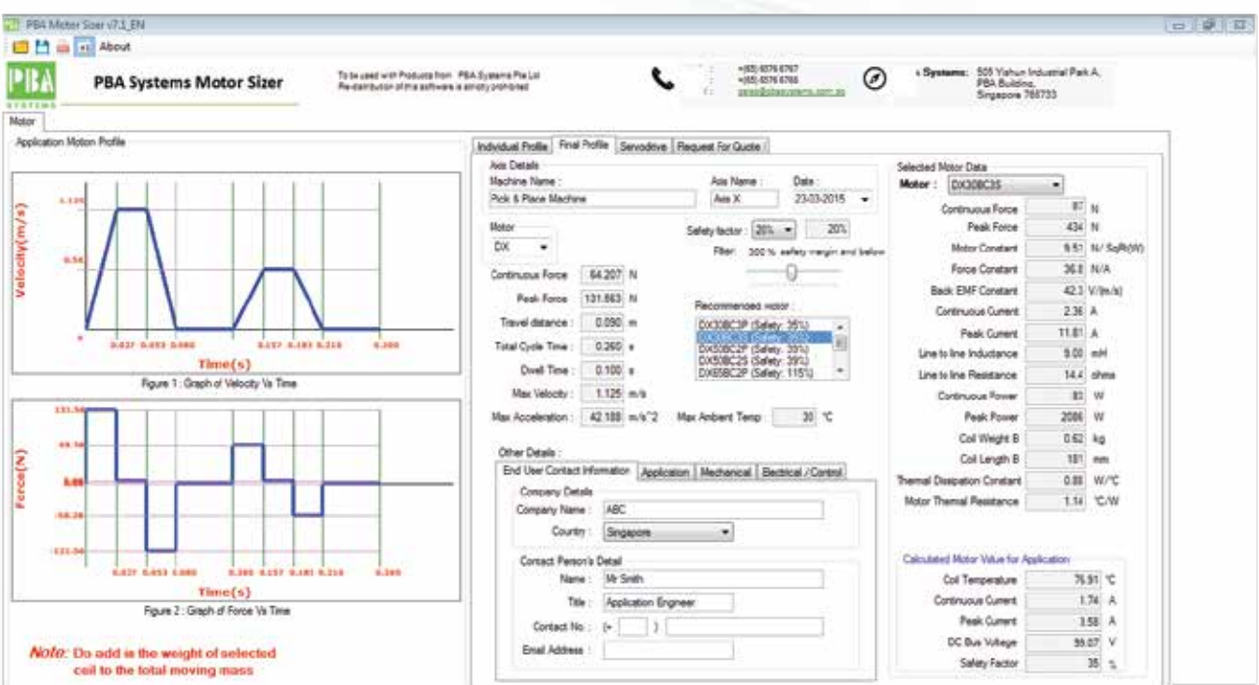
11. Remarks: If you have any special motion request for sizing procedure, please specify your requirement in below remarks.

PBA SYSTEMS LINEAR MOTOR SIZER SOFTWARE

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

http://www.pbasystems.com.sg GO

SIMULATED PERFORMANCE CHARTS



Application Form - DDR Motor Selection

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

PBA DDR MOTOR SELECTION QUESTIONAIRE

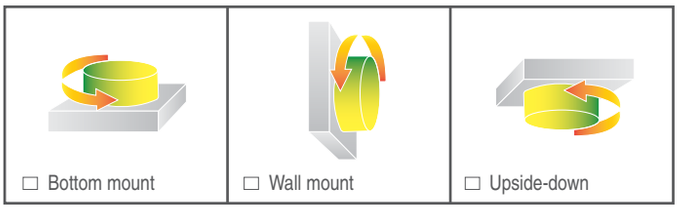
1. Application Description

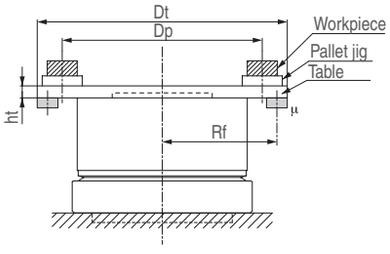
1a. Application Sketch With Approx Dimensions

2. Load Parameter *(Please Circle Accordingly)*

	a) Load moment of inertia	$kg.m^2$	
	Frictional torque	N.m	
Table	b) Table top shape		Disk / Rectangular Plate
Table	Material		Steel / Aluminium
Table	Dimension	Dt (mm)	
Table	Plate thickness	ht (mm)	
Table	Weight	m1 (kg)	
Workpiece	c) Quantity	nw (pc.)	
Workpiece	Max. weight	mw (kg/pc.)	
Workpiece	Installation center	Dp (mm)	
Pallet Jig	d) Quantity	np (pc.)	
Pallet Jig	Max. weight	mp (kg/pc.)	

Mounting Requirements





3. Motion Parameter

		Profile 1	Profile 2	Profile 3
Rotational angle (θ)	°			
Moving time	s			
Moving speed	rps			
Dwell time	s			

4. Command/Bus *(Please Circle Accordingly)*

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

5. Encoder *(Please Circle Accordingly)*

Incremental / Analog		
Resolution	cpr	327680 / 518400 / 655360 / 864000

6. Motion Precision

Accuracy	arcsec	
Repeatability	arcsec	

7. Mechanical Specification *(Please Circle Accordingly)*

Axial run-out	um	5 / 10 / 20
Radial run-out	um	5 / 10 / 20
Space constraints (H x W)	mm	

8. Working Environment

Room temperature	°C	
Clean room class		

9. Additional Requirements *(Please Tick (✓) Accordingly)*

Motor extension cable length	Flexible cable	Amplifier	Controller	Other: _____
m				

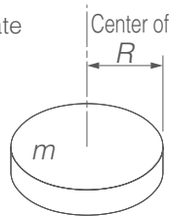
10. Remarks: If you have any special motion request for sizing procedure, please specify your requirement in below remarks.

Formula of moment of inertia

(m : Weight of object (kg))

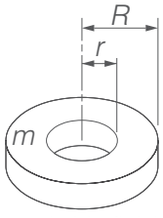
A When rotation center is own shaft

1. Circular plate (cylinder)



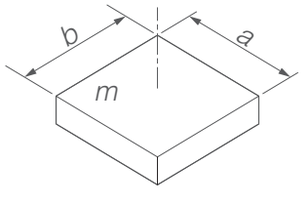
$$I = \frac{mR^2}{2}$$

2. Hollow circular plate (hollow cylinder)



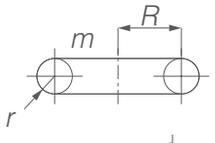
$$I = \frac{m(R^2 + r^2)}{2}$$

3. Direct hexagonal side finish body



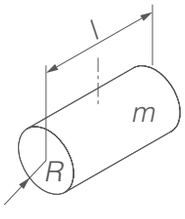
$$I = \frac{m(a^2 + b^2)}{12}$$

4. Ring



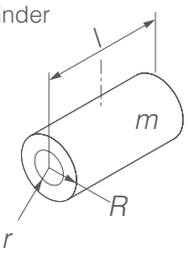
$$I = \frac{m(4R^2 + 3r^2)}{4}$$

5. Cylinder



$$I = \frac{m(3R^2 + l^2)}{12}$$

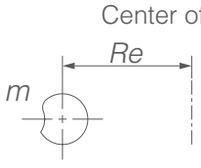
6. Hollow cylinder



$$I = \frac{m(R^2 + r^2 + l^2/3)}{4}$$

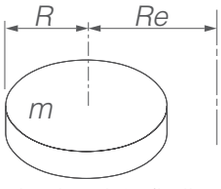
B When rotation center differs from own shaft

1. Any shape (if small very well)



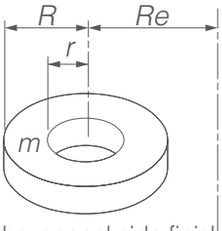
$$I = mRe^2$$

2. Circular plate (cylinder)



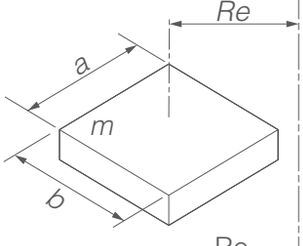
$$I = m\left(\frac{R^2}{2} + Re^2\right)$$

3. Hollow circular plate (hollow cylinder)



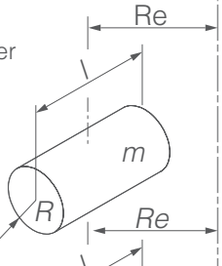
$$I = m\left(\frac{R^2 + r^2}{2} + Re^2\right)$$

4. Direct hexagonal side finish body



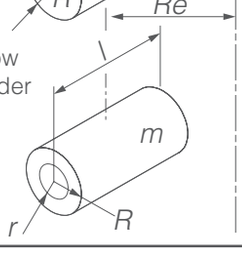
$$I = m\left(\frac{a^2 + b^2}{12} + Re^2\right)$$

5. Cylinder



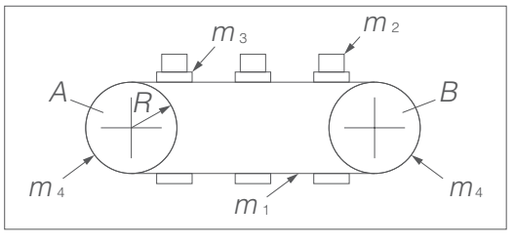
$$I = m\left(\frac{3R^2 + l^2}{12} + Re^2\right)$$

6. Hollow cylinder



$$I = m\left(\frac{R^2 + r^2 + l^2/3}{4} + Re^2\right)$$

For conveyer



m_1: Chain weight
m_2: Workpiece total weight
m_3: Jig (pallet) total weight
m_4: Sprocket A (drive) + B total weight
R : Drive side sprocket radius

$$I = \left(m_1 + m_2 + m_3 + \frac{m_4}{2}\right) \cdot R^2$$

PBA GROUP

Singapore

505 Yishun Industrial Park A, PBA Building, Singapore 768733

PBA Systems Pte. Ltd.

Tel: +(65) 6576 6767
Fax: +(65) 6576 6768
Email: sales@pbasystems.com.sg
Website: www.pbasystems.com.sg

PBA Technology Pte. Ltd.

Tel: +(65) 6576 6760
Fax: +(65) 6576 6761
Email: enquiry@pbatechnology.com
Website: www.pbatechnology.com

PBA Spindles Pte. Ltd.

Tel: +(65) 6576 6778
Fax: +(65) 6576 6782
Email: sales@pba-spindles.com
Website: www.pba-spindles.com

Ultraxis Pte. Ltd.

Tel: +(65) 6576 6766
Fax: +(65) 6576 6765
Website: www.ultraxis.com.sg

PBA Solutions Pte. Ltd.

Tel: +(65) 6576 6767
Fax: +(65) 6576 6768
Email: enquiry@pbasolutions.com
Website: www.pbasolutions.com

Malaysia

PBA Systems (Malaysia) Sdn. Bhd.
PBA Advantech (M) Sdn. Bhd.

PBA Building
No. 20, Jalan Anggerik Mokara 31/50
Seksyen 31, Kota Kemuning
40460 Shah Alam Selangor, Malaysia
Tel: +(60) 03 5525 4101/02/03
Fax: +(60) 03 5525 4106
Email: malaysia@pbagroup.net

PBA Industries (PG) Sdn. Bhd.
Email: malaysia@pbagroup.net

PBA Leader Motion Sdn.Bhd.
Email: enquiry@pbalm.net

No. 32A, Jalan Sungai Tiram 7
11900 Bayan Lepas, Penang Malaysia
Tel: +(60) 04 637 1915 (3 hunting lines)
Fax: +(60) 04 637 1917
Email: malaysia@pbagroup.net

China

碧绿威自动化（深圳）有限公司
PBA Systems (China) Co. Ltd.

广东省深圳市宝安区新安六路御景湾
众里创业社区3楼316（518102）
316, 3rd Floor, Joinin Hub, Xin'an 6th Rd
Bao'an District Shenzhen China (518102)
Tel: +(86) 755 216 77507
Fax: +(86) 755 216 77506
Website: www.pbasystems.com.cn

Taiwan

振弘精密股份有限公司
PBA SYSTEMS TAIWAN

新竹縣湖口鄉八德路1段67號30349台灣
No.67, Sec 1, Bade Rd., Hukou Township
Hsinchu County 30349, Taiwan (R.O.C.)
HP: Ryan +(886) 966 197 381
Jordan +(886) 938 030 774
Email: pba.taiwan@pbagroup.net

Thailand

PBA Systems (Thailand) Co. Ltd.

234/118, Asok-Dindaeng Road
Huakwang, Bangkapi
Bangkok, Thailand 10310
Tel: +(66) 2 641 4522/641 4523
Email: support@th.pbagroup.net

Indonesia

REP Office

Mr. Raya
Jakarta Office, Ruko Cempaka Mas
Blok M/29,Cempaka Putih
Jakarta Pusat 10510, Indonesia
Tel: +(62) 21 4587 4679
Fax: +(62) 21 4587 4680
E-mail: rayac@pba.com.sg

Korea

REP Office

Dr. Sanguk Kim
12 Block-5 Lot, #622-4, NamChon-Dong
Namdong-Gu, Incheon, Korea 405846
Tel: +(82) 32 815 3428
Fax: +(82) 32 815 3429
Email: sales@pbasystems.com.sg

Philippines

REP Office

Mr. Harlo Mullen
P6 B31L34 Carmona Estates, Bgy.
Lantic Carmona Cavite
Philippines 4116
Tel: +(63) 919 975 3539
Email: h.mullen@pbagroup.net

Catalog PBA Systems Version 2.0