PDAB WITH ROBOT

LINEAR SERVO MOTOR ACTUATOR
WITH ROBOT MOUNTING
IRONLESS

PBA SYSTEMS

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PART NUMBERING SYSTEM

Coil Assembly

PDAB- D5 - C3 - S - TM - 1.0 - FC - HC - E1.0 - O - 1600 - A1

MOTOR MODEL

D3	DX30B
D3T	DX30BT
D5	DX50B
D5T	DX50BT

COIL SIZE

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

ROBOT

Delta Scara	
S1	DRS40L
S2	DRS60L
Delta Articulated	
A1	DRV70L
A2	DRV90L
Universal Robot	
U1	UR3
U2	UR5
U3	UR10

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

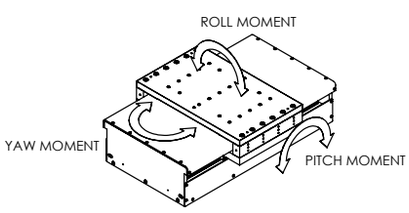
- Ironless Linear Motor
- Peak force to 724N, Continuous force to 145N

PDAB SERIES
IRONLESS LINEAR MOTOR

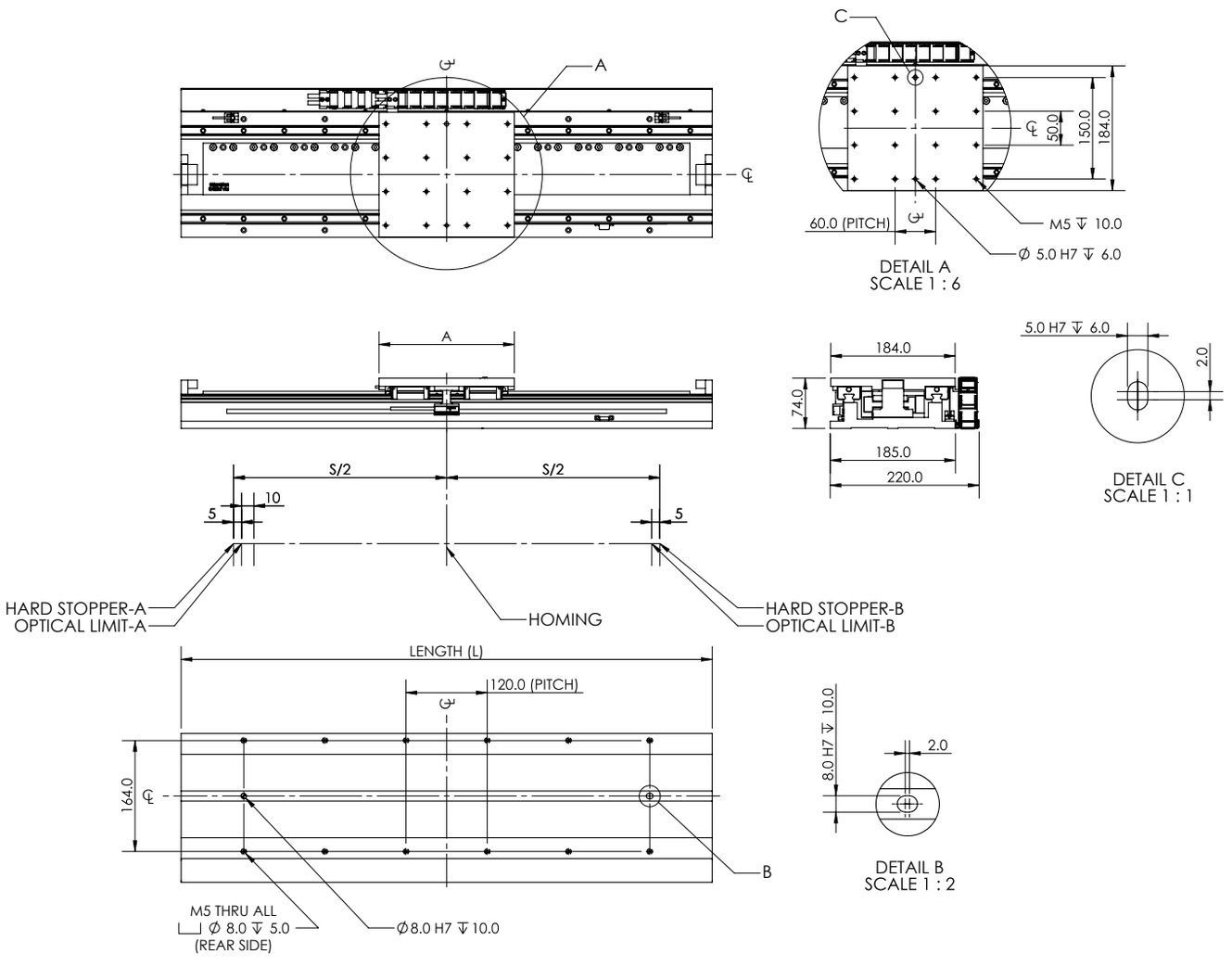
SPECIFICATION		MODEL							
		DX30B/BT							
		PDAB-D3-C3		PDAB-D3-C4		PDAB-D3T-C4	PDAB-D3-C5		
Motor Parameters	**Unit**	S	P	S	P	P	S	P	
Peak Force	N	434		579			724		
Continuous Force @ 120ºC*	N	87		116			145		
Peak Power @ 120ºC	W	2086		2781			3476		
Continuous Power @ 120ºC*	W	83		111			139		
Peak 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}	36.8	18.4	49	24.5	12.3	61.3	30.6	
Back EMF Constant	$V^{pk}/m/s$	42.3	21.1	56.4	28.2	14.1	70.4	35.2	
Coil Resistance L-L @ 25ºC	Ohm	14.4	3.6	19.2	4.8	1.2	24	6	
Coil Resistance L-L @ 120ºC*	Ohm	19.9	5	26.6	6.6	1.7	33.2	8.3	
Inductance L-L @ 1kHz	mH	9	2.25	12	3	0.75	15	3.75	
Motor Constant @ 25ºC*	N/√W	11.18		12.91			14.44		
Motor Constant @ 120ºC*	N/√W	9.51		10.98			12.27		
Max. Terminal Voltage	Vdc	400							
Thermal Resistance @ 120ºC*	ºC/W	1.14		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)

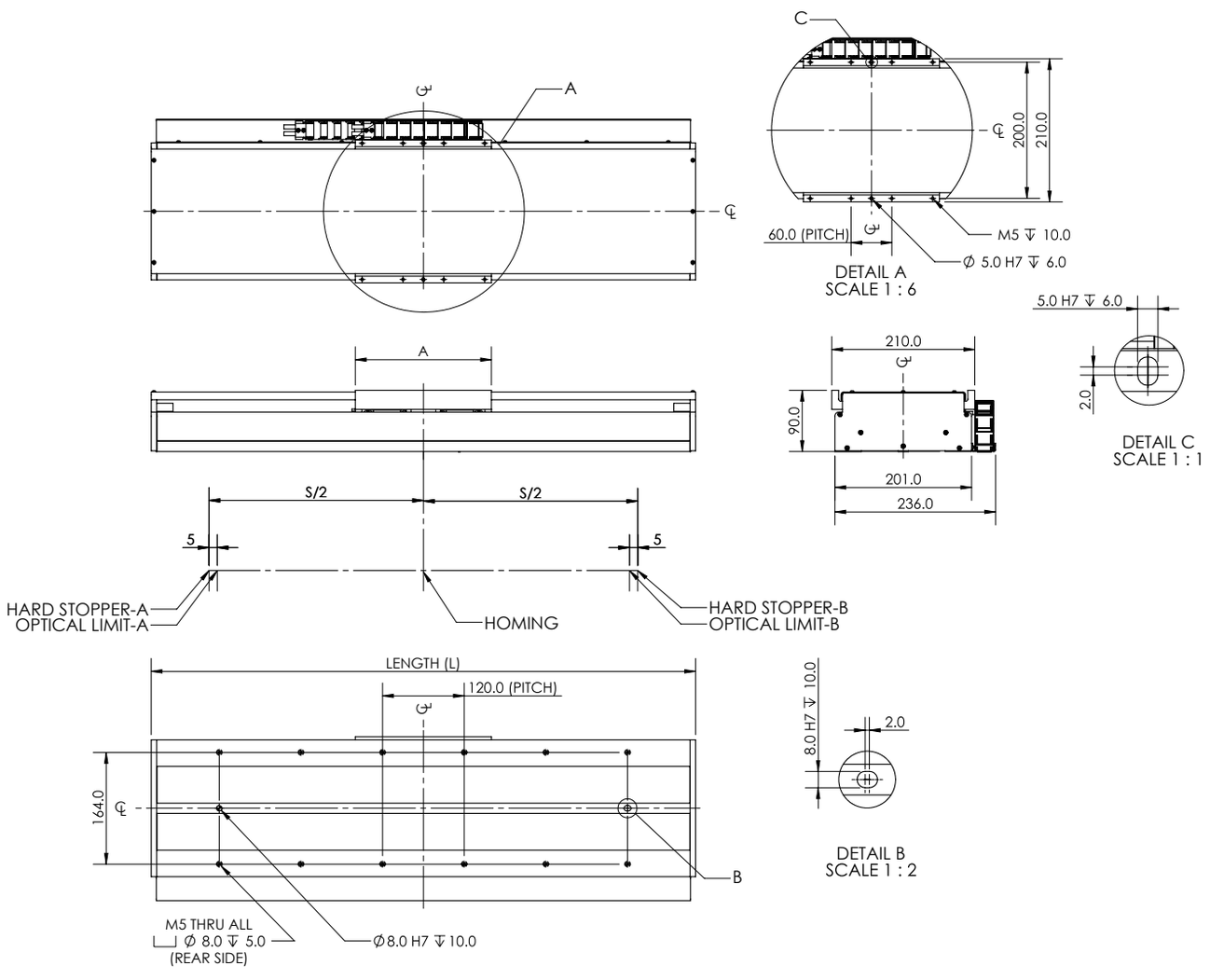


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C3	MIN:100 MAX:1600	MIN : 345 MAX: 1845	S=100+(Multiple of 60mm) L=S+A+(65mm)	200	1.9	MIN : 8.7 MAX: 53.7	W=8.7 + (Multiple of 1.8kg)
C4		MIN : 405 MAX: 1905		260	2.3	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)

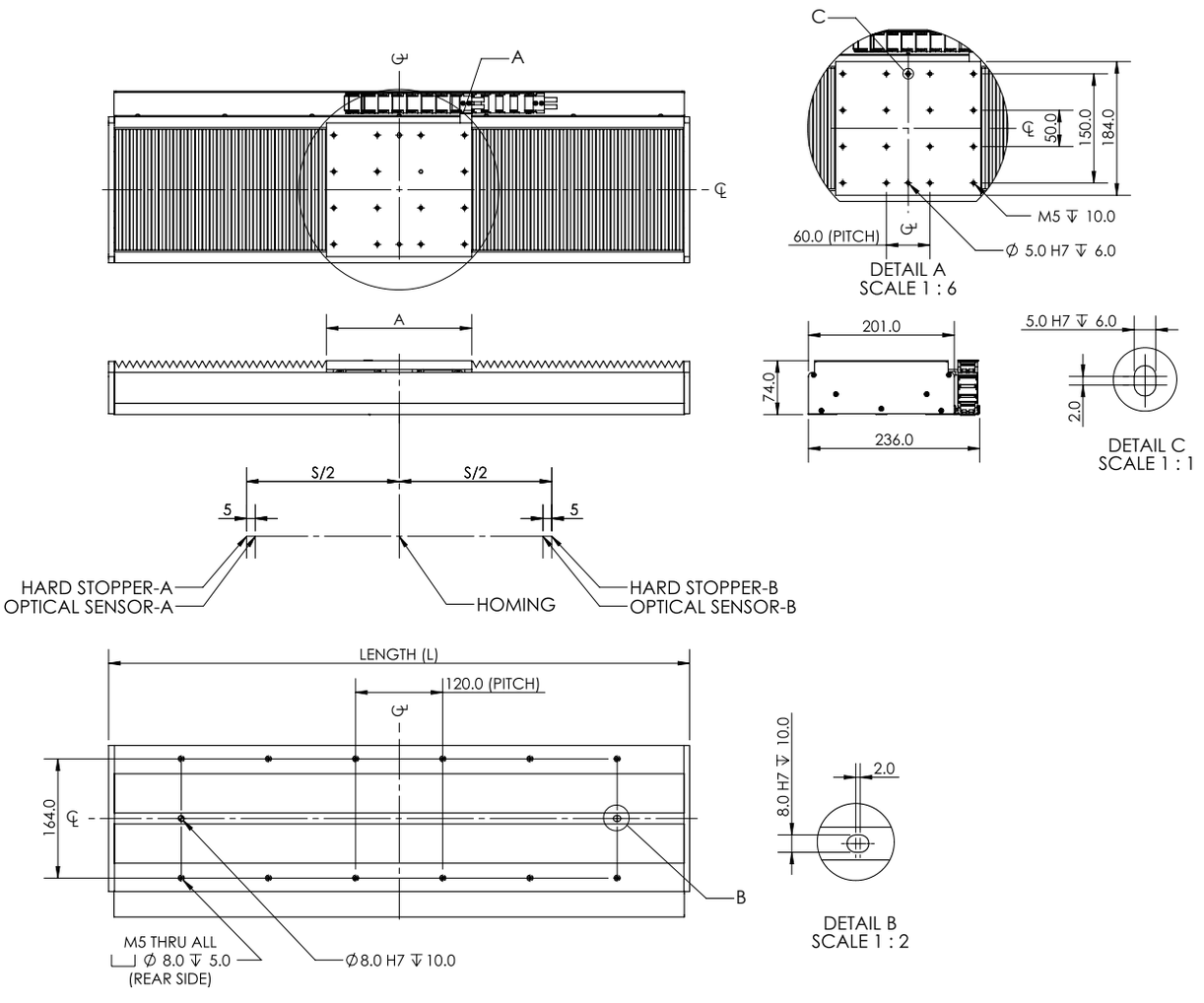


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C3	MIN:100 MAX:1600	MIN : 360 MAX: 1860	S=100+(Multiple of 60mm) L=S+A+(80mm)	200	2.3	MIN : 11.0 MAX: 66.0	W=11.0 + (Multiple of 2.2kg)
C4		MIN : 420 MAX: 1920		260	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	
C3	MIN:100 MAX:1000	MIN : 420 MAX: 1770	S=100+(Multiple of 60mm) L=S+A+(170mm)	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 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.
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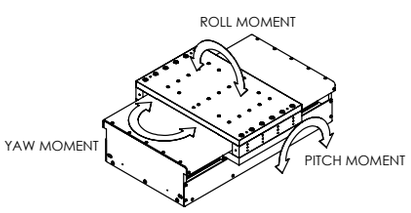
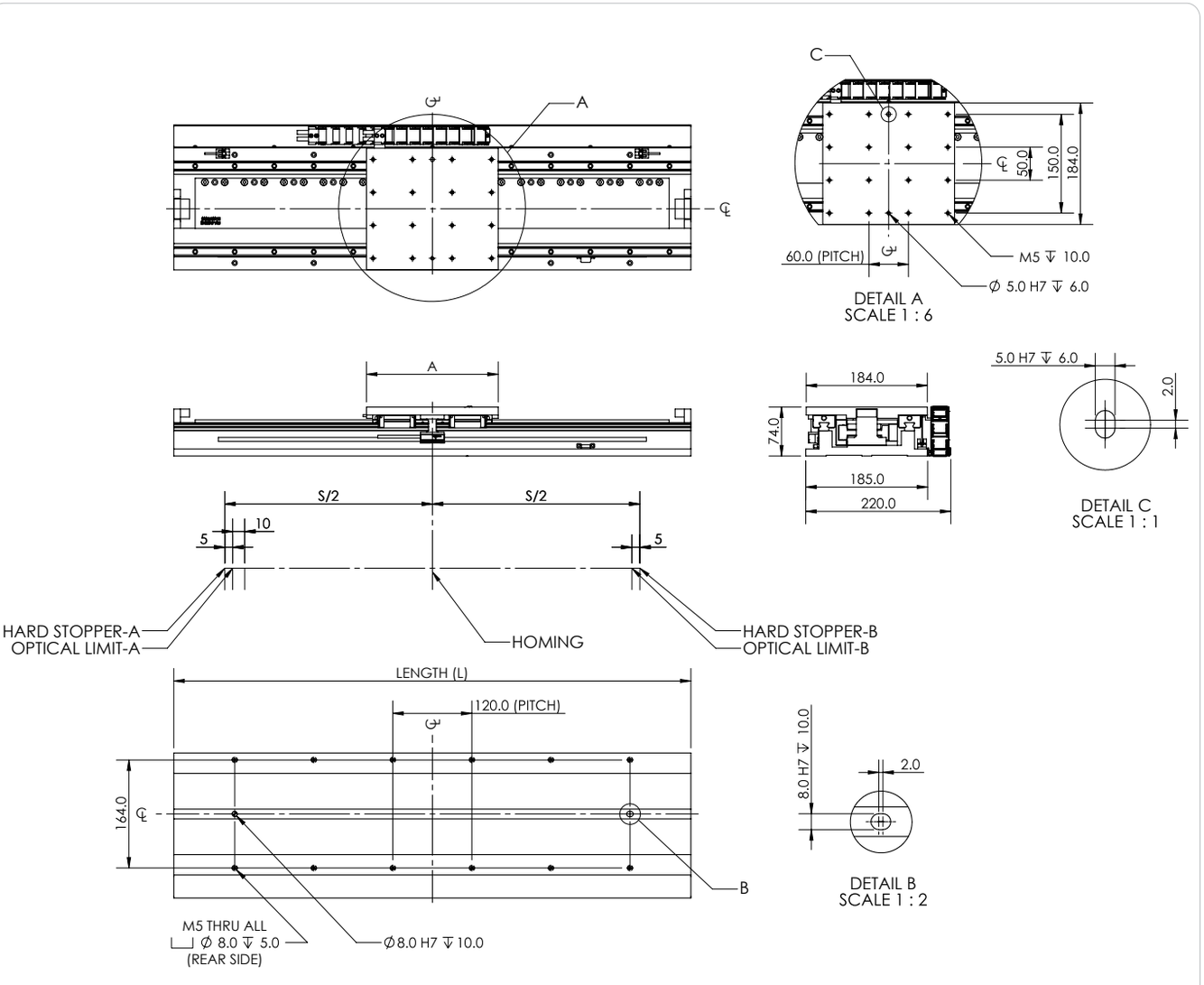


PDAB-D5/D5T (OPEN TYPE)

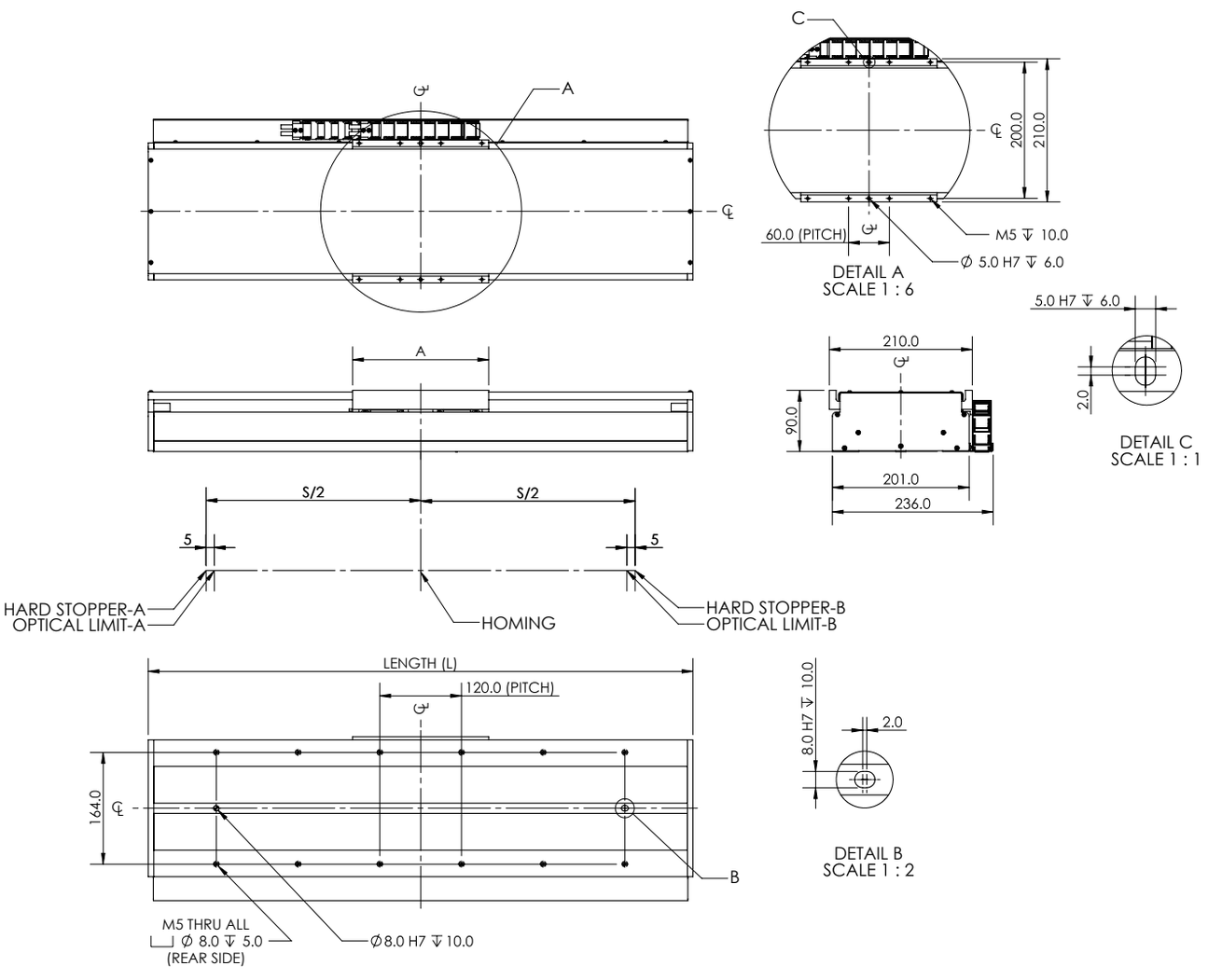


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C3	MIN:100 MAX:1600	MIN : 345 MAX: 1845	S=100+(Multiple of 60mm) L=S+A+(65mm)	200	2.1	MIN : 10.2 MAX: 62.7	W=10.2 + (Multiple of 2.1kg)
C4		MIN : 405 MAX: 1905		260	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)

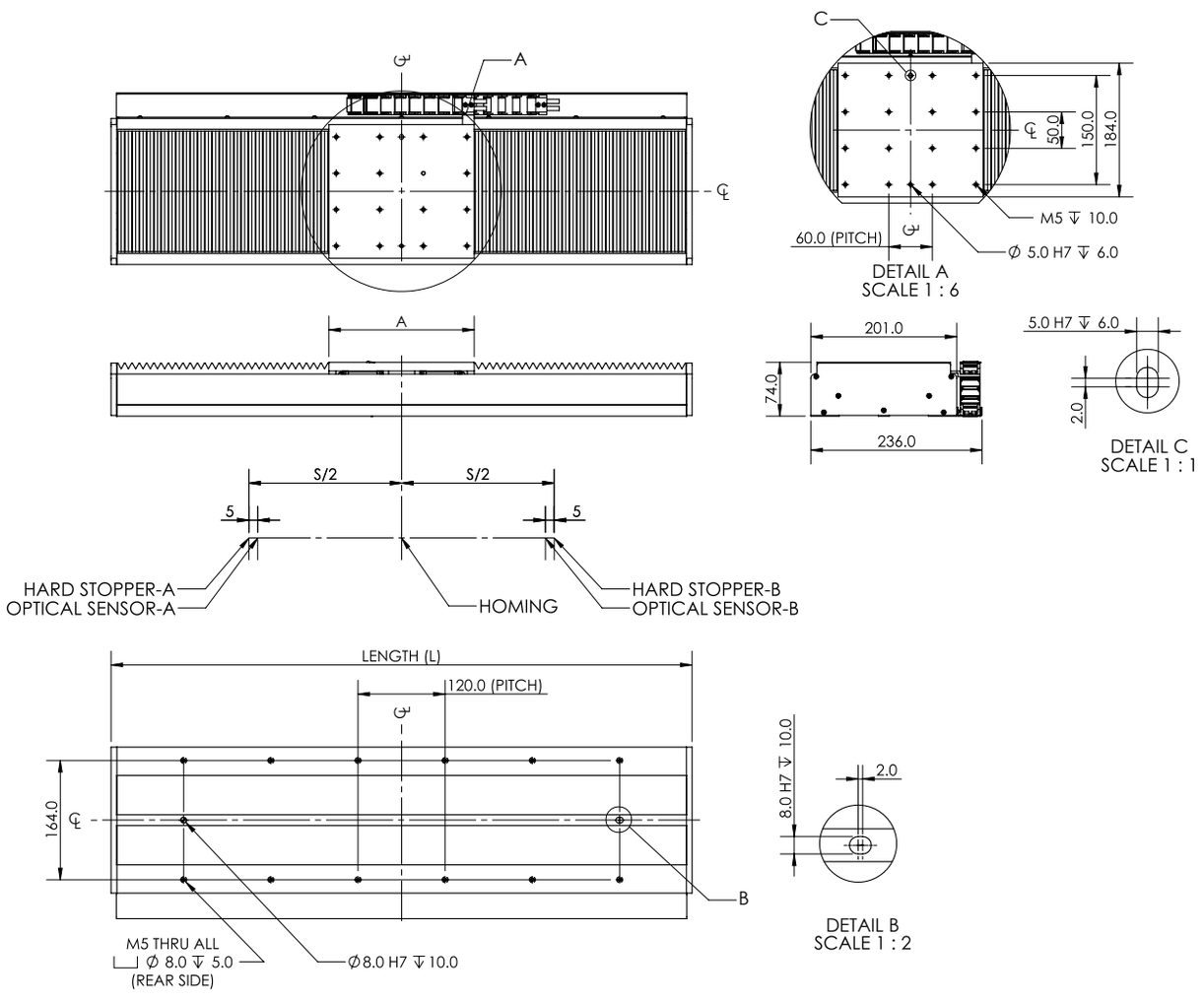


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C3	MIN:100 MAX:1600	MIN : 360 MAX: 1860	S=100+(Multiple of 60mm) L=S+A+(80mm)	200	2.5	MIN : 12.5 MAX: 75.0	W=11.0 + (Multiple of 2.5kg)
C4		MIN : 420 MAX: 1920		260	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)

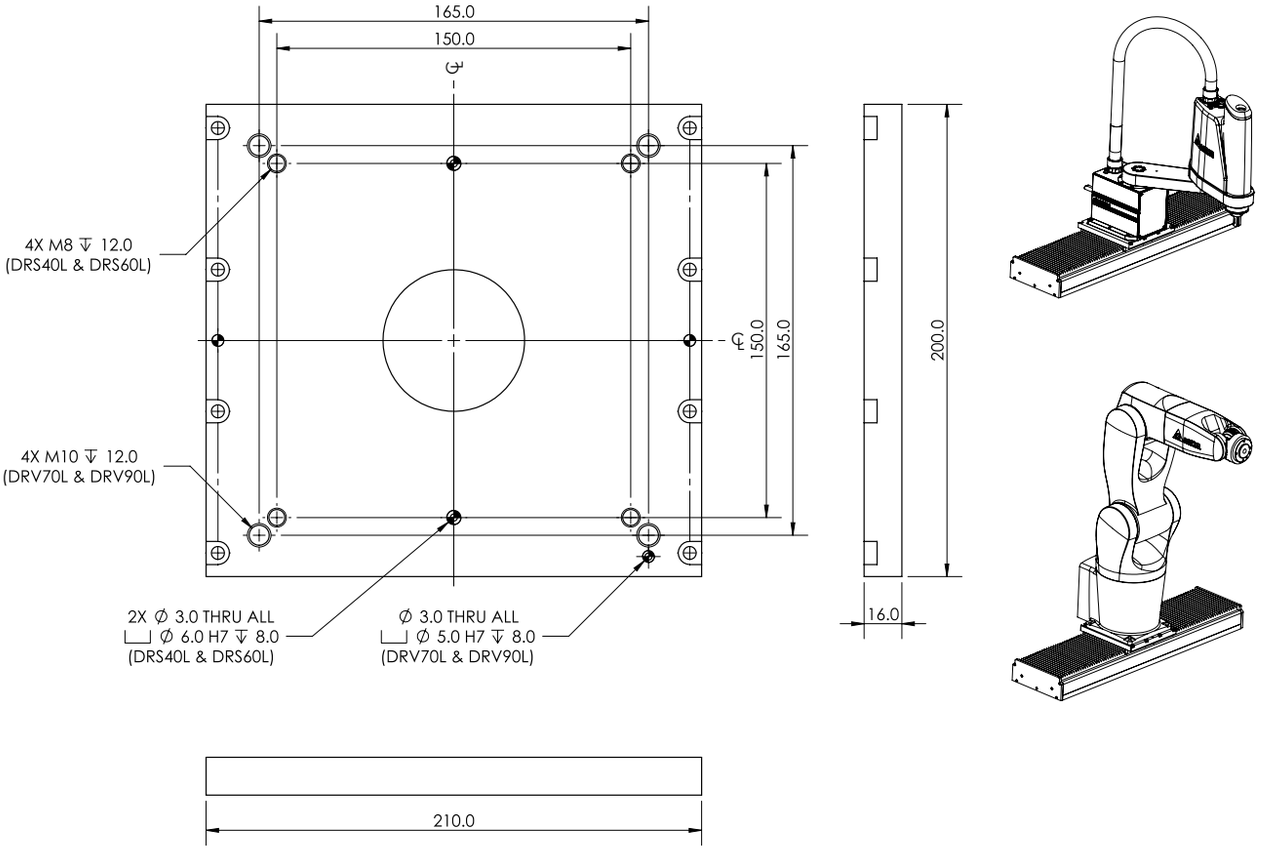


MOTOR MODEL	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	CARRIAGE LENGTH (A) mm	SLIDER MASS kg	MODULE MASS (W) kg	
C3	MIN:100 MAX:1000	MIN : 420 MAX: 1770	S=100+(Multiple of 60mm) L=S+A+(170mm)	200	2.2	MIN : 14.1 MAX: 56.1	W=14.1 + (Multiple of 2.8kg)
C4		MIN : 480 MAX: 1830		260	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

PDAB-DELTA ROBOT MOUNTING



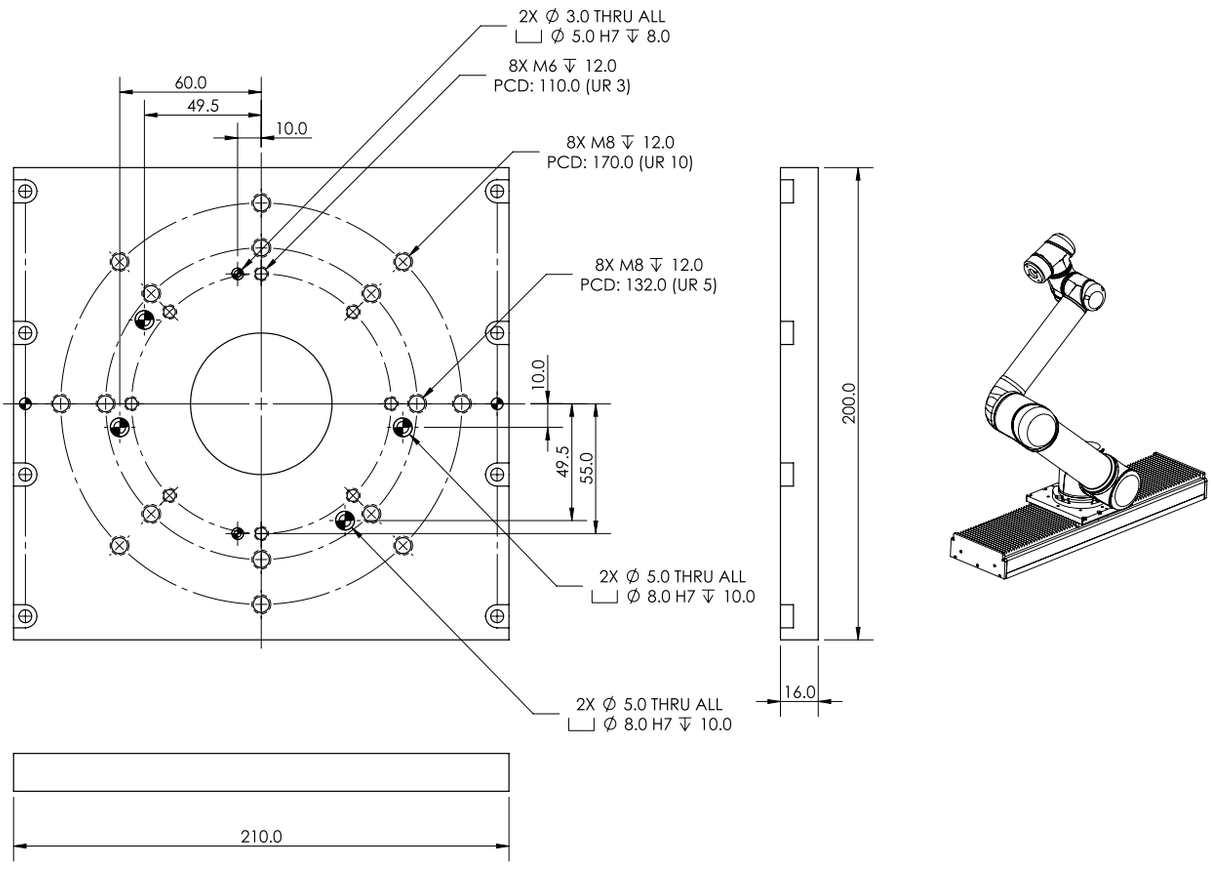
Robot Mounting Details

ROBOT TYPE	ROBOT MODEL	ROBOT WEIGHT (kg)	ROBOT PAY LOAD (kg)	ROBOT BASE PLATE (kg)
SCARA	DRS40L	16.0	3.0	1.7
	DDRS60L	20.0	6.0	
ARTICULATED	DRV70L	35.0	7.0	
	DRV90L	39.0	7.0	

Notes:

ROBOT SLIDER MASS = ACTUATOR SLIDER MASS + ROBOT BASE PLATE MASS + ROBOT WEIGHT

PDAB-UR ROBOT MOUNTING



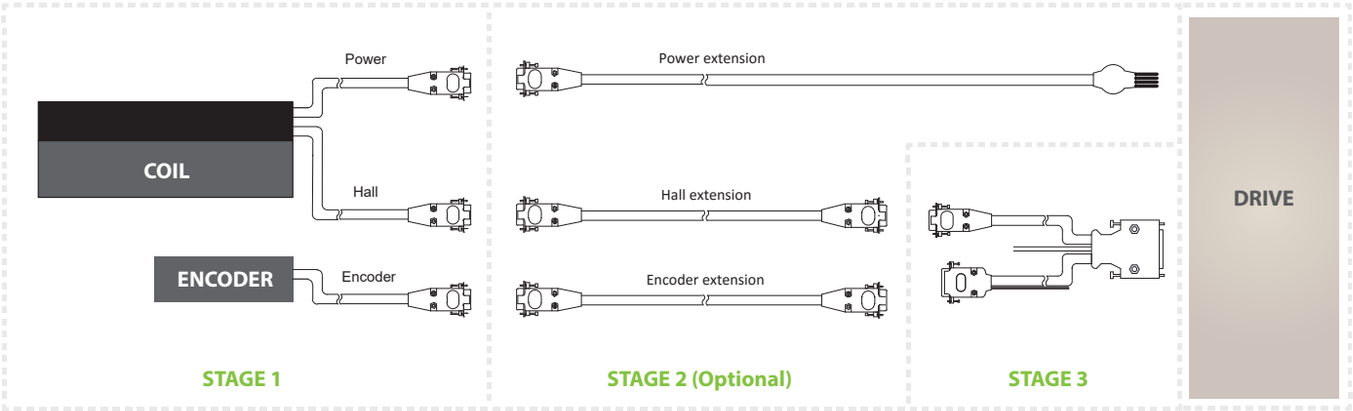
Robot Mounting Details

ROBOT TYPE	ROBOT MODEL	ROBOT WEIGHT (kg)	ROBOT PAY LOAD (kg)	ROBOT BASE PLATE (kg)
Collaborative	UR3	11.0	3.0	1.7
	UR5	18.4	5.0	
	UR10	28.9	10.0	

Notes:

ROBOT SLIDER MASS = ACTUATOR SLIDER MASS + ROBOT BASE PLATE MASS + ROBOT WEIGHT

CABLE OPTION

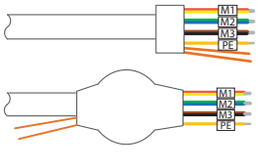


STAGE 1 — POWER AND HALL CABLE OPTION

PDAB-D5-C3-S-TM-1.0-**FC**-**HC**-E1.0-O-1600-00

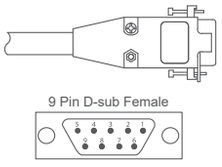
POWER CABLE OPTIONS

NF / FC



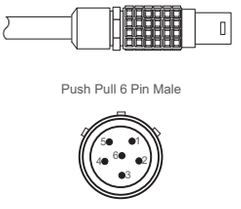
M1	Pink & Yellow
M2	Green & Blue
M3	Brown & Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

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



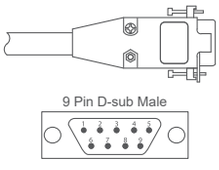
P1	M1	Pink & Yellow
P2	M2	Green & Blue
P3	M3	Brown & Black
P4	Temp sensor 1	Orange / Black
P5	Temp sensor 2	Orange
P6	PE	White

HALL SENSOR OPTIONS

H

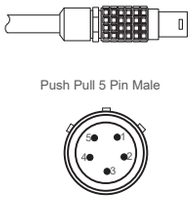
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

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:

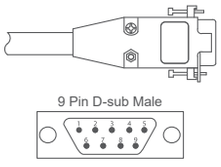
MODEL	THERMAL DEVICE TYPE	THERMOSTAT (NC) OPENS AT
DX30B	PT100	See Note 1
DX30B	Thermostat	100°C
DX50B	Thermostat	100°C

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.

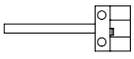
PDAB CABLE PIN OUT

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

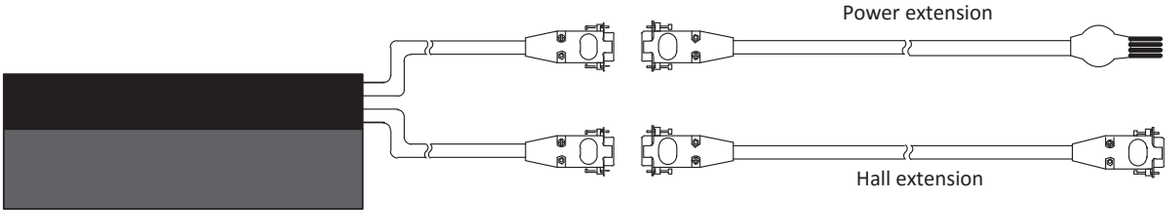
OPTICAL LIMIT SWITCH (PM-L24)

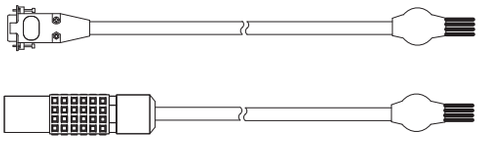


+5V dc	Brown
GND	Blue
LIGHT-ON	Black
DARK-ON	White

STAGE 2 PDAB EXTENSION CABLE

Connection example: PDAB-D5-C3-S-TM-1.0-FC-HC-E1.0-O-1600-00



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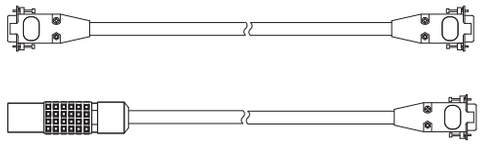
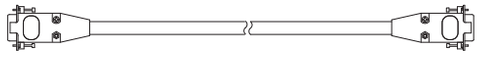
Hall Sensor Extension Cable		CBL_EXT_HALL_DX_X.X
		CBL_EXT_HALL_DX_CC_X.X
Encoder Extension Cable		CBL_EXT_REN01_X.X
		CBL_EXT_REN01B_X.X

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