PIAB WITH ROBOT

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 - A1

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

ROBOT

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

EFFECTIVE STROKE (mm)

100-1700	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

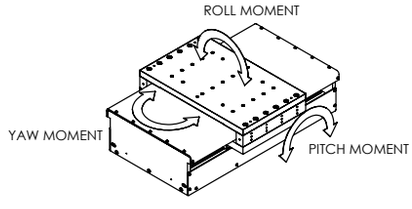
- Iron Core Actuator
- Peak force to 542N, Continuous force to 108N

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	4.8	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. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. Peak force and current - 1 second duration.
5. *** Specific accuracy, straightness and flatness requirement, contact PBA for more information.
6. For customized stroke length, contact PBA.
7. For different motor models, contact PBA.



PIAB-P2

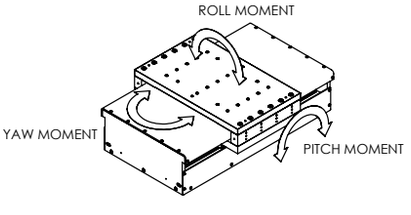
- Iron Core Actuator
- Peak force to 893N, Continuous force to 179N

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	8.3
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	1.8
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. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. Peak force and current - 1 second duration.
5. *** Specific accuracy, straightness and flatness requirement, contact PBA for more information.
6. For customized stroke length, contact PBA.
7. For different motor models, contact PBA.



PIAB-P3

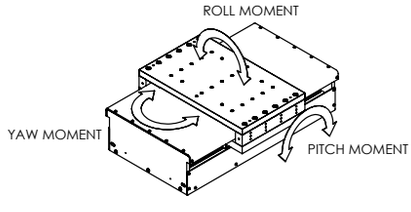
- Iron Core Actuator
- Peak force to 943N, Continuous force to 189N

PIAB SERIES
Iron Core Actuator

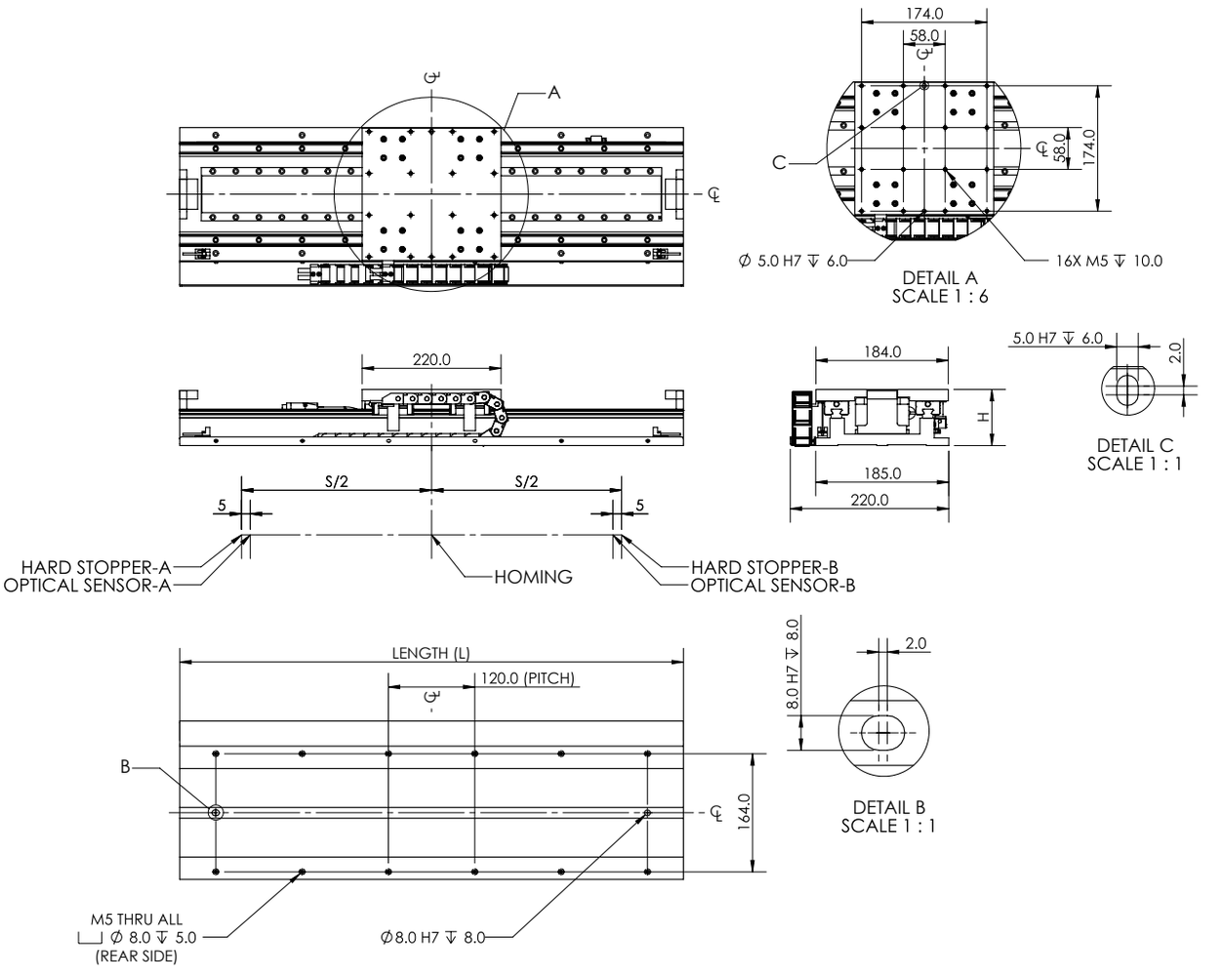
SPECIFICATION		MODEL	
		PIAB-P3	
Motor Parameters	**Unit**	S	P
Peak Force	N	943	
Continuous Force @ 105ºC*	N	189	
Continuous Stall Force @ 105ºC*	N	133	
Peak Power @ 105ºC	W	2144	
Continuous Power @ 105ºC*	W	86	
Peak Current	A^{pk}	21.9	41
Continuous Current @ 105ºC*	A^{pk}	4.4	8.2
Continuous Stall Current @ 105ºC*	Arms	3.1	5.8
Force Constant	N/A^{pk}	43	37
Back EMF Constant	$V^{pk}/m/s$	49.5	42.5
Coil Resistance L-L @ 25ºC	Ohm	4.3	1.5
Coil Resistance L-L @ 105ºC*	Ohm	6	2.1
Inductance L-L @ 1kHz	mH	40	15
Motor Constant @ 25ºC*	N/√W	24	
Motor Constant @ 120ºC*	N/√W	20.4	
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. * Ambient temperature 25ºC, heat dissipation by natural convection, without heat sink attached.
3. ** Depend on encoder resolution.
4. Peak force and current - 1 second duration.
5. *** Specific accuracy, straightness and flatness requirement, contact PBA for more information.
6. For customized stroke length, contact PBA.
7. For different motor models, contact PBA.



PIAB - OPEN TYPE

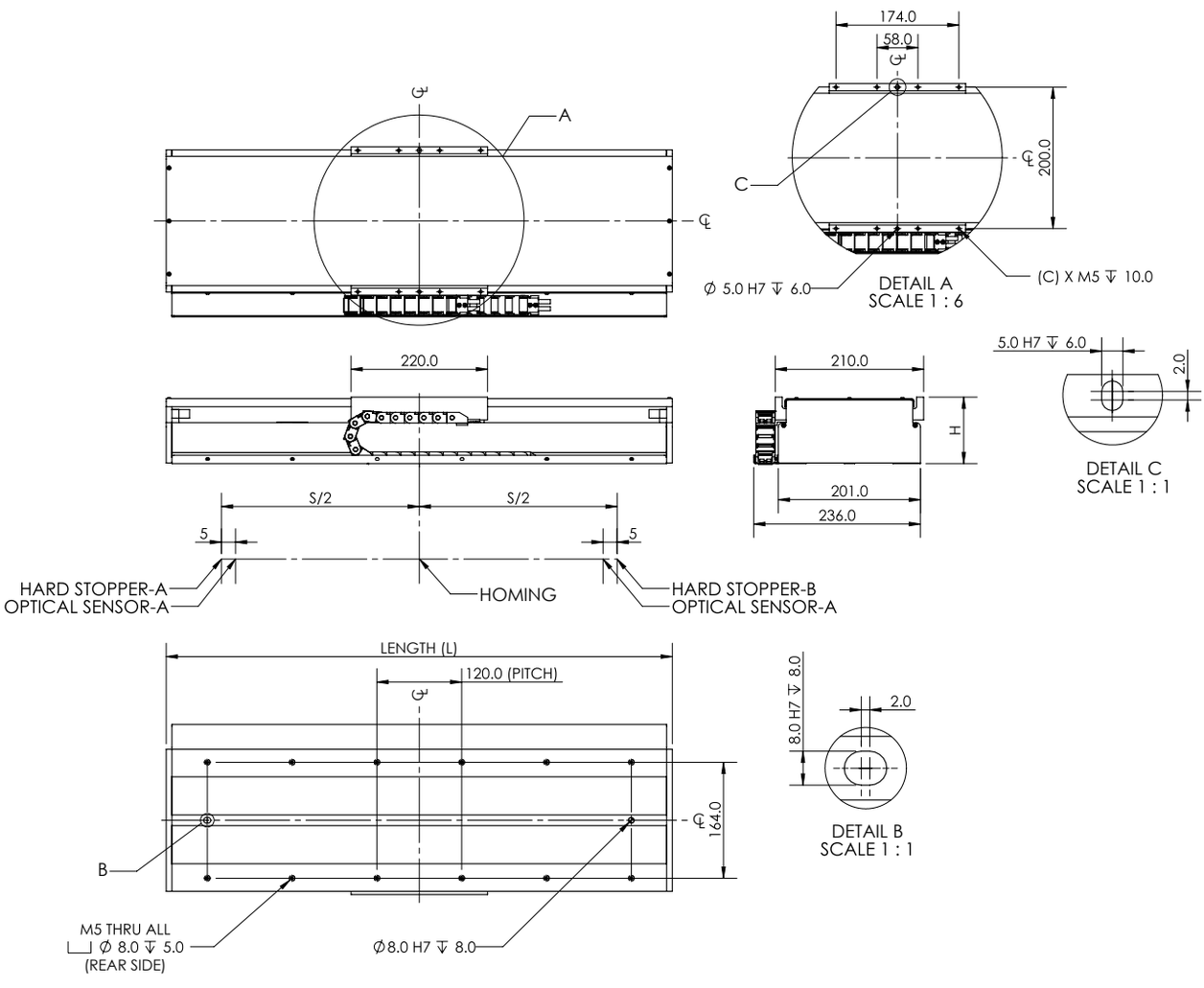


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	65	MIN:100 MAX:1700	MIN:380 MAX:1980	S=100+(Multiple of 64mm) L=S+220+(60mm)	3.1	MIN : 8.6 MAX: 40.5	W=8.6 + (Multiple of 1.2kg)
PIX200-027-050					3.8	MIN : 9.8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

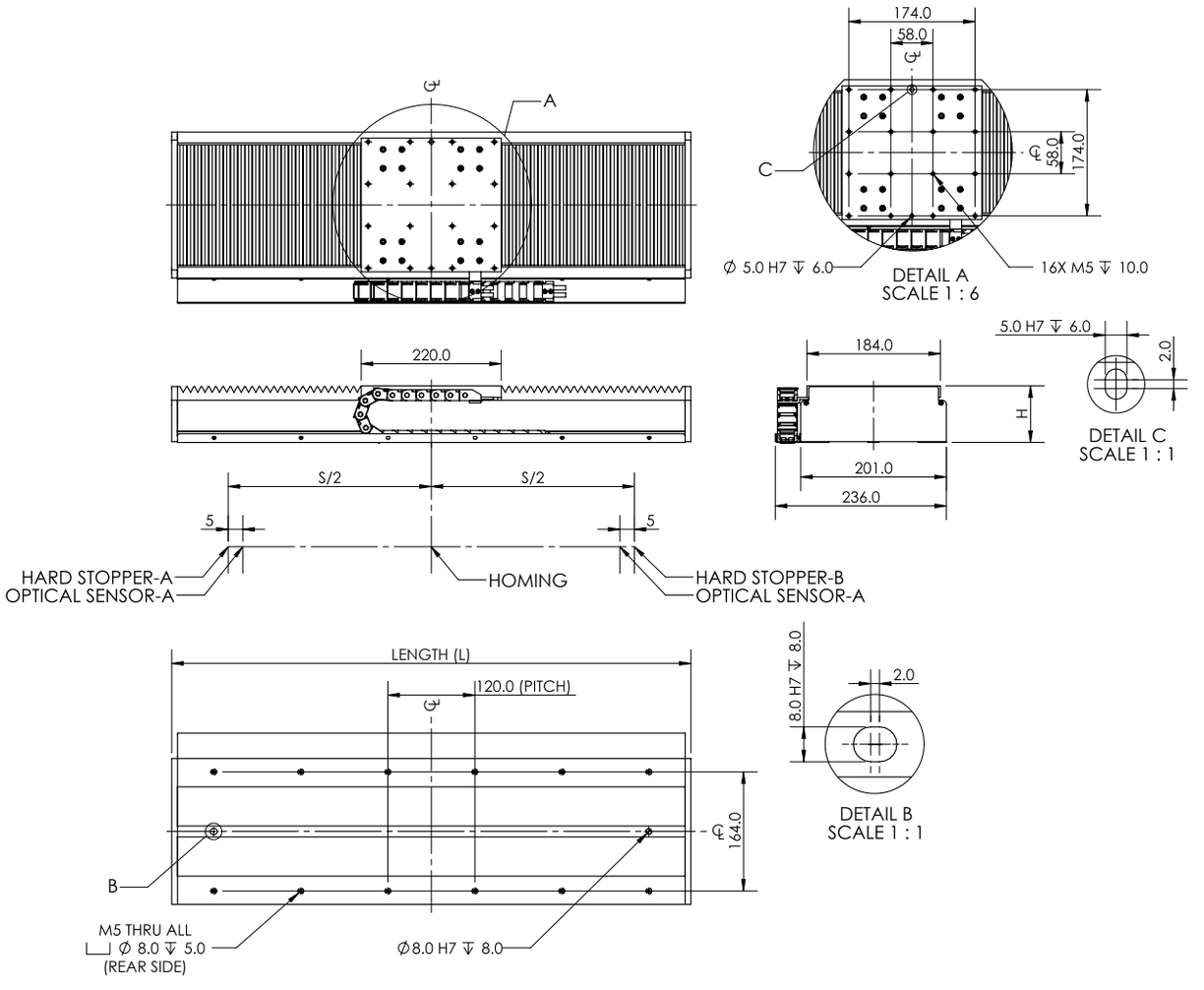


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	80	MIN:100 MAX:1700	MIN:396 MAX:1996	S=100+(Multiple of 64mm) L=S+220+(76mm)	3.5	MIN : 11.2 MAX: 46.2	W=11.2 + (Multiple of 1.4kg)
PIX200-027-050					4.2	MIN :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

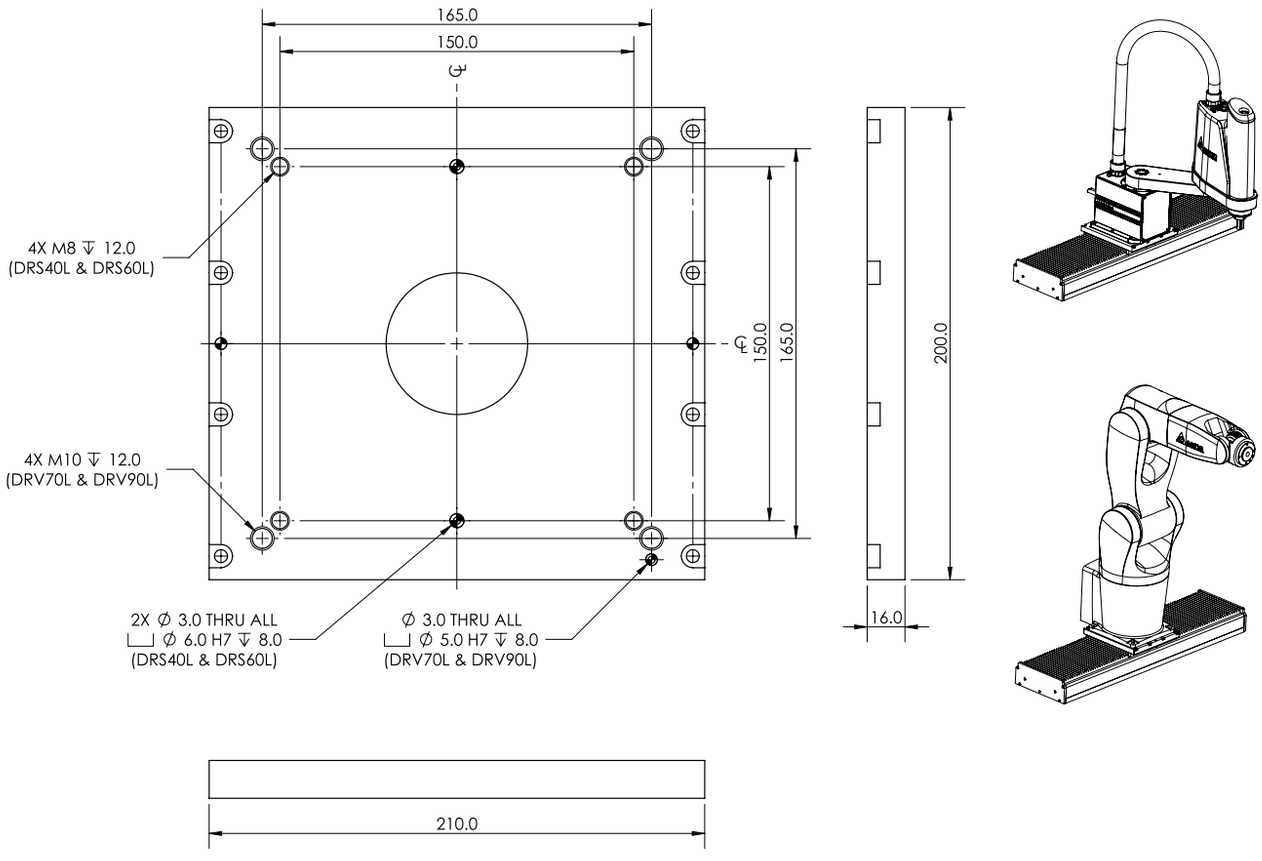


MOTOR MODEL	HEIGHT (H) mm	STROKE (S) mm	ACTUATOR (L) mm	STROKE/ACTUATOR LENGTH (S) / (L) mm	SLIDER MASS kg	MODULE MASS (W) kg	
PIX200-027-030	65	MIN:100 MAX:1060	MIN:428 MAX:1868	S=100+(Multiple of 64mm) L=S+220+(200mm)	3.3	MIN : 10.5 MAX: 30.0	W=10.5 + (Multiple of 1.3kg)
PIX200-027-050					4.0	MIN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

PDAB-DELTA ROBOT MOUNTING



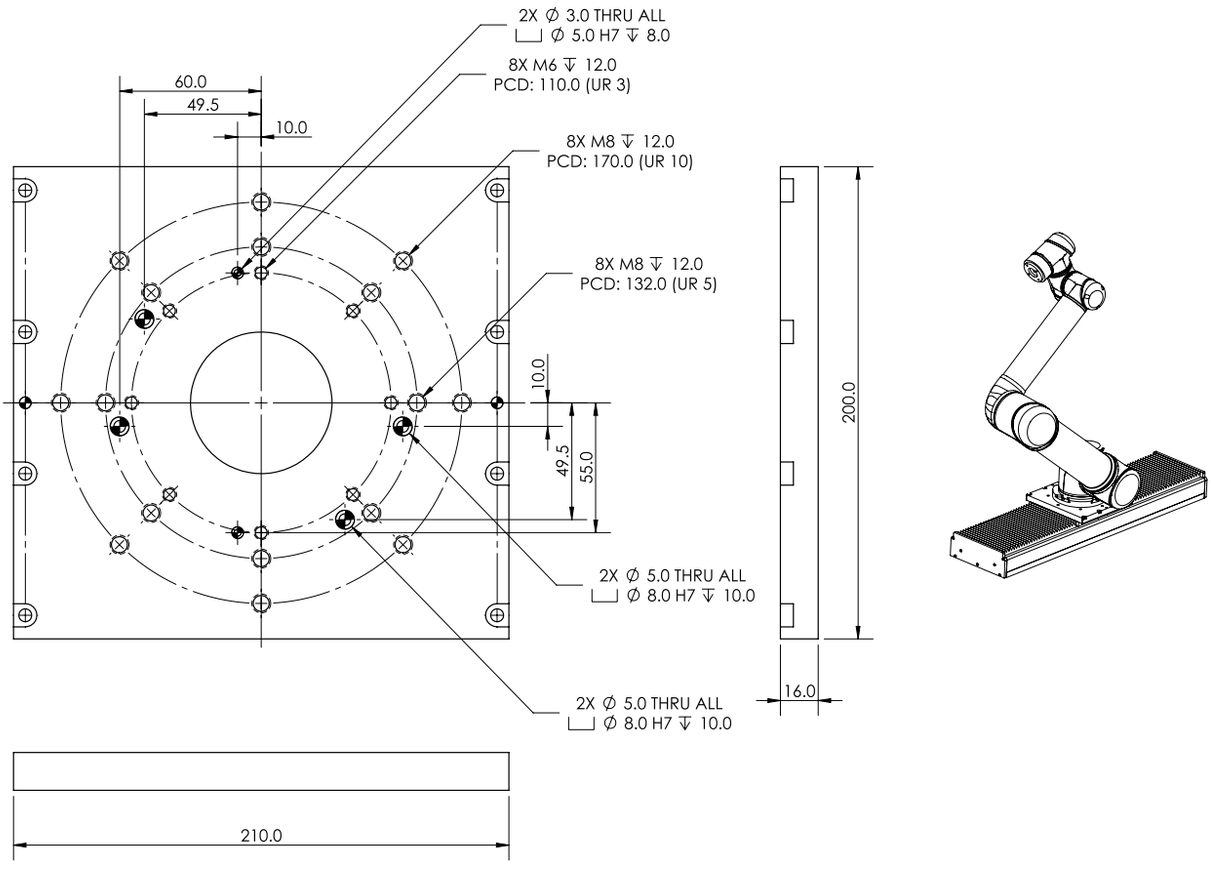
Robot Mounting Details

ROBOT TYPE	ROBOT MODEL	ROBOT WEIGHT (kg)	ROBOT PAY LOAD (kg)	ROBOT BASE PLATE (kg)
SCARA	DRS40L	16.0	3.0	1.7
	DRS60L	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



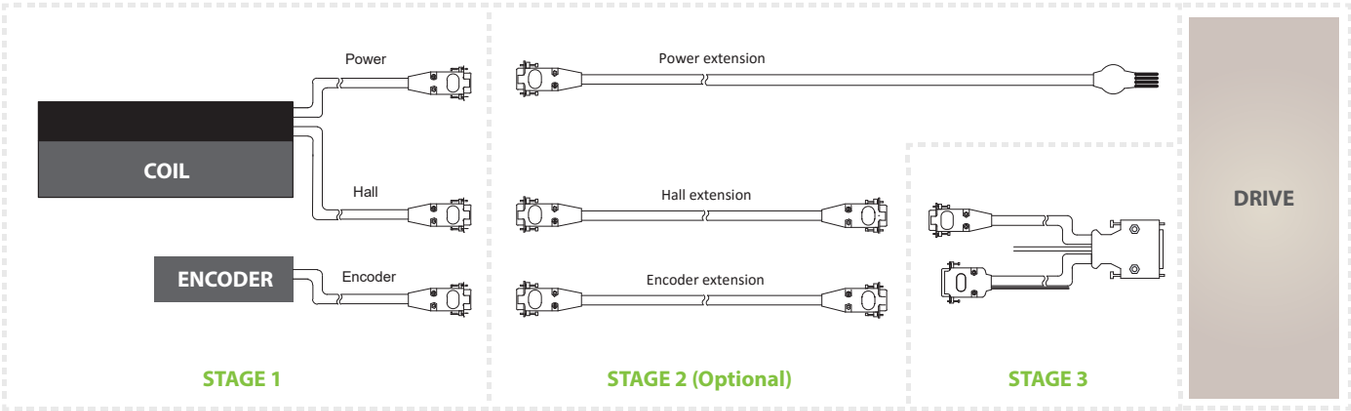
Robot Mounting Details

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

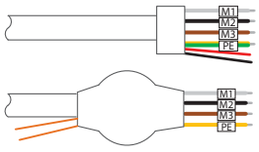


STAGE 1 — POWER AND HALL CABLE OPTION

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

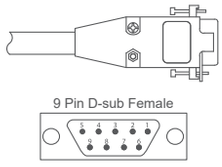
POWER CABLE OPTIONS

NF / FC



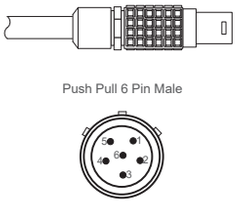
M1	Grey
M2	Brown
M3	Black
PE	Yellow
Temp sensor 1	Orange / Black
Temp sensor 2	Orange

9NF



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

CNF



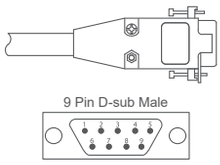
P1	M1	Grey
P2	M2	Black
P3	M3	Brown
P4	Temp sensor 1	Red
P5	Temp sensor 2	Black
P6	PE	Yellow & Green

HALL SENSOR OPTIONS

H

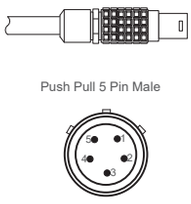
Hall A	White
Hall B	Green
Hall C	Blue
5V	Red
0V	Black

HC



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

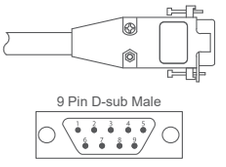
CHC



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

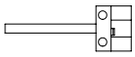
PIAB CABLE PIN OUT

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

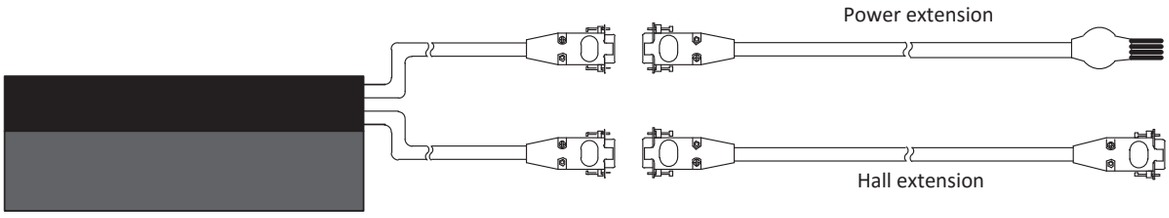
OPTICAL LIMIT SWITCH (PM-L24)



+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