



<b>Travel</b>	120 inches	[3 m]
<b>Velocity</b>	100 inches / sec	[2.5 m/s]
<b>Acceleration</b>	12 G's	12 G's
<b>Peak Force</b>	180 lbs	[800 N]
<b>Continuous Force</b>	60 lbs	[266 N]

The DC brush linear motor is ideal for long stroke, open or closed loop servo, linear motion applications. They can be used at speeds up to 100 in / sec [2.5 m / sec] and as low as 1 in/sec [25 mm / sec]. They are capable of very precise position, velocity and acceleration control when coupled with a linear encoder.

The motor is commutated using brushes on the moving permanent magnet secondary in conjunction with a stationary commutator bar on the coil assembly. This results in only the coils directly beneath the secondary with current flowing in them.

The short moving brush assembly is magnetically attracted to the long stationary laminated coil assembly. A customer supplied bearing system is required to guide the moving secondary and to maintain a .025" [0.63 mm]

gap between the secondary and the coil assembly.

The power to the motor (from a customer supplied PWM DC servo amplifier) is supplied to the moving secondary via a power cable. The resultant force is proportional to the input current.

The low overall height (1.65" [41.9 mm]) of the brush motor allows it to fit into a very compact space. The low moving mass of the secondary allows for higher accelerations of light payloads.

The motor comes in different widths and secondary lengths to meet different force and packaging requirements.

#### Advantages:

- Low profile and small cross section
- Available in many different widths and lengths
- High Acceleration of light loads
- High Speed
- Uses low cost PWM amplifier

#### Applications:

- Pick and Place
- Coordinate measuring machines
- Parts transfer
- Inspection Machines

#### The Linear Brush Motor consists of 2 main parts

- **Long Stationary Coil Assembly:** The laminated motor stacks are insulated and bonded together. The copper coils are inserted into insulated slots in the stack. The ends of the coils are brought out and soldered to the commutator bar. An aluminum mounting angle and a mounting bar are bolted to each side of the lamination stack. Threaded mounting holes in the angle or "T" nuts are available to mount the coil assembly to the customer supplied base plate. The coil assembly is available in widths from 2.0" to 5.0" [50 mm to 125 mm]. The length of the coil assembly is a function of the stroke. Single piece motors are available as long as 144 inches [3.6 m]. Longer motors will be made in sections.
- **Short Moving Secondary Assembly:** The secondary is made of nickel plated steel with permanent magnets bonded to bottom. A PCB with brushholders and brushes soldered on, is mechanically attached to the side of the secondary. Mounting holes are provided for attaching the secondary to the moving member of the customer supplied table assembly. The secondary comes in different widths and lengths, depending on the required force. Multiple secondaries can be supplied with a single coil assembly to allow for independent moving heads or they can be coupled together to produce larger forces. The standard lengths for the secondaries are 4.38" for BRA motors and 9.56" for BRB motors.

#### Required Electronics:

The motor requires a single phase brush type PWM amplifier with power supply, that is rated with sufficient current and voltage to meet the motion requirements. The inductance of the linear motor coil should be greater than the minimum load inductance of the servo amplifier.

#### Environmental Considerations:

The brush motor is an open type motor and should not be mounted in an environment that is wet or excessively dirty. It should be protected with some type of bellows or cover when installed by the customer.

#### Mounting:

The DC brush motor should be mounted to flat (better than .003"/ft [246 microns / m] and stiff surface. Threaded holes on the bottom of the coil assembly or optional thru holes are present in the aluminum angles to allow for the mounting of the motor to the customers system. The moving secondary assembly has threaded holes on the top surface for attaching it to the customer supplied moving table. The motor may be mounted in any orientation. When mounting the

stage with the secondary moving vertical, it should be noted that the stage will be required to generate additional force due to gravity and that the stage will slide down to the bottom when power fails.

### Ordering Info:

DC brush motors can be ordered for any stroke up to 144inches and any peak force up to 180 lbs. Higher forces can be achieved by adding additional secondaries in series (consult factory for more information)

Model Number	Width (W)		F cont		F peak		Force Constant		Back EMF		R	L	Magnetic Attraction	
	(in)	[mm]	(lbs)	[N]	(lbs)	[N]	lbs/amp	[N/amp]	(V/in/sec)	[V/m/sec]	(ohms)	(mH)	(lbs)	[N]
BRA-XXX-051	2.0	[51]	4	[19]	13	[58]	0.9	[4]	0.1	[3.9]	1	1.2	45	[200]
BRA-XXX-064	2.5	[64]	9	[38]	26	[116]	1.7	[8]	0.19	[7.9]	1.4	2.4	90	[400]
BRA-XXX-076	3.0	[76]	13	[58]	40	[178]	2.6	[12]	0.29	[11.5]	1.7	3.5	135	[600]
BRA-XXX-084	3.3	[76]	15	[67]	47	[209]	3.0	[13]	0.34	[13.2]	1.9	4.1	160	[710]
BRA-XXX-089	3.5	[84]	17	[75]	54	[240]	3.5	[16]	0.39	[15.4]	2.1	4.7	180	[800]
BRA-XXX-102	4.0	[102]	22	[98]	68	[302]	4.3	[19]	0.48	[19.0]	2.4	5.9	225	[1000]
BRA-XXX-114	4.5	[114]	26	[115]	82	[364]	5.2	[23]	0.58	[22.9]	2.7	7.1	270	[1200]
BRA-XXX-127	5.0	[127]	31	[138]	96	[427]	6.1	[27]	0.68	[26.9]	3.1	8.2	315	[1400]

Model Number	Width (W)		Fc		Fp		Force Constant		Back EMF		R	L	Magnetic Attraction	
	(in)	[mm]	(lbs)	[N]	(lbs)	[N]	lbs/amp	[N/amp]	(V/in/sec)	[V/m/sec]	(ohms)	(mH)	(lbs)	[N]
BRB-XXX-051	2.0	[51]	8	[36]	25	[111]	0.9	[4]	0.1	[3.9]	0.5	0.6	90	[400]
BRB-XXX-064	2.5	[64]	17	[76]	52	[231]	1.7	[8]	0.19	[7.9]	0.7	1.2	180	[800]
BRB-XXX-076	3.0	[76]	25	[111]	78	[347]	2.6	[12]	0.29	[11.5]	0.9	1.8	270	[1200]
BRB-XXX-084	3.3	[84]	29	[129]	91	[404]	3.0	[13]	0.34	[13.2]	0.9	2.1	315	[1400]
BRB-XXX-089	3.5	[89]	34	[151]	104	[462]	3.5	[16]	0.39	[15.4]	1	2.4	360	[1600]
BRB-XXX-102	4.0	[102]	42	[187]	131	[582]	4.3	[19]	0.48	[19.0]	1.2	2.9	450	[2000]
BRB-XXX-114	4.5	[114]	51	[227]	157	[698]	5.2	[23]	0.58	[22.9]	1.4	3.5	540	[2400]
BRB-XXX-127	5.0	[127]	69	[267]	185	[822]	6.1	[27]	0.68	[26.9]	1.5	4.1	600	[2670]

F cont = Continuous Force, F peak = Peak Force @ 10% Duty

For BRA motors; I continuous = 5.0 Amps, I peak = 15.0 Amps

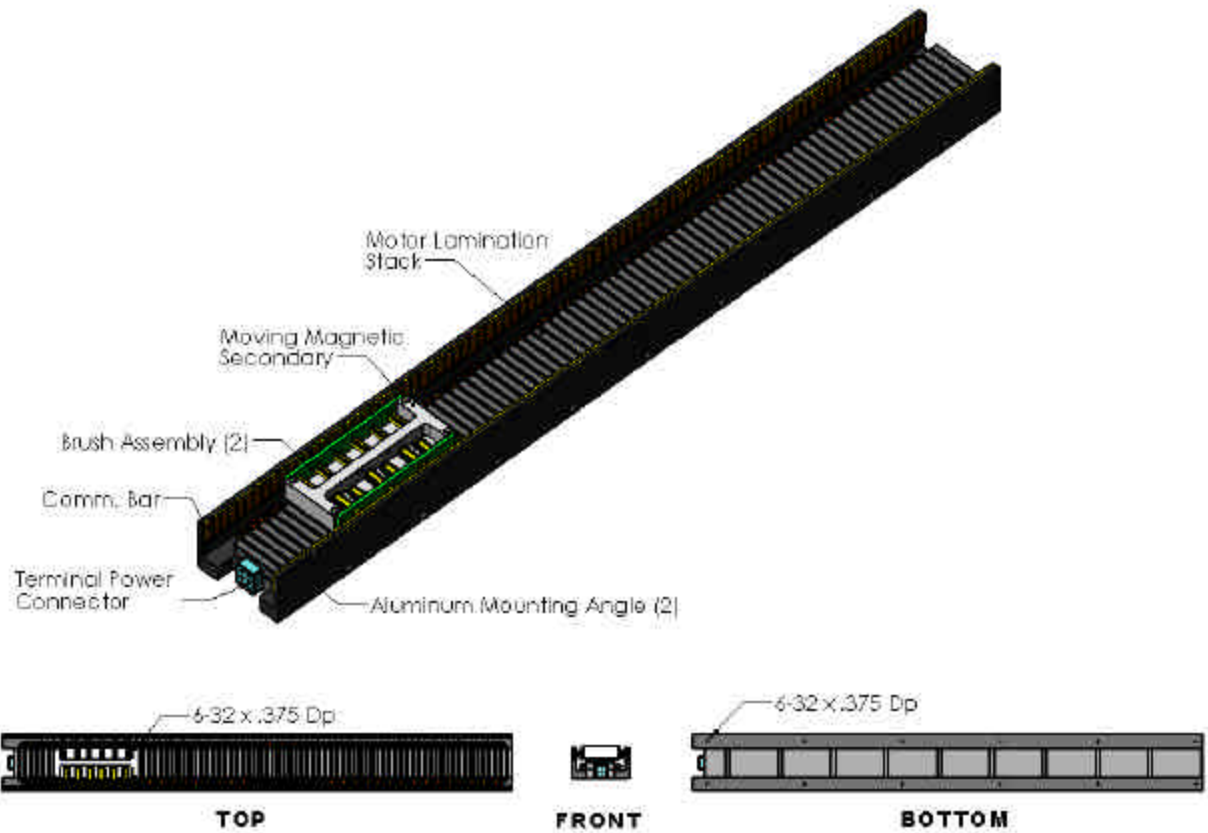
For BRB motors; I continuous = 10.0 Amps, I peak = 30.0 Amps

Required DC Bus Voltage for Amplifier;  $V_{required} = (I_{peak} \times R_c \times 1.4) + (\text{Back EMF} \times \text{Velocity})$

The -XXX in the model number is for the stroke in inches (i.e. 18 inches is -018)

Ls = 4.38 [111.3 mm] for BRA motors and Ls = 9.56" [242.8 mm] for BRB motors

## Brush Motor (U Shape)



## Brush Motor (L Shape)

