Servo Wheel Series:

Compact Wheel Drives for Electric Vehicles

The Servo Wheel™ combines a brushless dc motor with planetary gears in a lightweight, aluminum housing to provide a compact solution for vehicle control. The Power Wheel's unique design makes system integration easy. You no longer have to purchase the motor, gearhead, wheel, electronics and bracket from different sources. Bayside does all of the work for you. From component sourcing to actual assembly, Bayside engineers designed the Power Wheel with your application in mind.
All you have to do is bolt it up and go!

Servo Wheel Series:
Design Features

Single Piece Construction Motor Shaft

The first stage's planetary section sun gear is integrated into the single piece construction motor shaft, to provide higher reliability in a compact package.

Planetary Gears

The planetary input stage provides a first pass reduction that is capable of carrying high torques with high input speeds in a small package.

Integrated Output Stage

The second stage planetary's unique design uses two planets for higher efficiency. Built entirely into the wheel, it utilizes an otherwise wasted area to provide a compact, space-saving package. Two large diameter bearings support the weight, protecting the gears from shock loading and dramatically increasing the radial load carrying capacity of the wheels.

Servo Wheel Series:
Compact Wheel Drives for Electric Vehicles

Baysides NEW Servo Wheel™ Drive System features state-of-the-art technology to provide motion for small, battery-powered, electric vehicles including:

- **Automated Cleaning Equipment**
- **Healthcare Equipment**
- **Robotic/Material Handling Equipment**
- **AGV's**

Bayside's Servo Wheel™ features:

BRUSHLESS DC MOTOR AMPLIFIERS designed for common motion profiles in battery powered vehicles to provide:

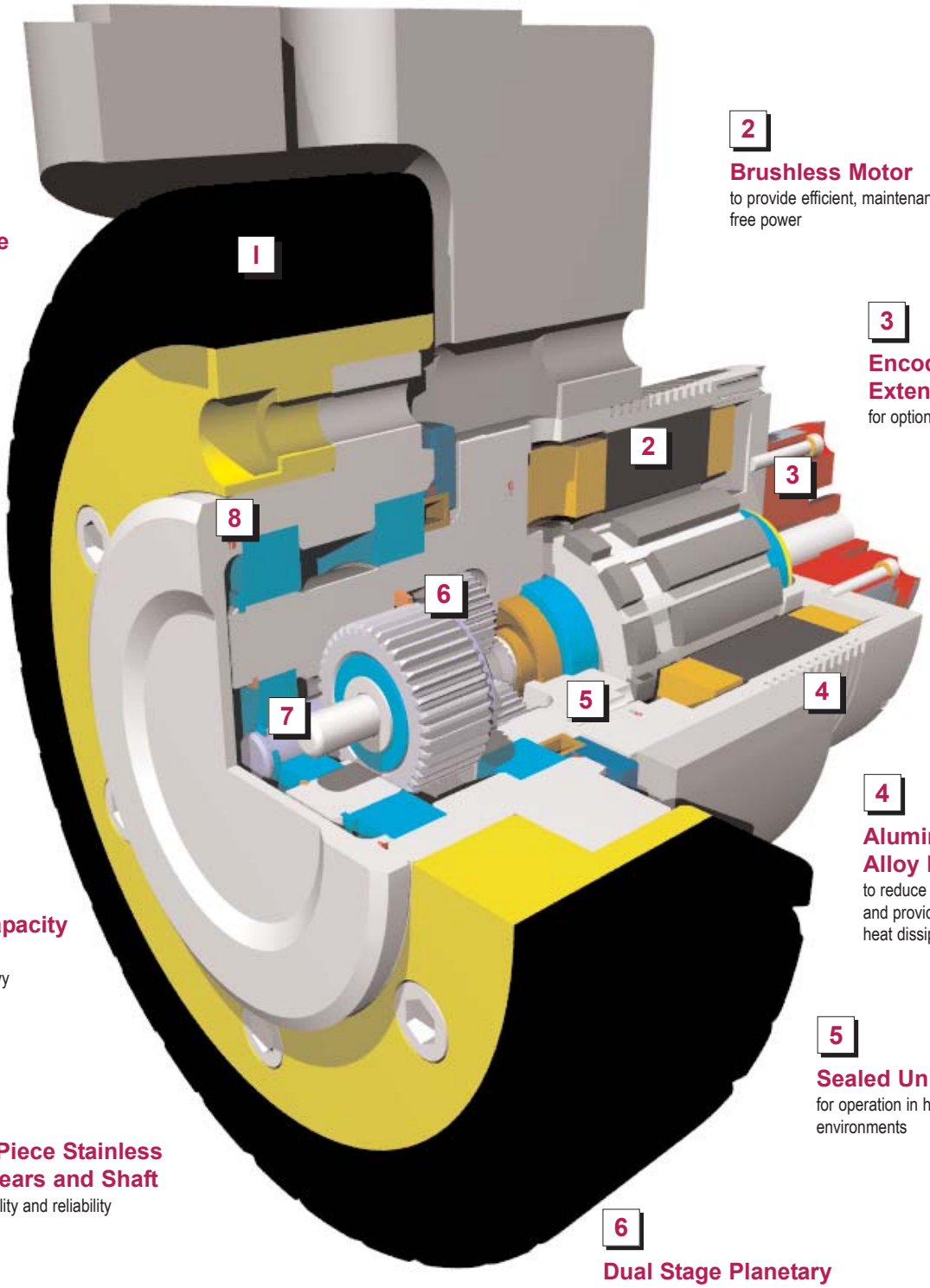
- 12, 24, 36 and 48 volt operation
- Synchronized steering - accurate digital control for differential steering applications
- Current and temperature feedback control for safe, reliable operation
- Multiple input architectures for easy communication with higher level controllers and navigation systems

PERMANENT MAGNET BRUSHLESS MOTORS to provide:

- High efficiency for longer run times between battery charges
- Greater power to size ratio for a compact package
- Internal position feedback eliminating the need for an encoder
- Long life and maintenance free operation
- High input speeds in excess of 10,000 RPM
- No internal sparking – safe in explosive environments
- Low EMI, eliminating the need for heavy shielding

PLANETARY GEARS to provide high torque-carrying capability in a small package. The gears are built into the hub of the wheel, making the package compact and lightweight. This design also increases the radial load-carrying and shock loading capacity of the entire system.

TIRES Polyurethane is ideal for applications in hospitals, schools, and airports – any place requiring non-marking materials. This material is also ideal for high load carrying applications like material handling.



1
Polyurethane Tires
for all types of surfaces

2
Brushless Motor
to provide efficient, maintenance-free power

3
Encoder/Brake Extension
for optional ad-ons

4
Aluminum Alloy Housing
to reduce weight and provide optimum heat dissipation

5
Sealed Unit
for operation in hostile or wet environments

6
Dual Stage Planetary Gear Design
to deliver high torque and high efficiency in a compact package

7
Single Piece Stainless Steel Gears and Shaft
for high quality and reliability

8
High Load Capacity Ball Bearings
to accommodate heavy vehicle loads

Servo Wheel Series:
Performance Specifications

Performance Specifications

Tire Diameter				152mm (6in)				203mm (8in)			
Speed Code				20	25	30	36	20	25	30	36
Motor Code	Power										
1	150	Speed	Km/hr	**6.3**	**5.0**	**4.2**	**3.5**	**8.4**	**6.8**	**5.6**	**4.7**
			MPH	3.9	3.1	2.6	2.2	5.2	4.2	3.5	2.9
		Peak Torque	Nm	**65**	**81**	**97**	**116**	**65**	**81**	**97**	**116**
			in lb	578	722	866	1,040	578	722	866	1,040
		Continuous Torque	Nm	**20**	**24**	**29**	**35**	**20**	**24**	**29**	**35**
			in lb	174	217	260	312	174	217	260	312
2	300	Speed	Km/hr	**5.8**	**4.7**	**3.9**	**3.2**	**7.7**	**6.3**	**5.2**	**4.3**
			MPH	3.6	2.9	2.4	2.0	4.8	3.9	3.2	2.7
		Peak Torque	Nm	**88**	**110**	**132**	**158**	**88**	**110**	**132**	**158**
			in lb	784	980	1,176	1,411	784	980	1,176	1,411
		Continuous Torque	Nm	**26**	**33**	**40**	**48**	**26**	**33**	**40**	**48**
			in lb	235	294	353	423	235	294	353	423
3	746	Speed	Km/hr	**5.5**	**4.4**	**3.6**	**3.0**	**7.3**	**5.9**	**4.9**	**4.1**
			MPH	3.4	2.7	2.2	1.8	4.5	3.6	3.0	2.5
		Peak Torque	Nm	**235**	**294**	**353**	**423**	**235**	**294**	**353**	**423**
			in lb	2,100	2,625	3,150	3,780	2,100	2,625	3,150	3,780
		Continuous Torque	Nm	**70**	**88**	**106**	**127**	**70**	**88**	**106**	**127**
			in lb	630	788	945	1,134	630	788	945	1,134
ALL TIRES		Load Capacity	kg	**454**				**454**			
			lb	1,000				1,000			

Tire Composition

Code		
	P	Polyurethane Clear Smooth
	Q	Polyurethane Clear x Thread
	R	Polyurethane Black Smooth
	S	Polyurethane Black x Thread

Operating Voltages

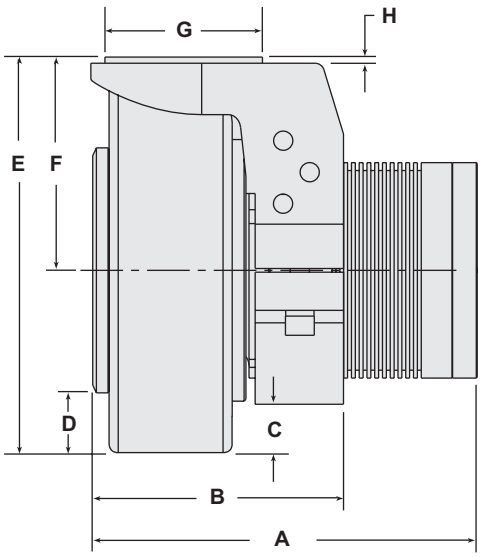
Code	K	M
Volts	24	48

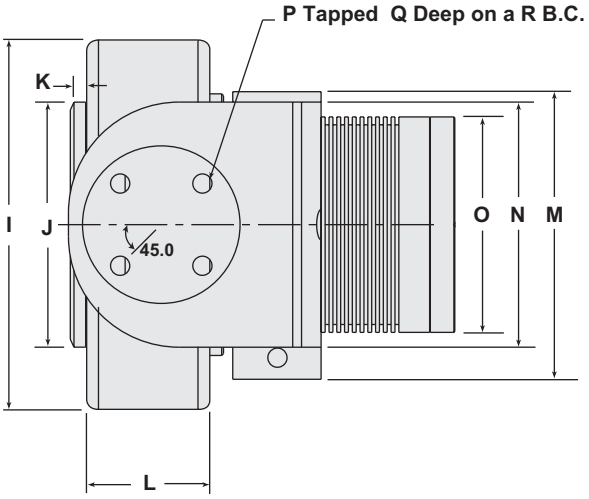
Brake

Code	0	None
	3	50 in-lb

Servo Wheel: Dimensions

Dimensions





Model Number	Motor Power	A with out Brake		B		C		D		E		F	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
	150	158.75	6.25	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
DX6	300	175.26	6.90	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
	746	191.77	7.55	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
	150	158.75	6.25	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60
DX8	300	175.26	6.90	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60
	746	191.77	7.55	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60

Model Number	Motor Power	G		H		I		J		K		L	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
	150	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
DX6	300	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
	746	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
	150	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0
DX8	300	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0
	746	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0

Model Number	Motor Power	M		N		O		P		Q		R	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
	150	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
DX6	300	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	746	118.6	4.67	101.1	3.98	100	3.94	7.94	5.16	25.4	1.0	47.98	1.889
	150	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
DX8	300	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	746	118.6	4.67	101.1	3.98	100	3.94	7.94	5.16	25.4	1.0	47.98	1.889

Servo Wheel Series:
Selection Guide & How to Order

5 Step Procedure

1 **Motor Code Selection**

Based on the application requirement, select the appropriate motor power from the second column in the "Performance Specifications" table. The number to the left of it in the first column is the motor code.

2 **Speed Code Selection**

Find the intersection of the column with the selected tire diameter and the row with the motor code to give you the available speed ranges. From the four given speeds (in mph), select the one that meets your application needs. Proceed to the top of that column to find the speed code just under the tire diameter you have selected in step 1.

3 **Voltage Code Selection**

From the "Operating Voltages" table, select the correct voltage code based on the power supply available for the application.

4 **Tire Composition Code Selection**

Servo Wheels™ are available for a wide variety of applications. Some require a smooth ride or high load carrying capacity, or a combination of both. From the tire composition table, select the appropriate material for you application. The letter in the first column is the tire composition code.

5 **Compose part number based on the codes selected**

Specifications are subject to change without notice.

How to Order

Order Numbering Example: **D X C A – R M V T B**

CLEAN ROOM RATING (Optional)	TIRE DIAMETER	GEARBOX RATIO	MOTOR SIZE	VOLTAGE	TIRE MATERIAL	BRAKE SIZE
0 = None 3 = Class 1,000 4 = Class 10,000	A = 6 in. B = 8 in.	1 = 20 2 = 24 3 = 30 4 = 36	1 = 150W 2 = 300W 4 = 746W	K = 24V	P = Polyurethane clear Q = Polyurethane clear x thread R = Polyurethane black S = Polyurethane black x thread	0 = No Brake 3 = 50 in-lb

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

Motor Amplifier Board

How to Order

TB1

1	Motor Phase A
2	Motor Phase B
3	Motor Phase C

TB2

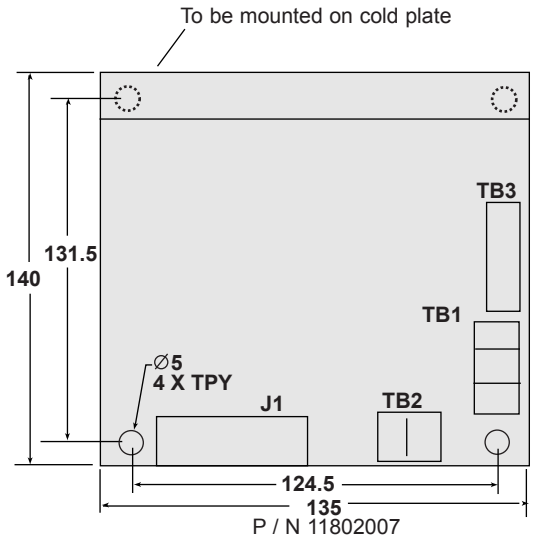
1	Battery Ground
2	Battery Voltage

TB3

1	Hall Sensor Ground
2	Hall Sensor +6.5V
3	Hall Sensor C
4	Hall Sensor B
5	Hall Sensor A

J1

Digital Control I/O Interface	1	Digital Host Ground
	2	Digital Host Voltage
	3	Distance Feedback
	4	Direction Feedback
	5	Lost Pulse count Warning
	6	Reset Computer / Motor Off
	7	Distance Input
	8	Direction Input
	9	Motor On / Off
+ / - 10V or Joy Stick	10	Analog Host Power
	11	Analog Host Ground
	12	Analog Signal Input
	13	Analog Direction Output
	14	Frequency Output
Available Voltage	15	Motor Ref. A. +15V
	16	Motor Ref. B. +6.5V
	17	Motor Ground
	18	Not Used
	19	Not Used
	20	Not Used



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Input Voltage	24V (Battery 17V to 37V)
Continuous Current	37 Amps (1)
Peak Current	100 Amps (2)
PWM Frequency	60KHz
Pulse Rate or # of Hall Sensor State Change Rate	20KHz
Operating Temperatures	0 to 50 deg C

(1) With Cold Plate @ 50 deg C

(2) For 2 sec

Specifications are subject to change without notice.

How to Order

Order Numbering Example: **MA 1 – 24V – 100B**

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

MODEL
1 = Single Axis

VOLTAGE OPTIONS
24 = 24V

PEAK CURRENT
100 = 100 Amps

OPERATION
B = CLOSED LOOP