

**Portescap**



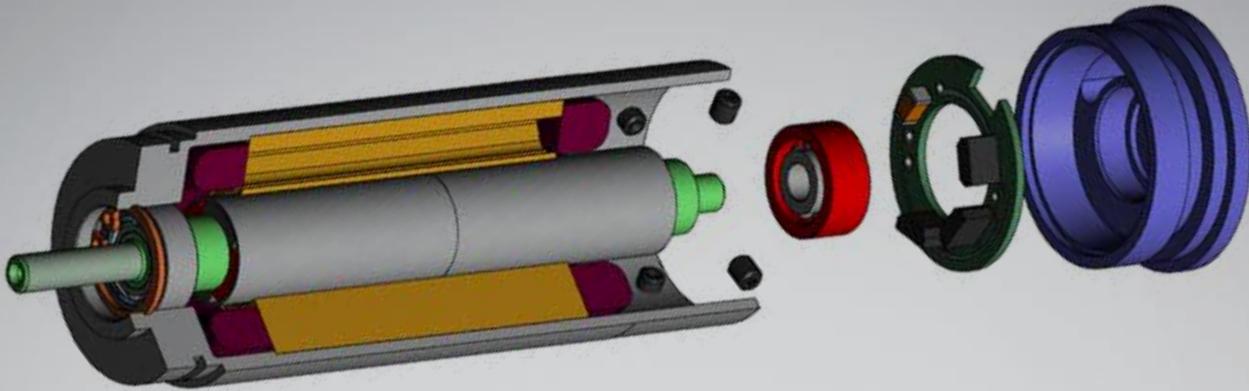
**MOTION  
compass™**

**Guide to Interactive Motor Selection**



MOTION SOLUTIONS THAT MOVE LIFE FORWARD.™





## MotionCompass™ ([www.motioncompass.com](http://www.motioncompass.com)) is a powerful web-based application designed to provide miniature motor solutions based on unique motion requirements of a wide spectrum of applications – from medical devices, instrumentation to industrial automation.

Typically motion needs (performance requirements) vary based on the operating environment and the end usage of devices or machines. Multiple motor technologies (Brushless DC, Brush DC Coreless and Stepper) can at times meet a few basic performance parameters of an application. MotionCompass provides a virtual environment that allows users to configure specific motion needs, compare performance across motor technologies and select an optimal solution for applications. Additional features such as E-mail, Print, On-line chat and Contact Us allow users to solicit guidance and support from motion experts at Portescap during the motor selection process. Access to MotionCompass requires users to register, a process that can be completed in less than two minutes.

Users can start the process of motor selection with two basic application requirements, speed and torque. MotionCompass uses a proprietary algorithm, developed

based on years of experience in motion control, to recommend top choices across motor technologies. Users can further configure MotionCompass to mirror specific application needs using variables such as voltage, envelope size, efficiency and feedback.

A wealth of data is available on recommended choices, including Electrical and Mechanical specifications, Speed vs. Torque curves and Performance charts. All data is dynamically generated in real-time and provides the ability to select a motor solution based on specific application needs. Input voltage can be changed to view motor performance at specific voltage(s), while performance criteria (speed, efficiency, power, and current) can be adjusted to meet the end usage needs of the product – e.g. continuous high speed or ambulatory application running on battery.

# Getting Started: 3 Steps to Motor Selection

## Step 1

- Start with two basic application parameters: speed and torque
- Configure MotionCompass with specific application requirements
- Narrow search using additional filters

For more help with adjusting Operating Point settings, see page 4.

## Operating Point

## Step 2

- Input key performance criteria based on end usage
- Intelligent algorithm recommends motor solutions based on application needs

For more help with adjusting Application Performance settings, see page 5.

## Application Performance

## Step 3

- Review recommended motors across different motor technologies (Brushless DC, Brush DC Coreless and Stepper)
- Compare basic performance parameters side by side

The motor recommendation summary provides the ability to review and compare the output performance of each recommended motor to determine if one (or more) of the listed motors meets application needs. If not, users can go back to Step 1 and make necessary adjustments (torque, speed, diameter, etc.) and receive an immediate update on motor recommendations. This iterative and dynamic process enables users to engage in detailed product (application) configuration sessions and test out multiple motion control possibilities.

## Recommended Motors

Brush DC					
Comparison	Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)
<input checked="" type="checkbox"/>	22N28-216E.286	2 Weeks	10.0	256	4.5
<input checked="" type="checkbox"/>	22N28-216P.286	2 Weeks	10.0	360	6.7
<input type="checkbox"/>	22N2R28-216P.204	2 Weeks	10.0	360	6.7
<input type="checkbox"/>	22N28-213E.286	2 Weeks	10.0	388	5.5
<input type="checkbox"/>	22V28-208E.201	2 Weeks	10.0	750	11.6

Brushless DC					
Comparison	Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)
<input checked="" type="checkbox"/>	16BHS 88 P.01	4 Weeks	10.0	6,197	38.3
<input checked="" type="checkbox"/>	32BF 88 K.5	4 Weeks	10.0	8,589	55.6
<input type="checkbox"/>	22BHL 88 K.01	4 Weeks	10.0	22,878	83.8
<input type="checkbox"/>	22BHL 88 P.01	4 Weeks	10.0	32,228	84.7
<input type="checkbox"/>	22BHM 88 K.01	4 Weeks	10.0	32,605	86.1

# Step 1: Operating Point Settings

## Operating Point

<b>Torque</b>	<input type="text" value="10.0 mNm"/>	<b>Maximum Diameter</b>	<input type="text" value="mm"/>
<b>Speed</b>	<input type="text" value="20 rpm"/>	<b>Maximum Length</b>	<input type="text" value="mm"/>
<b>Voltage</b>	<input type="text" value="VDC"/>	<b>Bearing</b>	<input type="text" value=""/>
<b>Stepper Current</b>	<input type="text" value="A"/>	<b>Feedback</b>	<input type="text" value=""/>
<b>Minimum Efficiency</b>	<input type="text" value="%"/>	<b>Gearbox / Linear</b>	<input type="text" value=""/>
<b>Maximum Power</b>	<input type="text" value="W"/>	<b>Units</b>	<input checked="" type="radio"/> Metric <input type="radio"/> English
<b>Maximum Current</b>	<input type="text" value="A"/>		

### Torque:

The first basic input based on application motion need.

### Speed:

The second basic input based on application motion need.

### Voltage:

Changing the voltage updates the performance of all motors at the specified voltage. With specific operating voltage, users can view the actual motor performance in the application.

### Stepper Current:

If using a chopper driver, users can adjust the current controlled to the stepper motor to view the performance of motor(s) at that current. Current adjustments shows performance changes at different current levels.

### Maximum Power/Current and Minimum Efficiency:

Users can tailor motor recommendations based on the amount of power (or current) available from the driver. If users choose to set the amount of power dedicated for motion control in the application, MotionCompass filters the list of recommended motors to ones that fit the profile.

### Maximum Diameter/Length:

Users can set the mechanical envelope of the application. If users do not receive any motor(s) recommendation after making this selection, it is likely that the working point (speed and torque) and mechanical envelope requirements are not a match for motor performance.

### Bearing/Feedback:

If an application places high radial or axial load on the motor, select single or dual ball bearings to maximize motor life. Feedback options are available for Brushless DC motors based on the driver used in the application.

### Gearbox:

Select gearbox if the application requires a high torque and low speed combination. This filters the list of motor recommendations to motor and gearbox combinations available.

## Step 2: Application Performance Settings

### Application Performance

Parameter	Value	Lock
Speed	100 %	<input type="checkbox"/>
Efficiency	0 %	<input type="checkbox"/>
Power	0 %	<input type="checkbox"/>
Current	0 %	<input type="checkbox"/>

**Balance** 100%

#### Speed:

Confirm how critical the motor output speed is for the application. A critical application, such as a dosing pump, would require the closest possible motor to achieve the speed and torque target. The percentage weights should be varied depending on the importance of the motor speed in the application.

#### Efficiency:

If the application is battery powered, efficiency will be a key factor in the motor selection to maximize battery life. In this case, vary the percentage for efficiency to see the effect on the list of motor recommendations. If battery life is the most important criteria, set efficiency to 100% to identify most efficient motors based on the Operating Point selection.

#### Power/Current:

If the application has limited budget for power (such as ambulatory applications), adjust Power and Current percentages accordingly (i.e. low) to receive recommendations based on the motors that draw the least amount of power.

#### Balance Feature:

Receive motor recommendations based on balanced importance of above mentioned criteria; click the Balance button to set all four parameters to 25% importance. This provides the best combination of speed, efficiency, power and current for an application.

# Step 3: Review Recommended Motors and Compare Performance

Upon completion of the product (application) configuration, users can select one or more motor(s) from the recommended list and proceed to the following pages to review and compare performance characteristics. At any point during this process, users have the ability to start all over with a fresh set of inputs as laid out in the Getting Started section.

## Recommended Motors

Brush DC					
Comparison	Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)
<input checked="" type="checkbox"/>	22N28-216E.286	2 Weeks	10.0	256	4.5
<input checked="" type="checkbox"/>	22N28-216P.286	2 Weeks	10.0	360	6.7
<input type="checkbox"/>	22N2R28-216P.204	2 Weeks	10.0	360	6.7
<input type="checkbox"/>	22N28-213E.286	2 Weeks	10.0	388	5.5
<input type="checkbox"/>	22V28-208E.201	2 Weeks	10.0	750	11.6

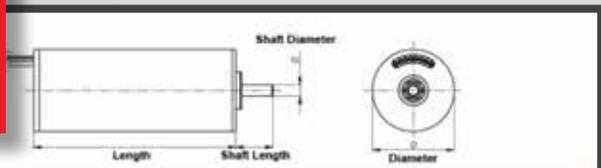
Brushless DC					
Comparison	Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)
<input checked="" type="checkbox"/>	16BHS 8B P.01	4 Weeks	10.0	6,197	38.3
<input checked="" type="checkbox"/>	32BF 8B K .5	4 Weeks	10.0	8,589	55.6
<input type="checkbox"/>	22BHL 8B K.01	4 Weeks	10.0	22,878	83.8
<input type="checkbox"/>	22BHL 8B P.01	4 Weeks	10.0	32,228	84.7
<input type="checkbox"/>	22BHM 8B K.01	4 Weeks	10.0	32,605	86.1

## Electrical and Mechanical

Select Electrical and Mechanical to review catalog data with detailed electrical and mechanical specifications for selected motors side by side.

**ELECTRICAL & MECHANICAL**

- Configuration Page ▶
- Electrical And Mechanical ▶
- Comparison Graphs  
Brush DC And Brushless DC ▶
- Stepper Comparison Graphs ▶
- Performance Graphs ▶



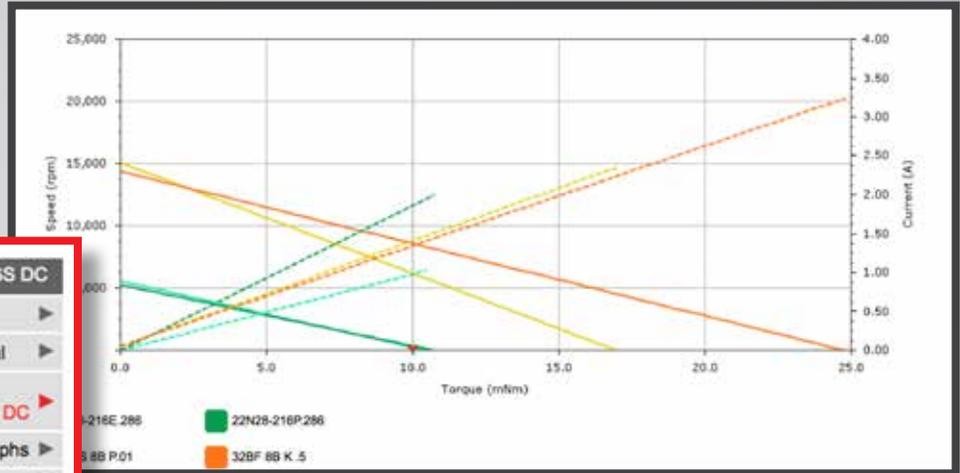
	22N28-216E.286	22N28-216P.286	16BHS 8B P.01	32BF 8B K .5
<b>MOTOR</b>				
Technology	Brush DC	Brush DC	Brushless DC	Brushless DC
Diameter (mm)	22.0	22.0	16.0	32.0
Length (mm)	32	32	32.3	11.2
Shaft Diameter (mm)	1.5	1.5	2.0	3.0
Shaft Length (mm)	7.5	7.5	7.0	10.6
Mounting Hole	M2 (8)	M2 (6)	M1.6 (2)	M3 (3)
BCD (mm)	17.0	17.0	10.0	22.0
Lead Length (mm)	-	-	-	100.0
Weight (g)	53.0	53.0	39.0	26.0
Torque Constant (mNm/A)	10.2	5.4	7.4	7.8
Reaction Type	Sleeve	Sleeve	Dual Ball	Dual Ball

# Step 3: Review Recommended Motors and Compare Performance (cont'd)

## Comparison Graphs Brush DC and Brushless DC

Next, review motor performance relative to the application's working point on the Speed vs. Torque chart. Performance of Brushless DC and Brush DC Coreless motors is available on the same chart while Stepper performance is generated on a separate chart (select Stepper Comparison Graphs).

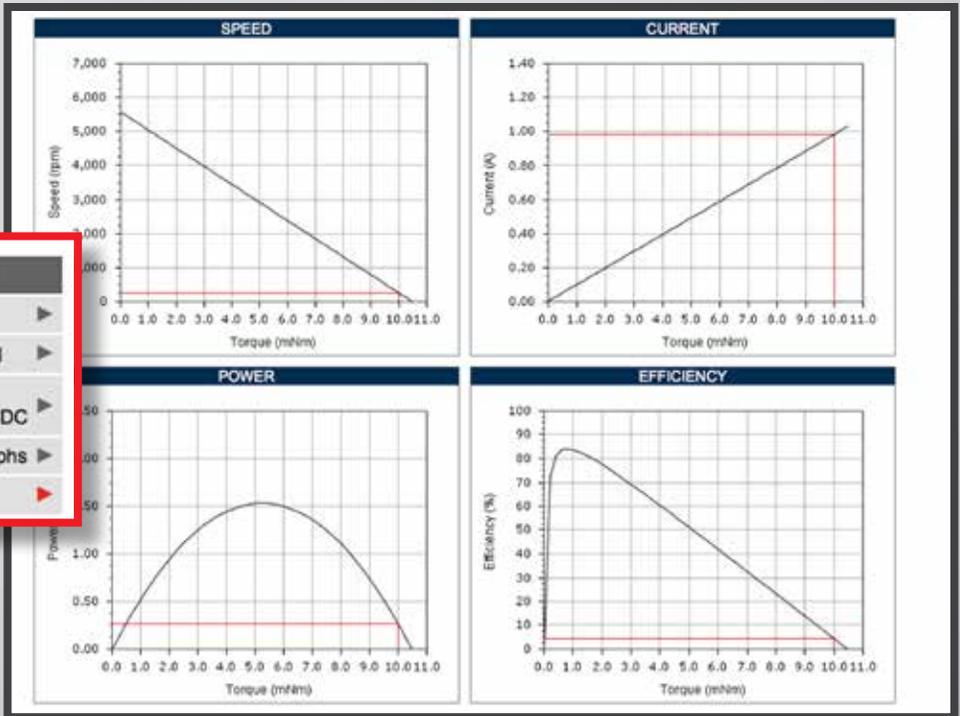
- BRUSH DC & BRUSHLESS DC**
- Configuration Page ▶
- Electrical And Mechanical ▶
- Comparison Graphs Brush DC And Brushless DC ▶**
- Stepper Comparison Graphs ▶
- Performance Graphs ▶



## Performance Graphs

Finally, users can evaluate performance curves and review the working point of the application on speed, current, power and efficiency curves for each of the selected motor(s).

- PERFORMANCE GRAPH**
- Configuration Page ▶
- Electrical And Mechanical ▶
- Comparison Graphs Brush DC And Brushless DC ▶
- Stepper Comparison Graphs ▶
- Performance Graphs ▶**



# Ready to Prototype

## Order Placement

To further assist in the selection process, lead times are listed for each motor in the recommendation summary.

### Brush DC (Coreless)

Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)	Power (W)	Current (A)
22N28-216E.286	2 Weeks	10.0	256	4.5	0.3	0.9
22N28-216P.286	2 Weeks	10.0	360	6.7	0.4	1.1
22N2R28-216P.204	2 Weeks	10.0	360	6.7	0.4	1.1
22N28-213E.286	2 Weeks	10.0	388	5.5	0.4	0.9
22V28-208E.201	2 Weeks	10.0	750	11.6	0.8	0.2

### Brushless DC

Model	Lead Time	Torque (mNm)	Speed (rpm)	Efficiency (%)	Power (W)	Current (A)
16BHS 8B P.01	4 Weeks	10.0	6,197	38.3	6.5	1.4
32BF 8B K .5	4 Weeks	10.0	8,589	55.6	9.0	1.3
22BHL 8B K.01	4 Weeks	10.0	22,878	83.8	24.0	1.1
22BHL 8B P.01	4 Weeks	10.0	32,228	84.7	33.7	1.0
22BHM 8B K.01	4 Weeks	10.0	32,605	86.1	34.1	1.0

Once the final selection of a motor(s) is completed, users can contact Portescap by phone or e-mail to place an order for sample(s).

 **Call us directly** to order your selected motor

**Americas:**

+1 610 235 5499

**Europe:**

+41 32 925 62 34

**China:**

+86 21 61286411

**Japan:**

+81 3 5479 7701

**India:**

+91 22 4200 6200

or **contact us via email**  and one of our sales engineers will contact you with 24 business hours.

MotionCompass is designed to allow users access to Portescap's expertise 24 hours a day. Users can also contact their local Portescap representative or initiate a live chat on the website for assistance. Go to [motioncompass.com](http://motioncompass.com) to register today and begin to experience the ease of interactive motor selection.

## More than just motors ...

Originated in Switzerland, driven by a passion for **precision**, customer-centric innovation, **technical excellence** and **best-quality service** since 1931, Portescap has become a recognized leading **expert in miniature motors and precision motion control solutions for a variety of markets.**

**... motion solutions for  
better performance outcomes.**

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