

# Permanent Magnet DC Motor Selection Guide



**KOLLMORGEN**®

*Because Motion Matters™*

# Kollmorgen: Your partner. In Motion.

Every solution comes from a real understanding of the challenges facing machine designers and users.

## **Innovators consistently rate Kollmorgen as one of their best motion systems**

**manufacturing partners.** Whether you are looking for classic servo motors, direct-drive servo motors, stepper motors, drives & amplifiers, gearing, actuation, or CNC & multi-axis motion controllers, Kollmorgen is one of the few companies in the world who actually designs and manufactures all of these products.

**Our customers are leaders** in many industries such as Aerospace & Defense, Printing, Packaging & Converting, Food & Beverage Processing, Medical Imaging, In Vitro Diagnostics & Laboratory Automation, Pharmaceutical Manufacturing, Material Forming and Cutting, Oil & Gas, and Robotics. Kollmorgen is also a leader in Warehouse Automation, including complete AGV systems, software, awareness and autonomy.

**Our Automation Solutions** can be found on Mars and in space, ships and submarines, O&G drilling and metrology, surgical robots and laser eye surgery, even inside artificial hearts. These are just a few applications that demand high-performance and high-quality while satisfying their specific needs.

**Because motion matters, it's our focus:** Motion can distinctly differentiate a machine and deliver a marketplace advantage by increasing its performance and dramatically improving overall equipment effectiveness (OEE).

High-performance motion can make your customer's machine more reliable and energy-efficient, enhance accuracy and improve operator safety. Motion also represents endless possibilities for innovation.

We've always understood this potential, and thus have kept motion at our core and in our Vision, Mission & Values, relentlessly developing products that offer precise control of torque, velocity and position accuracy in machines that rely on complex motion.

**Removing the Barriers of Design, Sourcing, and Time**

At Kollmorgen, we know that OEM engineers can achieve a lot more when obstacles aren't in the way. So, we clear obstacles in three important ways:

**Integrating Standard and Custom Products**

The optimal solution is often not clear-cut. Our application expertise allows us to modify standard products or develop totally custom solutions across our whole product portfolio so that designs can take flight.

**Providing Motion Solutions, Not Just Components**

As companies reduce their supplier base and have less engineering manpower, they need a total system supplier with a wide range of integrated solutions. Kollmorgen offers complete solutions as well as motion subsystems that combine programming software, engineering services and best-in-class motion components.

**Global Footprint**

With direct sales, engineering support, manufacturing facilities, and distributors spanning the Americas, Europe, Middle East, and Asia, we're close to OEMs worldwide. Our proximity helps speed delivery and lend support where and when they're needed.

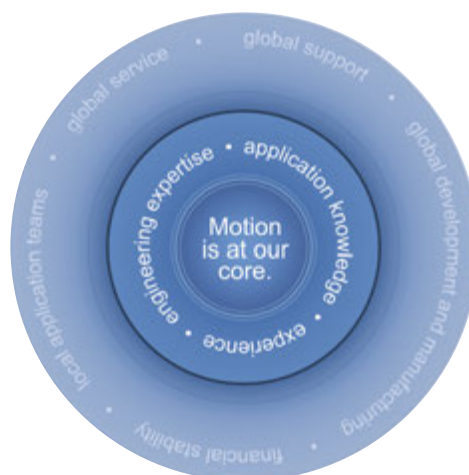
**Financial and Operational Stability**

Kollmorgen is part of Fortive. A key driver in the growth of all Fortive divisions is the Fortive Business System, which relies on the principle of "kaizen" – or continuous improvement. Using world-class tools, cross-disciplinary teams of exceptional people evaluate processes and develop plans that result in superior performance.

Kollmorgen: Your partner. In Motion.

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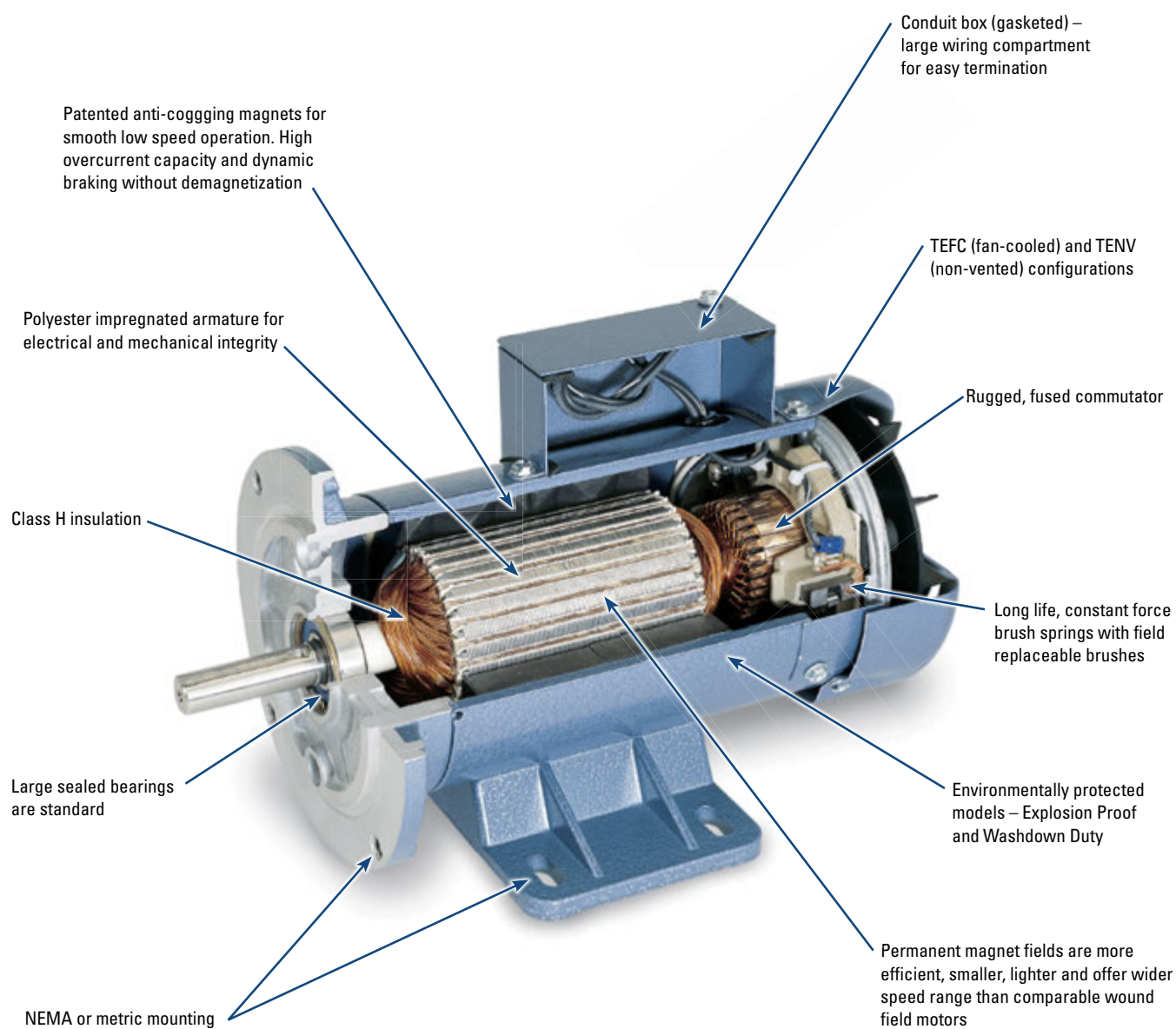
# ► PMDC Permanent Magnet DC Motors

**Why have design engineers depended on Kollmorgen permanent magnet DC motors for nearly 50 years? Value and Performance.** Rugged, quality construction, backed by a 2 year warranty.

Plus, when you need something special, you know we've built thousands of custom-designed motors. Many more than we could ever show with these pages.

And if we don't have just what you need, we'll design a new one, even for a modest volume requirement.

## Standard PMDC Motor Features



# SR/SRF Series Continuous Duty Motors

## General Specifications



### SCR Rated NEMA Standards

- NEMA C face with removable base – except the 180 V / 1.5 HP has a welded base
- Class H insulation
- UL Recognized (UL 1004, File E61960)
- CSA Certified (CSA Standard C22.2 No. 100, Class 421101, File LR43477)
- CE marked. Conforms to EN60034-1 and EN60034-5
- 1750 RPM

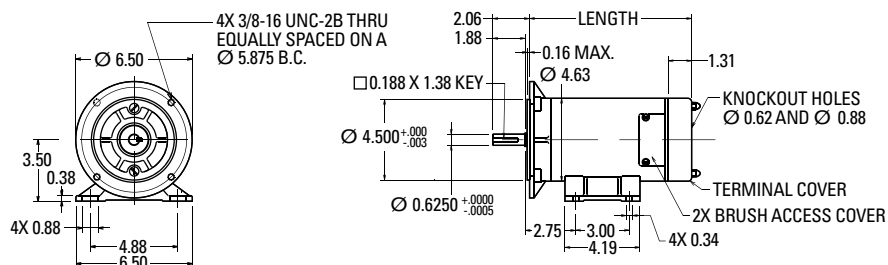
	HP	Model Number	Product Code	NEMA	Enclosure	Parameters							Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
						Continuous Current (A)	Continuous Torque (lb <sub>f</sub> -in)	Peak Current (A)	Torque Constant (lb <sub>f</sub> -in/A)	Resistance (Ω)	Inertia (lb <sub>f</sub> -in)	Inductance (mH)				
90 V	1/8	SR3616-8290-7-56BC-CU	FGS2430	56C	TENV	1.5	4.5	34.0	4.0	5.3	2.9	19.4	1	8.13	14	YP00565
	1/4	SR3624-8291-7-56BC-CU	FGS2431	56C	TENV	2.7	9.0	54.0	3.9	2.5	4.0	9.6	1	9.13	18	YP00565
	1/3	SR3632-8292-7-56BC-CU	FGS2432	56C	TENV	3.5	12.0	71.0	3.9	1.8	5.0	6.6	1	10.13	21	YP00565
	1/2	SR3642-4822-7-56BC-CU	FGS2434	56C	TENV	4.7	18.0	74.0	4.2	0.9	6.5	3.8	1	12.10	27	YP00565
	1/2	SRF3632-5227-84-5-56BC-CU	FGS2748	56C	TEFC	5.1	18.0	54.0	4.0	1.3	5.2	5.8	2	10.10	22	YP00565
	3/4	SRF3650-4823-84-5-56BC-CU	FGS2749	56C	TEFC	6.9	27.0	81.0	4.2	0.7	7.8	3.7	2	13.25	30	YP00565
	1.0	SRF3756-4996-84-5-56BC-CU	FGS2751	56C	TEFC	9.5	36.0	81.0	4.4	0.5	12.8	3.4	2	13.25	30	YP00565
180 V	1/4	SR3624-1032-7-56BC-CU	FGS2658	56C	TENV	1.4	9.0	28.0	7.4	9.6	4.0	42.8	1	9.13	18	YP00566
	1/2	SR3642-4982-7-56BC-CU	FGS2438	56C	TENV	2.6	18.0	40.0	7.6	3.3	6.3	16.2	1	12.13	27	YP00566
	1/2	SRF3632-5265-84-5-56BC-CU	FGS2735	56C	TEFC	2.4	18.0	27.0	8.1	5.3	5.2	29.5	2	10.10	21	YP00566
	3/4	SRF3736-4983-84-5-56BC-CU	FGS2750	56C	TEFC	3.2	27.0	26.0	8.8	3.6	8.9	28.8	2	11.25	23	YP00566
	1.0	SRF3752-4984-84-5-56BC-CU	FGS2752	56C	TEFC	4.6	36.0	41.0	8.2	1.8	12.0	15.6	2	13.25	29	YP00566
	1.5	SRF5348-4485-84-5-45BC-CU	FGS2753	145TC*	TEFC	7.8	54.0	62.0	7.9	1.2	26.2	13.5	3	16.00	64	YP00574
	2.0	SRF5360-4985-84-5-82BC-CU	FGS2754	145TC/182	TEFC	9.5	72.0	78.0	8.2	0.6	35.9	7.0	4	16.50	75	YP00559
	3.0	SRF5570-4986-84-5-82BC-CU	FGS2755	145TC/182	TEFC	14.0	108.0	78.0	9.3	0.6	40.1	7.2	5	19.75	87	YP00585

\* Stamped steel, welded base, not removable

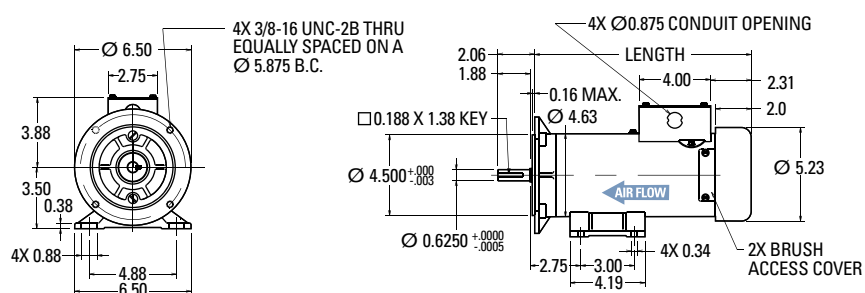


### Configurations and Dimensions (inches)

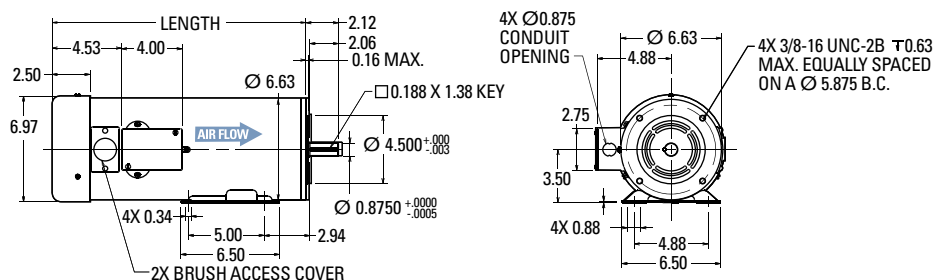
## 1 – TENV



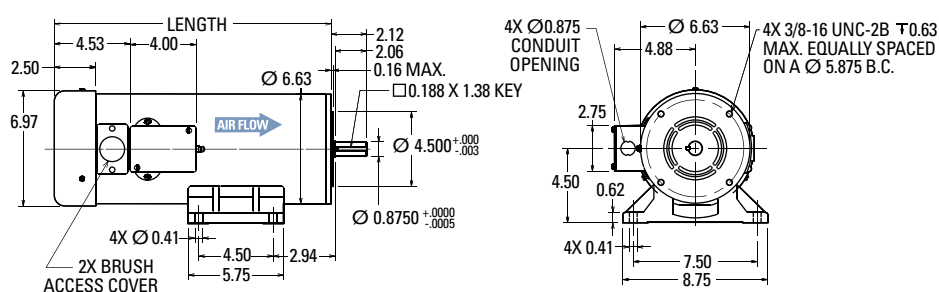
## 2-TEFC



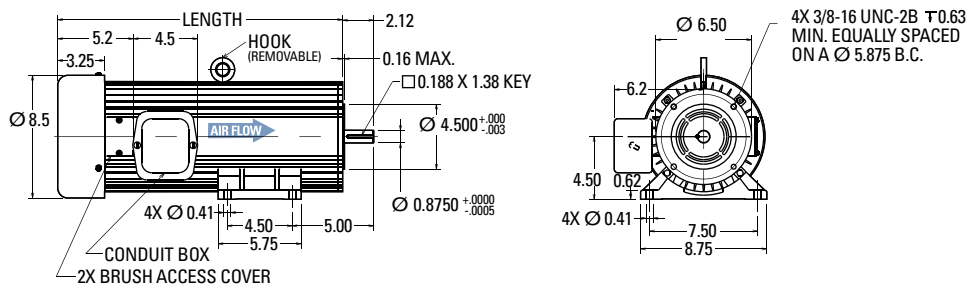
### 3 – TEFC



#### 4 – TEFC



## 5 – TEFC



# STF Series Washdown Motors

## General Specifications



### SCR Rated NEMA Standards – Washdown Duty

- NEMA C face with removable base – except the 1 and 1.5 HP motors have welded bases
- Class H insulation
- UL Recognized (UL 1004, File E61960)
- Complies with NEMA MG1-1.26.5 Waterproof designation and IP65
- Bakery Industry Sanitation Standards Committee (BISSC) certified per BISSC Standard 29 (Authorization No. 301)
- 1750 RPM

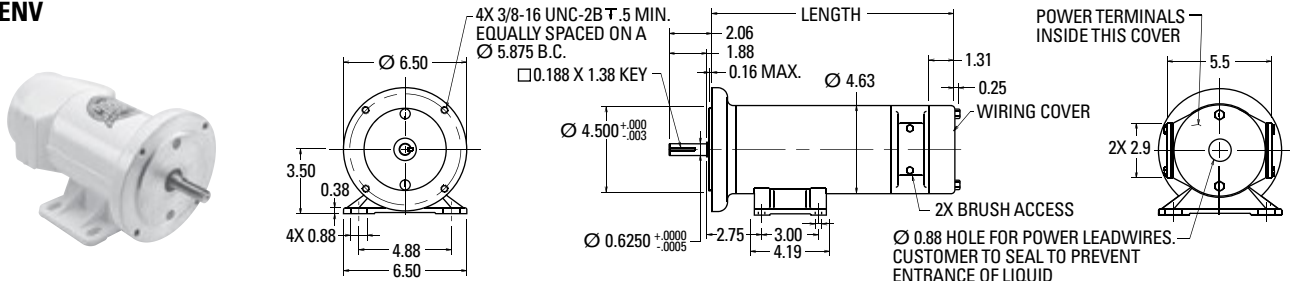
	HP	Model Number	Product Code	NEMA	Enclosure	Parameters							Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
						Continuous Current (A)	Continuous Torque (lb <sub>f</sub> -in)	Peak Current (A)	Torque Constant (lb <sub>f</sub> -in/A)	Resistance (Ω)	Inertia (lb <sub>f</sub> -in)	Inductance (mH)				
90 V	1/4	STF3624-4976-61-56BC	FGS2419	56C	TENV	2.9	9.0	54.0	3.89	2.51	4.0	9.61	1	11.20	22	YP00572
	1/2	STF3640-4977-61-56BC	FGS2420	56C	TENV	5.1	18.0	67.0	4.05	0.95	6.3	4.38	1	12.20	26	YP00572
	3/4	STF3758-5150-61-56BC	FGS2757	56C	TENV	7.3	27.0	126.0	4.05	0.72	8.7	3.50	2	15.20	41	YP00572
180 V	1/2	STF3648-5268-61-56BC	FGS2738	56C	TENV	2.4	18.0	37.0	8.30	3.59	6.4	19.60	1	11.80	27	YP00571
	1.0	STF5332-3748-61-56BC-CU	FGS2389	56C*	TENV	4.6	36.0	36.0	8.00	2.40	22.4	32.00	3	13.30	41	YP00574
	1.5	STF5356-3749-61-45BC-CU	FGS2390	145TC*	TENV	7.1	54.0	70.0	7.90	1.11	29.8	11.20	4	16.30	65	YP00574
	2.0	STF5372-3750-61-82BC-CU	FGS2342	145TC/182	TENV	9.3	72.0	93.0	7.90	0.77	39.3	6.80	5	18.30	84	YP00574

\* Stamped steel, welded base, not removable

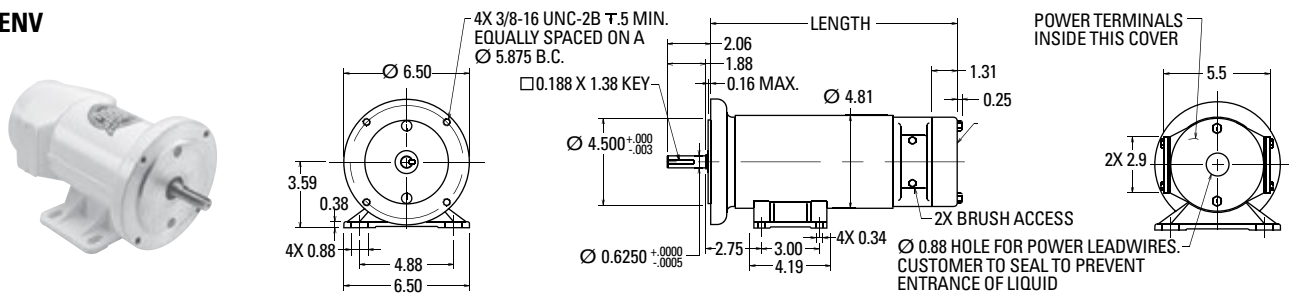


## Configurations and Dimensions (inches)

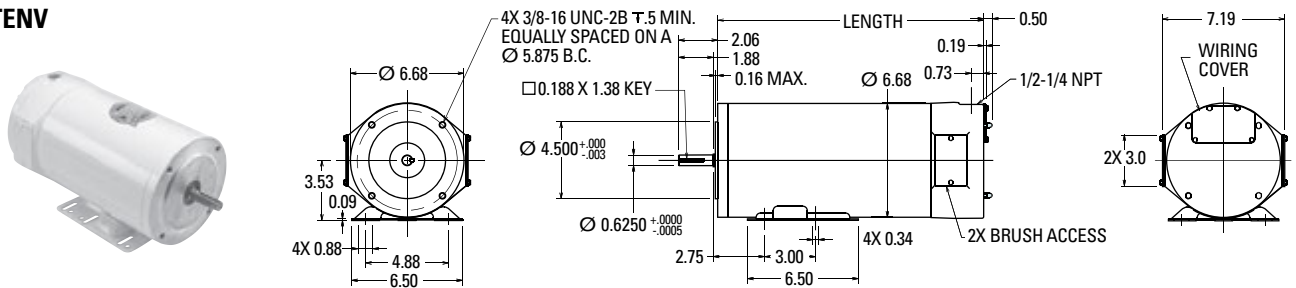
### 1 – TENV



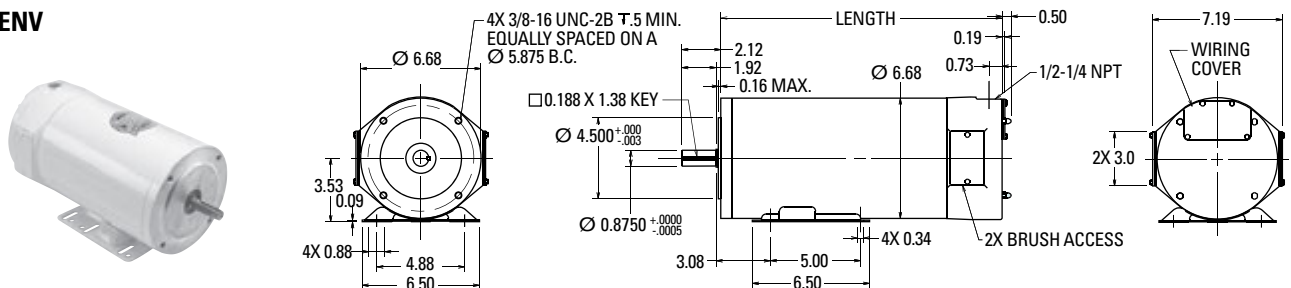
### 2 – TENV



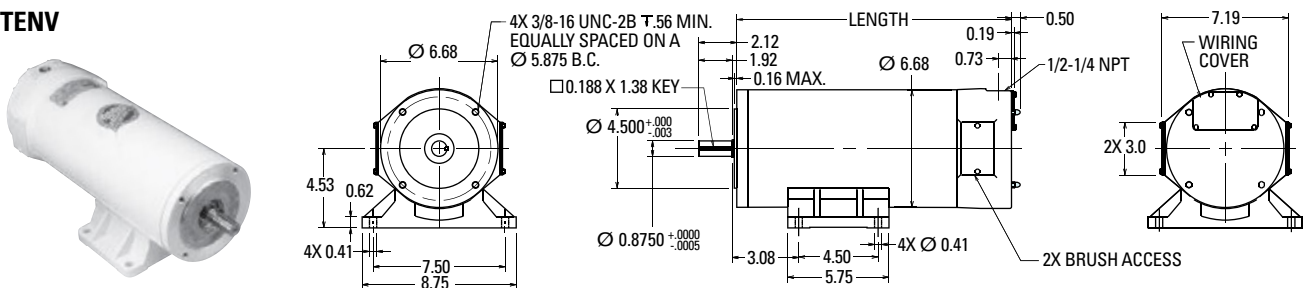
### 3 – TENV



### 4 – TENV



### 5 – TENV



# EP Series Explosion Proof Motors

## General Specifications

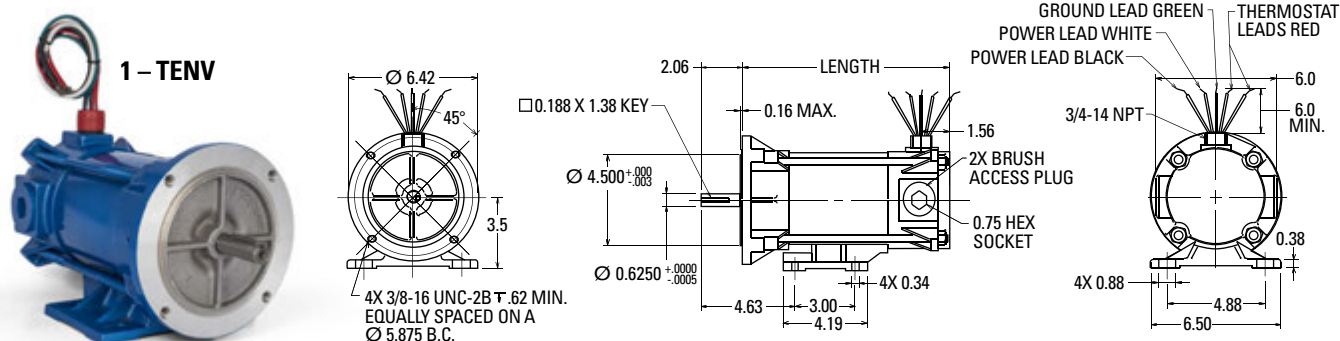


### SCR Rated NEMA Standards – Explosion Proof

- NEMA C face with removable base
- Class H insulation
- UL Recognized (UL 674, File E56538), meets Division 1 & 2, Class 1 (Groups C & D), Class II (Groups F & G) and Class III
- CSA Listed Components per CSA Standard C22.2 No. 145, Class 428801 (File 213464).
- 1750 RPM

	HP	Model Number	Product Code	NEMA	Enclosure	Parameters							Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
						Continuous Current (A)	Continuous Torque (lb <sub>f</sub> -in)	Peak Current (A)	Torque Constant (lb <sub>f</sub> -in/A)	Resistance (Ω)	Inertia (lb <sub>f</sub> -in)	Inductance (mH)				
90 V	1/4	EP3624-1434-7-56BC-CU	FGE0212	56C	TENV	2.6	9.0	52.0	4.07	2.63	4.0	10.5	1	10.38	23	YP00565
	1/3	EP3632-1435-7-56BC-CU	FGE0242	56C	TENV	3.5	12.0	71.0	3.94	1.76	5.0	6.6	1	11.38	27	YP00565
	1/2	EP3640-1436-7-56BC-CU	FGE0213	56C	TENV	4.7	18.0	87.0	4.24	1.03	6.4	5.1	1	12.38	30	YP00565
	3/4	EP3758-5151-7-56BC-CU	FGE0248	56C	TENV	7.0	27.0	113.0	4.15	0.74	8.0	3.8	1	14.0	36	YP00565
180 V	1/4	EP3624-5269-7-56BC-CU	FGE0261	56C	TENV	1.3	9.0	26.0	8.10	10.50	4.0	51.80	1	10.38	23	YP00566
	1/2	EP3644-5214-7-56BC-CU	FGE0262	56C	TENV	2.3	18.0	34.0	8.10	4.00	6.7	24.20	1	12.38	30	YP00566
	3/4	EP3752-5215-7-56BC-CU	FGE0263	56C	TENV	3.3	27.0	38.0	8.10	3.10	11.4	17.40	1	14.38	34	YP00566
12 V	1/3	EP3620-1954-7-56BC-CU	FGE0243	56C	TENV	28.0	12.0	n/a	0.52	0.04	3.5	0.18	1	10.38	19	YP00583
24 V	1/3	EP3624-2757-7-56BC-CU	FGE0245	56C	TENV	13.4	12.0	n/a	1.02	0.16	4.0	0.66	1	10.38	24	YP00593
	3/4	EP3648-4952-7-56BC-CU	FGE0244	56C	TENV	28.2	27.0	n/a	1.02	0.06	7.1	0.22	1	13.38	33	YP00593

## Configuration and Dimensions (inches)



# BA/BAF Series Low Voltage Motors



## General Specifications

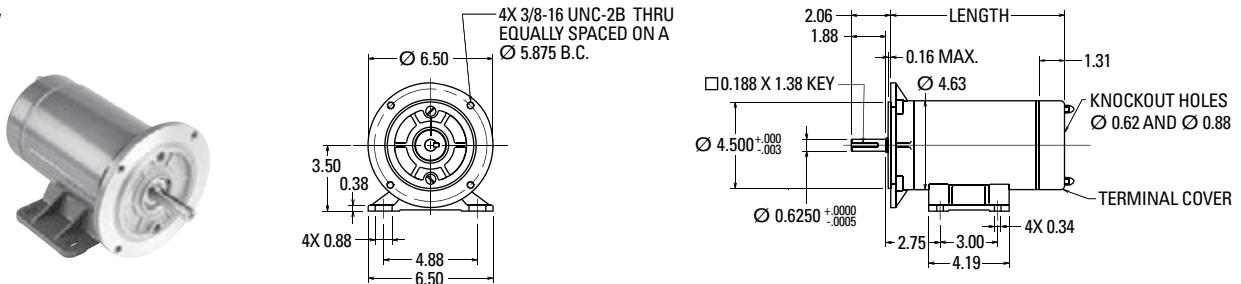
### Low Voltage Rated NEMA Standards

- NEMA C face with removable base
- Class H insulation
- UL Recognized (UL1004, File E61960)
- Designed for use with low voltage supplies (batteries).
- Highly efficient
- For constant speed, motors are operated directly from a battery with no motor control interface.
- For adjustable speeds, low voltage motor controls are readily available
- 1750 RPM

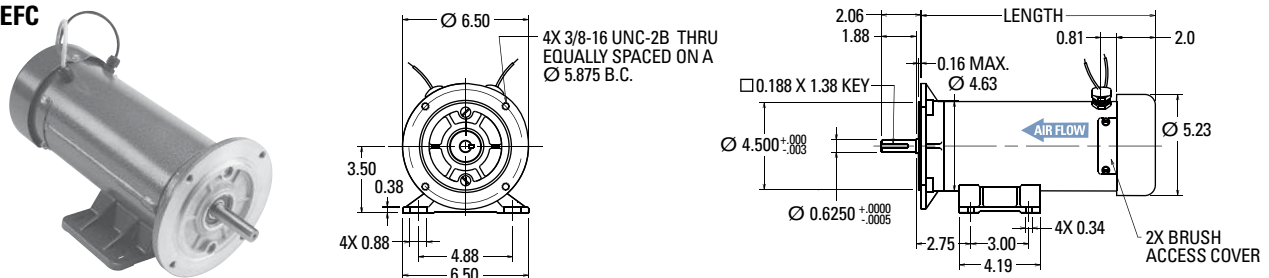
	HP	Model Number	Product Code	NEMA	Enclosure	Parameters							Configuration/Dimensions (facing page)	Length (in)	Weight (lbs)	Brush Replacement (order 2 per motor)
						Continuous Current (A)	Continuous Torque (lb <sub>f</sub> -in)	Peak Current (A)	Torque Constant (lb <sub>f</sub> -in/A)	Resistance (Ω)	Inertia (lb <sub>f</sub> -in)	Inductance (mH)				
12 V	1/4	BA3614-4648-9-56BC	FGB2010	56C	TENV	21.1	9.0	n/a	0.51	0.07	2.9	0.27	1	8.13	15	YP00593
	1/3	BA3624-7005-9-56BC	FGB2002	56C	TENV	27.0	12.0	n/a	0.51	0.04	4.0	0.14	1	9.13	19	YP00602
	1/2	BA3638-4588-9-56BC	FGB2005	56C	TENV	39.8	18.0	n/a	0.49	0.02	5.5	0.07	1	11.13	25	YP00592
24 V	1/4	BA3618-7009-9-56BC	FGB1592	56C	TENV	10.3	9.0	n/a	1.04	0.14	3.2	0.57	1	9.13	18	YP00593
	1/3	BA3624-7024-9-56BC	FGB2285	56C	TENV	13.4	12.0	n/a	1.02	0.16	4.0	0.66	1	9.13	19	YP00593
	1/2	BA3628-7012-9-56BC	FGB1441	56C	TENV	19.5	18.0	n/a	1.01	0.10	4.4	0.38	1	10.13	21	YP00593
	3/4	BA3648-4650-9-56BC	FGB2006	56C	TENV	28.2	27.0	n/a	1.02	0.06	7.1	0.22	1	12.10	29	YP00592
	1.0	BAF3644-5081-56BC	FGB2335	56C	TEFC	38.4	36.0	n/a	1.00	0.05	6.6	0.21	2	12.25	28	YP00583

## Configuration and Dimensions (inches)

### 1 – TENV



### 2 – TEFC





# Model Nomenclature

## PMDC Permanent Magnet DC Motors

**AAA** nnnn – ... – **56BC** – nn

### Motor Type

SR = TENV SCR-Rated  
SRF = TEFC SCR-Rated  
STF = Washdown (TENV) SCR-Rated  
EP = Explosion Proof (TENV)  
BA = LVDC input (TENV), PWM or Battery Rated  
BAF = LVDC input (TEFC), PWM or Battery Rated

### Frame

56BC = 56C Frame  
45BC = 145TC Frame  
82BC = 182TC Frame

## PMDC Permanent Magnet DC Motors – Selection Guide

	HP		Voltage (DC)		Page
SCR Rated • Nema Standards	1/8 - 1		90		6-7
	1/4 - 3		180		
SCR Rated • Washdown Duty	1/4 - 3/4		90		8-9
	1/2 - 2		180		
SCR Rated • Explosion Proof	1/4 - 3/4		90		10
	1/4 - 3/4		180		
	1/3		12		
	1/3 - 3/4		24		
Low Voltage Rated • NEMA Standards	1/4 - 1/2		12		11
	1/4 - 1		24		

# Servo & Stepper Motors and Drives

Kollmorgen's AKM family of servo motors gives you unprecedented choice and flexibility from a wide range of standard products so you can select the best servo motor for your application.



AKM® Servo Motor



AKM® 2G Servo Motor



AKM® Food Grade

AKM® Washdown

By pairing AKM servo motors with our family of plug-and-play AKD® servo drives, PDMM programmable multi-axis controller, or PCMM stand-alone controller, selecting the right motion control products has never been easier. Millions of servo motor/servo drive combinations are available. Go to [www.kollmorgen.com](http://www.kollmorgen.com) to find the best solution for your application.



AKMH™ Hygienic Washdown

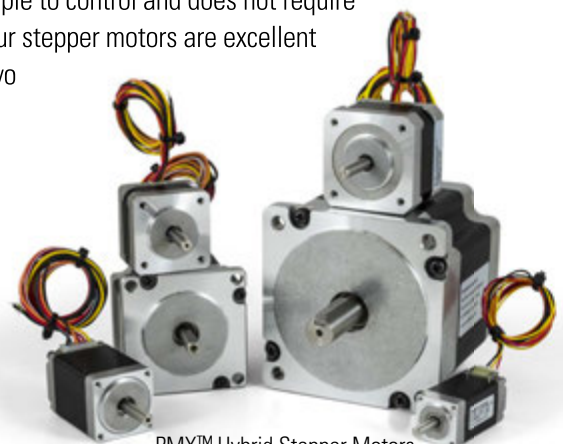
Our stepper motors, drives and controllers, which accommodate a wide range of power requirements, provide a high-performance, yet very cost-effective solution when you need precise motion control.



P-Series Stepper Drives

Our hybrid stepper motors are some of the highest torque-density motors in the industry. Available in several NEMA frame sizes, these 2 phase stepper motors inherently move in small, precise 0.9 or 1.8 degree increments (400 or 200 steps/revolution). This stepping action is simple to control and does not require complicated, expensive feedback devices. Our stepper motors are excellent alternatives to pneumatic, hydraulic and servo motor systems.

Kollmorgen's stepper drives are designed with versatility, ease-of-use, and cost-effectiveness in mind. Choose from a broad range of advanced drives and controls including full, half, and microstepping models in both modular and packaged designs.



PMX™ Hybrid Stepper Motors

*Because Motion Matters*

## About Kollmorgen

Since its founding in 1916, Kollmorgen's innovative solutions have brought big ideas to life, kept the world safer, and improved peoples' lives. Today, its world-class knowledge of motion systems and components, industry-leading quality, and deep expertise in linking and integrating standard and custom products continually delivers breakthrough motion solutions that are unmatched in performance, reliability, and ease-of-use. This gives machine builders around the world an irrefutable marketplace advantage and provides their customers with ultimate peace-of-mind.

For assistance with your application needs  
in North America, contact us at: **540-633-3545**,  
**support@kollmorgen.com** or visit  
**www.kollmorgen.com** for a global contact list.



**KOLLMORGEN**®

*Because Motion Matters™*

Kollmorgen  
203A West Rock Road  
Radford, VA 24141 USA  
Phone: 1-540-633-3545  
Fax: 1-540-639-4162

Kollmorgen Europe GmbH  
Pempelfurtstraße 1  
40880 Ratingen  
Germany  
Phone: +49 (0) 2102 9394 0  
Fax: +49 (0) 2102 9394 3155

Kollmorgen Asia  
Floor 4, Building 9, No. 518,  
North Fuquan Road, Changning District,  
Shanghai 200335, China  
Phone: + 86 400 661 2802

Kollmorgen Aerospace and Defense  
501 West Main Street  
Radford, VA 24141 USA  
Phone: 1-540-731-5668  
Fax: 1-540-731-5679