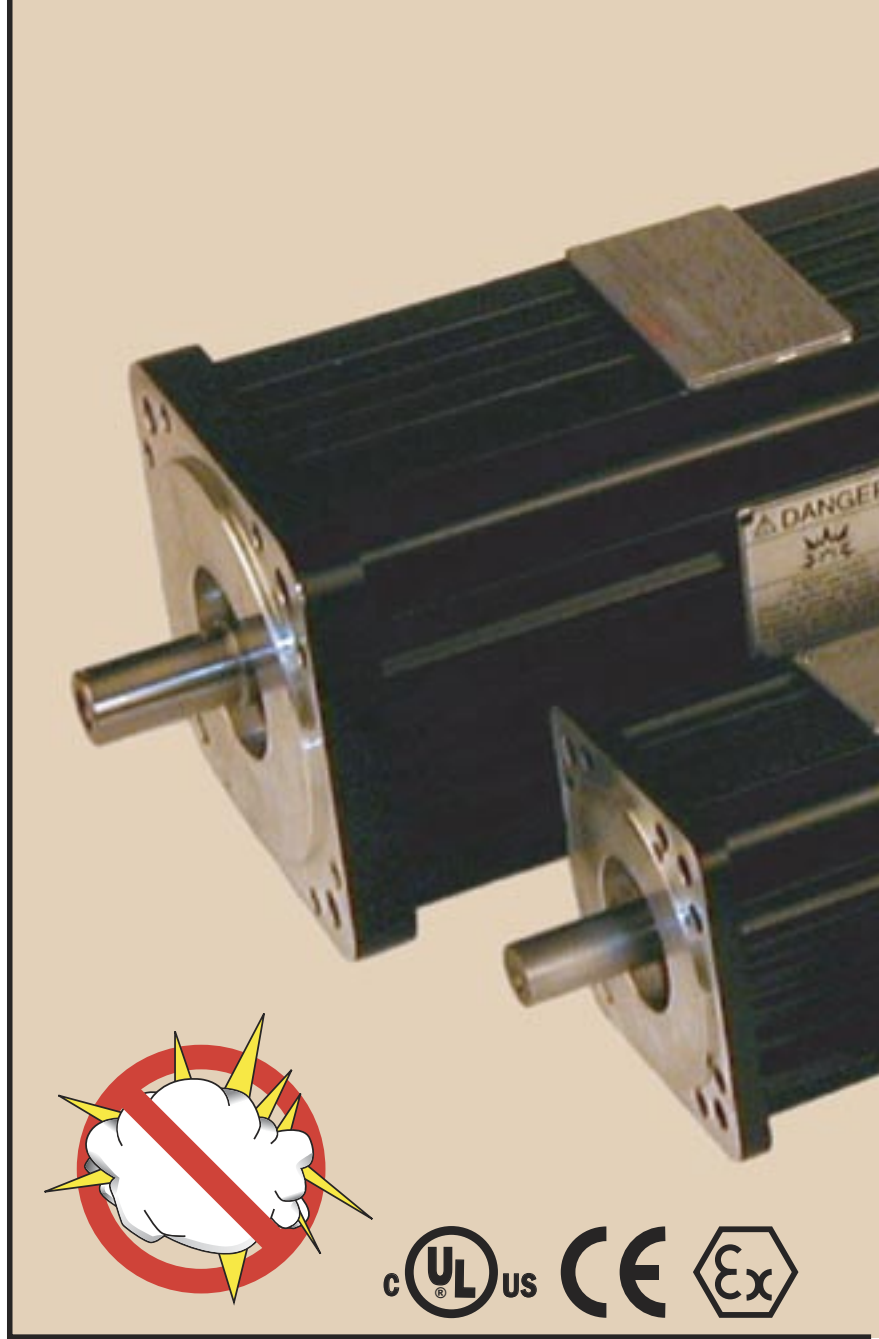


# EXPLOSION-PROOF SERVO MOTORS

www.elwood.com



**ELWOOD<sup>®</sup> GETTYS**  
HIGH PERFORMANCE MOTORS

ISO 9001:2000  
CERTIFIED COMPANY

**SX SERIES**

Enabled by  
**Rockwell  
Automation**  
Technologies

The "SX" Series servo motors are available with frame sizes of 3.38 inch (85.9 mm), 4.30 inch (109.2 mm), 6 inch (152.4 mm), and 7 inch (177.8 mm). These models provide a continuous operating torque range of 12.2 lb-in (1.38 Nm) to 372.2 lb-in (42.1 Nm) with speeds to 6500 RPM at 40°C ambient temperature.

For high torque to inertia ratios, rare earth magnets constructed of Neodymium Iron Boron and Samarium Cobalt are used. These materials produce excellent continuous and peak torques, greater acceleration/ deceleration rates, and higher torque values throughout a wide speed range.

Various winding configurations are available for maximum flexibility. Motor speed/torque characteristics can be tailored, based on specific application demands. Standard motor sealing is IP66 which provides protection against heavy jet spray and dust penetration, UL® Listed Hazardous Location motors are available for volatile areas. A synthetic Teflon™ shaft seal is standard on all motors. Motor ball bearings are double shielded and permanently lubricated.

Flange mounting and output shaft options include metric DIN-N 42955 normal, metric DIN-R 42955 reduced, English, NEMA standard, or modified. The "SX" Series optional mountings allow you to mate with major gear reducer manufacturers conforming to DIN and NEMA mounting specifications. Gettys can also supply special mounting configurations - so, if you have a special need that is not already listed, let us review your requirement.

## Standard Features

- UL® Listed (North America) and ATEX Certified (Europe) for hazardous locations
- Rare earth magnets for maximum torque to inertia ratios
- Rugged TENV, IP66 splash-proof capability, shaft seal and O-ring/gasket construction
- 230V/460V windings
- Resolver or Encoder (Incremental or Absolute) feedback
- Rear exit NPT pipe threads

## Optional Features

- High resolution/absolute multi-turn encoders
- Fail-safe electromechanical brake
- NEMA mounting dimensions
- Custom shafts, keyways, mounting flanges
- Custom windings
- Side exit NPT pipe threads

## HAZARDOUS LOCATION CLASSIFICATIONS

The UL® Listed and ATEX Certified "SX" Series AC Brushless Servo Motors were designed for use in high-performance industrial automation applications where vapors or gases form flammable or explosive environments when ignited by a spark or flame. These applications include, paint spray equipment, axis and spindle drives, packaging machinery, material handling systems, and assembly equipment. Gettys' design for the "SX" Series motors provide a totally enclosed square frame servo motor that does not require purge or pressure system.

Gettys' "SX" Series servo motors conform to UL® Listed specification #674 (National Electric Code Section #500), Class 1, Division 1 and 2, Groups C and D, for hazardous locations based on the atmosphere in which the motor will be operating. European compliance is ATEX Directive 94/9/EC harmonised standard EN 60079-0:2006 (General Requirements) and EN 60079-1:2007 (Flameproof Enclosures "d".)

Each atmospheric condition is divided into multiple groups and classifications differentiated by the explosiveness of the environment. The most hazardous environment is group A, with the lower groups being less combustible, such as B, C, D, and so on.

Listed below are examples of the atmospheric groups the UL® Listed Hazardous Location Servo Motors are well suited for:

### Class 1, Division 1

#### Group C - Atmospheres

Acetaldehyde, allyl alcohol, n-butyraldehyde, carbon monoxide, crotonaldehyde, cyclopropane, diethyl ether, diethylamine, epichlorohydrin, ethylene, ethylenimine, ethyl mercaptan, ethyl sulfide, hydrogen cyanide, hydrogen sulfide, morpholine, 2-nitropropane, tetrahydrofuran, unsymmetrical dimethyl hydrazine (UDMH 1, 1-dimethyl hydrazine).

#### Group D - Atmospheres

Acetic Acid (glacial), acetone, acrylonitrile, ammonia (1), benzene, butane, 1-butanol (butyl alcohol), 2-butanol (secondary butyl alcohol), n-butyl acetate, isobutyl acetate, di-isobutylene, ethane, ethanol (ethyl alcohol), ethyl acetate, ethyl acrylate (inhibited), ethylene diamine (anhydrous), ethylene dichloride, ethylene glycol monomethyl ether, gasoline, heptanes, hexanes, isoprene, isopropyl ether, mesityl oxide, methane (natural gas), methanol (methyl alcohol), 3-methyl-1 butanol (isoamyl alcohol), methyl ethyl ketone, methyl isobutyl ketone, 2-methyl-1-propanol (isobutyl alcohol), 2-methyl-2-propanol (tertiary butyl alcohol), petroleum naphtha (2), pyridine, octanes, pentanes, 1-pentanol (amyl alcohol), propane, 1-propanol (propyl alcohol), 2-propanol (isopropyl alcohol), propylene, styrene, toluene, vinyl acetate, vinyl chloride, xylenes.

(1) See Safety code for Mechanical Refrigeration (ANSI/ASHRAE 15-1978) and Safety Requirements for the Storage and Handling of Anhydrous Ammonia (ANSI/CGA G2. 1-1972).

(2) A saturated hydrocarbon mixture boiling in the range 20-135°C (68-275°F). Also known by synonyms benzine, ligroin, petroleum ether, or naphtha.

## Motor Data (230V)

Model	Cont. Rated Torque (Stall) lb-in (Nm)	Peak Torque lb-in (Nm)	Cont. Rated Current (RMS) Amps	Speed @ Max. Power (RPM)	Max. Cont. Speed (RPM)	Rotor Inertia lb-in-sec <sup>2</sup> (kg-m <sup>2</sup> )	Weight lb (kg)
M431-N	10.39 (1.17)	31.17 (3.51)	2.79	5500	6210	0.0006 (0.00007)	9.46 (4.29)
M432-N	20.77 (2.35)	62.31 (7.05)	5.22	5200	6210	0.0011 (0.00012)	12.43 (5.64)
M433-F	27.97 (3.16)	83.91 (9.48)	4.06	2500	2911	0.0015 (0.00017)	13.42 (6.09)
M433-H	27.97 (3.16)	83.91 (9.48)	4.50	3000	3223	0.0015 (0.00017)	13.42 (6.09)
M433-J	27.97 (3.16)	83.91 (9.48)	5.08	3500	4122	0.0015 (0.00017)	13.42 (6.09)
M433-M	27.97 (3.16)	83.91 (9.48)	7.44	5000	6210	0.0015 (0.00017)	13.42 (6.09)
M442-E	31.16 (3.52)	93.48 (10.56)	3.47	2500	2673	0.0036 (0.00041)	17.71 (8.03)
M442-K	31.16 (3.52)	93.48 (10.56)	6.26	4500	5118	0.0036 (0.00041)	17.71 (8.03)
M443-E	41.55 (4.69)	124.65 (14.07)	4.91	2500	2635	0.0045 (0.00051)	21.56 (9.78)
M443-K	41.55 (4.69)	124.65 (14.07)	9.64	4500	5204	0.0045 (0.00051)	21.56 (9.78)
M444-E	58.33 (6.59)	179.99 (19.77)	7.02	2500	2957	0.0056 (0.00063)	25.41 (11.52)
M444-H	58.33 (6.59)	179.99 (19.77)	9.31	3500	3764	0.0056 (0.00063)	25.41 (11.52)
M461-G	43.15 (4.88)	129.45 (14.64)	6.85	3000	3549	0.011 (0.0012)	26.4 (11.97)
M462-G	91.89 (10.38)	275.67 (31.14)	13.45	3000	3576	0.018 (0.0020)	37.4 (16.96)
M463-K	131.04 (14.81)	393.12 (44.43)	26.14	3500	4826	0.025 (0.0028)	41.8 (18.96)
M464-G	164.59 (18.6)	493.77 (55.8)	24.53	2500	3603	0.032 (0.0036)	49.5 (22.45)
M465-G	186.97 (21.13)	560.91 (63.39)	26.01	2500	3376	0.039 (0.0044)	57.2 (25.94)
M471-H*	59.5 (6.72)	178.5 (20.16)	8.82	3300	3539	0.0151 (0.00171)	27.5 (12.47)
M473-C*	142.22 (16.07)	426.66 (48.21)	11.34	1750	1937	0.0454 (0.00513)	55 (24.94)
M474-C*	180.57 (20.4)	541.71 (61.2)	15.06	1750	1971	0.0659 (0.00744)	66 (29.93)
M476-C*	278.85 (31.51)	836.55 (94.53)	23.10	1700	2001	0.0909 (0.0103)	88 (39.91)
M477-C*	316.4 (35.75)	949.2 (107.25)	26.06	1500	1990	0.106 (0.012)	99 (44.9)

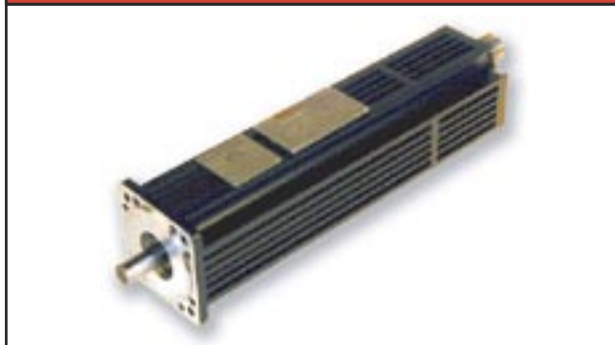
## Motor Data (460V)

Model	Cont. Rated Torque (Stall) lb-in (Nm)	Peak Torque lb-in (Nm)	Cont. Rated Current (RMS) Amps	Speed @ Max. Power (RPM)	Max. Cont. Speed (RPM)	Rotor Inertia lb-in-sec <sup>2</sup> (kg-m <sup>2</sup> )	Weight lb (kg)
M431-N	9.8 (1.1)	29.4 (3.3)	1.30	5500	6210	0.0006 (0.00007)	9.46 (4.29)
M432-N	19.5 (2.21)	58.5 (6.63)	2.50	5200	6210	0.0011 (0.00012)	12.43 (5.64)
M433-F	26.3 (2.97)	78.9 (8.91)	1.90	2500	2911	0.0015 (0.00017)	13.42 (6.09)
M433-H	26.3 (2.97)	78.9 (8.91)	2.10	3000	3223	0.0015 (0.00017)	13.42 (6.09)
M433-J	26.3 (2.97)	78.9 (8.91)	2.50	3500	4085	0.0015 (0.00017)	13.42 (6.09)
M433-M	26.3 (2.97)	78.9 (8.91)	3.6	5000	6210	0.0015 (0.00017)	13.42 (6.09)
M442-E	29.3 (3.31)	87.9 (9.93)	1.60	2500	2673	0.0036 (0.00041)	17.71 (8.03)
M442-K	29.3 (3.31)	87.9 (9.93)	2.90	4500	5118	0.0036 (0.00041)	17.71 (8.03)
M443-E	39.1 (4.41)	117.3 (13.23)	2.30	2500	2635	0.0045 (0.00051)	21.56 (9.78)
M443-K	39.1 (4.41)	117.3 (13.23)	4.60	4500	5204	0.0045 (0.00051)	21.56 (9.78)
M444-E	54.2 (6.13)	162.6 (18.39)	3.30	2500	2957	0.0056 (0.00063)	25.41 (11.52)
M444-H	54.2 (6.13)	162.6 (18.39)	4.40	3500	3881	0.0056 (0.00063)	25.41 (11.52)
M461-G	39.3 (4.44)	117.9 (13.32)	3.10	3000	3549	0.011 (0.0012)	26.4 (11.97)
M462-G	83.6 (9.45)	251 (28.4)	5.70	3000	3751	0.018 (0.0020)	37.4 (16.96)
M463-K	119.2 (13.47)	357.6 (40.1)	11.90	3500	4826	0.025 (0.0028)	41.8 (19)
M464-G	149.8 (16.92)	449 (50.8)	11.10	2500	3603	0.032 (0.0036)	49.5 (22.4)
M465-G	170.1 (19.22)	510 (57.07)	11.80	2500	3375	0.039 (0.0044)	57.2 (25.9)
M471-H*	54.1 (6.12)	162.3 (18.36)	4.00	3300	3539	0.0151 (0.00171)	27.5 (12.47)
M473-C*	129.4 (14.62)	388.2 (43.86)	5.20	1750	1937	0.0454 (0.00513)	55 (24.94)
M474-C*	164.3 (18.57)	492.9 (55.71)	6.90	1750	1971	0.0659 (0.00744)	66 (29.93)
M476-C*	253.8 (28.67)	761.4 (86)	10.50	1700	2001	0.0909 (0.0103)	88 (39.91)
M477-C*	287.9 (32.53)	863.7 (97.59)	11.90	1500	1990	0.106 (0.012)	33 (44.9)

## M43X 'SX'



## M44X 'SX'



## M46X 'SX'



## M47X 'SX'



\* Motors are not currently ATEX rated. Please consult Factory if application requires ATEX rating.

## SW SERIES

### WASH-DOWN SERVO

Extremely rugged design for demanding environments such as automotive and machine tool industries.



- 2, 3, 4, 6, 7 and 11" Frame Sizes
- 5 LB-IN (0.6 Nm) to 845 LB-IN (95.5 Nm) Torque Range
- IP66 Sealing (High Pressure Wash Down)
- 115V / 230V / 460V Windings
- Resolver Encoder Feedback
- English, Metric or Nema Mounting Flange



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## SF SERIES

### FOOD-GRADE SERVO

Designed exclusively for the food and baking industries. Capable of withstanding repeated high pressure wash downs. Smooth housing and special connectors minimize potential entrapment areas.



- 2, 3, 4, 6 and 7" Frame Sizes
- "Finless" Extruded Aluminum Housing
- FDA-Approved Epoxy Coating
- 5 LB-IN (0.6 Nm) to 440 LB-IN (49.8 Nm) Torque Range
- IP66 Sealing (High Pressure Wash Down)
- 115V / 230V / 460V Windings
- English, Metric or Nema Mounting Flange

[www.elwood.com/sf](http://www.elwood.com/sf)

## SD SERIES

### SEVERE-DUTY SERVO

Designed exclusively for the meat and dairy industries where extreme cleanliness is required. Plated construction resists even the most caustic chemicals.



- 2, 3, 4, 6 and 7" Frame Sizes
- "Finless" Extruded Aluminum Housing
- Stainless Steel Shaft, Endbells and Hardware
- Zero-Maintenance Shaft Seal
- Corrosion Resistant from 1 to 12 pH
- FDA-Approved Plated Coating
- 5 LB-IN (0.6 Nm) to 440 LB-IN (49.8 Nm) Torque Range
- IP66 Sealing (High Pressure Wash Down)

[www.elwood.com/sd](http://www.elwood.com/sd)

## SX SERIES

### EXPLOSION-PROOF SERVO

Ideal for hazardous locations where vapors or gasses form potentially flammable or explosive environments. Can be applied virtually worldwide.



- 3, 4, 6 and 7" Frame Sizes
- UL Listed (North America) and Cenelec Certified (Europe) for Hazardous locations (Class 1, Division 1, Groups C and D).
- 12.2 LB-IN (1.4 Nm) to 440 LB-IN (49.8 Nm) Torque Range
- Rear-Exit NPT Pipe Thread
- Resolver or Encoder Feedback
- English, Metric or Nema Mounting Flange



[www.elwood.com/sx](http://www.elwood.com/sx)

**ELWOOD**® **GETTYS**  
HIGH PERFORMANCE MOTORS

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Rev. C