Industrial Division

FEMSAN
ELECTRIC MOTORS

FEMSAN
ELECTRIC MOTORS

FEMSAN
ELECTRIC MOTORS

FEMSAN Electric Motor Company has been founded in 1989. FEMSAN is the pioneer company in Turkish market at BLDC and DC motor industries. The company mainly focuses on design and production of PM DC Motors, Brushless DC Motors, Slotless BLDC Motors, Alternators, Electromechanical Actuators and different kind of sub-systems.

FEMSAN offers customized motor and alternator types in large scale at different voltages and speeds. Thanks to its comprised dynamic engineer staff, FEMSAN has gone far beyond being a component-based DC and Servo Motor manufacturer and has been able to carry out design and analysis activities that can meet the requirements of different applications. Especially, on account of its enhanced reflexes to compensate the sub-system needs of defence and aerospace industry, FEMSAN has been not only a supplier but also a solution partner for its customers.

FEMSAN provides significant advantages by its customized solutions, designs for long life operations and high reliability intended at comprehensive product range. FEMSAN works as a tailor when getting specific requirements from the customers on their special projects. “Designing and materialising at the speed of thought.” This is what makes FEMSAN unique and how it maximizes customer satisfaction in addition to excellent product quality and on-time delivery as well as cost effectiveness.

Engineering skills and experiences of FEMSAN are a source of inspiration and creativity to overcome any adversities. Our collective purpose is to create and sell differentiated and competitive products and services, and to make it easy for our customers to do business with us.

FEMSAN
ELECTRIC MOTORS

Automated
Guided Vehicles

Shuttle
Warehouse Systems

Lifting
Crane Systems

Personnel
Lifting Systems

Amusement
Park Vehicles

Cleaning
Vehicles

Battery
Operated Vehicles

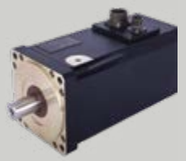
Industrial
Machines

Brushed PM DC Motors
Ferrite Magnet
0.18 kW. - 3.0 kW.

Brushed PM DC Motors
Neodymium Magnet
1.1 kW. - 5.0 kW.

Square Frame DC Motor
0.75 kW. - 397 kW.

Brushless DC Motors
0.25 kW. - 7.5 kW.



Brushless Servo Motors
1 Nm. - 70 Nm.

Brushless DC
Motor Drives

Brushless Servo
Motor Drives

FEMSAN
ELECTRIC MOTORS

Brushed PM DC Motors

	Frame	Output	Voltage
Ferrite Magnet	70	0.18 – 0.60 kW.	24 – 180 V. DC
	80	0.25 – 1.10 kW.	12 – 180 V. DC
	90	1.1 – 3 kW.	12 – 48 V. DC
Neodymium Magnet	63	0.37 – 0.75 kW	12 – 48 V. DC
	90	1.1 – 2.2 kW.	12 – 48 V. DC
	100	2.2 – 5 kW.	12 – 72 V. DC

0.18 kW. - 3.00 kW.
Ferrite Magnet
DC Motor Production
12 V. DC - 180 V. DC

0.37 kW. - 5.00 kW.
Neodymium Magnet
DC Motor Production
12 V. DC - 48 V. DC

Customized Permanent Magnet DC Motors for special voltage and speed requirements

General Specifications

- Compact design and less heat at frame due to magnets in stator.
- 12-24-48-90-110-180 Volts DC.
- 0.18 kW - 5.0 kW Output Power.
- Customized speed from 600 rpm to 3000 rpm.
- IP 23 and IP 44 Protection Classes.
- IC 01 and IC 410 Cooling Types. Forced ventilation available on request.
- F Class Insulation. H Class available on request.
- S1 Continuous and S2 Intermittent Working Duties.
- Foot mounting or standard flanges of 63-71-80-90-100-112 frames.
- Long brush life due to optimum selected copper-graphite brushes.
- Balance degree of grade N.
- Trickle impregnated armature windings.
- Customized electrical windings for versatility of customer requirements.
- Customized mechanical dimensions for shaft and flange, foot mounting.
- High dynamic acceleration, high power density, high efficiency.
- Good regulation characteristics.

Modular Configurability

Motor Controller

Planetary Gearbox

Worm Gearbox

Magnetic Brake

Incremental Encoder

Brushed PM DC Motor Drives

FEMSAN
ELECTRIC MOTORS

4Q Model DC Drives for Permanent Magnet / Neodymium Magnet						
Model		**HF 2D 60**	**HF 2D 90**	**HF 2D 140**	**BIG 180**	**BIG 300**
Supply Voltage	V	12 - 24 V.	12 - 24 V.	12 - 24 V.	24 - 48 V.	24 - 48 V.
1 Hour	A	21	32	48	50	100
1 Minute	A	55	81	121	150	250
Current Limit	A	60	90	140	180	300

Technical Specifications

- Voltage rating ..... 12-24-36-48 VDC
- Allowed power supply variation..... From 85% to 125%
- Operation frequency ..... 16 Khz
- Operation temperature..... -20°C / +40°C

Main Technical Features

- Control unit aided by microprocessor.
- Operation parameters adjustable acceleration slope.
- Slow starting though adjustable acceleration slope.
- Settable limiter of the max. current supplied to the motor.
- Proportional action thermal limiter.
- Recovery braking system activated during deceleration, by pedal release and in reverse.
- Settable limiter of the max. braking current.
- Control system by a 5K potentiometer connected to 3 wires.
- Control system by a potentiometer connected to 2 wires with adjusting angle on request.
- Total protection against battery polarity inversion thanks to an internal line relay.
- Intervention of the safety block in case of short circuit of the chaos units.
- Intervention of the safety block in case of potentiometer breakdown.
- Intervention of the safety block when, turning the key, the potentiometer is not on 0 and disabling by resetting the potentiometer to 0.

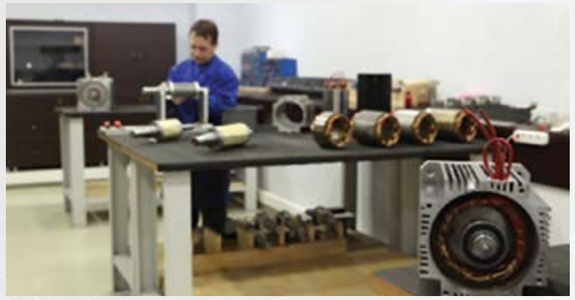
- 12 - 120 V. DC Supply Voltage
- 0.25 - 7.5 kW Production
- Customized design and production

- Encoder, Resolver, Sin/Cos, Hall Sensor Feedbacks
- User friendly, precise digital control
- 4 Quadrant Control

- CAN BUS communication
- Speed and Torque Modes
- Direction change without Contactor

- Static and dynamic current limits
- Regenerative Running
- Programming interface
- Built in or separate Driver

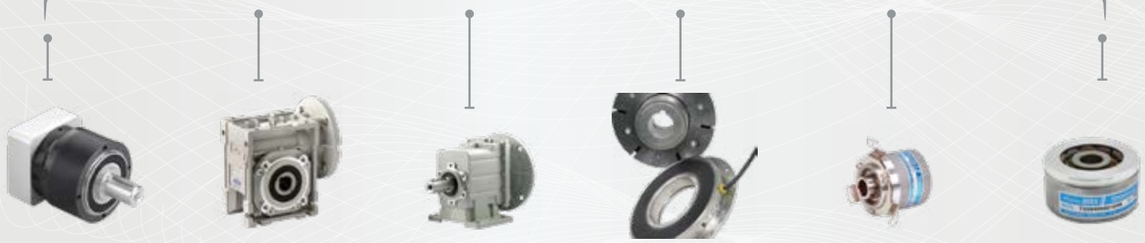
Supply Voltage	Frame	Output	Accessories
12 - 48 V.DC	80 x 80 mm.	0.25 - 0.60 kW	Integrated or separate drive Planet / worm / helical gearbox Magnetic Brake Encoder, Resolver, Hall Sensor
12 - 48 V.DC	105 x 105 mm.	0.75 - 1.50 kW	
12 - 48 V.DC	140 x 140 mm.	1.8 - 3.5 kW	
12 - 120 V.DC	190 x 190 mm.	3.7 - 7.50 kW	

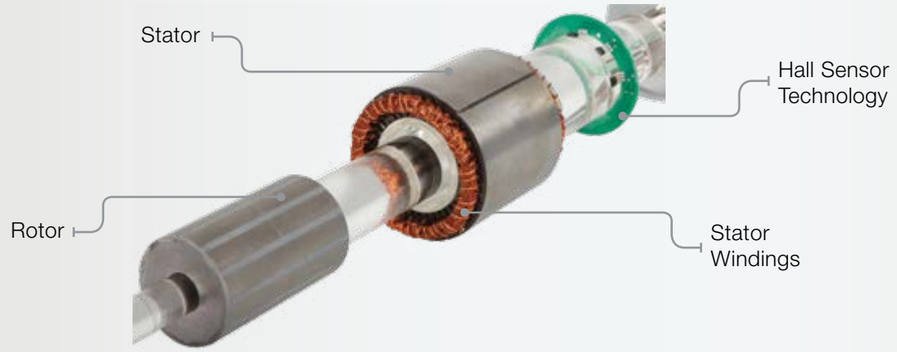


Changing world requires more mobility with forcing the use of clean energy. It seems mobile power systems will soon be a common sight at everywhere.

Without focusing only sales, supplying of all technical support and service turns our products to well known motion gadgets.

Modular Configurability





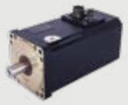
FEMSAN Brushless DC Servo Drives					
Supply Voltage	**Nominal Current**	**Peak Current**	**PWM f(kHz)**	**Ref. Voltage**	**Temp. Range**
V.DC	**A.**	**A.**	**f(kHz)**	**V.**	**°C**
15 - 55	25	50	15	0 - 5	‘-10 … + 50
15 - 55	35	70	15	0 - 5	‘-10 … + 50
15 - 55	100	100	15	0 - 5	‘-10 … + 50

Brushless DC Servo Drives						
Supply Voltage	**Nominal Current**	**Peak Current**	**Structure**	**Ref. Voltage**	**Temp. Range**	**Weight**
V.DC	**A.**	**A.**		**V.**	**°C**	**kg**
24-48	40	80	Digital	± 10	‘-10 … + 50	2,8
24-48	60	120	Digital	± 10	‘-10 … + 50	2,8
24-48	125	250	Digital	± 10	‘-10 … + 50	4,2
24-48	225	450	Digital	± 10	‘-10 … + 50	4,2
12 - 120	50	100	Digital	± 10	‘-10 … + 50	6,8
12 - 120	100	200	Digital	± 10	‘-10 … + 50	6,8
12 - 120	150	300	Digital	± 10	‘-10 … + 50	6,8

- CAN BUS and Serie RS 232 Communication
- Encoder, Resolver, Hall Sensors Feedbacks
- Direction Change without Contractor
- Programming Interface
- Static and Dynamic Current Limits
- Regenerative Braking (Battery Charging)

- **1 - 3 Nm Brushless Servo Motor Frame 80 x 80 mm 220 V. AC - 380 V. AC**

- **3 - 6 Nm Brushless Servo Motor Frame 110 x 110 mm 220 V. AC - 380 V. AC**



- **7 - 12 Nm Brushless Servo Motor Frame 140 x 140 mm 220 V. AC - 380 V. AC**

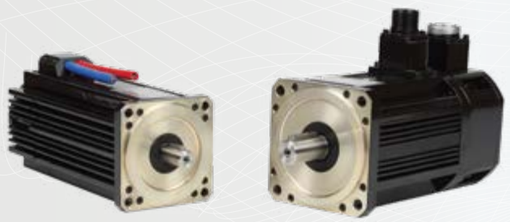
- **11 - 70 Nm Brushless Servo Motor Frame 190 x 190 mm 220 V. AC - 380 V. AC**

Decades of experience combined with extensive know- how and a wealth of ideas paved the way to create a comprehensive line of Servo Motors. All motors are developed and produced within Femsan's own plant. The heavy duty design and carefully selected power transmission elements allow high overload capacity and long life.

F series Brushless Servo Motors designed and manufactured according to wide range of industrial applications which require high performance, fast dynamic response, good reliability, and free maintenance.

General Specifications

- Flange dimensions at I6 tolerance and DIN42955 sensitivity
- VI or V3 Mounting Possibility without Additional Equipment
- H Class Insulation (180 °C) according to EN 60034-18 Standard
- P54 Protection Class according to EN 60034-5 Standard
- Over Heat Protection at 135 °C with Normally Closed Thermal Contact
- 2048 or 2500 p.p.r. Incremental Encoder Feedback
- High Dynamic Response by Neodymium Magnets
- Low Moment of Rotor Inertia
- Max. 40 'C Ambient Temperature



Options

- Various Front Flange Mounting Arrangements.
- Resolver or Sin Cos Encoder Feedback.
- Power-off or Power-on Brake mounting Possibility.
- Mounting of Worm, Helical, Bevel, Planetary Gearboxes.
- Special sealing for further leakage.
- Customized Mechanical Design.
- Plain Shaft (non keyed) for High Dynamic Applications.

Power Technology

- Extended 3 phase supply: 3x200Vac - 10% .: 460Vac +10%
- External DC Bus power supply with internal soft start
- LGBT power section, built in braking chopper (resistor not included)
- Built in pre charge device with automatic or external enabling

TDE MACNO
give life to technology

I/O Board "Basic"

- 4 opto insulated configurable digital input.
- 2 opto insulated configurable digital output.
- 1 - 14 bit analogy input ±10 V.
- 1 configurable analogy output.
- Supply ±10 V. for external potentiometer.

Regulation

- Basic board with built in CAN controller.
  - Direct supply of the regulation (380 - 460V. AC t%10)
  - 24 V. dc external supply for the regulation and the LGBT drivers (safety stop function EN954-1).
- Input/ Output (I/O) boards.
- RS485 serial interface board and display.
- Feedback boards

Software Functions

- Indexing function for spindle application
- Electronic gearing with setting of the speed ratio
- Multi positioner
- Real time positioner via Can Bus
- PID control

Size	MiniOPDE		OPDE					
	230 V.	400 V.	400 V.					
Power kW	3	3	5,5	7,5	11	15	22	30
I rates (A rms)	10	6,8	12	15	22	32	46	57,5
Weight (kg)	2		4,8	4,8	5,5	6,4	9,3	10
Size (mm)								
H	257		303			322	322	
W	74		116			137	194	
D	176		253			253	273	

Square Frame DC Motors
FEMSAN ELECTRIC MOTORS

0.75 kW - 397 kW
(180 V. DC - 500 V.
DC. arm - 2200 r.p.m.)
DC Motor Production

Custom Design
(Max 2000 Nm)
DC Motor Production

Degree of Protection IEC60034-5
Standard protection class is IP 23. Motors having IP 44 or higher protection classes are available on request.

Cooling Type IEC60034-6
In Square Frames, standard cooling type is IC 06. Blower is forced by an AC motor.

Mounting IEC60034-7
Mounting from foot (IM B3 - IM 1001) is another standard of square frames. Flange mounting is available on request.

Altitude and Ambient Temperature IEC60034-1
Outputs is based on max. 40 degrees of Celsius ambient temperature and motor located at max. 1000 meters above sea level.

Duty Cycle IEC60034-1
The rated outputs in selection and ordering tables are referred to continuous running duty SI, and motors are fed from a 3 - phase fully controlled thyristor.

Insulation IEC60085
All motors in selection and ordering tables have Class F (155 degrees of Celsius) insulation.

High Level of Flexibility

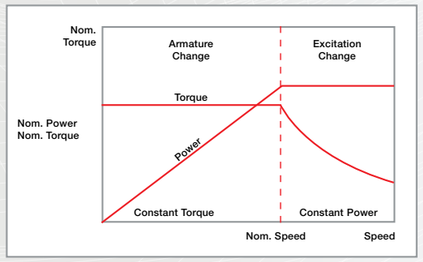
Windings
In standard version, all motors have separate excitation, the field being shunt wound. Compound or series winding can be supplied on request.

Impregnation
Stator and rotor windings are trickle-impregnated to ensure high static and dynamic resistance among windings.

Commutation
Excellent commutation is obtained due to the ideal magnetic harmony between windings.

Tests
Each motor is given routine tests to determine that it is free from electrical or mechanical defects and to provide assurance that it meet design specifications.

Stator and Rotor
Stator has square framed design. Up to frame size 100, main and inter poles are stamped. From frame size 132, main poles screwed on, inter poles stamped Frame sizes 80 and 100 have 2 poles. From frame size 132, motors have 4 poles.



Square Frame DC Motor			
Tip	**kW.**	**rpm**	**Arm. V.**
K.08.07	0.72 - 2.40	1600 - 4350	180 - 320
K.08.10	1.50 - 3.11	1600 - 3750	180 - 320
K.09.15	0.92 - 3.92	450 - 3000	180 - 440
K.09.20	0.75 - 4.10	550 - 2850	180 - 440
K.09.25	0.69 - 4.40	380 - 2200	180 - 440
K.10.10	2.08 - 7.85	980 - 4350	180 - 440
K.10.14	1.35 - 7.50	610 - 3000	180 - 440
K.10.23	2.20 - 11.0	530 - 2500	180 - 440
K.10.28	3.35 - 15.0	610 - 2500	180 - 440
K.13.12	4.08 - 25.0	600 - 3500	180 - 440
K.13.16	2.52 - 25.5	270 - 2800	180 - 440
K.13.20	7.50 - 31.5	700 - 2800	180 - 440
K.13.25	5.13 - 30.0	390 - 2250	180 - 440
K.13.30	8.96 - 32.6	590 - 2850	180 - 440
K.16.13	6.17 - 37.5	370 - 2800	180 - 440
K.16.18	11.9 - 56.0	600 - 2500	180 - 440
K.16.26	6.21 - 75.0	180 - 2600	180 - 440
K.16.30	9.61 - 82.5	320 - 2100	180 - 440
K.16.40	8.23 - 43.0	180 - 1000	180 - 440
K.18.30	8.98 - 75.0	200 - 1500	180 - 440
K.18.35	25.3 - 112.5	510 - 2200	180 - 440
K.18.40	20.4 - 133.0	330 - 1900	180 - 440
K.20.28	8.45 - 146.0	140 - 2100	180 - 440
K.20.40	28.6 - 146.0	320 - 1500	180 - 440
K.20.45	27.9 - 106.0	260 - 1100	180 - 440
K.20.50	45.2 - 200.0	370 - 1950	180 - 440
K.20.60	28.0 - 135.0	190 - 950	180 - 440
K.25.45	145.0 - 396.5	680 - 1700	400 - 500

Bearings
All bearings and their internal clearances have been especially selected based on load carrying ability, thermal stresses and speed range consistent with ample bearing life.

Brushes and Brush Holders
All motors utilize top-cushioned brushes for low-vibration operation. Brush holders are extruded metal. The constant pressured springs do not need adjustment.

0.85 kW. - 12 kW
DC Motor Production

Customized DC Motors for custom voltage and speed requirements

Gearbox, Brake, Tacho and Encoder Mountain and Sales

General Specifications

- More mechanic resistance due to coils in stator.
- 24 - 36 - 48 Volts DC
- 0,85 kW - 12 kW Output Power.
- Customized speed from 900 rpm to 3000 rpm.
- IP23 and IP44 Protection Classes.
- IC01 and IC410 Cooling Types. Forced ventilation available on request.
- F Class Insulation. H Class available on request.
- SI Continuous and S2 Intermittent Working Duties.
- Foot mounting or standard flanges of 100-112-132 frames.
- Long brush life due to optimum selected copper-graphite brushes.
- Customized electrical windings for versatility of customer requirements.
- Customized mechanical dimensions for shaft and flange, foot mounting.

Frame	Torque	Output	Voltage
112	4.6 - 9.5 Nm.	0.85 - 1.5 kW.	24 – 48 V. DC
132	8.1 - 28.6 Nm.	1.5 - 4.0 kW.	24 – 48 V. DC
160	28.6 - 38.2 Nm.	4.5 - 12 kW.	24 – 72 V. DC

MOPA

Marketing of Industrial Products

Mopa represents and distributes the products of many brands in Turkey.

Dedicated and technically strong team provides the deep penetration of various industrial products into Turkish market.

FAULHABER

dunkermotoren advanced motion solutions

LITEON

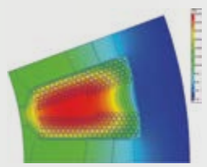
KENDRION

Elmo Motion Control

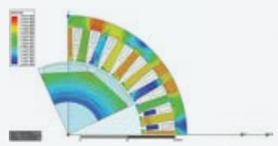
TRANSTECNO THE MODULAR GEARMOTOR

MOTEK

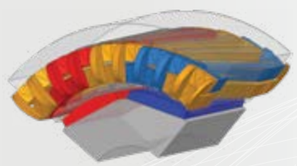
Research & Development for Electromechanics



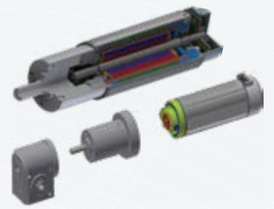
Engineering service not only for electric motors but also actuation and propulsion systems and sub-systems



Research and Development activities at the fields of electric, electronic, software, mechanic, mechatronic and aviation



Thermal and structural analysis including static and dynamic for designed and developed systems



Gearbox, Brake, Encoder, Resolver, Lead Screw and Ball Screw mounted Electric Motors

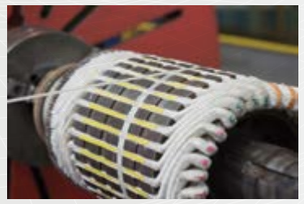
MOGESER

Maintenance and Overhaul of Motors, Generators

Specialized in maintenance and repair services for electric motors, alternators and servo motors.

Highly skilled technical team provides favorable turnaround time for our customers.

When you need the maintenance of your motors be the first to think Mogeser.



FEMSAN
ELECTRIC MOTORS

FEMSAN Elektrik Motorlari A.S.
Industrial Division
Harmandere Mah. Sehit Mehmet Guney Sokak, No:11
34912 Kurtkoy, Pendik, Istanbul, Turkey
Tel: +90 216 378 88 88 | Fax: +90 216 482 50 52
sales@femsan.com
www.femsan.com

FEMSAN Elektrik Motorlari A.S.
Teknopark Defense Division
Sanayi Mah. Teknopark Bulvarı, Teknopark 1E Apt. No:1/1E 103
34906 Kurtkoy, Pendik Istanbul, Turkey
Tel: +90 216 378 88 88 | Fax: +90 216 482 50 52
sales@femsan.com
www.femsan.com