

COMPONENTS TO SOLUTIONS FOR ELECTRIC MOTORS

**COMPETENT
SOLUTIONS.
TRUSTWORTHY
PARTNER.**





PROUDLY A PART OF GODREJ

Founded in 1897, Godrej is a USD 4.5 billion corporation and enjoys the patronage and trust of over 600 million customers every single day. With its roots in self-reliance for an emerging, independent India, Godrej has always been perceived as a trustworthy and reliable brand. Today, Godrej endeavours to offer contemporary, technologically advanced and aesthetically superior products and solutions that are built on the foundation of decades of deep customer insight and understanding.

Godrej & Boyce Mfg. Co. Ltd., the holding company of the Godrej Group, is one of India's most respected, family-owned and privately held companies, rapidly progressing under the leadership of Jamshyd Godrej. Apart from significant presence in consumer and institutional products, the Godrej Group offers several cutting-edge industrial products, systems and solutions such as electric motors and components, process equipment, material handling equipment, industrial storage solutions, tooling, precision components and systems, construction materials, power, infrastructure and renewable energy systems. While these businesses seem diverse, they are unified because their development was founded on the principles of self-reliance and superior engineering capabilities.

Headquartered in Mumbai, India, the Godrej Group operates across all major global markets such as Europe, U.S., Middle East, Africa and South East Asia through its offices in more than 20 countries.

Godrej is also an extremely responsible corporate citizen known for philanthropy, labour reforms and ethical dealings. This social responsibility is best manifested in its stewardship of one of the world's largest privately owned Mangrove Reserves. The Group invests 25% of its profits in environment, healthcare and education as per its corporate policy. The essence of the Godrej brand is 'Brighter Living', which is manifested in the Group's long-term vision called 'Good and Green'. This initiative focuses on increasing employability of underprivileged youth through vocational training, creating a greener India through an eco-sustainable approach towards business and developing environmentally friendly solutions.

As India marches ahead confidently on the global stage, Godrej will endeavour to partner in its progress through its ingenuity, attention to detail and world-class manufacturing practices for a brighter future.



Vijay Crishna
Executive Director

LAWKIM MOTORS GROUP

Established in 1961, Lawkim pioneered the manufacture of hermetic compressor motors in India in technical collaboration with Emerson Electric, USA. Today, we are a part of the Godrej Group and a leading manufacturer of indigenously developed specialised hermetic compressor motors, single phase motors, custom-built three phase motors, single phase flameproof motors, components and parts such as wound stator & rotor assemblies and laminations/stampings for different applications. We cater to various industry segments such as air-conditioning and refrigeration, domestic appliances, energy, motion handling and general purpose market.

Our expertise lies in providing customised solutions and developing special purpose motors for the most challenging requirements of our customers. Lawkim is well known for a high level of motor manufacturing excellence and design support. We value and enjoy a long-term relationship with our customers in India and abroad. This is evident from our associations with customers like Cummins, Emerson, Godrej (Appliances Division), Hitachi and Kollmorgen Corporation.

Lawkim is a USD 50 million company with 26% CAGR. Our manufacturing plant near Pune in India follows modern manufacturing practices and is recognised for ensuring high levels of productivity and safety. The plant focuses on lean manufacturing to mass manufacture various types of motors. It is spread over 60,000 sq. m., of which 28,000 sq. m. is built-up. It has the capacity to manufacture 4 million motors every year. It has a strong team of more than 700 people, including nearly 100 engineers.

At Lawkim, we constantly evolve by developing new products, processes and technologies. As a result, our BLDC motors, IE3 motors and single phase flameproof motors are already in the market and are gaining good recognition. Presently, we are developing high efficiency IEC frame motors, which will soon be introduced.

We leverage our core engineering experience and capabilities to the advantage of our customers by responding quickly and effectively to the changing business and technological environment around us. Our goal is to be a world-class manufacturer of electric motors for home appliances and commercial & industrial applications. We will achieve this by being competitive, focused on the customer, and being consistent in the value we add and the quality we provide to our customers globally.



COMPONENTS TO SOLUTIONS FOR ELECTRIC MOTORS

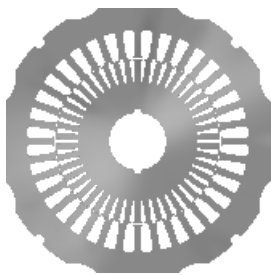
High-quality, reliable and compact motors from Lawkim are an integral part of several appliances, machines and plants manufactured by leading companies. Several of them, particularly hermetic compressor motors are custom-designed to suit specific requirements of customers. Lawkim also offers a standard range of general purpose, single phase and custom-built three phase motors for industrial and commercial use.



Stitched stator stacks



Hermetic motors for refrigerator compressors



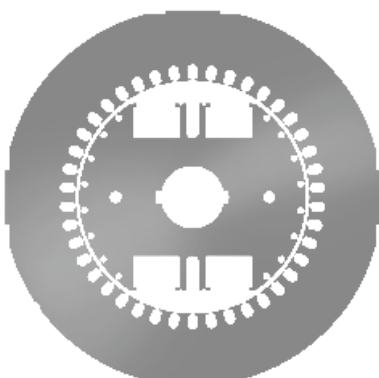
Motor laminations



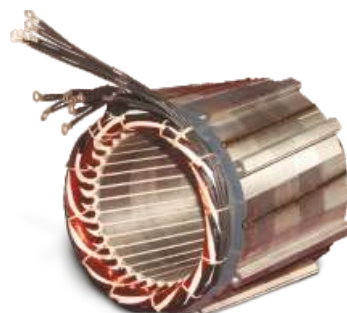
Stitched rotor stacks



Hermetic motors for commercial compressors



Generator laminations



Wound stators for power generation application



Wound stators and die-cast rotors for LT motors

Our range of offerings can be broadly classified under three verticals.

Hermetic compressor motors for air-conditioning and refrigeration

- Induction motors & BLDC motors for domestic & commercial refrigeration compressors
- Induction motors for unitary type and commercial air-conditioner compressors

Motors for appliances, machines and plants

- Single phase motors: Induction, BLDC and Flameproof
- Custom-built three phase motors: General purpose, IE2 & IE3

Components and sub-assemblies for motors and generators

- Laminations/stampings, stacks, wound stators and die-cast rotors

Apart from providing a range of standard motors, Lawkim is known for developing most competent solutions for challenging requirements of customised motors through its well-equipped Product Development Centre at Pune, India.



BLDC motors for refrigerator compressors



Golf cart motors



FHP motors



BLDC motors for HVAC application



Single phase flameproof motors



FHP motors with flange



Hermetic motors for air-conditioner compressors



FHP motors for HVAC application



Custom-built three phase motors

COMPONENTS TO SOLUTIONS FOR ELECTRIC MOTORS

Hermetic compressor motors



Domestic refrigerators	Induction motors	60 W to 150 W
	BLDC motors	60 W to 130 W
Commercial refrigeration	Induction motors	150 W to 750 W
	BLDC motors	150 W to 250 W
Air-conditioners	Unitary	1500 W to 2250 W
	Packaged units	3700 W to 10000 W

- > Custom-designed motors for 115 V - 60 Hz & 230 V – 50/60 Hz
- > Can operate with CSIR/RSIR/RSCR/CSCR type
- > Most cost-effective, custom-designed solutions with peak efficiency up to 87%
- > Can operate in R134A/Hydrocarbon/410A refrigerants
- > Consistent performance with guaranteed efficiencies for tough operating conditions
- > Proven track record of supply to global leaders in compressors
- > Built-in reliability with lowest residue levels

Industrial & commercial motors

Single phase and custom-built three phase

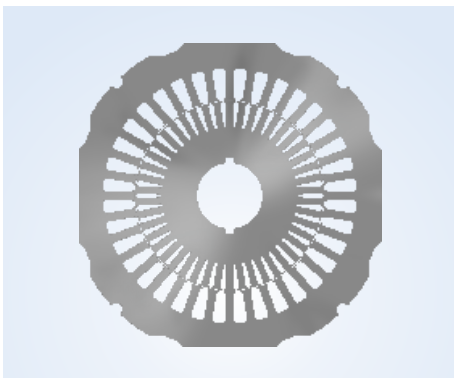


Three phase	Induction motors	Up to 22 kW
Single phase	Induction motors	75 W to 2250 W
	BLDC motors	186 W to 400 W

- > Custom-designed motors for 115 V - 60 Hz & 230 V – 50/60 Hz
- > Can operate with CSIR/RSIR/CSCR type
- > Additional overload bearing capability compared to competition
- > Customised motor design for most cost-effective solutions
- > High quality raw materials for long-life and reliability
- > Permanently lubricated bearings with service life exceeding 40,000 hours
- > Thermal overload protection (optional)

Components for motors and generators

Laminations/stampings, stacks, wound stators and die-cast rotors



Laminations	Induction motors & generators	Dia. 40 mm to 1000 mm
	BLDC motors	Dia. 40 mm to 180 mm
Stator stacks	Induction motors	Max. Dia. 1000 mm, Max. core length 360 mm
Rotors	Induction motors	Max. Dia. 250 mm, Max. core length 360 mm
Wound stators & rotors	2, 4, 6 & 8 poles as per requirement for motors/generators	

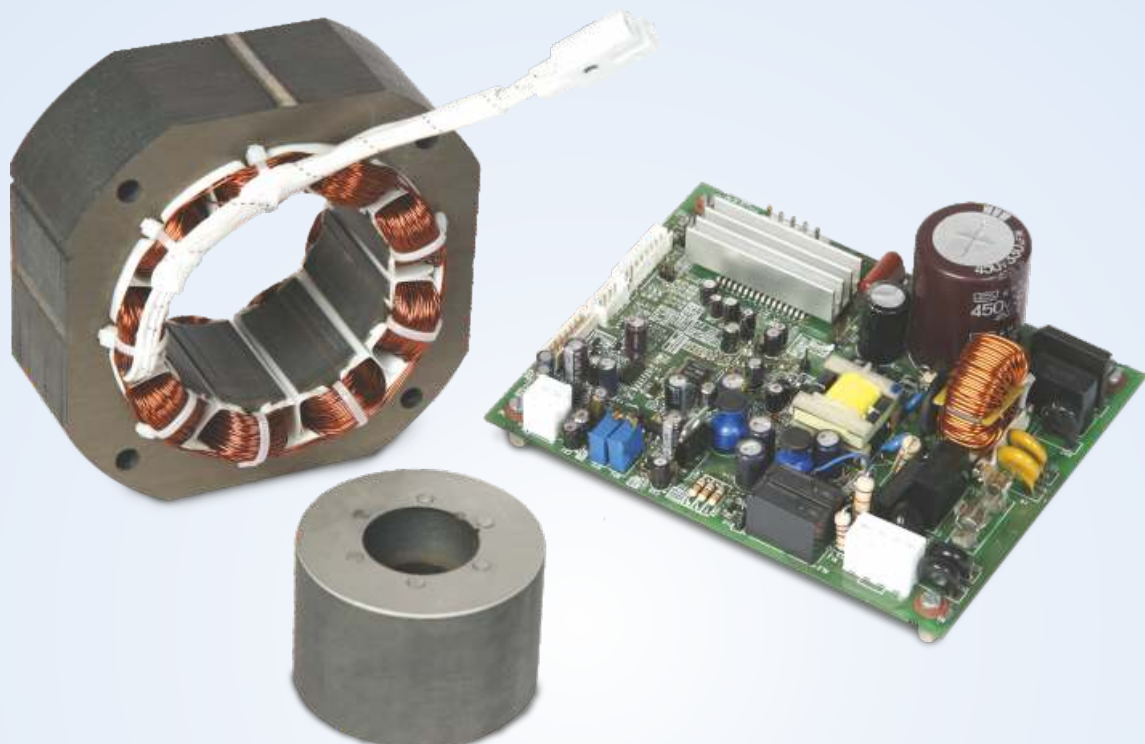
- > Capacity: 2000 MT of laminations per month
- > Range: Dia. 105 mm to 1000 mm
- > High speed presses with progressive dies:
For laminations Dia. up to 500 mm
- > Compound dies and CNC notching machine:
For laminations dia. from 500 mm to 1000 mm
- > Advanced quality control tools and systems to maintain high accuracy
- > High speed presses - 10 Nos. : From 100 Ton to 550 Ton capacity
- > Sophisticated tool room for die making, calibration and maintenance of dies

COMPETENCE TO DEVELOP THE RIGHT SOLUTION FOR YOU

Lawkim was founded in 1961 to develop special purpose motors for hermetic compressors. Since then, the company carried forward this legacy to be a specialist in the development of customised solutions. Our admirable range of products and solutions is a testimony to this. In order to respond to such challenging requirements, we have a separate Product Development Centre, where a team of 25 qualified engineers works to understand customer needs and develop appropriate solutions. This team is provided with the latest designing tools, prototyping facility and an advanced test setup. The most important advantage of our Product Development Centre is the fast turnaround time. The vast experience of individual members and a large data bank developed over decades of experience allow us to quickly develop appropriate solutions which not only save time, but also substantial costs as well.

Once the prototype is developed and field trials are successful, mass production of such motors and components in the shortest possible time is possible because of our in-house facilities like a sophisticated tool room for developing dies and punches. As a result, our competent solutions have been serving leading companies from different segments domestically and internationally.

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**BLDC motors for
refrigerator compressors**

CAPACITY TO DELIVER LARGE VOLUMES – EFFICIENTLY

Lawkim firmly believes in self-reliance, so that we are able to serve our customers efficiently and cost-effectively. Our plant in India is a large integrated facility for complete motor manufacturing. It is spread over 60,000 sq.m. and is presently capable of producing 4 million motors every year. This capacity can be expanded significantly with the addition of a few machines since the basic infrastructure is already in place. To ensure higher productivity and streamlined material flow, we follow a cellular manufacturing system.

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Automatic presses from 100T to 550T – Total 10 nos.



Automatic press 550T





The plant is equipped with facilities such as -

- > Advanced test setup for lamination steel properties checking
- > Automated press shop with coil feeders and stackers
- > In-house tool room for development and maintenance of dies
- > De-carburizing/annealing/steam bluing plants
- > Automatic rotor die-casting plant
- > Automatic and semi-automatic winding lines
- > Vacuum impregnation plant
- > Powder coating plant
- > Conveyorised motor assembly lines
- > Regenerative test setup for motors
- > Foam packing setup
- > Various testing and calibration facilities

Tool room



Automatic rotor die-casting machine



CAPACITY TO DELIVER LARGE VOLUMES – EFFICIENTLY

Automatic coil winding and insertion machine



Lawkim is well known for ensuring consistent supply of large quantities of motors and components to several OEMs. This reputation is built on years of our association with major brands. The confidence in the capacity and supply chain management ability of Lawkim is such, that some of our OEM customers maintain just 48 hours inventory at their own plants, which are more than 1600 km away from our factory.



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Seven automatic winding lines from Statomat and Yahotec

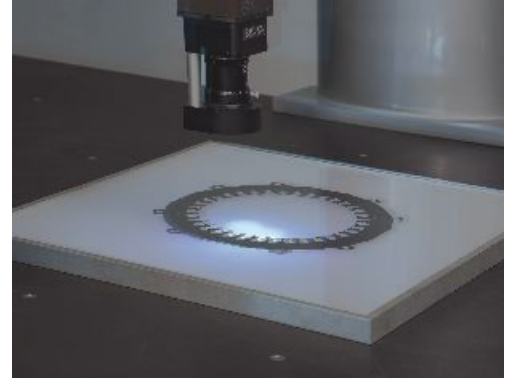


COMMITMENT TO SERVE WITH QUALITY IN EVERY ASPECT

At Lawkim, we firmly believe in the principle – ‘Quality at every step, quality in every aspect’. This way, we ensure minimum in-process rejection and almost zero customer complaints. It is also reflected in our response and service to customers, as well as in employee relations. That’s why all our stakeholders are happy in being associated with us.

To ensure the highest quality of end products, we have set up systems to evaluate quality at every step of manufacturing. The steel coils received are checked to ensure appropriate magnetic properties using latest technology testing machines. Stampings are routinely checked for consistent dimensions. Every wound stator is checked for insulation strength and winding consistency. Once the motor gets assembled, each and every motor is tested to ensure its performance and correctness of all parameters. Using this step-by-step quality check, highest quality and reliability of the end product is completely assured.

3D Coordinate Measuring Machine



Stitched stack punching



Wound stator - Electrical parameters testing



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Product certifications

- UL certified insulation system
- ATEX certification for single phase flameproof motors
- BIS certification for single phase flameproof motors

Our quest for quality does not end at manufacturing products of high quality, but is also evident in the service response to our customers. Be it developing a new product, updating an order status or solving field problems if they occur, our team of experts responds with great enthusiasm and speed. It is the very reason our customers are with us for decades together.

Epstein test setup from Brockhaus, Germany

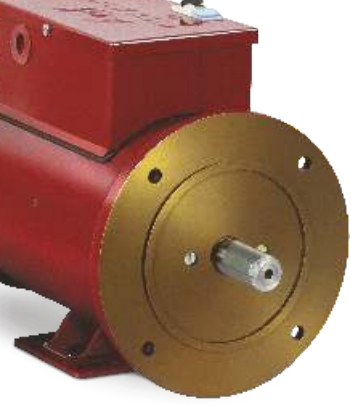


Dynamometer testing for FHP motors



Dynamometer testing for LT motors





WE LOVE TO BE SYSTEMATIC AT EVERY STEP

At Lawkim, various practices such as Six Sigma, Kaizen and TPM are rigorously followed, which help improve quality, productivity and performance. We are one among three companies in Asia Pacific to have ASQ certified 'Master Black Belt' title winner in our team. Our team is proud to have completed 3658 Kaizen during the year 2014.

Lawkim has been attested with system certifications such as - ISO 14001:2004, ISO 9001:2008 and OHSAS 18001:2007

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Conveyorised motor assembly



EVERYONE AT LAWKIM IS INSPIRED TO INNOVATE

At Lawkim, we encourage each team member to think differently. For this, training and workshops are regularly conducted with the help of outside experts. This inspires people to think of new ways of doing things. It gets reflected in our products, processes, manufacturing techniques or simply a great new idea.

As a result of this, we are able to develop new products such as BLDC motors, single phase flameproof motors for petrol pumps, IE3 motors and several other products. Unique software programs have been developed by Lawkim engineers for designing high

efficiency induction motors with optimum material content and designing and printing of the complete winding tool set from slot insulation to finish forming. Cellular manufacturing techniques developed by our engineers are used to optimise process and shop efficiency.

Lawkim's novel products such as a bicycle and a cycle rickshaw made from bamboo have also won awards. Our Automated Guided Vehicle (AGV) is another innovative achievement, which has been developed in-house at half the cost.



Bamboo bicycle



Automated Guided Vehicle (AGV)



SAFETY EVERYWHERE FOR EVERYONE

At Lawkim, safety of employees, assets and the plant is of prime importance. That is why there is a lot of emphasis on following safe working practices. The 11 best practices in safety have enabled Lawkim to surpass 2000 safe working days. Lawkim has been recognised to have the safest manufacturing shop in India. The National Safety Council of India has awarded Lawkim for its safe practices repeatedly. We have also won the first prize for the Highest Safety and Best Housekeeping among all divisions of the Godrej Group.

Safety Gold Award from National Safety Council of India



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Foam packing system



RIGHT EFFORTS ARE ALWAYS RECOGNISED

Our sincere approach and efforts to innovate and offer the most pertinent solutions, ensure high levels of service to customers, follow safe working practices, and care for society have been rightly recognised.

Our customers like Emerson, Cummins, Godrej (Appliances Division) and others routinely award us with the best vendor awards.

So far, eight employees from Lawkim have won the Gunwant Kamgar Puraskar (Meritorious Worker Award) – the most coveted industry award from Government of Maharashtra.

Our innovative products – the bamboo cycle and the solar powered bamboo rickshaw have won the Innovation Award from Indian Merchants' Chamber in 2013-14, and the Golden Peacock Eco Innovation Award in 2014-15.

Golden Peacock Eco Innovation Award



Continuous annealing furnaces (2 nos.) with capacity for processing 2000 kg/hour



WE ARE GLOBAL YET IN THE HEARTS OF OUR CUSTOMERS

Lawkim is proud to be present globally, whether through direct exports to developed countries or through the global presence of its customers in appliances, machines and plants. We directly export our custom-designed solutions to leading companies in Germany, UK and USA.

However, our motors are at the heart of leading appliances of well-known brands of refrigerators, air-conditioners, washing machines and wet grinders. Also, our single phase flameproof motors are an integral part of some leading brands of fuel dispensing units. Our custom-built single and three phase motors form an indispensable part of several industrial machines and plants.

All these appliances, machines and plants perform flawlessly, year-after-year in almost all the continents of the world and keep up the reputation of our customers. Our association with our customers over decades is a testimony of our globally acknowledged performance.

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Naoroji Godrej Center for Plant Research (NGCPR)

NGCPR is first of its kind research organization in India set up in 1991 by Vijay Krishna, Executive Director. The activity is dedicated to the memory of Late Shri. Naoroji Godrej with the vision of nurturing the unique plant life of the Western Ghats (mountain ranges) through researching its biodiversity and plant conservation with a special emphasis on medicinal plants. The center made several significant contributions towards research and preservation of endangered plant species. This includes, the discovery of two new taxa, namely *Brachystelma Naoroji* & *Arysaema Murrayi* Var *Sonubeniae* and conservation studies on two globally threatened species, namely *Frerea Indica* and *Abutilon Ranadeli*.



**Arysaema Murrayi
Var Sonubeniae**



Brachystelma Naoroji

HAPPINESS FIRST FOR EVERY STAKEHOLDER

Each of our stakeholders enjoys being associated with Lawkim. Be it a customer in India or another country, a dealer, an employee, a vendor, an investor or simply a resident in the neighbouring town of our plant, everyone is benefited, gets an opportunity to progress and enjoys quality life. That's why during our existence of more than half a century, we have progressed rapidly and are recognised as a responsible corporate citizen.



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LAWKIM
MOTORS GROUP

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