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Lafert S.p.A.

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Company Profile

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Company Profile



Mission	5
Lafert Group	9
Sector Leaders	13
Sustainable Technology	17
Manufacturing	21
Certified Quality	25
Human Resources	29
Communication	33
Plants	37
Sales Network	47

<i>Mission</i>
<i>Il Gruppo Lafert</i>
<i>Leader di Settore</i>
<i>Tecnologia e Sostenibilità</i>
<i>Produzione</i>
<i>Qualità Certificata</i>
<i>Risorse Umane</i>
<i>Comunicazione</i>
<i>Stabilimenti</i>
<i>Rete di Vendita</i>



Mission

Mission

Lafert represents the *Made in Italy* in the sector of high-performance electric motors worldwide.

We stand out from others by our ability to meet continuously changing demands using innovation and flexibility, thus providing solutions with both quality engineering and competitiveness.

We are *Motor Specialists*: Our products represent state of the art in research and technical application. We undertake to introduce innovative technologies into the market and meet the strictest standards on energy saving.

Our competitive advantage is our ability to adapt our production to specific demands. Our certified quality ensures we gain the market confidence. Italianism is our guarantee of creativity.

In tutto il mondo Lafert è il Made in Italy nel settore dei motori elettrici ad alte prestazioni. Ci differenziamo perché sappiamo rispondere con innovazione e flessibilità alle continue trasformazioni della domanda, offrendo soluzioni che uniscono alta progettualità e competitività.

Siamo Motor Specialist: i nostri prodotti rappresentano l'avanguardia nella ricerca e nelle applicazioni tecniche fatta materia. Concentriamo risorse e Know-how per introdurre nel mercato tecnologie innovative, all'altezza dei più severi standard in materia di risparmio energetico.

La capacità di adattare la produzione a esigenze specifiche è il nostro vantaggio competitivo. La qualità certificata ci assicura la fiducia del mercato. L'italianità è la nostra garanzia di creatività.



Lafert Group



- Lafert N.A. North America
- Lafert Electric Motors Ltd., UK
- Lafert Moteurs S.A.S., France
- Lafert Motores Eléctricos S.L., Spain
- Lafert GmbH, Germany
- Lafert S.p.A., Italy
- Lafert Servo Motors S.p.A., Italy
- Lafert Elektromotorji, Slovenia
- Lafert Servo Drives S.r.l., Italy
- ICME S.p.A., Italy

Lafert Singapore Pte Ltd. Singapore

Lafert Electric Motors, Australia



Lafert Group

Our core business is the manufacturing of motors engineered and developed according to specific demand. Our manufacturing plants adopt a variety of techniques, choosing not to be linked with one production doctrine. This gives us adaptability and flexibility for a dynamic market.

Our structure, divided into four different specialised units ensures such flexibility. Lafert Motors, the mother company, defines developing products and invests in the most efficient methods of production. IcmeMotors represents the department where customised motors are manufactured at unbeatable prices. LafertServo and LafertDrives attend to the production of components intended for *Industrial Automation*: servomotors and drives.

Lafert was established in 1962 and today is a group whose strength is dynamism and customer care. Great Britain, Germany, France, Spain, Slovenia, North America, Singapore, and Australia. Our direct commercial network is present in the main industrialised countries in order to be close to the customer and to ensure prompt service for customised solutions.

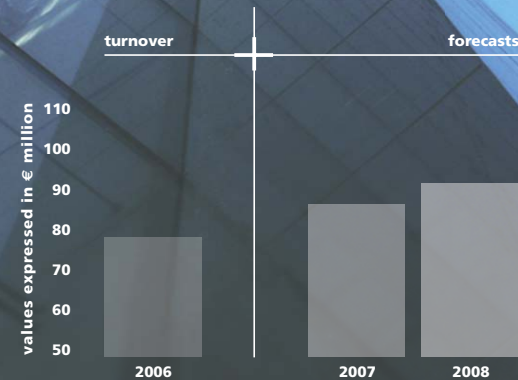
Il nostro core business è la produzione di motori ideati e sviluppati in base alle specifiche evoluzioni della domanda. La grande varietà e adattabilità dei nostri manufatti, mai legati a una singola tipologia produttiva, ci permette di affrontare il mercato con elasticità, senza temere flessioni e crisi congiunturali.

La flessibilità è assicurata da una struttura articolata in quattro diverse unità specializzate. LafertMotors, la casa madre, determina linee di sviluppo e investimenti nell'ottica di un'innovazione orientata al risparmio energetico. IcmeMotors è il reparto dove nascono motori customizzati dall'imbattibile rapporto qualità-prezzo. LafertServo e LafertDrives si occupano della produzione di componenti specifici per Industrial Automation: servomotori e azionamenti.

Fondata nel 1962, Lafert è oggi un Gruppo che fa della dinamicità e del customer care i suoi punti di forza. Gran Bretagna, Germania, Francia, Spagna, Slovenia, Nord America, Singapore, Australia: la nostra rete commerciale diretta è presente nei maggiori Paesi industrializzati per essere sempre vicina al cliente e assicurare interventi davvero tempestivi e su misura.



Sector Leaders



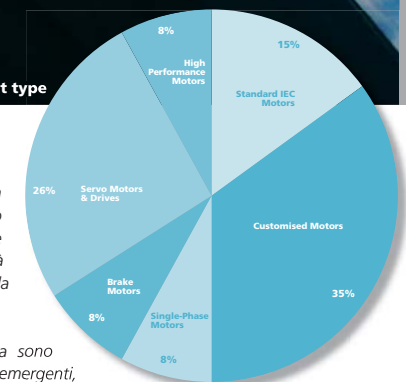
Sector Leaders

Lafert Group has been leading the specialised electric motors market for nearly half a century. The wide range of products and growing sales bears witness to our ability to meet each market demand and to combine competitiveness with the most advanced technological research.

Our customised innovative offer combined with our qualified customer service makes us successful even against our competitors from the emergent countries. Thanks to our high service standards that set us apart from others, Lafert is the market leader in the field of engineered electric motors.

turnover trend Lafert Group and forecasts

manufacture by product type



Da quasi mezzo secolo il Gruppo Lafert è il protagonista italiano nella produzione di motori elettrici per impiego industriale. L'ampia gamma dei prodotti e il costante aumento del volume d'affari attestano la nostra capacità di incontrare ogni richiesta del mercato e di coniugare la competitività alla più avanzata ricerca tecnologica.

Offerta innovativa personalizzata e assistenza qualificata sono il product mix con cui sfidiamo la concorrenza dei paesi emergenti, competitivi sui prezzi per i bassi costi della manodopera e dei materiali, ma deludenti in qualità, garanzie e supporto tecnico. Per gli elevati standard che ci caratterizzano, la nostra azienda incarna la leadership della manifattura italiana.





Sustainable Technology



Sustainable and available technology: these are our watchwords, because we believe it is important to safeguard the environmental heritage of the world.

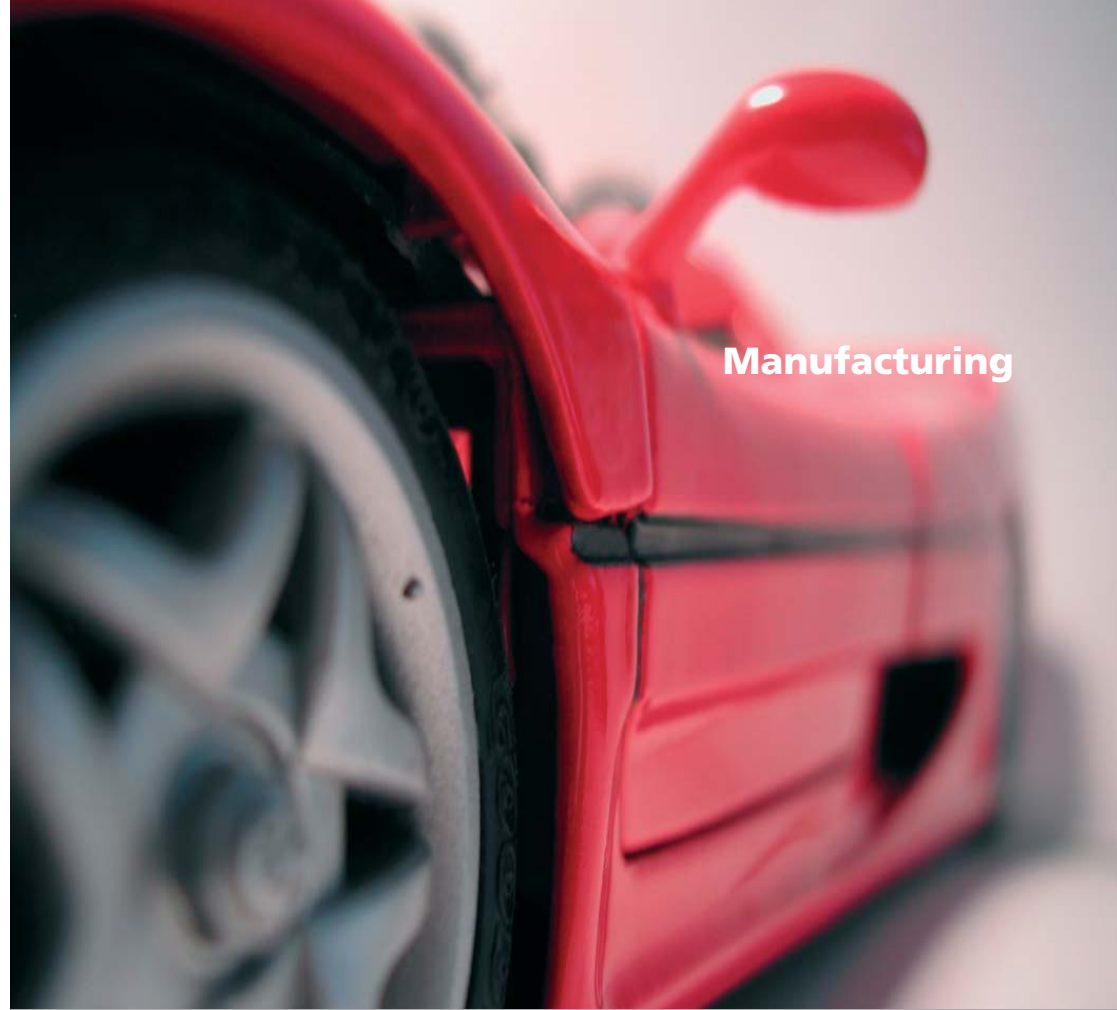
Our vision is to combine innovation with ecology. The awareness of energy saving within our R&D department allowed us to plan high-functionality technical solutions with low environmental impact. Competitive quality products for both industrial and domestic applications.

Permanent magnet motors, combine competitive costs with the highest efficiency; generators for wind micro-turbines able to provide enough energy for the domestic usage. Traction systems for motorcycles and cars which are able to provide low cost and high performance with emissions equivalent to zero. These are all products attesting to the Lafert philosophy: to cope with the energy challenges using creativity and thus making the renewable source more attractive. In short, to combine business success with environmental protection.

Tecnologia sostenibile e disponibile: questa è la nostra parola d'ordine. Perché crediamo nell'importanza di salvaguardare il patrimonio ambientale del mondo.

Il nostro sogno è coniugare l'innovazione all'ecologia, e noi sappiamo come farlo avverare. Una R&D attenta al risparmio energetico ci ha permesso di ideare soluzioni tecniche ad alta funzionalità ma dal basso impatto ambientale, competitive per qualità e prezzo, tanto per l'applicazione industriale quanto per il consumo quotidiano.

Motori a magneti permanenti che uniscono costi concorrenziali al massimo rendimento; generatori per microturbine eoliche capaci di fornire energia sufficiente all'uso domestico; sistemi di trazione per motocicli e auto in grado di garantire economicità e prestazione con emissioni pari a zero. Sono tutti prodotti che testimoniano la filosofia Lafert: affrontare con creatività le sfide dell'approvvigionamento energetico preferendo le fonti rinnovabili, per coniugare il successo aziendale alla tutela della natura.



Manufacturing



Manufacturing

Our production choice basically depends on our main target: *customer satisfaction*.

Our production system has been arranged according to a vertical integration model in order to gain greatest efficiency and flexibility. Designing, procurement and materials management, production and assembly of components, marketing and after-sales service: all manufacturing and distribution stages of our products are completely internalised. We therefore maintain knowledge management and the circulation of information flow. This represents our basic platform for innovation and research.

We are able to ensure the quality of the product because we directly control the whole production line.

We keep costs under control by optimising plant use and by investing in production equipment that ensures increased productivity.



Produzione

Ogni nostra scelta produttiva dipende essenzialmente dal nostro obiettivo principale: customer satisfaction.

Per la massima efficienza e flessibilità, abbiamo organizzato il nostro sistema produttivo secondo un modello di integrazione verticale. Progettazione, approvvigionamento e gestione dei materiali, produzione e assemblaggio dei componenti, commercializzazione e assistenza post-vendita: tutte le fasi di creazione e distribuzione dei prodotti sono completamente internalizzate. Così favoriamo il knowledge management e la circolazione dei flussi informativi, presupposti fondamentali per l'innovazione e la ricerca.

Siamo in grado di garantire la qualità del prodotto perché verifichiamo direttamente l'intera filiera produttiva.

Abbiamo il controllo dei costi grazie all'ottimizzazione dell'utilizzo degli impianti e all'investimento su attrezzature produttive e di assemblaggio che garantiscono crescente produttività a parità di personale impiegato.

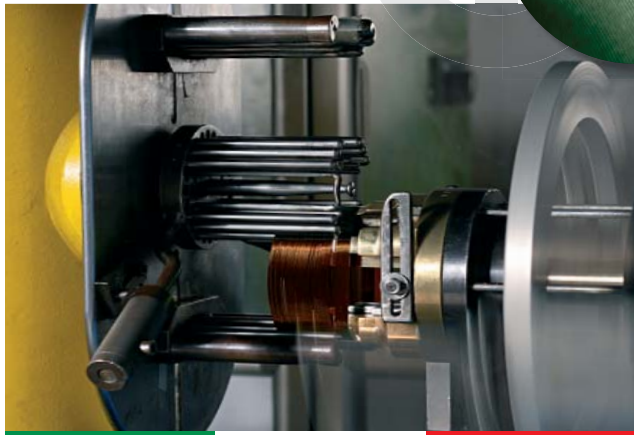


Certified Quality

LAFERTGROUP



Qualità Certificata



Certified Quality



The Quality Certification means reliability of the whole business, from human resources to design, from process management to product specifications.

Thanks to the strictness of our quality control in the whole production line, in 1994 we achieved the ISO 9001 certificate. In addition, the Underwriters Laboratories Inc. certified that our products meet all requirements for product safety, not to mention the United States Department of Energy (the USA are the first country in the world to seriously regulate the efficiency of motors) that certified our commitment in energy saving, which ensures our customer products meet the highest efficiency standards in Europe, America and Australia.



The USA market, which is the most restrictive worldwide, gave the green light to Lafert motors. Our leadership in the USA for metric motors represents the most convincing evidence of their value.



"The ETL symbol is a UK registered certification mark of the Carbon Trust"

La Certificazione di Qualità vuol dire affidabilità dell'intera realtà aziendale, dalle risorse umane alla progettazione, dalla gestione dei processi alle specifiche di prodotto.

Il rigore con cui eseguiamo il controllo della qualità in tutta la filiera produttiva ci ha fatto ottenere, già nel 1994, la certificazione ISO 9001. Inoltre l'Underwriters Laboratories Inc. ha attestato che i nostri prodotti rispettano tutti i parametri per la sicurezza. Il nostro impegno nel risparmio energetico – che assicura al cliente prodotti rispondenti ai più alti standard di efficienza in Europa, America e Australia – è stato certificato dal Dipartimento di Energia degli USA, il primo Paese al mondo che ha affrontato in modo serio il problema energetico.

Il mercato statunitense, il più restrittivo del mondo, ha detto sì ai motori Lafert. La nostra leadership nei motori metrici negli USA costituisce la prova più convincente del loro valore.

"Il simbolo ETL è un marchio britannico registrato di certificazione di proprietà di The Carbon Trust".



Human Resources

Human Resources

We buck the trend: production is not sub-contracted to countries with low labour cost. This would dilute our qualified know-how and our ability to immediately answer to market demands. We believe that being Italian means to be able to combine creativity, innovative skill and production safety.

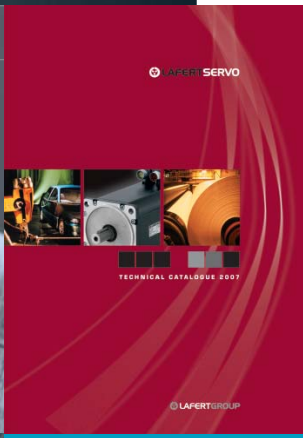
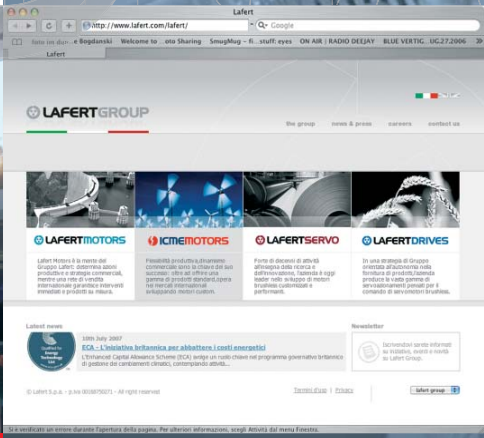
Lafert does not build its own competitiveness on the reduced labour cost and reduced competence of others: expertise and specialist know-how are basic for the final quality of our product, therefore, for these elements it's not a question of price. Our constant growth arises from the maximisation of resources and the optimisation of production plant. The human value that sets us apart from others – professionalism – is secure.

Abbiamo fatto una scelta controcorrente: non delocalizzare la produzione in Paesi a basso costo di manodopera. Questo per non disperdere il nostro qualificato know-how e la nostra abilità nel rispondere in modo immediato agli stimoli del mercato. Essere italiani per noi significa saper fondere creatività, capacità innovativa e sicurezza della produzione.

Lafert non costruisce la sua competitività sulla contrazione del costo del lavoro a scapito della competenza: expertise e conoscenze specialistiche sono decisive per la qualità finale del prodotto, quindi non hanno prezzo. La nostra crescita continua deriva dalla massimizzazione di tempi e risorse e dall'ottimizzazione di spazi e impianti produttivi. Il valore umano che ci contraddistingue – la professionalità – è salvo.



Communication



Communication

Four companies, one single trade mark: Lafert Group.
Four different production units that are highly specialised but joined by mission and *Made-in-Italy* quality assurance. All can be recognised by the same strong Corporate Identity.

Our corporate communication aims at highlighting our experience and competence. This is the reason why we are regularly present with business and product advertising within the most important trade journals. In addition, we take part in the most significant worldwide exhibitions, such as SPS in Nuremberg, the Hannover Messe, Mostra Convegno Expocomfort in Milan and EASA in the United States.

The Lafert Group also takes part in social work.
Our core business is strongly linked to the environmental protection and energy saving. In 2006 the Group decided to support Special Olympics Italy as sponsor of the XXIII swimming games for special athletes.

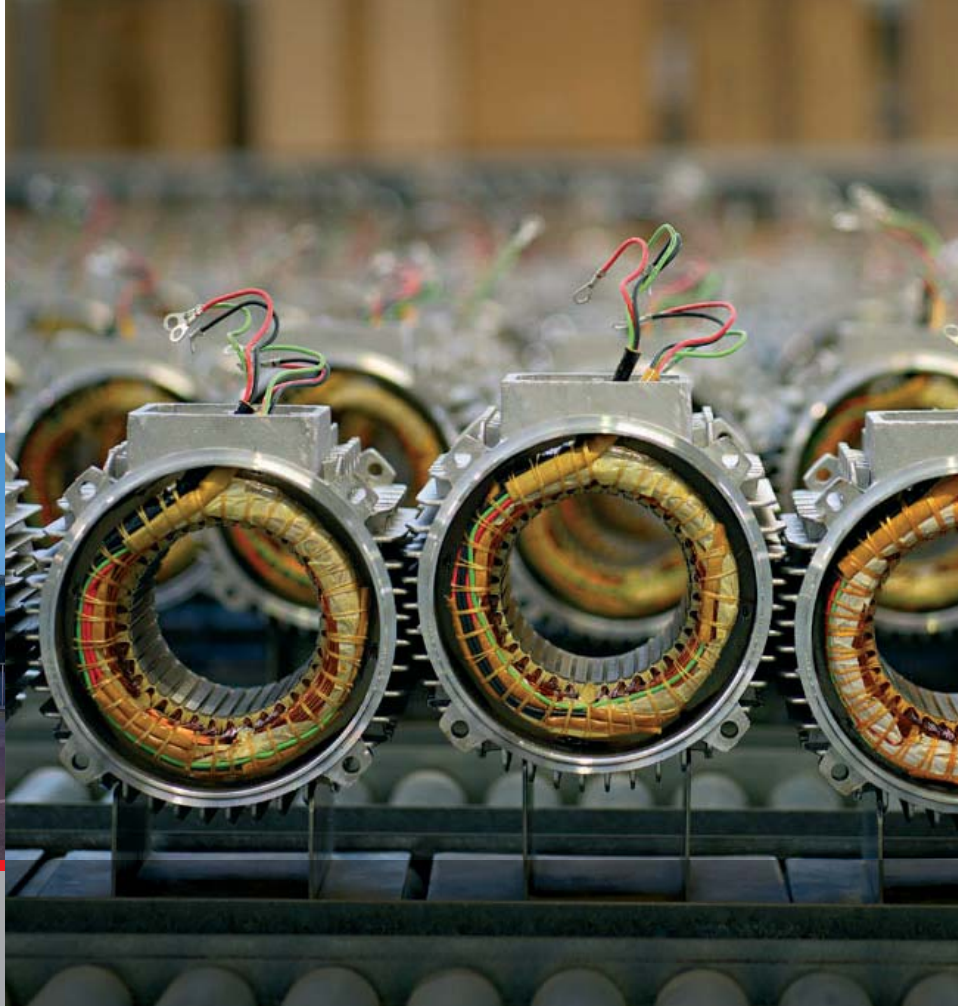
*Quattro aziende, un solo marchio: Lafert Group.
Quattro diverse unità produttive, altamente specializzate ma unite da mission e garanzia di qualità Made in Italy, che si riconoscono nella stessa forte Corporate Identity.*

Le scelte di comunicazione sono mirate a sottolineare la nostra esperienza e competenza, le qualità più apprezzate dai professionisti esigenti. Per questo siamo regolarmente presenti con advertising aziendale e di prodotto sulle più importanti riviste di settore. Inoltre partecipiamo alle fiere nazionali e mondiali più rilevanti, tra cui la SPS di Norimberga, la Hannover Messe, la Mostra Convegno Expocomfort di Milano e la EASA negli Stati Uniti.

Lafert non trascura l'impegno sociale, già testimoniato dal core-business fortemente legato alla tutela ambientale e al risparmio energetico. Ecco perché nel 2006 il Gruppo ha deciso di affiancare Special Olympics Italia come sponsor dei XXIII giochi di nuoto per atleti speciali.



Plants



Lafert S.p.A. – San Donà di Piave (VE), Italy

Experience, flexibility, consideration for tradition and the courage to introduce innovations. These are the features that allow Lafert Motors to meet its customers highest standards and to maintain its leadership in the customised solution sector.

Lafert Motors is the mastermind of the Lafert Group. It defines production activities and business strategies, while an international sales network ensures immediate response for customised products.

The Company manufactures three-phase and single-phase asynchronous electric motors and brake motors, designed for different applications and all industrial environments.

The new high-performance motors are one of the most interesting innovations. A perfect mixture between the product technology of the permanent magnet motor and the process technology of the asynchronous motor, which results in an unbeatable balance of performance, high efficiency and competitive costs.

Lafert Elektromotorij d.o.o. – Nova Gorica, Slovenia

The factory is located at the boundary between Italy and Slovenia and has been a centre of excellence for the production of windings for our Italian factories for the past ten years.

Professionalism and promptness in answering to these factory's demands has made it a key element in the Lafert Group development.

Lafert S.p.A. – San Donà di Piave (VE), Italy

Esperienza e adattabilità, rispetto della tradizione e coraggio nell'innovazione: queste le qualità che permettono a Lafert Motors di assicurare ai suoi clienti la massima affidabilità e di mantenere la leadership in un settore ad alto contenuto tecnologico.

Lafert Motors è la mente del Gruppo Lafert: determina azioni produttive e strategie commerciali, mentre una rete di vendita internazionale garantisce interventi immediati e prodotti su misura.

L'azienda realizza motori elettrici asincroni e autofrenanti, trifase e monofase, progettati per usi differenziati e per ambienti commerciali e industriali.

Tra le innovazioni di maggior interesse vi sono i nuovi motori ad alte prestazioni, un perfetto connubio tra la tecnologia di prodotto del motore a magneti permanenti e la tecnologia di processo del motore asincrono. Il risultato: un imbattibile equilibrio tra prestazioni, altissimo rendimento e costi competitivi.

Lafert Elektromotorij d.o.o. – Nova Gorica, Slovenia

Lo stabilimento si trova al confine tra Italia e Slovenia, ed è diventato da oltre un decennio un centro di eccellenza nella produzione di avvolgimenti per gli stabilimenti italiani.

La professionalità e tempestività nel rispondere alla domanda degli stabilimenti ne hanno fatto un elemento fondamentale per lo sviluppo del Gruppo Lafert.


ICME S.p.A. – Fusignano (RA), Italy

Joining Lafert Group in 1997, ICME S.p.A. boasts more than twenty years experience in the production of small and medium sized electric motors. Today this allows ICME to be a specialist in manufacturing customised motors at an unbeatable quality/price ratio.

Production flexibility and commercial dynamism are key to its success: ICME offers a range of standard products but also acts on international markets thus develops motors designed according to the specific needs of every single customer.

ICME proves its own extraordinary production versatility in different application areas. From electric pumps to ventilation systems. From car washers to hydraulic power units. From equipment for car garages to woodworking machinery.

ICME boasts an increasing number of loyal customers all over the world and their faith boosts creativity and the ability to introduce innovations.

ICME S.p.A. – Fusignano (RA), Italy

Parte del Gruppo Lafert dal 1997, ICME vanta un'esperienza più che ventennale nella produzione di motori elettrici di media e piccola taglia, che le permette oggi di essere la specialista nella creazione di motori customizzati dall'imbattibile rapporto qualità-prezzo.

Flessibilità produttiva e dinamismo commerciale sono la chiave del suo successo: ICME, oltre ad offrire una gamma di prodotti standard, opera nei mercati internazionali sviluppando motori progettati sulle richieste specifiche dei singoli clienti.

ICME dimostra la sua straordinaria versatilità produttiva nelle più diverse aree di applicazione: dalle elettropompe agli impianti di ventilazione, dagli autolavaggi alle centraline oleodinamiche, dalle attrezzature per autofficine alle macchine per la lavorazione del legno.

Vanta un numero in continuo aumento di clienti fidelizzati in tutto il mondo, e la loro fiducia è di stimolo a una sempre maggiore creatività e capacità di innovazione.

**Lafert Servo Motors S.p.A. – Noventa di Piave (VE), Italy**

Lafert Servo Motors is one of the few European companies able to fully manufacture every single component of brushless servomotors. The complete control of the manufacturing process, from raw materials to the finished product and the accurate knowledge at each stage ensures quality and reliability assurance for Lafert Servo Motors.

Thanks to ten years of research and innovation, this company is now leader in the development of customised and performance brushless motors. Able also to offer technically advanced solutions at competitive prices.

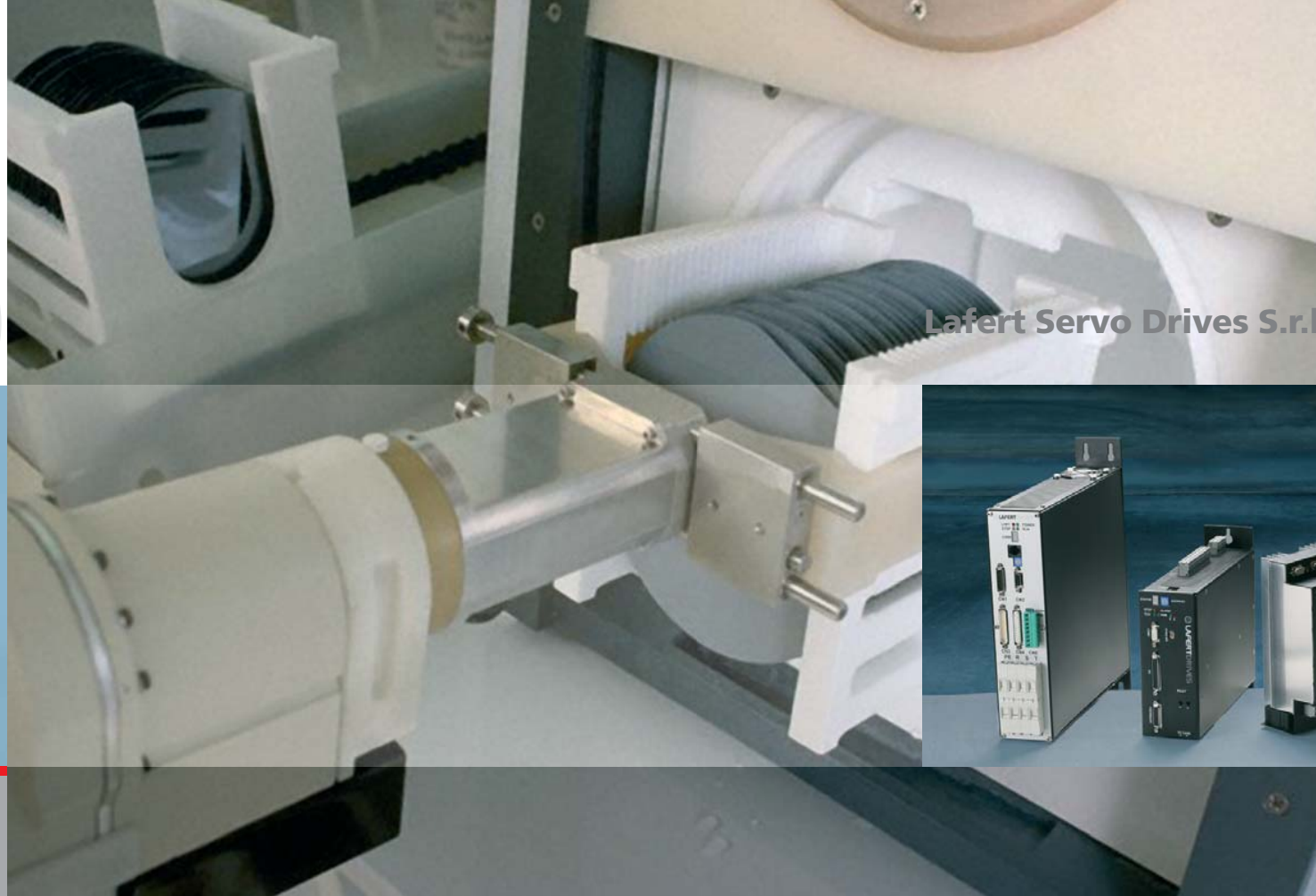
The Lafert trademark as the first choice for brushless motors by many Italian and International companies confirms its leadership.

Lafert Servo Motors S.p.A. – Noventa di Piave (VE), Italy

Lafert Servo Motors è in grado di realizzare internamente tutti i singoli componenti dei motori brushless, ed è tra le poche aziende europee in grado di farlo. Il controllo completo del processo produttivo, dalle materie prime al prodotto finito, e la dettagliata conoscenza di ogni sua fase, sono la migliore assicurazione sulla qualità e l'affidabilità dei motori Lafert.

Forte di decenni di attività all'insegna della ricerca e dell'innovazione, l'azienda è oggi leader nello sviluppo di motori brushless customizzati e performanti, capace di offrire soluzioni tecnologicamente avanzate a prezzi competitivi.

La sua preminenza è confermata dalle tante aziende italiane e internazionali che hanno scelto i motori brushless a marchio Lafert come prima garanzia di sicurezza e superiorità del proprio business.



Lafert Servo Drives S.r.l. – Villanova di Castenaso (BO), Italy

Lafert Servo Drives core business is firmly related to that of Lafert Servo Motors. The company develops and manufactures a wide range of servo-drives designed for the control of brushless servomotors, by means of the most advanced hardware and software technologies.

Its products are manufactured according to the criterion of usability and flexibility. This ensures an easy, fast set-up and great adaptability. Thanks to their configuration and diagnostic programme package that can be used on the PC in the Windows environment: the debugging is precise and can be customised.

Every device always ensures the highest reliability and safety, because it is subject to strict tests in different load and climatic conditions. This results in the full satisfaction of customers demonstrated by the thousands of drives produced and marketed by Lafert Servo Drives in its twenty years of activity all over the world.

Lafert Servo Drives S.r.l. – Villanova di Castenaso (BO), Italy

In una strategia di Gruppo orientata all'autonomia nella fornitura di prodotti e servizi, il core business di Lafert Servo Drives è fortemente legato a quello di Lafert Servo Motors, perché l'azienda sviluppa e produce la vasta gamma di servoazionamenti pensati per il comando dei servomotori brushless, impiegando le tecnologie hardware e software più avanzate.

I suoi prodotti sono realizzati secondo criteri di usabilità e flessibilità, per garantire una installazione semplice e rapida, e grande adattabilità: grazie al loro corredo di programmi di configurazione e diagnostica, utilizzabili su PC in ambiente Windows, la messa a punto del sistema è precisa e personalizzata.

Ogni apparecchiatura garantisce sempre la massima affidabilità e sicurezza, perché sottoposta a severi collaudi in diverse condizioni di carico e climatiche. Il risultato è la piena soddisfazione dei clienti, dimostrata dalle decine di migliaia di azionamenti prodotti e commercializzati nel mondo da Lafert Servo Drives in venti anni di attività.



Sales Network



Lafert GmbH – Esslingen, Germany

The sales centre for electric motors for the Group in Germany. The German market represents the largest export market of the Group. In such a market, sales policy focuses on the satisfaction of large customers, and logistics is therefore directly managed between factories and final customers.

Lafert Electric Motors Ltd. – Crewe, United Kingdom

Serving the UK and Eire, the English branch is located near Manchester. It was established in 2001. Today the UK market is the second export market for the Group.

Lafert Motores Electricos S.L. – Zaragoza, Spain

This branch was established at the beginning of the 1990s. The Spanish branch boasts a consolidated position and an excellent service level to the market thanks to a wide range of finished product stock and its ability to carry out changes, modifications and repairs.

Lafert Moteurs S.A.S. – Lyon, France

The French branch plays an important role in the supply of customised motors especially in the electrical pump and ventilation & conditioning industries. In France our stock also ensures service to the market.

Lafert GmbH – Esslingen, Germany

La centrale di vendita per i motori elettrici del Gruppo in Germania. Il mercato tedesco rappresenta il maggiore mercato di esportazione del Gruppo. In questo mercato la politica di vendita si concentra sull'acquisizione di grossi clienti, e la logistica viene quindi gestita direttamente tra stabilimenti e clienti finali.

Lafert Electric Motors Ltd. – Crewe, United Kingdom

Nei pressi di Manchester si trova la filiale inglese costituita nel 2001; attualmente il mercato britannico rappresenta il secondo sbocco a livello di esportazione per il Gruppo.

Lafert Motores Electricos S.L. – Zaragoza, Spain

Costituita all'inizio degli anni '90, la commerciale spagnola vanta un posizionamento consolidato ed un livello di servizio al mercato eccellente grazie anche ad un ampio stock di prodotto finito e alla capacità di modifiche, trasformazioni e riparazioni.

Lafert Moteurs S.A.S. – Lyon, France

La filiale francese occupa un posto importante nella fornitura di motori customizzati soprattutto nell'industria delle elettropompe e della ventilazione e condizionamento. Anche in Francia il servizio al mercato viene garantito da uno stock.



**LAFERT
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- Brake motors
- Single phase motors
- 2 speed motors
- Explosion proof motors
- Coolant pumps
- Flanges & Parts

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Lafert N.A. - Mississauga (Ontario), Canada

The most comprehensive stockist of electric motors in North America. With its seven strategically placed stock locations throughout the United States and Canada and its ability to offer energy efficient products consistent to the market, Lafert N.A. is the market leader for metric motors in North America.

Lafert Electric Motors - Springvale (Melbourne), Australia

Lafert motors have been readily available on the Australian market for over ten years. Our presence in this market is secured by a motor service company with several stock locations covering the continent.

Lafert Singapore Pte Ltd – Singapore

Lafert entered the South East Asian market relatively recently and utilises the cooperation of local professionals with twenty years experience in the sector of electric motors.

Lafert N.A. - Mississauga (Ontario), Canada

Il più importante stock di motori metrici di tutto il Nord America situato in 7 diverse location distribuite tra Stati Uniti e Canada, unitamente all'abilità di sviluppare prodotti compatibili con le esigenze del mercato in materia di risparmio energetico hanno reso possibile a Lafert N.A. di diventare il market leader per motori metrici sul mercato nordamericano.

Lafert Electric Motors - Springvale (Melbourne), Australia

Da oltre un decennio i motori Lafert sono regolarmente disponibili sul mercato australiano grazie alla presenza garantita da una società efficiente con prodotti disponibili a stock su varie location nel continente.

Lafert Singapore Pte Ltd – Singapore

L'ingresso di Lafert sul mercato del sud est asiatico è relativamente recente e si avvale della collaborazione di professionisti locali con esperienza ventennale nel settore specifico dei motori elettrici.

Standard Efficiency Motors - IE¹

Efficiency values according to IEC 60334-3:2008

Efficiency testing method: IEC 60334-2-1:2007

Frame size	56 - 160 aluminium design
Output:	0,09kW - 22kW
Frequency:	50 - 60 Hz
Polarity:	single - 2, 4, 6, 8 poles
	double - 4/2, 8/4, 6/6, 6/8 poles

Available also without fan for installation, e.g. in a directed air stream.

Motors with higher output (progressive motors) available as a standard.

Motors can be delivered with special accessory: encoder, external cooling etc.

High Efficiency Motors - IE² code

Efficiency values according to IEC 60334-3:2008.

Efficiency testing method: IEC 60334-2-1:2007

Frame size:	71 - 160 aluminium design
	180 - 315 cast iron design
Power rating:	0,75kW - 200kW
Rated frequency:	50 Hz
Polarity:	single - 2, 4, 6 poles

High Efficiency Motors - IE²/cURus Energy

Efficiency values according to **EPAct, Energy Policy Act.**

Verified by **UL, Underwriters Laboratories Inc.**

Frame size:	90 - 160 aluminium design
Power rating:	1,5kW - 18,5kW
Rated frequency:	50 Hz
Polarity:	single - 2, 4 poles

Premium Efficiency Motors - IE³ code

Efficiency values according to IEC 60343-3;2008

Efficiency testing method: IEC 60343-2-1;2007

Frame size:	90 - 160 aluminium design
Power rating:	1,1kW - 22kW
Rated frequency:	50 Hz
Polarity:	single - 2, 4 poles

Premium Efficiency Motors - IE³/EISA

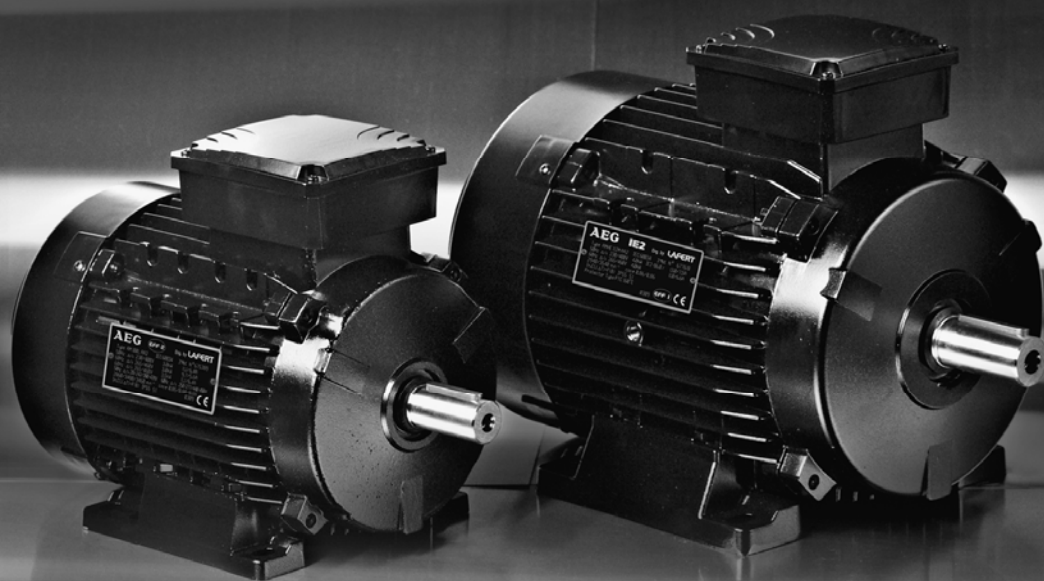
Efficiency values according to **EISA**, *Energy Independence and Security*

Act, 2005

Verified by **UL Environment**.

Frame size:	90 - 160 aluminium design
Power rating:	1,1kW - 22kW
Rated frequency:	50 Hz
Polarity:	single - 2, 4 poles

Three-phase LV Motors



OPERATING INSTRUCTIONS

2009

AEG

Explanations regarding the safety measures and special instructions for three-phase motors and generators

Read these Operating Instructions before you transport, install, commission, maintain or repair industrial motors or generators.

These symbols will draw your attention to the safety measures and additional instructions given in these Operating Instructions.

Special instructions regarding safety and warranty:



Danger:



For reasons of protection of persons and objects, all the safety measures and additional instructions given in these Operating Instructions must be strictly complied with.



Low-voltage machines have dangerous rotating and conductive parts, as well as possibly hot surfaces. All transport, installation, commissioning, maintenance and repair works have to be carried out exclusively by qualified personnel and checked by responsible experts (observe VDE 0105; IEC 364).



Inappropriate use may cause major damage to persons and objects.

Should additional data be required, you should immediately consult the manufacturer or an authorized service workshop.



All work on electrical connections to the motors and generators should only be carried out by qualified personnel.

General information

Scope

These instructions refer to surface-ventilated three-phase and AC low-voltage cage induction motors and generators, IP 54 and IP 55 to DIN VDE 0530, part 5, EN 60034 and IEC 34-5. Higher degrees of protection are indicated on the rating plate.

These low-voltage machines are intended for industrial installations. They comply with the harmonized standards DIN VDE 0530/EN 60034. Observe any possible special prescriptions for their use. Air-cooled low-voltage machines are designed for operation at altitudes ≤ 1000 m above sea level and at ambient temperatures between -20°C and $+40^{\circ}\text{C}$. Exceptions are stated on the rating plate.



Observe especially different indications on the rating plate. The conditions at the place of use must coincide with all the data of the rating plate.

The low-voltage machines are components of a machine according to the Directive Machines 2006/42/CE. The commissioning of this machine is forbidden until conformity of the final product with this directive is proved (observe EN 60204-1).

Transport

Should any damage be observed after delivery of the low voltage machine at its destination, these should be notified immediately to the transport company; avoid commissioning.

Lifting eyes



Lift motors only on lifting eyes provided. Do not add any load to the motor. Lifting eyes are designed for the motor mass only. Should it be necessary, use appropriate cable guides.

Rotor locking device



Motors with roller bearings are protected against bearing damage during transport by means of a locking device which has to be removed before putting the motor into operation. Close the fixing hole by means of the plug supplied. The locking device must also be used for any further transport of the motor.

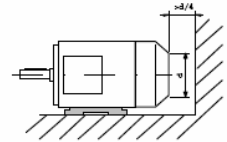
Ventilation

The distance between air intake of the motor and walls or other machinery must be at least $\frac{1}{4}$ of the diameter of the air intake opening. Cooling air flows from the non-drive end towards the drive end.

Air leaving the motor must not be drawn in again by the fan. Keep air inlets and outlets clean.



For vertical shaft-up designs, suitable protection must be provided at the mounting end so that no foreign matter can enter the ventilation hole. Such protection must, however, not affect the cooling and air leaving the motor/generator - or adjacent groups - must not be drawn in again.



Condensation drain holes

Even after installation the condensation drain holes must be at the lowest point of the motor. They must be kept clean. Plug drain hole after each drainage.

Installation and commissioning

Mechanical

Transmission elements



Use elastic couplings only; rigid couplings require a special bearing design.

When using transmission elements which provoke radial or axial shaft loads during operation (e.g. pulleys, gearwheels, etc.) take care that the permissible loads are not exceeded. Relevant data are given in the respective technical catalogue.

Rotors are at present dynamically balanced with half key. (As per DIN ISO 8821).

«H» or «blank» means balanced with half key

«F» means balanced with full key

«N» means no key

The state of balancing of the motor is indicated on the rating plate. When the motor is balanced with a half key (H), the coupling has also to be balanced with half key; machine the overhanging visible part of the key.

Remove anti-corrosion paint by means of a suitable solvent and grease the shaft extension. Use only suitable tools to mount or pull off pulleys or couplings, see Fig. 1-3, (heat to 80-100° C) and cover with a protection against accidental contact.

Avoid inadmissible tension of the belts (technical catalogue).

By no means the bearings may be subjected to any pressure or shock.



Remove fancover

Fig. 1 Mounted without female thread

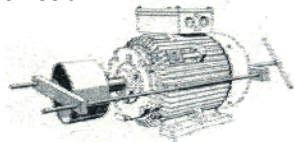


Fig. 2 Mounted with female thread

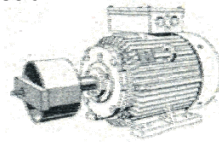
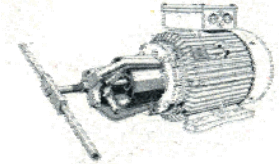


Fig. 3 Pulling off



Substructure

Make sure that the feet or flanges are safely fixed and rest positively on their entire surface. Check also the exact alignment with direct coupling.



All motor feet must rest positively on their entire surface to avoid distortion of the motor frame.

Avoid resonance of the base with the turning frequency and double mains frequency. Turn the rotor by hand. Check the direction of rotation with the machine uncoupled (see "Vibrations during operation").

Alignment

When the motor is connected to the driven machine via a coupling, the shafts must be aligned radially and axially to each other. The dial gauges must be firmly secured. Measurements have to be taken at four points, displaced by 90°, while both coupling halves are turned simultaneously.

Angular alignment (Fig. 4)

Deviations are to be equalized by means of shims placed under the motor feet. Permanent inaccuracies must not exceed 0.03 mm, referred to a diameter of 200 mm.

Parallel alignment (Fig. 5)

Deviations are to be equalized by placing shims under the motor. The remaining inaccuracies must not exceed 0.03 mm. The adjustment of the axial clearance between the coupling halves (dimension «E») is to be effected in accordance with the coupling manufacturers specification.



Re-check alignment with the machine at operating temperature.

Combination of angular and parallel alignment (Fig. 6)

Fig. 6 shows a relatively simple method of combining the two measurements. The dial gauges are inserted into the corresponding screwed or clamped flat iron holders (e.g. by set screws).

Fig. 4 Angular alignment

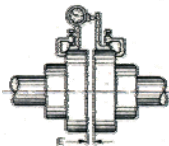


Fig. 5 Parallel alignment (centre offset)

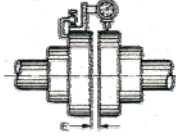
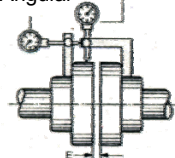


Fig. 6 Parallel alignment
Angular



Vibrations during operation

Vibration levels $V_{\text{eff}} = \leq 3.5 \text{ mm/s}$ ($P_N \leq 15 \text{ kW}$) or 4.5 mm/s ($P_N > 15 \text{ kW}$) of the coupled machine are not problematic. When there are differences in comparison with normal operation, such as higher temperature, noise, vibration, determine the cause and, if necessary, consult the manufacturer.



Do not switch safety devices off, not even when test running. In the case of doubt, disconnect the machine.

Elektrical

Insulation resistance (see "Check before commissioning")

Voltage and winding connection

The admissible fluctuation between rated voltage and supply voltage is $\pm 5\%$; for rated frequency, $\pm 2\%$ is allowed. Observe different connection indications and data on the rating plate, as well as the connection diagram in the terminal box.

Connection

Choose cable cross-sections in accordance with the rated current. Not used cable entries must be closed by compression glands.

The terminal box can be turned by 90° or 180°.



Work should only be carried out by qualified personnel, always with the machine out of operation, disconnected and previously secured against starting. This is also valid for auxiliary circuits (e.g. heaters). Make sure that there is no voltage!

The supply cables must be connected with special care to ensure permanent and reliable contact (without loose cable ends); use suitable terminals for the connection cables.

Supply cables must be stress-relieved so that no cantilever loads are exerted on the terminals.



Ensure a good connection of the protective conductor.

The minimum safety distances between conductors and between those and earth should not exceed the following values: $\leq 550\text{ V } 8\text{ mm}$; $\leq 750\text{ V } 10\text{ mm}$; $\leq 1100\text{ V } 14\text{ mm}$.

Make sure that no foreign matter is left in the terminal box, and that it is clean and dry. Cable entries which are not used and the terminal box itself have to be sealed dust and water-tight. In order to maintain the degree of protection, always make sure that the original gaskets are used when closing the terminal box.



Connect protective conductor here.



For the test run without drive elements, secure the key. Before commissioning brake motors, make sure that the brake is operating correctly.

Direction of rotation

Normally, the motors are suitable for both directions of rotation. Exceptions are indicated on the rating plate by an arrow. For the desired direction of rotation, the stator winding is connected as follows:

**Connection of L1, L2, L3 to
U1, V1, W1
W1, V1, U1**

Direction of rotation when viewing drive end
Clockwise
Counter-clockwise



Check of the direction of rotation, see below.

Reversing the direction of rotation

Mode of starting and winding	Measures
Direct-on-line starting and pole-changing motors with separate windings	Exchange two supply-cable conductors on the terminal board of the motor
Satr/delta starting and pole-changing motors with Dahlander winding	Exchange two supply-cable conductors at the incoming supply to the contactor combination

Test

To check the direction of rotation, switch the properly connected but uncoupled motor quickly ON/OFF.

Y/ Δ starting



In order to avoid excessive transient currents and torques, before changing over from Y to Δ , wait until the starting current of the Y stage has died down or run-up has concluded (e.g. change over when rated speed is reached).

Motor protection

Connect semiconductor temperature detectors to the release device in accordance with the wiring diagram. Continuity test, if necessary, to be carried out by means of a measuring bridge only (max. 2.5 V).



In order to achieve full thermal protection, an additional thermally delayed overload protection must be installed (Fig. 7). Normally, fuses alone protect only the supply system not the motor.

Example

Contactor with overcurrent relay
Thermistor protection and fuse

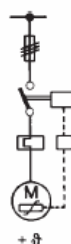


Fig. 7

Maintenance



Before carrying out any work on the motor, disconnect it and secure it against restarting.

Exception: In motors with greasing device, regrease the bearings with the motor running.



Caution, danger of accidents: Take care not to come in contact with moving parts!

Cleaning

Depending on the local conditions, air passages should be cleaned regularly.

Bearing lubrication



Observance of regreasing intervals is vital for the operational reliability of the motor!

Maintenance of bearings

Ball bearing with permanent lubrication. Under normal operating conditions, motors can be operated for about 20,000 hours without maintenance.

However, the maximum period of maintenance-free operation is four years. The ball bearings and the bearing caps should then be washed with petrol or benzene. If necessary, replace the bearings. Fill the spaces between the balls and the roller tracks as well as the grease compartments half with grease. Coat shaft bushings in the bearing caps or endshields with a thin layer of grease.

Permanently greased bearings (2RS and 2Z bearings) cannot be washed and regreased. Such bearings must therefore be replaced.

To dismantle the bearings, use pressing screws or other appropriate devices.

Ball bearings with regreasing device and grease slinger

Regreasing interval and required quantity of grease is indicated on the rating plate. Bearings and bearing caps must be washed with petrol or benzene when they have been regreased twelve times.



Used petrol or benzene in air-tight tanks should be disposed of as special refuse with the marking «Petrol» or «Benzene».

Afterwards, with the outer bearing cap open but the inner cap screwed on, the rotor should be turned slowly and grease pressed in through the regreasing device until approximately half the empty space between the rolling elements and the roller tracks is filled with grease.



If a grease with a different soap base is to be used, clean bearing seats thoroughly. Make sure that the bearing grease used meets the following requirements:

Pour point approx.	190° C
Ash content	4 %
Water content	0.3 %

Lubricant

Grease K 3 N to DIN 51825 (lithium-based, water resistant to DIN 51807 Part 1, grade 0 or 1). Regrease only with a similar grease (e.g. Esso Unirex N 3, Shell-Alvania G 3, Esso Beacon 3, etc.).

Repair Instructions



Any repair work within the guarantee period is subject to the approval of the motor manufacturer.

General

It is strongly recommended that only original spares be used for motor repairs. It is work which do not affect the explosion protection and is, therefore, not subject to special regulations.

- e.g.
- Replacement of gaskets or joints
 - Repair or replacement of fan or fan cover
 - Replacement of bearings
 - Replacement of terminal board

Special repairs

It is work which can affect the explosion protection, e.g. work on stator or rotor windings. Unless the repair is carried out by ourselves, the proper execution of the work in accordance with the relevant regulations must be certified by an authorized expert.

According to EN 50019 or EN 50014, any repair of this kind must be stated on an additional plate, permanently fixed to the motor.

Instructions for storage of motors

For prolonged storage of electric motors (e.g. spare motors), the following precautions must be observed:

Place

Make sure that they are kept in a dry and dust free place with minimum vibration ($V_{\text{eff}} \leq 0.2 \text{ mm/s}$) (damage to stalled bearings).

Ambient temperature + 10° C to + 40° C, relative humidity < 50 %.

Rotor locking device

On motors with roller bearings, fix the rotor in place by means of the locking device, to protect the bearings against damage due to vibration.

Motors shipped on vibration dampers should also be stored in this condition.

Where pulleys, half couplings, etc. are already mounted on the shaft extension, fit the locking device or place the motor on vibration dampers, if possible.



Use dampers and locking device also for any future transport of the motor.

Check before commissioning

Bearings

Before commissioning a motor that has been stored for more than 4 years, check the bearings.

For motors without regreasing device, grease has to be renewed or bearings have to be changed after 2 years at the latest.



Even minor corrosion can considerably shorten the service life of the bearings. Bearings that need not be replaced should be packed with new grease.



For grease type and quantity, refer to the rating plate (on the motor) and to «Bearing lubrication, Lubricant».

Motors with regreasing device have to be regreased after 2 years at the latest with the double quantity of grease indicated on the nameplate. Hereby the rotor has to be rotated. When motors are stored for over 4 years, change grease.

The rotor has to be rotated every month by approx. 30 degrees, in order to avoid compression spots on the bearings due to static load.



For rotating the rotor loosen, but not remove the locking device fitted. After the rotation procedure, retighten the locking device.

Insulation resistance



Before commissioning check the insulation resistance. With values $\leq 1 \text{ kW per Volt}$ rated voltage, dry the winding.

Check the insulation resistance of each phase against earth by means of a hand-driven generator (max. 630 V DC) until the measured value is constant. The insulation resistance of new windings is above 10 MΩ. The resistance can be lowered considerably by moisture.

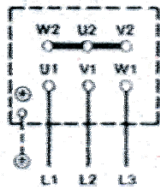
If, at room temperature, the resistance is below 0.5 MW, the winding must be dried. In this case the winding temperature must not exceed 80° C.

For drying connect the space heater or another heating device, or apply an AC voltage of 5 or 6 % (connect in delta) of the rated motor voltage to terminals U1 and V1. Repeat the measurement. The motor can be put into operation when the resistance is above 0.5 MΩ.

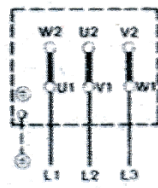
Insulation resistance is temperature-dependent, i.e. if the temperature is increased/decreased by 10 K, the resistance value is halved/doubled, respectively.

Wiring diagrams

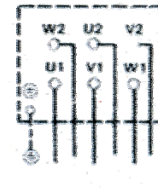
Three-phase cage motors



Star connection



Delta connection



Connection to star/delta starter

Three-phase pole-changing motors: In Dahlander connection: In the type designation the high number of poles = low speed is shown first (e.g. AM 160 ...8/4)

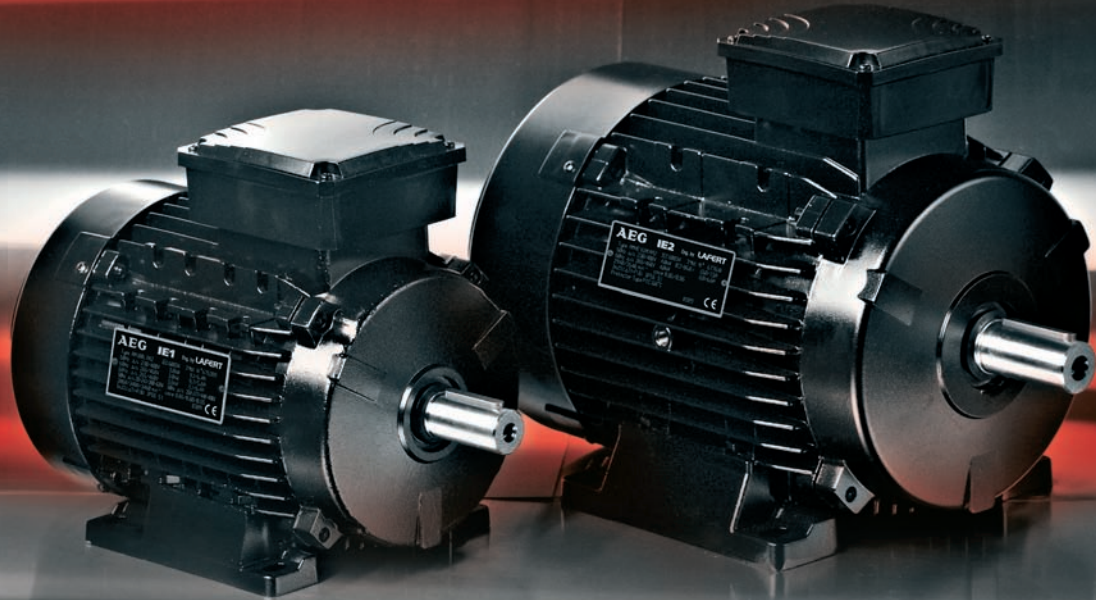
With 2 separate windings: In the type designation the low number of poles = high speed is shown first (e.g. AM 160 ... 4/8)

For pole-changing motors please observe the wiring diagram in the terminal box of the motor.

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High Efficiency
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TECHNICAL CATALOGUE

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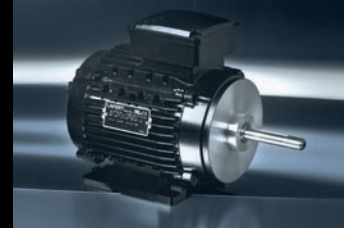
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