



Nuclear Applications

Low voltage safety related induction motors
Alternators for emergency diesel generators

LEROY-SOMER[™]

Nidec
All for dreams

Trusting our nuclear expertise & safety culture



Leroy-Somer, a world-class organization at your service

Leroy-Somer is a world leading manufacturer of drive systems, electric motors and alternators. The company has built a global organization and processes connecting some of the best experts in Motor & Drive systems and Power Generation around the world. This unique approach allows for global project management, with direct input from R&D and engineering. Leroy-Somer also provides comprehensive customer support, from initial specifications to equipment commissioning stage, including equipment qualification and personnel training.

40 years of commitment in the nuclear industry

Leroy-Somer has been designing and manufacturing motors and alternators for the nuclear industry for over 40 years. Tapping into the French ecosystem of nuclear innovation and development, we have developed a unique expertise that encompasses installed base management and new projects. Thousands of our products are making nuclear facilities safer around the globe.

Our offer covers solutions for both safety and non-safety applications:

- Motors from 0.55 kW to 750 kW, low voltage
- Alternators from 20 kVA to 20 MW, low & medium voltage

Long term nuclear strategy

Over the years, Leroy-Somer has developed a strong nuclear knowledge and a dedicated organization for the specific activities that are core of the nuclear expertise. Our team is trained and expertized all along the complete value chain.

A dedicated team with recognized expertise

Leroy-Somer has built a team of nuclear experts understanding all the requirements and expectations for the management of any nuclear project.

- Applicable nuclear qualification standards
- Supply chain
- Design, manufacturing and test processes
- Quality & traceability controls
- Surveillance management from our client and the operator
- Complete testing
- End Of Manufacturing Report (EOMR)

Meeting the highest standards



Well established Quality Management System (QMS)

Our general Quality Management System is ISO 9001 and ISO 14001 certified.
 Our nuclear activities are compliant with the IAEA international nuclear quality standards such as IAEA-50-C-Q or GS-R-3.
 All staff involved in nuclear activities attend special training session to maintain their safety awareness and expertise at the highest level.
 Our organization is fully audited by our main clients and international operators on a regular basis. Our offering also satisfies with key quality requirements such as EDF SGAQ.



Certification HAF 604

The NNSA (National Nuclear Safety Administration) from the People Republic of China has recognized and registered Leroy-Somer plant of Beaucourt for design & manufacturing. This certificate confirms the position of Leroy-Somer as supplier of nuclear safety related technology in China.



Proven qualification processes

Our nuclear range of motors and alternators is qualified for normal & accidental conditions (Earthquake – LOCA)

Our qualification file follows the requirements of the main international codes & standards:

- RCC-E 2012 (1EK1, K2, K3, K3AD, NC)
- IEEE 323-334-344-387
- IEC 60-980
- IEC 60-034 series
- Others

Our products have been tested by recognized certifying laboratories regarding all required specifications:

- Thermal ageing
- Mechanical ageing
- Irradiation ageing
- Electromagnetic compatibility test
- Vibration & Seismic test

All personnel involved in nuclear activities (research, manufacturing, quality assurance, testing, etc) are subject to special qualification procedures (such as ACQPA paint certification for example).



Providing high-end project management

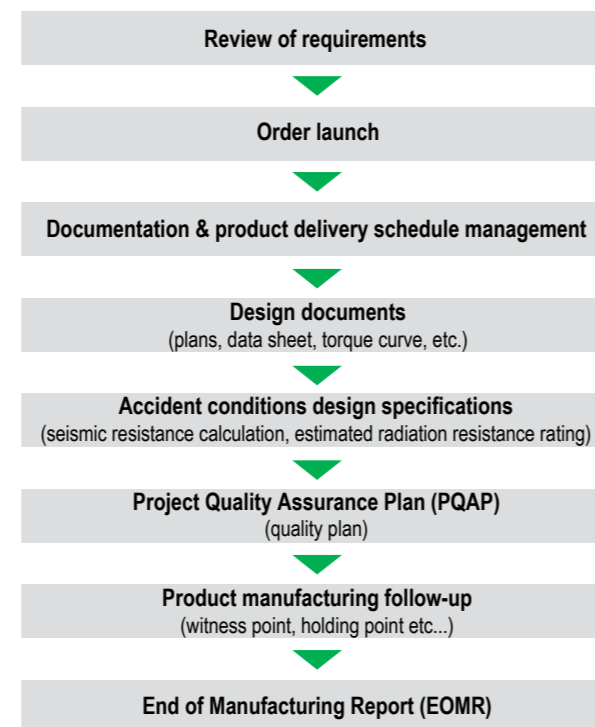


Comprehensive project organization

Our dedicated nuclear teams are organized to meet your expectations. A single project manager will follow-up on your order, from the initial specifications to the final delivery phases and the maintenance program.

We ensure an efficient execution of the contract during the design and manufacturing phase in close relationship with our customer (schedule management, supply of qualification documentation, customer review, witness management, review of the End Of Manufacturing Report).

This project organization is key to satisfy client's expectations.

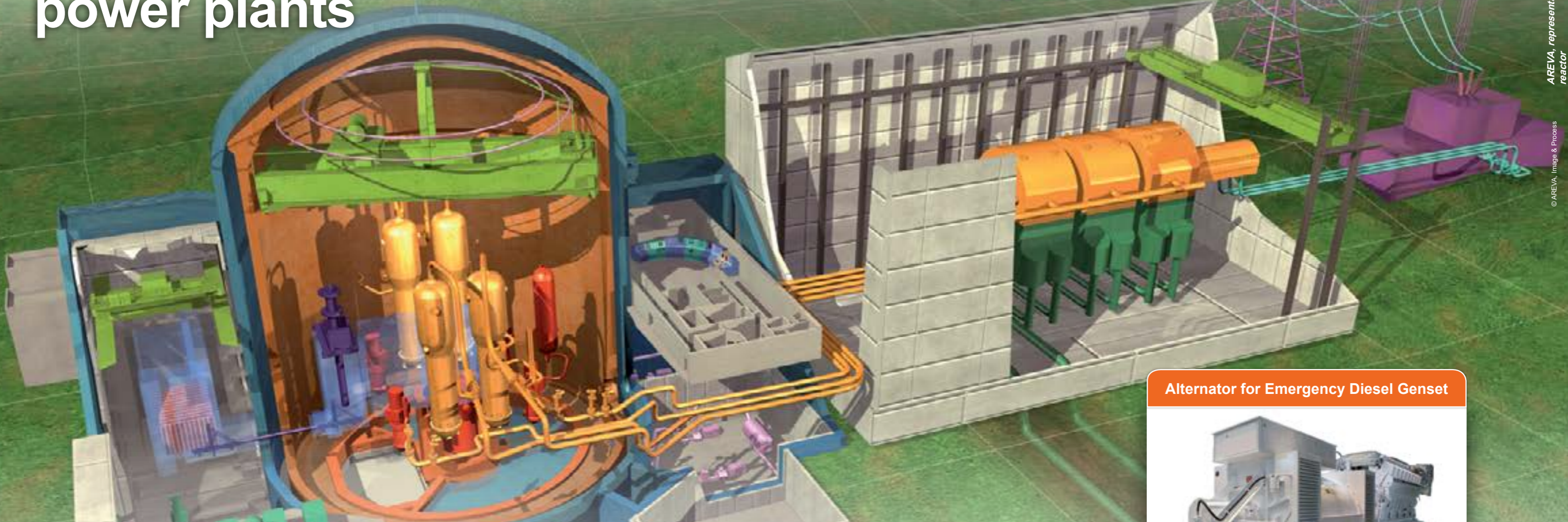


Document workflow

- Project Schedule
- Follow-up document
- Quality Related Activity list (QRA)
- Data sheet
- Torque and current curves
- List of electrical consumers
- Motor drawings
- Seismic calculation note
- Natural frequency note
- Qualification summary note
- End Of Manufacturing Report



Applications for nuclear power plants



Actuator & Valve control

K1 and K2 qualified motors
Containment room

Various Pumping, Ventilation, Compressor, Filtering, Hoisting Systems, etc.

NC, K3, K3AD qualified motors
ATEX

Alternator for Emergency Diesel Genset

LHSI pump

Low head safety injection pumping system
K3 AD

EFWS-ASG pump

Emergency feed water system
K3

CHRS - EVU pump

Containment heat removal system
K3AD

Alternator for Ultimate Diesel Gensets

Double Analog Voltage Regulator cabinet

RCCE K3 qualified cabinet

Single Analog Voltage Regulator

Analog AVR for cabinet mounting

Outstanding product range

Solid design

Our highly skilled engineering teams focus on optimization and continuous improvement resulting in outstanding electrical performances, life span and mechanical behavior. For this purpose, we use the best computation tools relying on Finite Element Analysis (FEA) and 3D CAD design. We work in close collaboration with engine manufacturers at every stage, from initial specifications to final testing, with the aim to ensure a sound behavior of the engine-generator system on site.

High-quality production

Our production sites, located in France for the nuclear, are equipped with state-of-the-art machinery. We achieve product excellence and reach expected performances through high quality components and controlled processes at every step. CNC plasma and laser cutting tools, precision form-wound winding, vacuum-pressure impregnation are some of the equipment operated by qualified and dedicated workers.

Advanced testing

All system components are tested in vibration, thermal and electric stress tests. Our facilities are equipped to validate all key specifications, from design to completion.

Induction low voltage motors

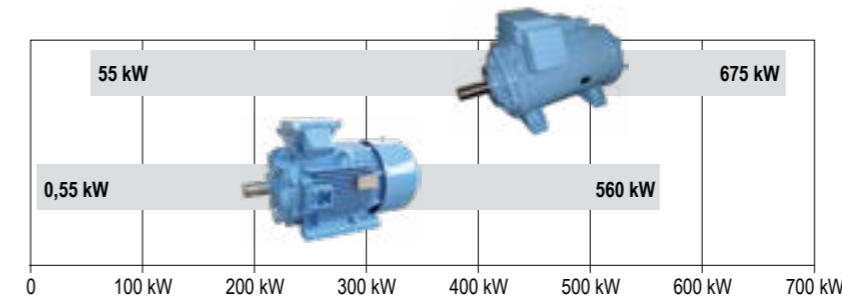


Design, development, and manufacturing of induction low voltage motors for the auxiliaries (pumps, compressors, fan, valves, handling...) in nuclear power plants.

The dedicated nuclear range of induction motors meet the performance requirement for energy using product specified in the European legislation (directive 2009/125/CE/ of October 21, 2009 and the ERP regulation 640/2009 of July 22, 2009).

Our motors are K1, K2 safety classified inside reactor building, or K3, K3AD, NC, NC AD inside conventional islands.

Range of power supplied: from 0.55 kW to 675 kW.



	Classification							
	Seismic resistance			Radiation accumulation (kGy)		Decontaminable paint		
	SC1	SC2	n.a.	< 5	> 5 < 100	No (PIA/PEC)	Yes (PIC)	No (PID)
NC								
NC.AD								
K3								
K3.AD								
K2								
K1								

Seismic resistance SC1 - SC2

Radiation from 5 to 850 kGy (85 Mrad)

K1 - K2 - K3 - K3AD ; 1EC - 1EB

Emergency & Stand-by Generators

Design, development and manufacturing of K3 emergency and stand-by generators with analog AVR.

Synchronous self-excited alternators, medium and high speed range from 1 to 20 MW and from 380 V to 15 KV.

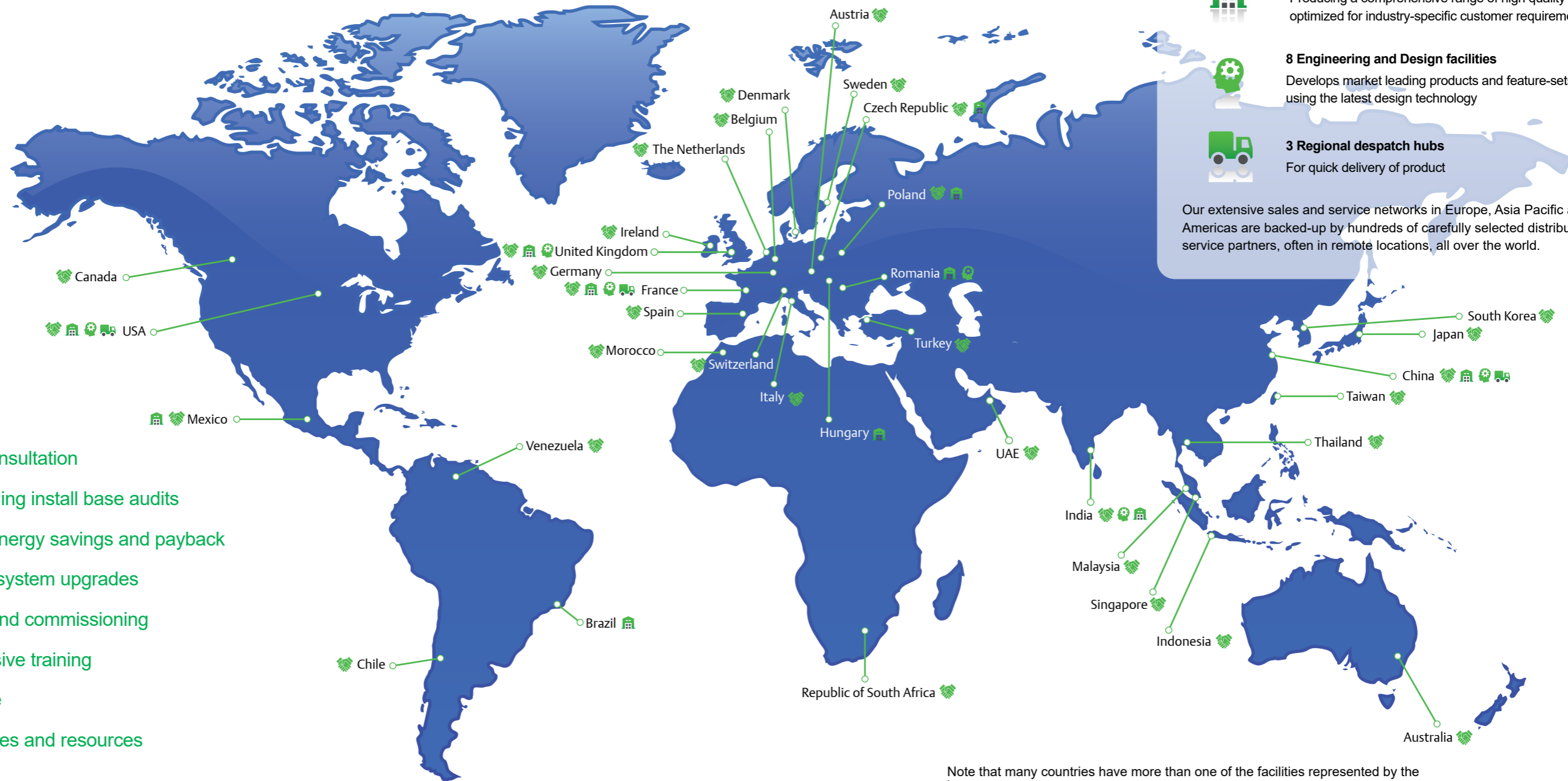
- Auxiliary winding AREP excitation with permanent magnet inductor (PMI), PMG available on request
- Alternators designed according to RCCE K3 requirement or IEEE 1E classification
- Other nuclear design references available upon request
- 40 or 60 years lifetime qualification
- Alternator seismic qualification performed by Leroy-Somer
- Single Analog AVR our double AVR cabinet RCCE K3 qualified



Safety related solutions for nuclear power plants

Customized local services and round-the-clock support

- Audit and consultation
- Industry leading install base audits
- Optimizing energy savings and payback
- Retrofit and system upgrades
- Installation and commissioning
- Comprehensive training
- Maintenance
- Global facilities and resources



An enhanced global presence that benefits all our customers

Through our integrated organization, we have an enhanced global presence that provides comprehensive local support & services. This provides:



7,900 employees



40+ Automation Centers

Providing excellent customer support for any product, automation solutions or service requirements



27 Manufacturing sites

Producing a comprehensive range of high quality products, optimized for industry-specific customer requirements



8 Engineering and Design facilities

Develops market leading products and feature-sets using the latest design technology



3 Regional despatch hubs

For quick delivery of product

Our extensive sales and service networks in Europe, Asia Pacific and the Americas are backed-up by hundreds of carefully selected distributors and service partners, often in remote locations, all over the world.

Note that many countries have more than one of the facilities represented by the icons

Services are optimized on a country-by-country basis, so please contact your local sales contact for full details of our local offering.

World-class references



Motors

France	EDF Flamanville EPR (EFWS, CHRIS, UCWS, JAC, ISBP, ...) <ul style="list-style-type: none">- Pump and ventilation applications- NC, K1, K2, K3, K3.AD & Atex qualified motors EDF UTO: replacement motors for 58 nuclear power plants in France <ul style="list-style-type: none">- Motorisation for valves- NC, K1, K2 & K3 qualified motors
Belgium	Tractebel / Suez <ul style="list-style-type: none">- Doel and Tihange power plant- Replacement motors for pump, ventilation and other applications- K3 qualified motors
China	Taishan EPR (EFWS, CHRIS, ISPB, ...) <ul style="list-style-type: none">- Pump and ventilation applications, etc.- NC, K1, K2, K3, K3.AD & Atex qualified motors 1000 MW power plants: Ling Ao, Guangdong, Qinshan, Hongyanhe, Ningde, Yang Jiang, Tianwan Lianyungang <ul style="list-style-type: none">- Pump, ventilation and valve control applications- NC, K1, K2 & K3 qualified motors
South Africa	Koerber: replacement motors for pump and ventilation applications <ul style="list-style-type: none">- K3 qualified motors

To name but a few ...

Alternators

France	EDF DUS/CCL and FARN projects
China	Sanmen AP1000 Haiyang AP1000 Ningde Hongyanhe Qinshan 2 Ling Ao
India	Kudankulam
Korea	Wolsong 2, 3 & 4
Romania	Cernavoda
Russia	Leningrad 2 - Unit 1 Beloyarsk 3
Sweden	Ringhals Oskarshamn OKG2
Taiwan	Maanshan

LEROY-SOMER[™]

www.leroy-somer.com

Connect with us at:

twitter.com/Leroy_Somer_en

facebook.com/leroy-somer.nidec.en

youtube.com/user/LeroySomerOfficiel

linkedin.com/company/leroy-somer



Nidec
All for dreams

© 2023 Moteurs Leroy-Somer SAS. The information contained in this brochure is for guidance only and does not form part of any contract. The accuracy cannot be guaranteed as Moteurs Leroy-Somer SAS have an ongoing process of development and reserve the right to change the specification of their products without notice.

Moteurs Leroy-Somer SAS. Headquarters: Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France. Share Capital: 32,239,235 €, RCS Angoulême 338 567 258.