Hydro Power Synchronous Generators

Power range 0.3 - 20MW
Over **4GW** installed capacity worldwide

Generators up to **20MW**

**50 years** of experience

Over **450 projects** completed worldwide over the last 20 years

ISO 9001 & 14001 certified

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**A trusted partner**

As a historical and recognized player in the field of hydroelectric power generation, Leroy-Somer develops an approach of commitment and transparency, for your full confidence and satisfaction.

Throughout the project life, including design and manufacturing phases, Leroy-Somer teams will help you meet technical and environmental specifications ensuring the perfect configuration and implementation.

**Our key word: quality**

Quality of products, supported by 90 years of know-how and continuous technical and innovative developments.

Quality in offering, with comprehensive and detailed proposals supported by a strong evaluation phase.

Quality in project management, with top-level technical and logistical support up to commercial operation and for long term service.

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Leroy-Somer, a part of the Nidec group, is a world leader in electromechanical and electronic drive systems, and the world leader in industrial alternators. Created in 1919, Leroy-Somer is a French company employing 7900 people in 27 production units and 470 sales and service centers across the world.

**Innovative - Reliable - Flexible**
Product range overview
A premium industrial & design expertise for your hydro projects.

<table>
<thead>
<tr>
<th>Power</th>
<th>0.3 - 20MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>400 - 15 000V</td>
</tr>
<tr>
<td>Rotation speed</td>
<td>250 - 1500 rpm / 50Hz</td>
</tr>
<tr>
<td></td>
<td>300 - 1800 rpm / 60Hz</td>
</tr>
<tr>
<td>Mountings</td>
<td>Vertical or Horizontal</td>
</tr>
<tr>
<td>Cooling</td>
<td>IEC01, IEC21, IEC31, IEC81W (IEC 60034-6)</td>
</tr>
<tr>
<td>Insulation class</td>
<td>H (medium &amp; high voltage included)</td>
</tr>
<tr>
<td>Temperature rise class</td>
<td>F or B</td>
</tr>
<tr>
<td>Excitation</td>
<td>Self-excited - Brushless rotating excitation</td>
</tr>
<tr>
<td>Regulation</td>
<td>Analogue or Digital Leroy-Somer AVR</td>
</tr>
</tbody>
</table>

Design
Our highly skilled engineering teams focus on optimization and continuous improvement resulting in the highest performances available on the market (efficiencies, life span and mechanical behaviour).

For this purpose, we use the best computation tools relying on Finite element analysis (FEA) and 3D CAD design.

Close coordination work with turbine manufacturers can be performed in order to refine design and ensure a sound behaviour of the turbine-generator system on site.

Production
Our production site (Orléans, France), is equipped with state-of-the-art machinery.

We achieve product excellence and reach expected performances through controlled high quality components and 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.

The right solution
• Our products can be coupled to all turbine types, with particular attention to critical speed issues.
• Overhung runner assembly on extended shaft end, with turbine load withstanding.
• Rigid mechanical assembly coupled to dynamical balancing grade G1 (ISO 1940-1), aiming at low vibration levels in all operating conditions.
• Compact design aiming at reducing foundation costs.
Custom solutions - Ease of integration

**On-site handling**

**Combined rotor shaft locking & tilting equipment**

For hard to reach sites and cramped machine rooms, we offer a wide range of solutions & devices that facilitate the alternator lifting & handling.

This tool, first introduced by Leroy-Somer, allows safe transport/handling and enables transfer from horizontal to vertical position (and vice versa) on site with only one lifting device.

- Speed detection
- Rotor earth fault detection
- Brake
- Oil level detection
- Vibration monitoring equipment
- IM 3011 mounting arrangement
- Easy access to the bottom bearing through manholes for inspection & light maintenance operations
- High-pressure jacking oil system
- Low point piping connections for bearing water cooling
- Easier & quicker integration
- Water leakage detection
- Anchoring equipment
- Fast opening louvers for powerhouse heating and/or in case of water supply failure
Electric Power Generation

Case study
Fredet-Bergès Hydro Plant, France

Reducing the acoustic footprint when inhabitants are just across the street: problem solved.

- Optimized main terminal box for the integration of:
  - Current & Voltage transformers
  - Surge arresters
  - PD couplers

- Inertia flywheel
- Possible additional brake
- Shaft-driven pump
- Adapted bearing and shaft end
- Oil lubrication unit with shaft-driven pump
  For safer bearing operation
- Anchoring equipment

Project ID
- 3.5 MW
- 750 rpm

Scan the QR code to watch the video or visit http://lrsm.co/fredetbergeshydro

HORIZONTAL MOUNTING
Digital Static Excitation System

Transition your old generator static excitation to digital.

The Leroy-Somer Digital Static Excitation System can be installed on older generators. It combines the proven technologies of a Leroy-Somer designed digital AVR like the D510 or D700 and a Leroy-Somer Mentor DC drive.

The drive provides a continuous direct excitation current up to 900A, controlled by the digital AVR with the following features:

- Automatic or manual voltage regulation
- Voltage equalization for grid connection
- Cos φ, Power Factor or kVAR regulation modes
- Advanced fault detection and data logging
- User-friendly touchscreen interface

Scan the QR code or visit http://lrsm.co/dses

VTHR range

Designed for small hydroelectric power plants looking for compact equipment.

Our Vertical Tubular Hydro Range of small alternators has been designed to provide a cost-effective, short lead time solution for micro hydropower plants.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Range</td>
<td>up to 3 MW</td>
</tr>
<tr>
<td>Pole Options</td>
<td>6, 8 &amp; 10 poles</td>
</tr>
<tr>
<td>Voltage Range</td>
<td>400-690V</td>
</tr>
<tr>
<td>Model Numbers</td>
<td>IC01, IC21, IC31, IC81W</td>
</tr>
<tr>
<td>Type</td>
<td>Digital AVR</td>
</tr>
</tbody>
</table>

Scan the QR code to download the catalogue or visit http://lrsm.co/vthren
Support, Maintenance and Training

Services
We provide a complete range of services to support you from installation to commissioning and maintenance:

- On-site assembly when requested by site constraints
- Site erection, installation and commissioning
- On-site or in-house operations including repair, maintenance and diagnostic
- Long term service agreements with possible remote monitoring
- Advanced electrical & mechanical diagnostics, analysis and reports
- Parts center ensuring up-time requirements

Training
Our services & engineering teams have designed courses to address the specific challenges of hydro projects:

- Engineering companies: increase or refresh your knowledge, for specification write-up, better evaluation of proposals and comparison processes
- Operating companies: identify key topics to optimize daily & strategic operation activities, including scheduled controls, monitoring and maintenance, and get the most of Leroy-Somer generators

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