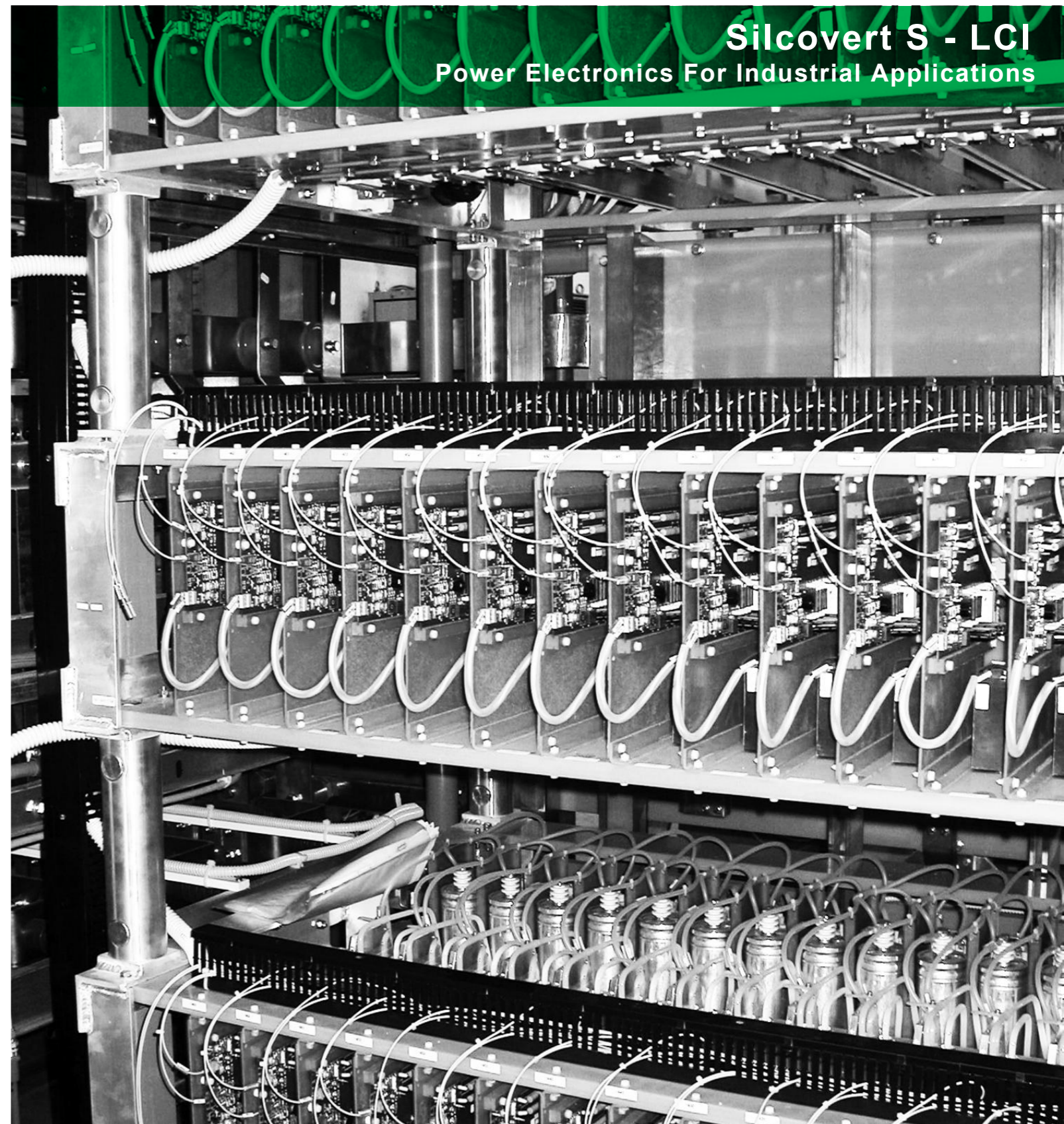
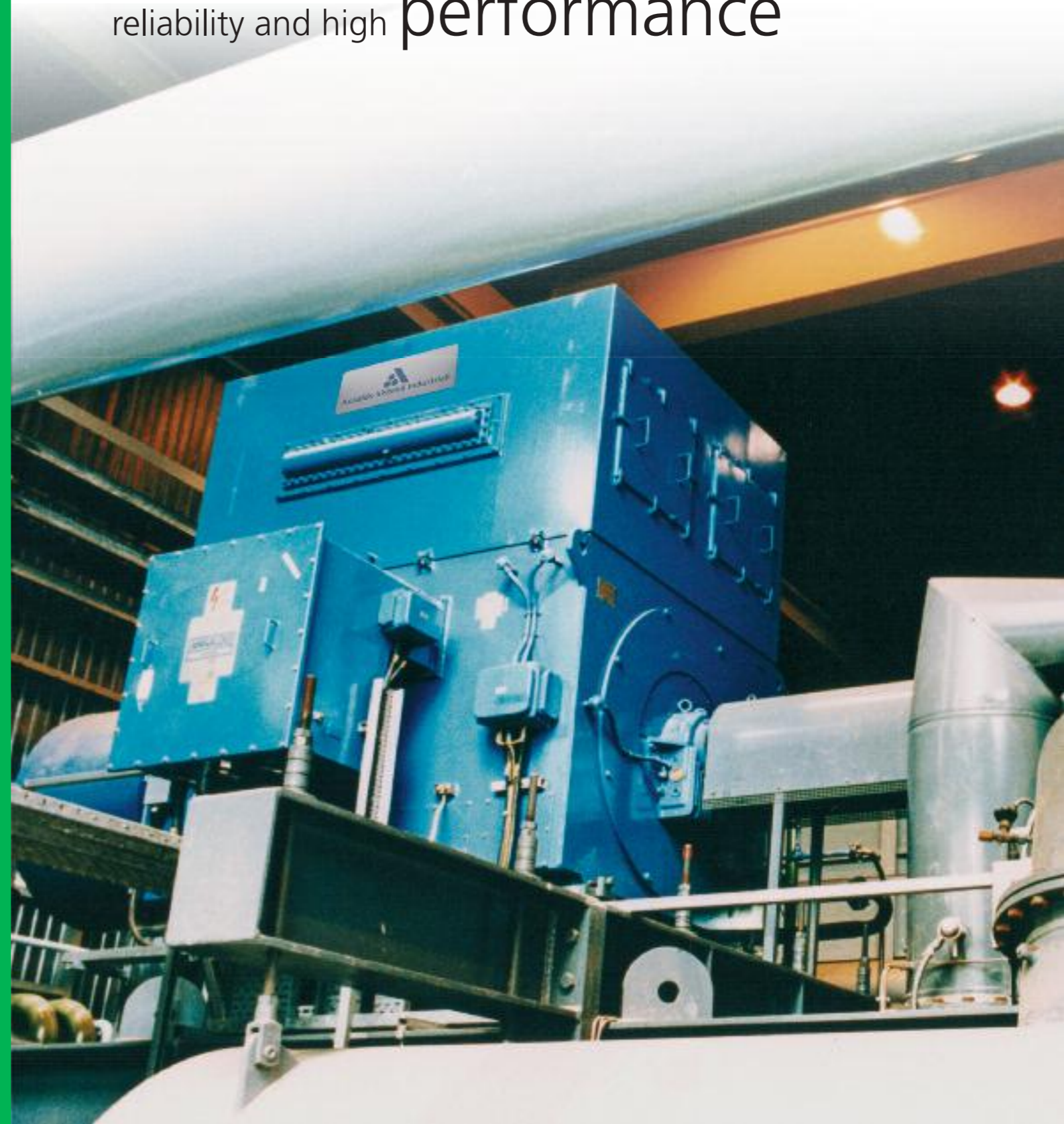


Silcovert S - LCI

Power Electronics For Industrial Applications



Hundreds of installations and more
than 30 years of field-proven experience
prove the Silcovert S Variable Frequency Drive's
reliability and high performance





yesterday



today

Taking your manufacturing processes to new frontiers

In an increasingly competitive world, innovating your production process can make a difference. Our development and applications engineers have the expertise in power control design to tailor solutions that often exceed customer expectations. Our Medium Voltage (MV) drives are designed to improve the overall flexibility and efficiency of the plant, achieving significant, long-term cost savings by reducing energy consumption.

Pioneers in Power Control & Power Electronics

Nidec ASI can trace its experience in power control and power electronics back to its original factory *Stabilimento Elettrotecnico* founded in 1899. Back then it was just a secondary switching device. Today, power electronics are a fundamental part of manufacturing and automation processes offering important advantages in terms of flexibility and reduced energy consumption. For over 110 years we have developed, manufactured and supplied electric drives and power control systems for numerous applications worldwide.

We have been present at every stage in the growing development of power electronics and, in many cases, have been at the forefront in pushing this technology to new levels of performance. In the early 1990's we were pioneers in high speed technology for gas compression applications. Today, our R&D activities are taking this technology even further, developing new power electronic solutions and continuously improving safety, reliability and overall efficiency. Exploring new areas of application allow us to increase the performance of our drives, providing our customers with highly reliable state-of-the-art components.

Improving **safety**, reliability
and overall **efficiency**

Over **110** years

Pioneers in high speed **technology**



The right fit for the right performance

From their inception our inverter system designs have been focused on compliance with customer requirements including: dynamic performance consistent with the most demanding process needs, user-friendly interface, high reliability as well as ease of maintenance and repair; offering optimum power quality, near unity power factor and more than 99% drive efficiency.

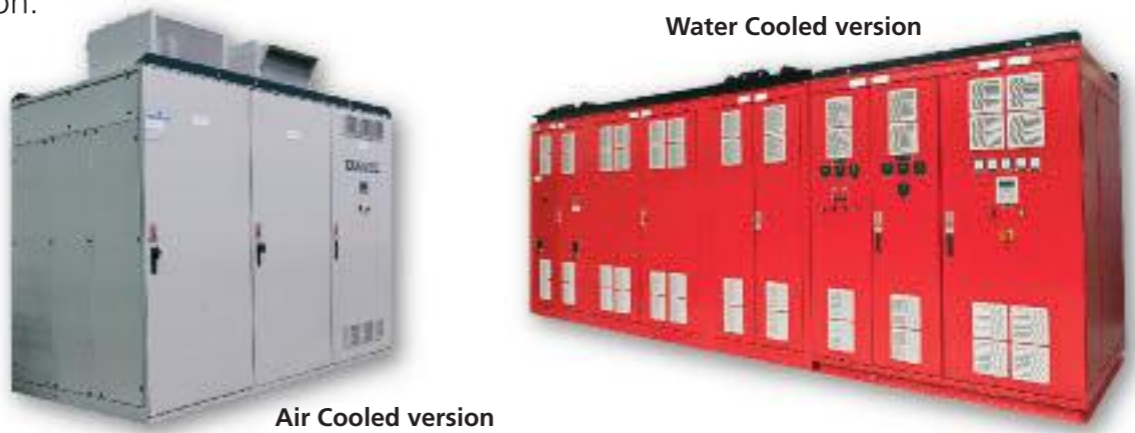
Up to 100 MW

Our engineering capabilities allow us to configure and supply power control systems up to 100 MW based on our standard drive technology.



LCI-Series

SILCOVERT S is a medium voltage load-commutated current source inverter (LCI) for synchronous machines that provides speed regularity, monitoring and braking torque regulation.



Variable Frequency Drive:

Thanks to its flexibility and performance the Silcovert S can be used as a Variable Frequency Drive (VFD) for large synchronous motors. It is the ideal solution for industrial applications and power station auxiliaries thanks to its very high level of reliability and availability.

Our Silcovert S is widely used on pumps and compressors, particularly for high-power high-speed applications, eliminating the need for gear boxes.

An important feature of Silcovert S is its user-friendly control and a complete set of diagnostic tools. It allows perfect synchronization of the machine with the line for parallel operation with no phase error.

As a total solution provider we can supply the complete electrical package (Motor + VFD) that also includes a precise Power Quality analysis.

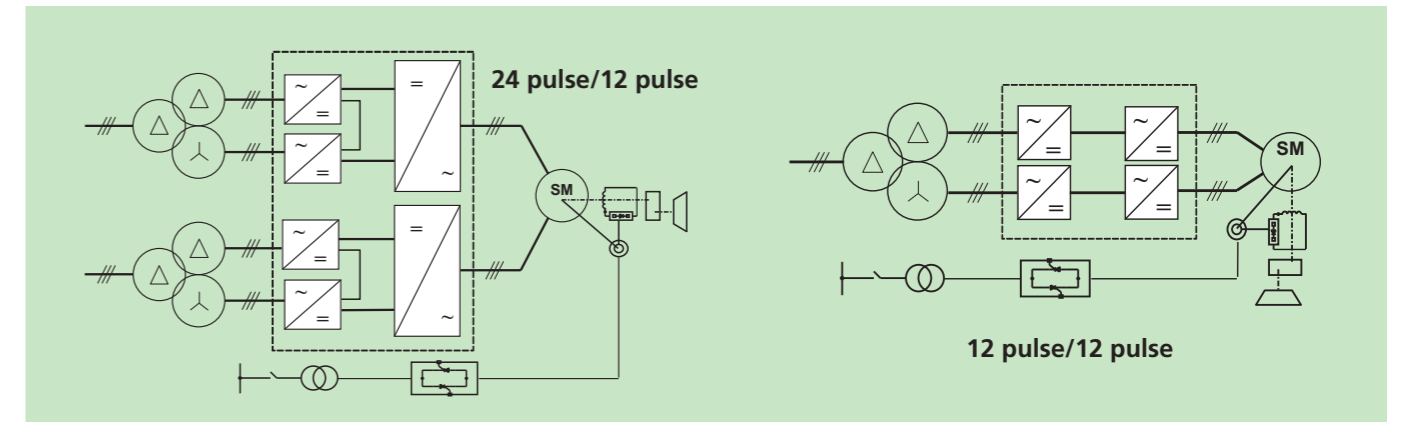
We guarantee a high level of protection inside the VFD: an important feature to avoid any network noise and instability.

Our 24 pulse/12 pulse configuration is the best solution when low line distortion is needed.

Our Silcovert S is a low maintenance drive that provides ultra high efficiency for energy saving.



Examples of available configurations



Starter for large synchronous machines

Our Silcovert S, with LCI topology, can also be used as a starter when you need to start a large synchronous machine with no noise on the network.

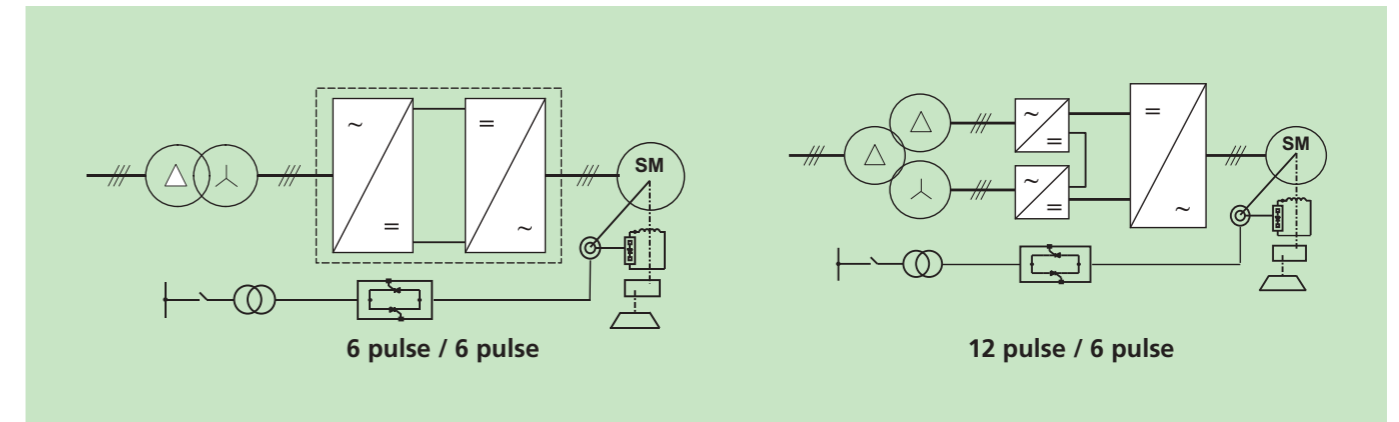
In this situation, LCI provides high availability due to a soft start of the machine which reduces the stress on the line contributing to longer equipment lifetime.

Reduced starting impact is guaranteed by a dedicated user-friendly interface board that controls the field of the synchronous machine through its existing exciter converter.

As a starter, the inverter is used for turbogas pumping station units and large synchronous machines. In this case the Electric Generator can be used as the gas turbine starter.

LCI allows the generator to act as a motor until the machine reaches self-sustaining speed. At that point, the generator function is switched to generation mode to achieve synchronization as soon as a suitable rpm is reached.

Examples of available configurations

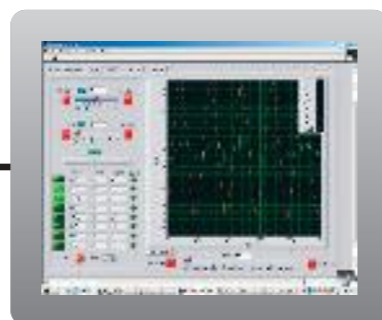
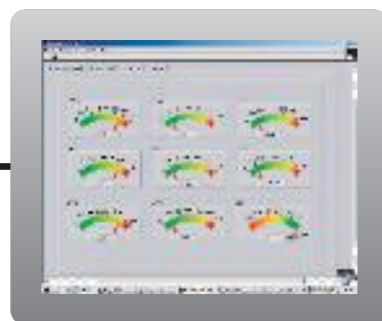
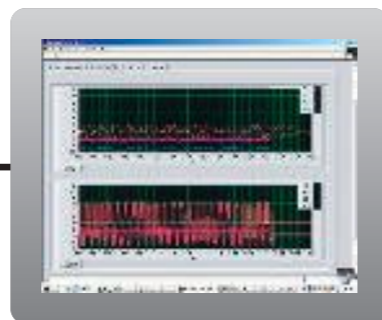
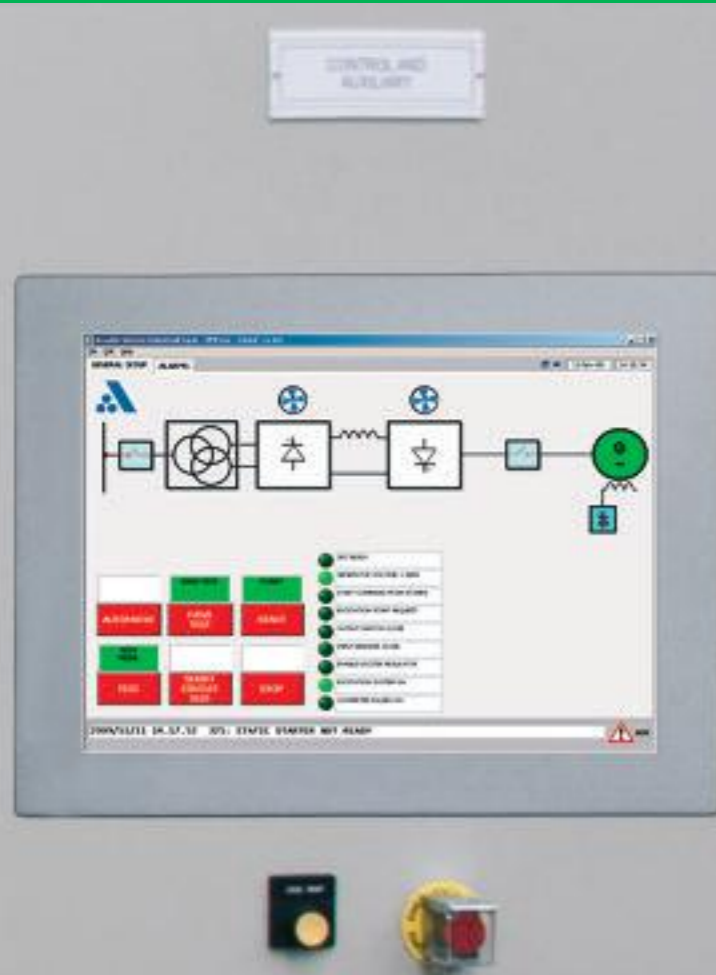


LCI Softstarter

Compact Softstarter
and Excitation System



Our uncommonly flexible,
common control platform...



User-friendly control

A diagnostic system and flexible operator interface provide user-friendly control. The intuitive HMI is highly versatile and permits the user to personalize the drive settings and controls at the touch of a finger through the front panel mounted touch screen.

Flexibility at your fingertip!

The operator can check the status of the drive through menu-organised diagnostics. This feature provides detailed fault analysis, assistance in troubleshooting and displays any critical occurring waveform. Our customized reports can be easily integrated into existing production reports and can be saved as ASCII file and exported for further examination and remote transmission.

When used as a starter, the **Silcovert S** is equipped with two special control functions:

- Synchronization of the machine with the line for parallel operation with no phase error.

- Synchronization of the drive to the frequency of the free-running machine. When used as a soft-starter, the **Silcovert S** includes a dedicated interface board that controls the field of the synchronous machine through its existing exciter converter.

An important part of your plant maintenance program

The drive control module is based on new microprocessor technology with the following functions:

- Speed regulation
- Monitoring and braking torque limitation

The software package includes full-diagnostic capabilities: Transformer and temperature monitoring, Black box, deionized cooling system-hydraulic circuit, Thyristor Status Layout, oscilloscope function and a complete set of event-alarm.

Seamlessly integrates into your production process.

Very safe to use



Our MV drives are configurable - built according to job specification needs using basic standard components. Safety is an important element that we manage and apply to all models and types for each installation and job.

Grounding is vital for safety and should be connected immediately after positioning the equipment at the installation site.

The complete installation procedure guarantees the intrinsic safety of personnel through a simple series of operations covering main circuit breaker, doors and earthing safety switch key interlock.

This last operation ensures that the opening of any cabinet door to access the medium voltage circuits inside is only possible when the main breaker is locked open and the internal safety earth blades switch is locked in the close position.



Very easy to maintain...

The modular design of our machines makes routine maintenance and inspection quick and simple. The drive's control system provides complete diagnostics tools making it possible to program maintenance activities when required. Our use of standard off-the-shelf components means reduced inventory and spare parts requirements. Nidec ASI is fully committed to Life Cycle Service and is ready to support customer's needs for upgrades or any other requirement that may arise during the life of our equipment.

...even from a distance

Our control software platform also contains an expert system for remote diagnostics. Main functions include: vibration analysis, line parameter analysis (current/voltage), thermal behavior analysis, partial discharge test, bearing health.

The right size for your needs

The importance of being adaptable

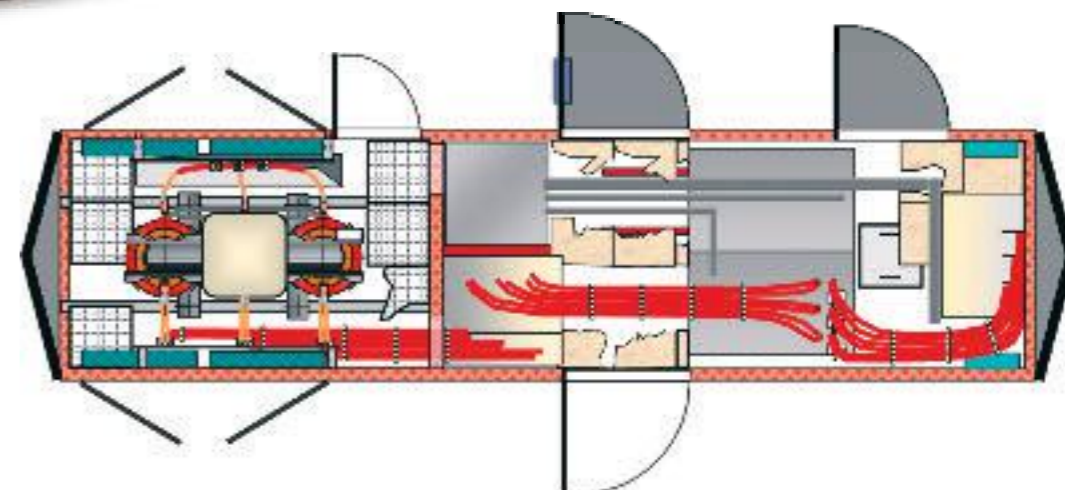
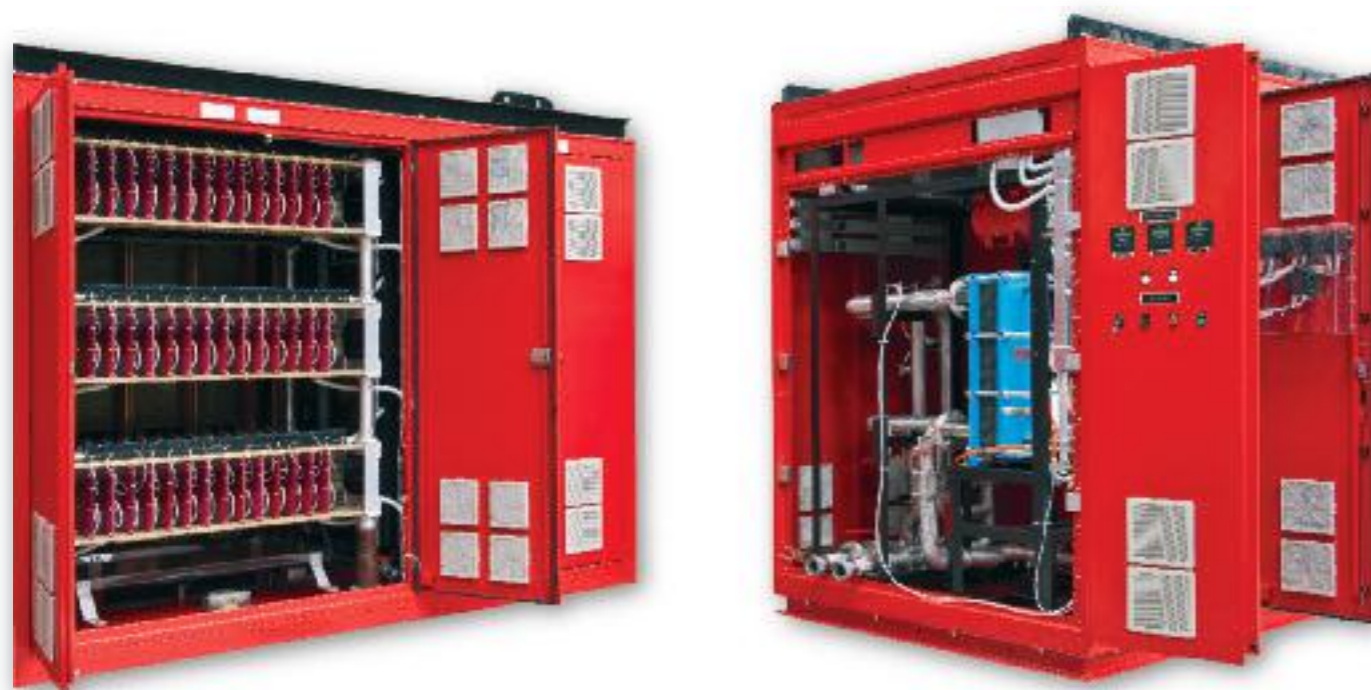
Adaptability is an important issue for certain situations, in particular for retrofit and revamping where a new drive has to replace an old one or has to be placed in a predetermined space. In these cases, our custom-engineered drives are the best fitting solution.



Finding the right footprint

For maximum adaptability, our modular design allows us to configure drives with the right footprint for your needs. For example, the drive can be supplied with a separate input transformer that can be placed near the drive or, if space is an issue, the drive can be supplied with an integrated input transformer in a more compact design.

We have also developed a series of solutions to provide the drive in a container for a plug-and-play solution that does not affect your current layout. Our container solutions can be equipped with adequate air conditioning systems to meet any environment from the Sahara Desert to the Russian Tundra.



Product compliance	
Standards	IEC EN 60149 IEC EN 61800-3 IEC EN 61800-4 IEC EN 61800-5-1 IEC EN 60204-11 IEC EN 60529
EU directives	98/37/EC and Amendments 2006/42/EC 89/336/EEC and Amendments

Environmental limits	
Storage Temperature	-20 °C... +70 °C
Operation Temperature	(water cooling) 0..45°C (MAX 50°C)
Permitted Coolant Temperature	Inlet: +5 ... + 35 °C
Relative Humidity	< 95 %, not condensing
Installation Altitude	≤ 1000 above sea level
Vibrations	3M1 class as per IEC 721-3-3: Displacement 2 ... 9 Hz = 0,3 mm Acceleration 9 ... 200 Hz = 1m/s ²
Noise Level	Air cooled: ≤ 80 dB(A) Water cooled: ≤ 70 dB(A)
Efficiency	≥ 0.99

Control Characteristics	
Motor Control Modes	4 Quadrant Operation
Stationary Operation	Speed static accuracy: ±0,2 % sensorless, speed range 5 to 100 % ±0,01 % with encoder (option)
Serial Communication	PROFIBUS, MODBUS, ETHERNET or other on request

Technical Information	
Inveter Type	LCI – Thyristor Technology
Main Supply Voltage (3phase)	Air Cooling up to 4500 V - Water Cooling up to 11000 V
Input Frequency	50/60 Hz ± 3%
Output Power	65 MW
Output Voltage	Air Cooling up to 4500 V - Water Cooling up to 10000 V
Output Frequency	5 up to 95 Hz
Cooling Method	Air Cooling, Water Cooling
Heat Exchanger	External Water to Air Exchanger - Internal Water to Water Exchanger
Degrees of protection	IP31 (higher protection degrees on request)

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