

## Static Excitation System

Series for Synchronous Machines

The Silcostat is an AC/DC thyristor power converter that supplies excitation current to the motor windings.

The complete system includes the regulation elements, field discharge (crow bar) and protection devices.

### Cooling methods include:

- natural air
- forced air
- forced water with water/ water-air exchanger



**Silcostat**

**Power range:**  
Natural air up to 200A  
Forced air up to 3500A  
Forced water up to 6000A

**Applications:**  
Voltage regulations of synchronous generators, power control of synchronous motors.

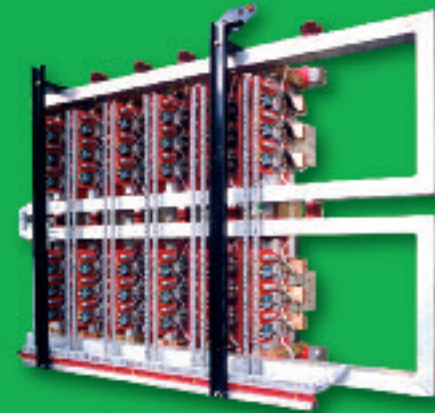
## Power Quality

High current AC/DC converters / Reactive Power static Compensator

Silcomax series is a very high current diode or thyristor-based DC converter. The cooling system is closed circuit using deionised water. The configuration on the network side start from 6 pulses to 48 pulses.

For DC Arc Furnaces we can also provide integrated electrode control. Silcomax Light is a cabinet solution. Silcomax Large is an open air or containerized solution.

### Silcomax series Industrial Power Rectifier



**Current ratings:**  
Silcomax Light 8-50 kA  
Silcomax Large 40-120 kA

**Voltage:**  
Silcomax Light up to 1000V  
Silcomax Large up to 1600V

**Applications:**  
DC arc furnaces, smelters (aluminium, magnesium, zinc, copper), electro-chemical processes (chlorin, caustic soda, PVC, fluor...), research facilities for nuclear energy.

The Silcovar is a reactive power static compensator. The system consists of Harmonic filters connected to the line and reactors controlled by static thyristor valves.

Reactive power supplied to the network is controlled electronically, ensuring fast, accurate and continuous control.

### Main benefits are:

- improved power factor and better stability
- reduction of harmonic current injected in the network
- reduction of "flicker effect" caused by arc furnaces

### Silcovar



**Power range:**  
2 - 250 MVAR

**Voltage:**  
1 - 35 kV

**Applications:**  
Reactive power compensation for arc furnaces and stabilization of transmission line voltage.

### CORPORATE

#### CUSTOMER SERVICE AND SUPPORT

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## POWER ELECTRONICS FOR INDUSTRIAL APPLICATIONS



**Nidec**  
All for dreams

## Brief History from 1853 to Present



Nidec ASI, a destiny with roots that go back more than 160 years. Nidec ASI was formed in December 2012 as a result of the acquisition of Ansaldo Sistemi Industriali Spa (ASI) by Nidec Corporation. The company can trace its origins back to the founding of Ansaldo in 1853. ASI was born as Ansaldo's stabilimento elettromeccanico (electro-mechanical workshop) in 1899. From its inception, ASI has specialized in providing innovative power control and system solutions that have satisfied hundreds of customers worldwide. Over the past century and a half, ASI has established itself as one of the pioneers of Italian manufacturing, engineering and industry.

As part of the Nidec Group, Nidec ASI is now able to offer a wider range of customers solutions and services as a leading player in the supply of industrial automation systems, power electronics, electric motors and generators in various applications and industries such as Metals, Energy, Marine, Oil & Gas and General Industry (cement, environment, rubber and plastic, materials handling, paper and ropeway).

## Reliable Cost-Effective Solutions for all industrial applications



custom engineered to provide outstanding static and dynamic performance with a high level of efficiency across the driven equipment's entire operating range. Our Variable Frequency Drives' built-in WINDOWS® based diagnostic tools and streamlined modular design result in easy maintenance and repair.

In addition, the flexibility of our modular design allows us to configure compact solutions granting you greater flexibility in terms of plant layout. Our remote diagnostics features can play an important role in your Maintenance and Operating strategies, contributing to a significant reduction in Life Cycle Costs for your equipment by making it possible for plant managers and technicians to monitor equipment performance from any position across the globe.

At Nidec ASI reliability is the foundation of our product design. Using proven IGBT/IGCT or traditional LCI technology our variable frequency drives are

**Compliant with all applicable norms and standards including IEEES19 and EN-IEC 61800**

### About Nidec Corporation

From its origins, in 1973, the goal of Nidec Group has been to become number 1 in electric drive solutions, with a strong focus on electric motors. Over the years, through hard work and determination, the company has grown, expanding from its original product base of motors for Information & Communication Technologies into motors for home appliances, automobiles, office equipment and industrial machinery. Quoted on the New York Stock Exchange (NYSE) since 2001, Nidec is headquartered in Kyoto, Japan. Through the combined strength of these two significant experiences, a new era in industrial drive solutions has dawned: today Nidec ASI is ready to serve its customers for another 160 years.

## AC Drives

## Medium Voltage Drives

Silcovert NH is a Multi-level drive with IGBT power devices and a more efficient and precise control for induction and synchronous motors.

The PWM technique with high switching frequency allows an almost sinusoidal motor current with low total losses and ripple-free torque. Its water cooling method permits to achieve high output power ranges.

Our H-series drives (TH/NH) are compatible with your existing motor systems, regardless of brand or age.

With our customized retrofit you can achieve increased levels of safety, reliability and efficiency.

### Silcovert NH



**Power range:**  
air cooling  
1500/3700 KVA  
water cooling  
2900/14400 KVA

**Voltage:**  
up to 4160/6000/6600

**Output Frequency:**  
5-140 Hz

**Applications:**  
Centrifugal load (pumps, compressors, fans),  
revamping of existing motors, high speed applications

## AC Drives

## Medium Voltage Drives - Cycloconverter

The Silcovert GN is a Neutral Point Clamped Voltage Source Drive with IGCT power devices and fields-oriented control technology for synchronous and induction motors.

Its three-level topology with Active Front End configuration achieves near-unity efficiency, near unity power factor, minimum torque ripple and low harmonic content, both on the line and on the motor side.

The Silcovert GN is suitable for a common DC bus configuration with reduced overall installation costs and optimized power balance of the multiple motor system.

### Silcovert GN



**Power range:**  
water cooling  
9000 - 24000 KVA  
(higher power on request)

**Voltage:**  
up to 3300 V

**Output Frequency:**  
normal 10 - 65 Hz  
extended 10 - 100 Hz

**Applications:**  
Hot rolling mills for flat and long products, cold rolling mills, iron and steel applications, and marine propulsion

## AC Drives

## Low Voltage Drives

Answer Drives 700 is a compact Variable Frequency Drive (VFD) that uses IGBT technology for control of low voltage AC motors. The Answer Drives 700 was designed for pumping stations, fans, HVAC systems and textile applications.

The Answer Drives 3000 is an IGBT-based VFD with unmatched levels of adaptability. This efficient drive has proven service in a wide range of applications with the highest levels of energy stability and user control.

The Answer Drives 5000 is an IGBT-based VFD. The Answer Drives 5000 drive is suitable for single or multi-motor applications with asynchronous motors and it was developed for A.C. or D.C. power supply. Our Low Voltage products are designed and manufactured by our wholly owned subsidiary Nidec ASI.

### Answer Drives 700/3000/5000



**Answer Drives 700**  
**Power range:**  
0.75 - 110 kW

**Voltage:**  
400-480 V

**Output Frequency:**  
1-480 Hz

**Answer Drives 3000/5000**  
**Power range:**  
0.75 - 1000 kW

**Voltage:**  
400-500, 525-690 V

**Output Frequency:**  
up to 200 Hz

## AC Drives

## Low Voltage Softstarter

The Answer Drives DC is an electronic starter for induction motors.

It consist of a three-phase fully controlled thyristor switch and is designed to reduce the inrush current during direct online starting of induction motors at low and medium power ratings.

Answer Drives DC provides three selectable start up modes:

- voltage ramp
- constant current
- constant acceleration

### Silcostart



**Power range:**  
5.5 - 1500 kW

**Voltage:**  
400 - 690 VAC

**Applications:**  
General purpose electric motor starter for industrial applications.

Silcovert TH is a Multi-level drive with IGBT power devices and a more efficient and precise control for induction and synchronous motors.

The PWM technique with high switching frequency allows an almost sinusoidal motor current with low total losses and ripple-free torque.

Its air cooling method permits to achieve an output power range up to 3000 KVA. Our H-series drives (TH/NH) are compatible with your existing motor systems, regardless of brand or age.

### Silcovert TH



**Power range:**  
air cooling  
up to 8100 KVA  
water cooling  
up to 18700 KVA

**Voltage:**  
up to 4160/6000/6600/7200 V

**Output Frequency:**  
250 Hz (std),  
330 Hz max with derating

**Applications:**  
Centrifugal load (pumps, compressors, fans),  
revamping of existing motors, high speed applications

The Silcovert S is a load-commutated current source inverter (LCI) for synchronous motors and provides speed regularity, monitoring and braking torque regulation, V/Hz low shaping.

The Silcovert S has a rugged, compact design and is highly efficient and reliable.

**Features:**

- high accuracy
- four-quadrant operation
- high immunity to any line transient and "flying restart" after a supply voltage loss or dip
- high starting torque and wide constant torque operation range
- air and water cooled
- 98% efficiency

### Silcovert S



**Output voltage:**  
air cooling up to 4500 V  
water cooling up to 10000 V

**Output Frequency:**  
5 - 95 Hz

**Applications:**  
Starting of synchronous compensators, large gas turbine alternators or motor/generators (hydro pump storage plants), ship propulsion, pumps and fans, extruders and mixers, high power ratings or high speed applications.

The Answer Drives HP, available with either forced air or water cooling, extends the power of the Answer Drives 3000 up to 6MW. The Answer Drives HP has the same HMI interface, software for parameter settings, control board and communication protocols typical of the Answer Drives 3000 family.

**Other main characteristics:**

- all types of control method available
- auto-tuning for simpler and quicker start-up
- water-cooling available for easier heat transfer without air filtering problems
- flying restart for powering into a spinning motor
- Trace log and Fault/Alarm log functions for easier troubleshooting
- energy savings
- communication options

### Answer Drives HP



**Power range:**  
480 - 6000 kW

**Voltage:**  
525 - 690 V

**Output Frequency:**  
up to 200 Hz

**Applications:**  
General purpose drives for industrial applications, particularly suitable for metals, paper, marine, petrochemical, cement, textile, material handling and cranes.

## DC Drives

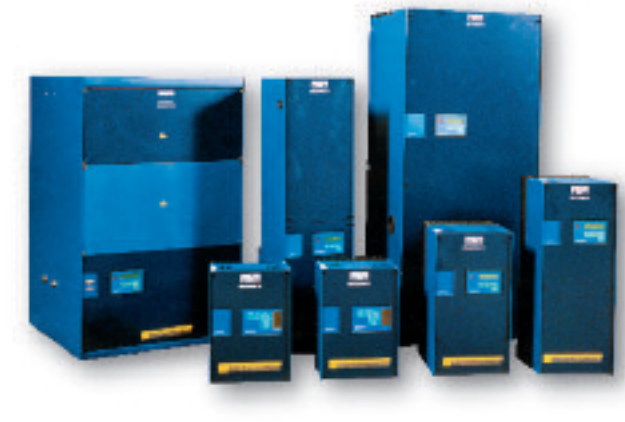
## Low/Medium Voltage Drives

The Answer Drives DC is a high performance digital thyristor converter for speed and torque control of DC motors.

**Other main characteristics:**

- two- or four- quadrant operation
- high dynamic response
- auto-tuning
- easy customization, even for complex functions
- powerful diagnostics
- automatic commissioning

### Answer Drives DC



**Current ratings:**  
30 - 4000 A dc

**Input Voltage:**  
400 - 950 V ac

**Applications:**  
General purpose converters for industrial applications, particularly suitable for metals, paper, cement and marine.

The Silcovert TN is a Neutral Point Clamped Voltage Source Drive with IGBT power devices and digital control for high performance variable speed drives for induction motors. Field oriented, V/Hz - Sensorless controls for different applications are available.

The PWM technique with high switching frequency allows an almost sinusoidal motor current with low total losses and ripple-free torque. Diode Front End and Active Front End configurations are available. Many inverters can be powered by a common DC bus.

This configuration optimizes the overall power balance for multiple motor systems.

### Silcovert TN



**Power range:**  
air cooling  
1300/10400 KVA  
water cooling  
up to 21600 KVA

**Voltage:**  
up to 3300 V

**Output Frequency:**  
normal 5 - 70 Hz  
extended 5 - 140 Hz

**Applications:**  
Extruders, pumps, fans, mixers, compressors, metals applications, propellers and thrusters for marine applications and wind generators

The Silcovert C is a direct AC/DC converter for synchronous and induction motors.

It is available in either a six-pulse or a twelve-pulse configuration, air or water cooled.

**Other main characteristics:**

- high speed accuracy and dynamic response
- field weakening operation
- very low torque ripple, even at the lowest speed
- high overload capability

### Silcovert C



**Power range:**  
air cooling 3600  
up to 10700 KVA  
water cooling 3750  
up to 11400 KVA

**Voltage:**  
1500 V (6-pulse config.)  
3300/4160 V  
(12-pulse config.)

**Output Frequency:**  
0 - 24 Hz (@ 60 Hz input frequency)

**Applications:**  
Medium to low speed main rolling stands, slab sizing presses, mine winders, cement mills and kilns.

The Answer Drives GS inverter family is designed for large-scale grid-connected photo-voltaic power plants. Answer Drives GS is designed for large photo-voltaic systems like industrial or ground mounted plants. It can be connected to LV or MV network. Its functions and performance place it at the top end of the market. The optional function «MIRO» allows the Answer Drives inverter to reduce losses during conversion. A special version - Answer Drives GS Power Plant - is also available. This is a fully containerized photovoltaic plant.

**Answer Drives GS inverter is available in 3 versions:**

- PV7 PV voltage range 320-630 Vdc (Vout 202)
- PV8 PV voltage range 430-760 Vdc (Vout 270)
- PV9 PV voltage range 540-950 Vdc (Vout 337)

### Answer Drives GS



**Power range:**  
0 - 2000 kW

**Output Voltage:**  
202 - 337 V

**Applications:**  
Photovoltaic power plants distributing power for the grid system; industries equipped with a photovoltaic plant to produce power using the grid system.

The Answer Drives DC is a high performance digital thyristor converter for speed control of DC motors with the highest power ratings.

**Other main characteristics:**

- two- or four- quadrant operation
- interactive dialogue with the operator
- interactive dialogue with a master system
- easy customization, even for complex functions
- automatic commissioning
- six or twelve pulse configuration
- air or water cooled

### Answer Drives DC



**Power range:**  
1.6 - 12 MW

**Voltage:**  
400 - 1500 V dc

**Applications:**  
General purpose converters for metals and industrial applications, including cement and paper.