Nidec

All for dreams

2 and 4 poles synchronous generators for orc turbines

HIGH PERFORMANCE ELECTRIC GENERATORS FOR ORC TURBINES

NIDEC ASI HAS DEVELOPED A COMPLETE LINE OF GENERATORS SPECIFICALLY DESIGNED FOR ORGANIC RANK CYCLE (ORC) TURBINES. AVAILABLE IN TWO SOLUTIONS, TRADITIONAL 4-POLE OR DIRECTED COUPLE 2-POLE MACHINES, THESE GENERATORS HELP MAXIMIZE EFFICIENT ENERGY PRODUCTION.

Nidec Industrial Solutions

Nidec Industrial Solutions is a business platform of Nidec Group. Nidec is a global manufacturer of electric motors and drives, founded in 1973. In 2012 Nidec acquired Ansaldo Sistemi Industriali Spa establishing Nidec ASI. Later that year they also acquired Avtron Industrial Automation in North America. Nidec ASI is specialized in providing innovative power control and system solutions for hundreds of customers worldwide while Avtron built its reputation in reliable drive systems and encoders.

In 2016 Nidec ASI assumed responsibility for Nidec Industrial Solutions, confirming its commitment and innovation in Industrial Power and Automation. Now as the global industrial platform leader, the company is helping to shape the future of the industrial sector. Our solutions are used in a wide range of commercial and industrial applications worldwide. The company is also a leading edge provider of solutions for renewable energy applications.

Built to last

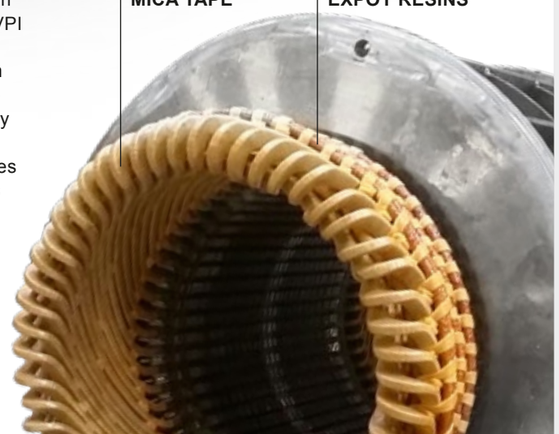
The key feature of our synchronous generators is their robust design.
Rotors are either cylindrical or salient pole design according to the application requirements and rated speed up to 3000 rpm.
The generators are provided with a brushless excitation system that consists of a shaft-mounted auxiliary generator (exciter) and rotating diode rectifier bridge.
The generators can be provided with air-to-water heat exchanger, air-to-air heat exchanger or simply open ventilated.

Moreover our MICASYSTEM® VPI process is used for the insulation of the machines. Micasystem® VPI insulation system is one of the best on the market. This system is based on a special mica tape and a blend of solventless expoy resins. Due to its outstanding dielectric and technical properties this class F insulation system is qualified for use in aggressive Environments.

MICASYSTEM®

SPECIAL MICA TAPE

SOLVENTLESS EXPOY RESINS



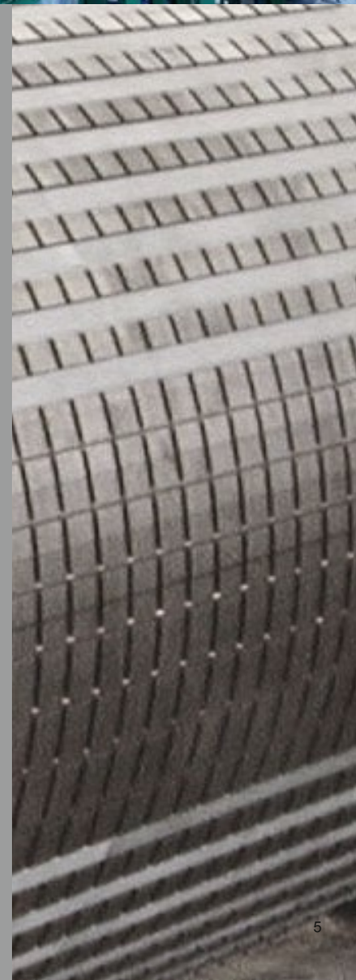
With a focus on Life Cycle Costs

The generators were studied to minimize operating expenses (OPEX). Bearings have been sized for 100,000 hours continuous operation. The mechanical and electrical design were studied carefully using 3D modelling based on more than forty years of experience in providing generators for power generation plants across the globe. In the unlikely event of a failure, our MICASYSTEM® insulation system allows repairs to be conducted on site by our technicians, eliminating the need to transport the machine to the nearest service shop.

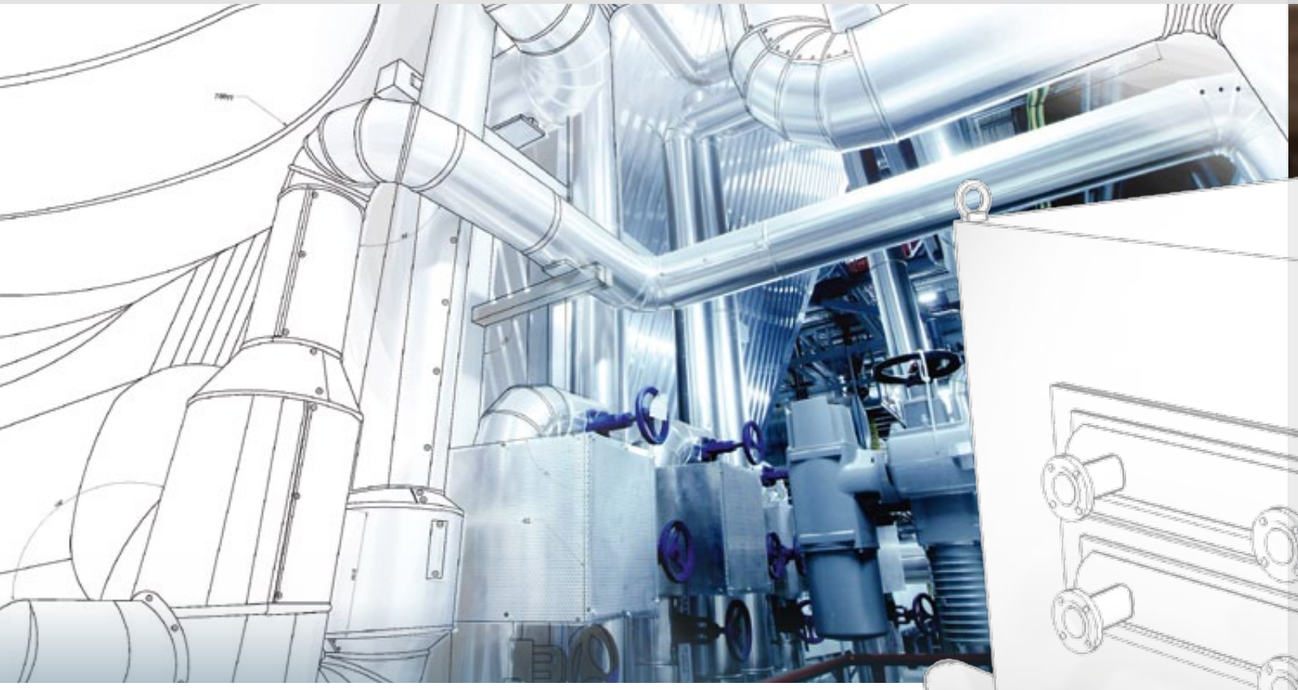
2 POLE GENERATORS

Our 2 poles synchronous generators with laminated rotor are the state-of-the-art solution for today's ORC Turbine application. They are directly coupled to the turbine without a gearbox providing many benefits including:

- REDUCED LOSSES
- LOWER LIFE CYCLE COST FOR PLANT OPERATORS
- REDUCED MAINTENANCE
- REDUCED FOOTPRINT (SHORTER TRAINS)
- INCREASED MTBF



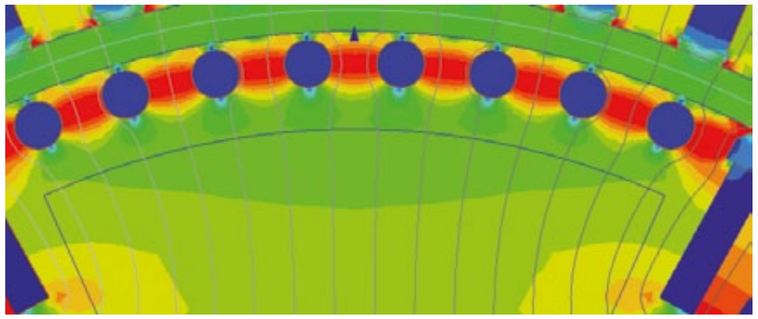
Tailor Fit solutions



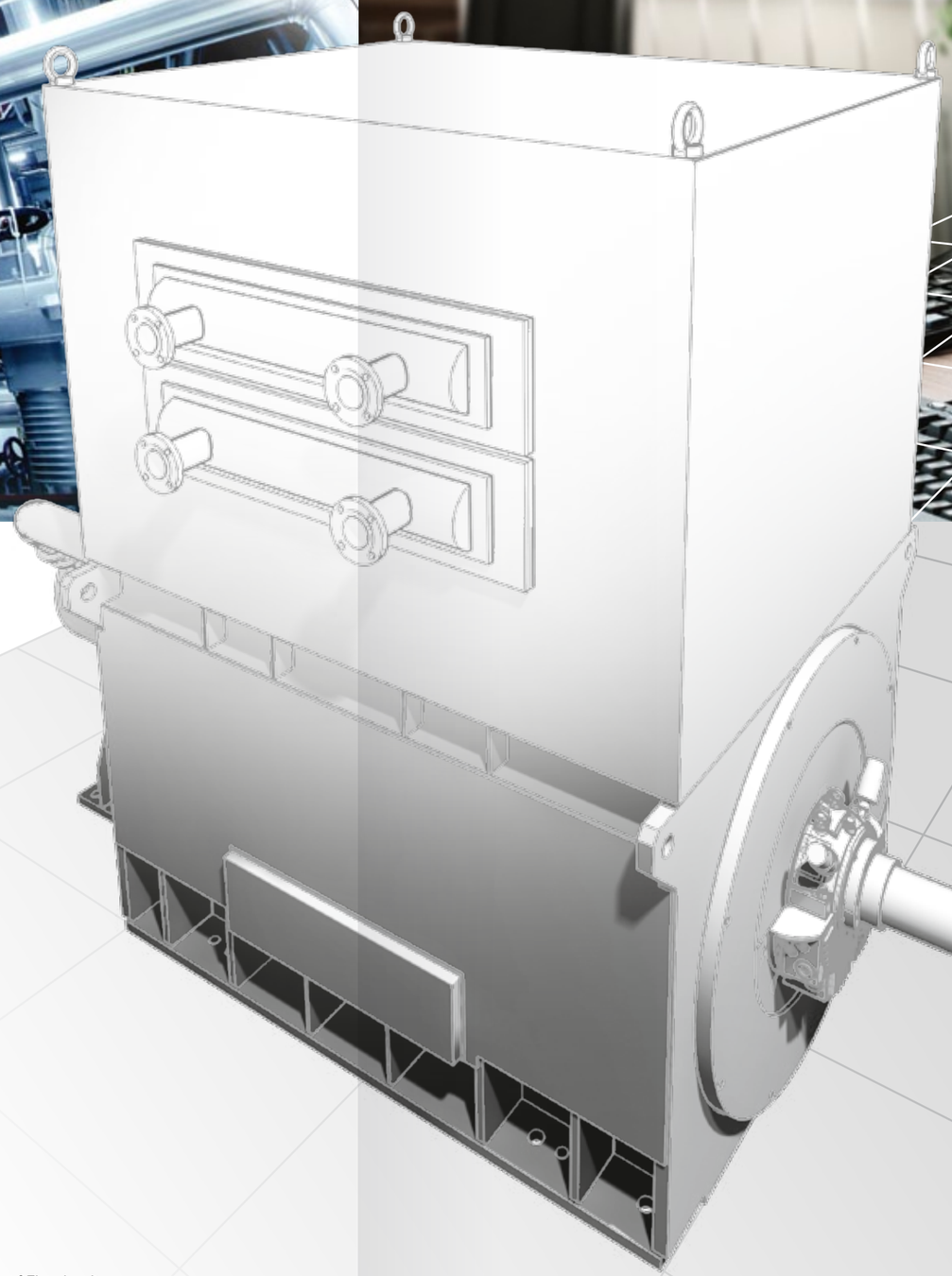
One of the things that sets us apart from our competitors is our engineer-to-order capability. Not only can our machines can be designed to meet specific application needs on a job-by-job basis but we can customize our products to create specific products for our Customers. Whether the objective is to reduce footprint, improve efficiency or design-to-cost, our engineering team is available to support our Customers in their effort to increase their competitive position on the market. Defining a dedicate product for Customers with pre-defined performance parameters and accessories, we can significantly reduce the lead times typically associated with the manufacture of these machines.

It starts with basic building blocks

We use a modular approach to our design, based on more than one hundred years in manufacturing electrical rotating equipment. As a result, our machines provide outstanding performance and reliability. In particular, our generators to be coupled with ORC Turbine are specifically designed with all the construction features to withstand the pulsating torque generated by the turbine itself to ensure smooth operation. From this simple starting point we can rapidly configure a machine to fit our Customers' needs.



Example of Flux density distribution analysis: detail of the damping cage region.



And enhanced engineering design

Our engineers use advanced design tools including the most state-of-the-art software to define the Electrical Design of the generator, enhanced rotor dynamic analysis, simulation of machine behavior and mechanical analysis to define and design the right machine to fit customer requirements.

Handled with care

Nidec is able to support OEMs and plant owners from preliminary feasibility study to end-of-life cycle.

Dedicated project managers, account manager and service technician support customers during the design, manufacturing, testing and commissioning and after sales support. We offer tailored support packages to OEM partners and plant operators to help assure maximum plant availability and performance.

Technical Data

4 POLES SYNCHRONOUS GENERATORS 50 Hz								
Type	kVA	Power Factor	V	A	Total Mass	Rotor Mass	Inertia (Kgm2)	Efficency
GSCR710Z4	6500	0,80	6000	625	18.700	5.950	379	97,5
GSCR800Y4	11250	0,80	6000	1083	26.000	6.600	550	97,7
GSCR900Z4	17400	0,80	6000	1674	35.800	9.950	965	97,8
GSCR1000Z4	26500	0,80	6000	2550	46.000	13.150	1.730	97,8
GSCR1120Z4	35000	0,80	6000	3368	56.500	16.300	2.480	97,9
GSCR710Z4	6250	0,80	11000	328	18.700	5.950	379	97,5
GSCR800Y4	10000	0,80	11000	525	26.000	6.600	550	97,7
GSCR900Z4	16500	0,80	11000	866	35.800	9.950	965	97,8
GSCR1000Z4	25000	0,80	11000	1312	46.000	13.150	1.730	97,8
GSCR1120Z4	32500	0,80	11000	1706	56.500	16.300	2.480	97,8
GSCR1250Z4	45000	0,80	11000	2362	76.000	23.000	3.940	97,8
4 POLES SYNCHRONOUS GENERATORS 60 Hz								
GSCR710Z4	7500	0,80	4160	1041	18.800	6.200	395	97,5
GSCR800Y4	13500	0,80	4160	1874	26.000	6.600	550	97,6
GSCR900Z4	18500	0,80	4160	2568	35.800	9.950	965	97,6
GSCR1000Z4	23500	0,80	4160	3261	41.800	12.000	1.430	97,7
GSCR710Z4	5000	0,80	13800	209	18.800	6.200	395	97,0
GSCR800Y4	10000	0,80	13800	418	26.000	6.600	550	97,1
GSCR900Z4	16500	0,80	13800	690	35.800	9.950	965	97,2
GSCR1000Z4	25000	0,80	13800	1046	46.000	13.150	1.730	97,6
GSCR1120Z4	32500	0,80	13800	1360	54.900	16.300	2.480	97,6
GSCR1250Z4	40000	0,80	13800	1673	72.000	16.300	2.480	97,8
2 POLES SYNCHRONOUS GENERATORS 50 Hz*								
GSCR800Y2	5000	0,80	6000	481	17.500	3.100	125	95,8
GSCR800Y2	5900	0,80	6000	568	19.000	3.350	145	96,1
GSCR800Y2	7300	0,80	6000	702	21.150	3.750	180	96,2
GSCR800Y2	8750	0,80	6000	842	23.200	4.100	220	96,5
GSCR900Y2	10000	0,80	6000	962	31.000	4.100	220	96,7
GSCR800Y2	4600	0,80	11000	241	19.700	3.500	160	95,5
GSCR800Y2	5100	0,80	11000	268	20.600	3.650	175	95,6
GSCR800Y2	5600	0,80	11000	294	21.600	3.800	190	95,7
GSCR800Y2	6500	0,80	11000	341	23.200	4.100	220	96,0
GSCR900Y2	7500	0,80	11000	394	27.500	3.650	175	96,4
GSCR900Y2	8500	0,80	11000	446	31.000	4.100	220	96,5

Technical Note:
- Insulation Temperature Class F
- Temperature Rise Class B
- Air Temperature 40° C
- Water Temperature 25° C

* For information on 2-pole synchronous generators at 60 Hz contact our sales department.

Markets and applications

Heat recovery system in Bulgaria

The challenge

Our customer wanted to supply a more cost effective, robust power generation system based on its Organic Rankine Cycle (ORC) turbine technology to turn heat into energy at a glass mill in Bulgaria.

The solution

Nidec ASI designed the generator to match turbine performance, maximizing performance in terms of efficiency and plant reliability. The 2-pole generator couples directly to the turbine offering a more compact solution compared to traditional 4-pole generators with gearbox, contributing to a more robust system. Today the plant produces 5 MWe of electricity with a savings of approximately 20,000 tons of CO_2 per year.

Scope of supply

Qty 1 GSCR 800 Y 2
Power: 5.5MVA
Voltage: 6 kV
Speed: 3000 r/min

Applications

The Nidec generator is particularly suited for ORC turbines and steam turbines used in:

With a focus on mid-sized power plants for industrial customers in markets such as Cement, Steel, Glass.

Service

Nidec offers personalized assistance to meet customer’s need. Our staff of highly qualified supervisors, as well as our Service Engineering team, are available to oversee complex interventions should the need arise 24 hours a day, 7 days a week. Nidec guarantees original manufacturer’s spare parts for the life of your equipment and offers a wide range of tailored contracts for preventive and predictive maintenance which are defined around plant needs and production schedules.

Customer Proximity remains one of our strongest commitments. Nidec has over 180 subsidiaries and affiliates across the globe, providing manufacturing, sales and service support to Nidec’s extensive customer base.

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INDUSTRIAL SOLUTIONS