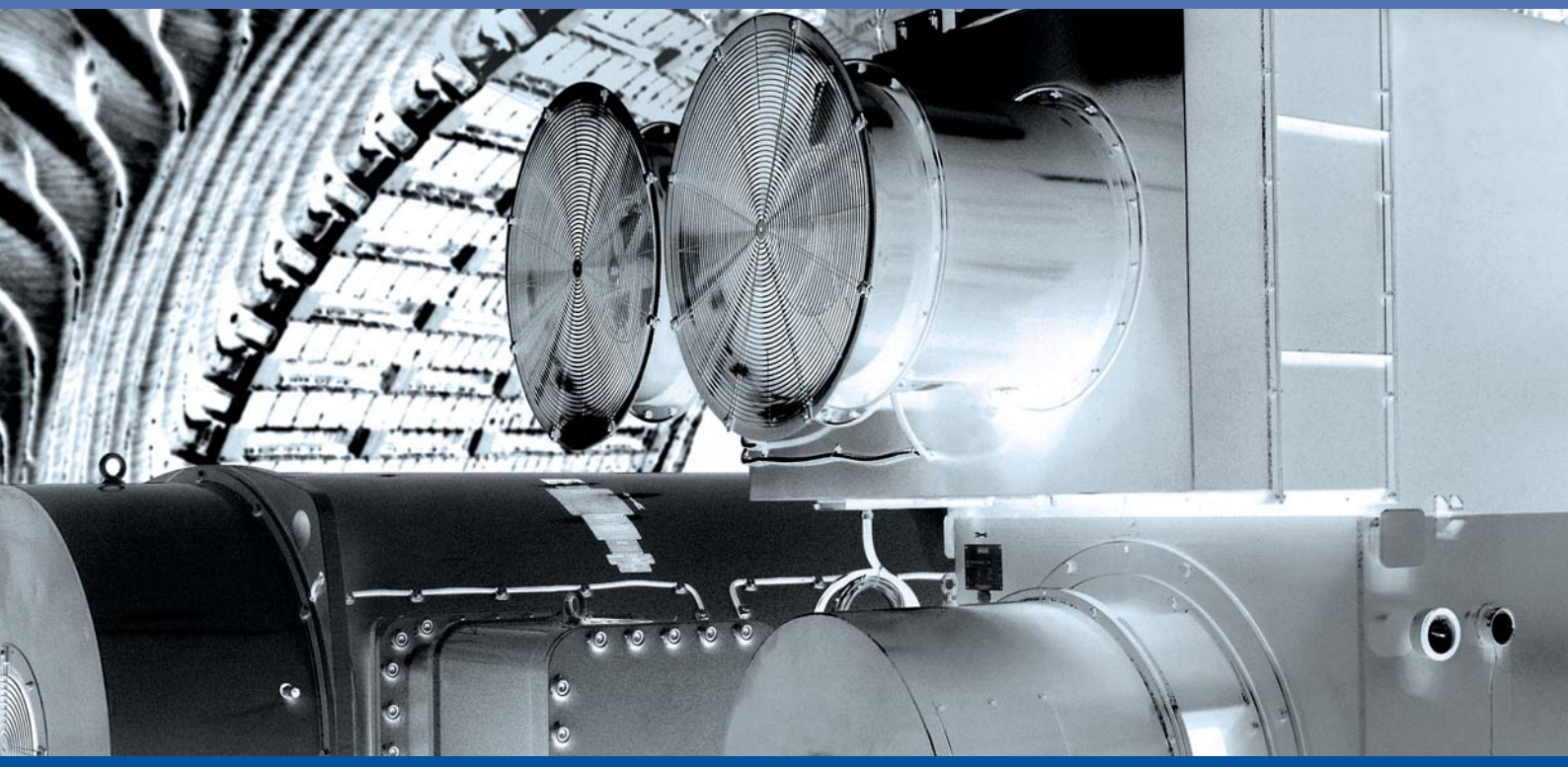
Ansaldo Sistemi Industriali S.p.A.

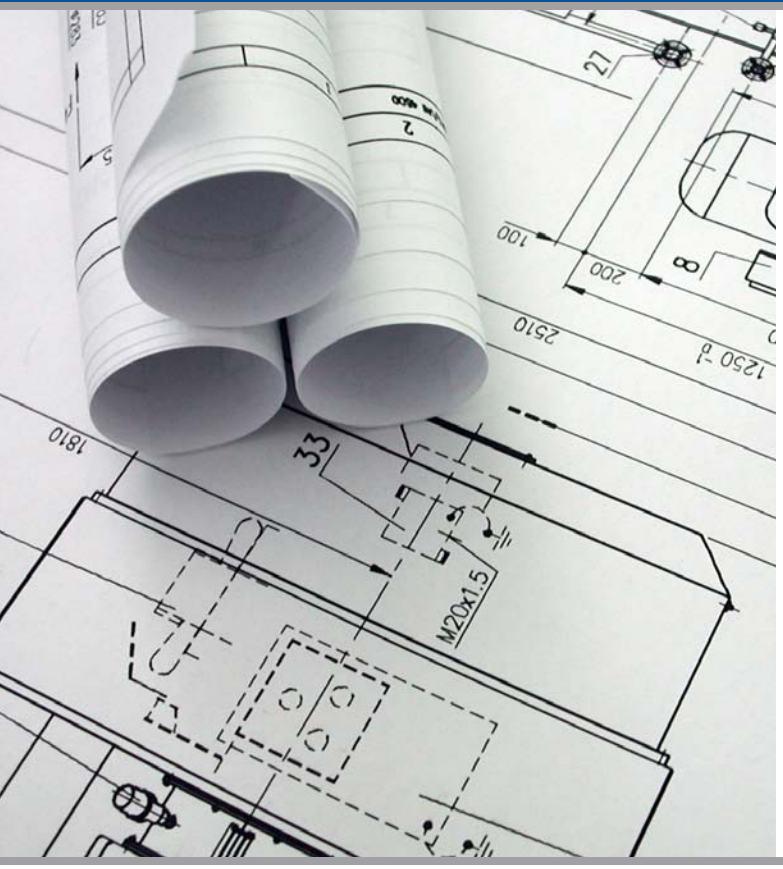
Electric Motors and Generators for Industrial Applications



ANSALDO
SISTEMI INDUSTRIALI

THE STRENGTH OF PROVEN EXPERIENCE

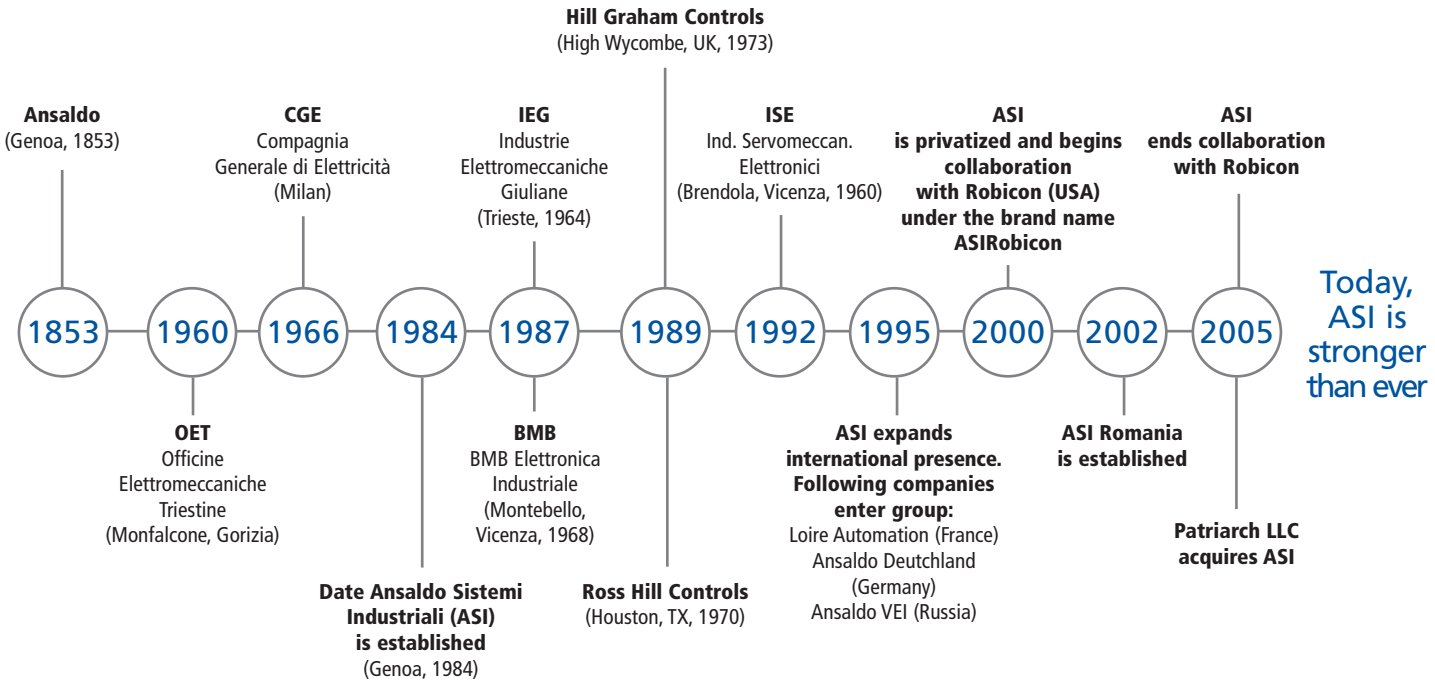
Nearly a century of excellence in motor and generator manufacturing



What sets us apart from other manufacturers are our Customer driven design capabilities. Whether it's pumps, turbines, compressors, alternators, ships, rolling mills, paper mills, movers, fans or special applications our motors and generators are specifically designed to meet our client's particular needs. All of our motors and generators are designed based on a flexible modular structure developed using modern computer aided engineering methods. This permits our engineering staff to efficiently configure the right machine for our Customer's application.

Brief History

Principal acquisitions and events in history of Ansaldo Sistemi Industriali S.p.A.:



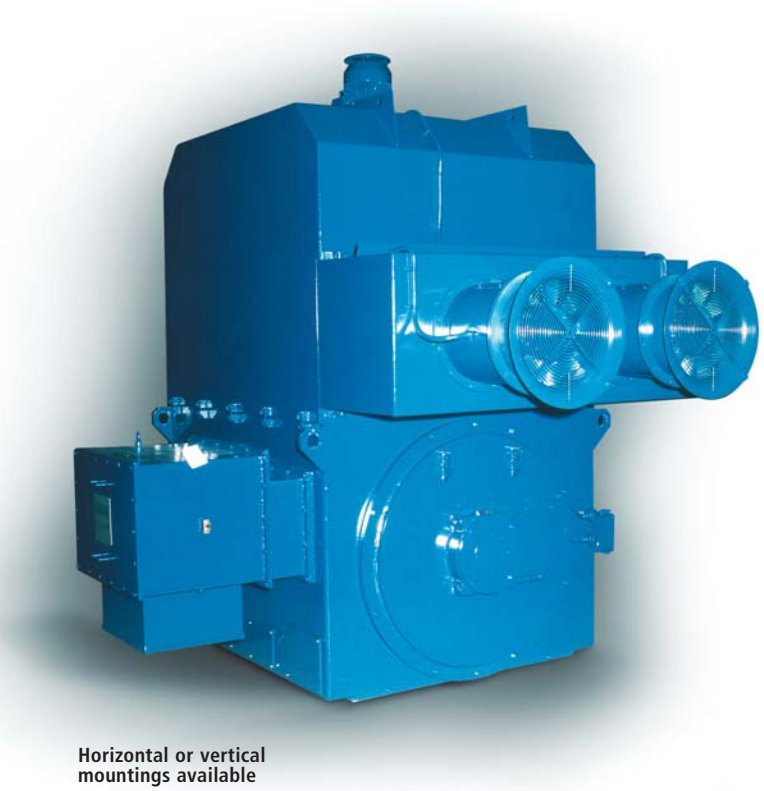
Ownership

Ansaldo Sistemi Industriali SpA, headquartered in Milan, Italy, is a privately held company. Principal Shareholders include Patriarch LLC and top management.

About Patriarch LLC

Patriarch LLC is an Investment fund with approximately 6 billion USD in assets under its management. Patriarch provides portfolio management services to 8 closed funds and one private equity fund. Funds include credit lines and equity positions in more than 65 companies.

STANDARD INDUCTION MACHINES
Series CT/CR/CB/W/N/ET/CAD



Horizontal or vertical mountings available

Our standard induction machines are built with an aluminum squirrel cage rotor. Rotor packs are made from single punch laminations up to size 1000. Larger packs are made using lamination segments. End rings are made of a special aluminum alloy which is welded to the cage using state of the art techniques. Stators are built as self contained units which are mounted into the frame after the coils have been inserted and the whole unit has undergone our **MICASYSTEM**® VPI process.

Micasystem®

Our 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 mechanical properties this class F insulation system is qualified for use in nuclear power stations and highly aggressive environments.

Power rating:
150 - 25,000 kW
200 - 33,500 HP

Voltage:
up to 15 kV

Mass:
1,500 - 120,000 Kg

Number of poles:
2 - 36

Frame size:
315 mm through
1120, 10, 11, 12, 13

Series CT

Type of cooling: IC 611

Series CR

Type of cooling: IC 81 W

Series W/N/CB

Type of cooling: IC 01 CB and N not shown

Power rating:
150 - 4,500 kW
200 - 6,030 HP

Voltage:
up to 15,000 V

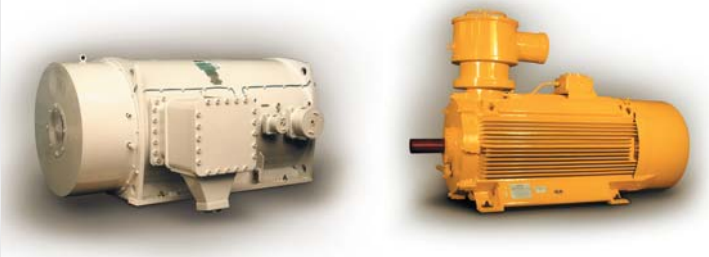
Mass:
1,500 - 25,000 kg

Number of poles:
2 - 12

Frame size:
355 - 800 mm

Type of cooling:
IC 511, IC 411

Hazardous area machines - Series ET/CAD



Our standard explosion proof protection is: EEx d IIB T3/T4
Sleeve or antifriction bearings available.
EEx d IIB H_2 upon request

Our strengths:

- Aluminum or Copper bar Rotor
- Micasystem® VPI insulation system
- Custom tailored to meet your specific needs

We also offer a wide range of pressurized "p", non sparking "n", and increased safety "e" machines.

SYNCHRONOUS MACHINES
Series MS/GS

Horizontal or vertical mountings available

As a standard our synchronous machines are built with either salient pole or cylindrical rotors, depending on the speed and size of the machine. Designed to meet specific application needs on a job-by-job basis, our synchronous motors provide outstanding performance and reliability. These machines are the preferred choice on large compressor and vertical pump applications. They are also widely used for wind tunnel fans and cycloconverter applications. Ansaldo Sistemi Industriali also has consolidated experience in generators coupled to diesel engines and turbines of all types. These generators are specifically designed with all the construction features to withstand the pulsating torque generated by a diesel engine to ensure smooth parallel operation. The construction features on our synchronous machines are basically the same as those on our induction motors for similar applications. As a standard our synchronous machines are supplied with a brushless excitation system. Our brushless excitation system was specially designed to resist even the heaviest industrial application.

Series MS

Power rating:
1000 - 30,000 kW
1340 - 40,200 HP

Voltage:
up to 15 kV

Mass
3,500 - 250,000 kg

Number of poles:
4 - 36

Type of cooling:
IC 01, IC 81W, IC 611, IC 31

Frame size: 315 mm through 1000,10,11, 12, 13

Series GS

Power rating:
1000 - 40,000 kVA

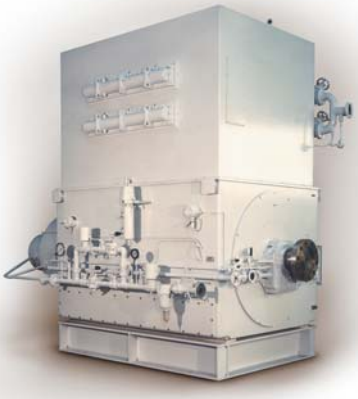
Voltage:
up to 15 kV

Mass
3,500 - 250,000 kg

Number of poles:
4 - 36

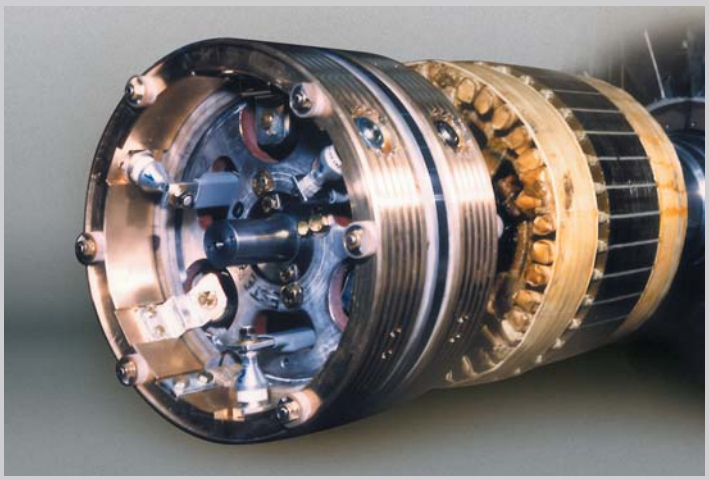
Type of cooling:
IC 01, IC 81W, IC 611, IC 31

Frame size: 315 mm through 1000,10,11, 12, 13

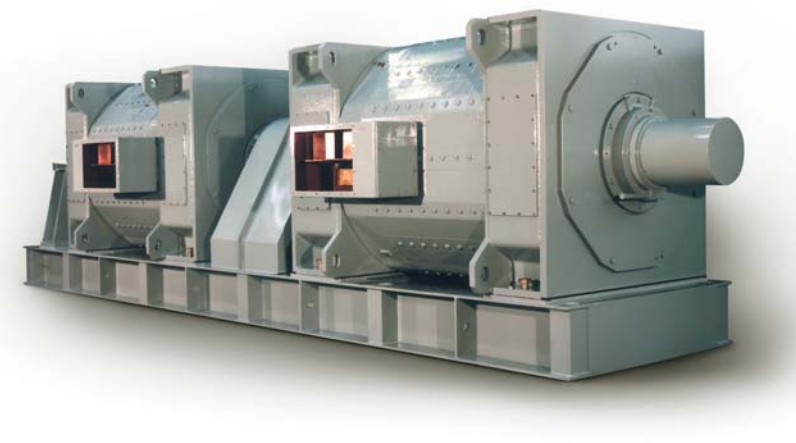


We are specialists in:

High speed designs, stiff shaft designs, hazardous area machines including explosion proof enclosures, vertical machines up to 10,000 kW (13400 HP) and special applications.



DC MACHINES
Series GH / Series DH / Series MD 800-MDL 800



Horizontal or vertical mountings available

Our DC motors and generators come in 22 different shaft heights and nearly 100 different frame sizes to cover all applicable industry applications. All DC machines are laminated frame design and can be supplied by any DC converter system.
Our DC series offers outstanding performance features:

- high dynamic response
- wide speed range
- high maximum speeds
- high efficiency
- high commutating capacity during current transients

Series GH/DH

Power rating:
2 - 6,000 kW (at 150 r/min in tandem)

Voltage:
up to 1,000 V

Mass:
100 - 110,000 kg

Frame size:
80 - 1120 mm

Type of cooling:
IC 06, IC 00, IC 666, IC 86 W, IC 37, IC 17

With over 100 years of combined experience in motor and generator manufacturing, Ansaldo Sistemi Industriali is the expert in special application machines. Despite the considerable growth in the use of AC drives over the year, DC machines continue to be used in a variety of markets thanks to their intrinsic value.

Special designs in the GH/DH series include:

- Totally enclosed non ventilated motors for outdoor applications (with IP55 type protection). These machines are particularly adapt for heavy duty handling and lifting systems.
- Motors and Generators for marine applications: propulsion, thruster, auxiliary services. These machines have been installed effectively in low noise vessels, providing optimum performance.

Series MD800-MDL 800

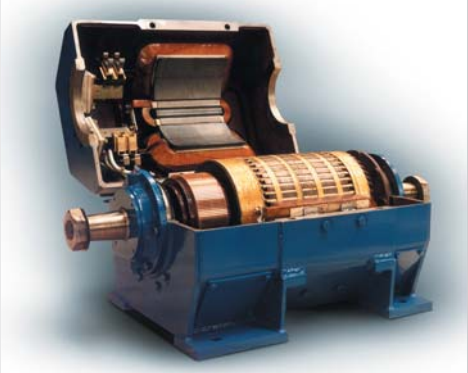
Power rating:
up to 500 kW

Voltage:
up to 500 V

Mass:
400 - 9000 Kg

Frame size:
804 - 824 (split frame)
810 - 816 (laminated frame)

Comply with AISE (Association of Iron and Steel Engineers - Usa) n. 1 Std



Insulating systems on DC line are class H;
large frames (above 225) always provided with compensating windings.

HIGH SPEED VFD PACKAGES
Cutting edge technology

Ansaldo Sistemi Industriali has over 10 years of experience in the manufacture of high-speed motors. Reaching over 20,000 r/min these hi-tech machines are the epitome of our superb engineering capabilities. Generally used in pump and compressor applications, these packages offer energy efficiency and low maintenance advantages over traditional motors with gear box. Coupled with our state-of-the-art variable speed drive controls, these packages are pushing the edge of electric drive technology as a replacement for mechanical prime movers.

Series HS/HSMS

Power rating:
500-20,000 kW
670 - 26,800 HP

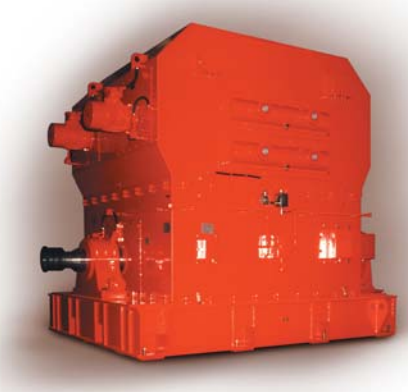
Voltage:
up to 15 kV

Mass:
4000-40,000 kg

Speed range:
70% - 105%

Top speed:
20,000 r/min

Type of cooling:
IC 86 W, IC 37,
IC 616, IC 06



Power rating:
5000 - 60,000 kW
6700 - 81,400 HP

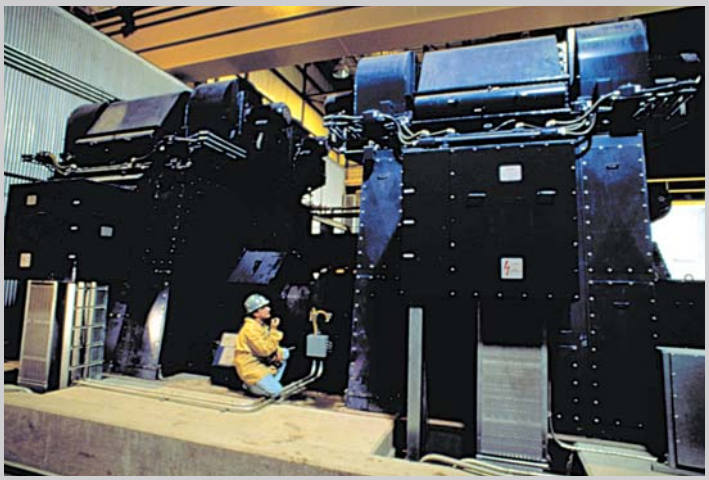
Voltage:
up to 15 kV

Mass
10,000-60,000 kg

Speed range:
70% - 105%

Top speed:
8,000 r/min

Type of cooling:
IC 86 W, IC 37,
IC 616, IC 06

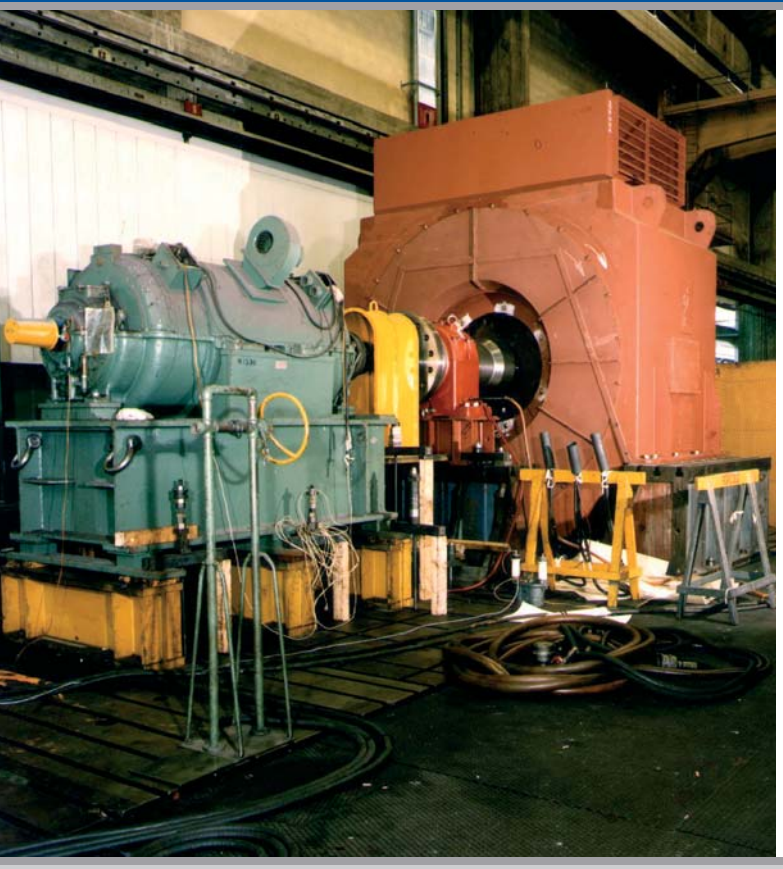


Our service committment

Ansaldo Sistemi Industriali's service and support network is never more than a phone call away. Our call centers provide 24 hour 7 day a week support and, if further assistance is needed, our technician can be on site within 24 hours in Europe, the U.S., Canada and Mexico, and 72 hours anywhere else in the world. We're rapidly expanding our network of authorized service centers locally to serve you better. Ansaldo Sistemi Industriali also offers original manufacturer renewal parts, preventive maintenance and training programs for site technicians.

Contact us for the service center nearest to you.

SYSTEM TEST PLATFORM
Full system testing up to 45 MW



Our test room is one of the best equipped in Europe. We have recently upgraded our testing capacity and can perform full system testing in back-to-back configuration up to 45 MW at nominal operating speed. With 5 test stands covering 2.200 mq plus an additional 1.500 mq of external area for drives and transformers, we are now able to extend our rigorous testing procedures to high-power machines - an additional guarantee there will be no surprises when the equipment goes out to the field.
Test benches are independent which allows us to perform routine and type tests as well as full load testing up to 4 MW @ 1,500 r/min (1,200 r/min on Vertical machines) on several machines at the same time, helping to reduce lead times. Our data acquisition system, complete with six operating stations, records test data and automatically calculates performance results.

The following is a list of the routine tests carried out on all induction motors produced in the Monfalcone factory.

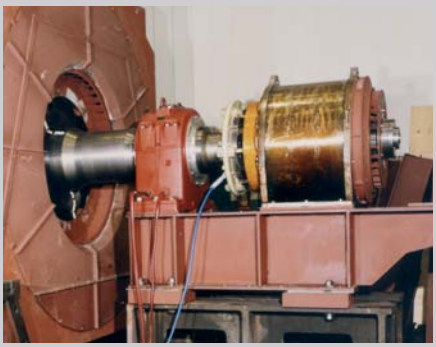
- **Windings ohmic resistance measurement**
  Test Method: **IEEE 118**

- **Direction of rotation check**
  Test Method: **IEC 60034 - 8**
  Acceptance Criteria: **IEC 60034 - 8**

- **Phase sequence check**
  Test Method: **IEC 60034 - 8**
  Acceptance Criteria: **IEC 60034 - 8**

- **No-load characteristic determination**
  Test Method: **IEEE 112**

- **Locked rotor test**
  Test Method: **IEEE 112**
  Acceptance Criteria: **IEC 60034 - 1**
- **Overspeed test**
  Test Method: **IEC 60034 - 1**
  Acceptance Criteria: **IEC 60034 - 1**



- **Vibration level measurement**
  Test Method: **IEC 60034-14**
  Acceptance Criteria: **IEC 60034 - 14**

- **High voltage test**
  Test Method: **IEC 60034 - 1**
  Acceptance Criteria: **IEC 60034 - 1**

- **Insulation resistance measurement**
  Test Method: **IEEE 43**
  Acceptance Criteria: **IEEE 43**

- **Visual and dimensional check**
  Test Method: **as per drawing**
  Acceptance Criteria: **as per drawing**

All tests are done on fully assembled machine. For information on special or type tests as well as information on testing for synchronous machines contact our Sales Office at the address below.
Special tests which may be carried out in the Monfalcone factory:

- Heat run test
- Current, speed and torque vs. time during acceleration (squirrel cage motors only)
- Inertia moment evaluation
- Shaft voltage
- Noise (SPL, sound pressure level) at no load (according to **IEC 60034 - 9**)
- Breakdown torque evaluation
- Polarization index
- Dielectric loss factor on test coils
- Impulse voltage test
- Ring test (on stator cores before winding assembly).

IEC Commission Electrotechnique Internationale International Electrotechnical Commission Международная Электротехническая Комиссия NEMA CE CSA LLOYD'S REGISTER QUALITY ASSURANCE NFPA IEEE ISO 9001 ISO 14000