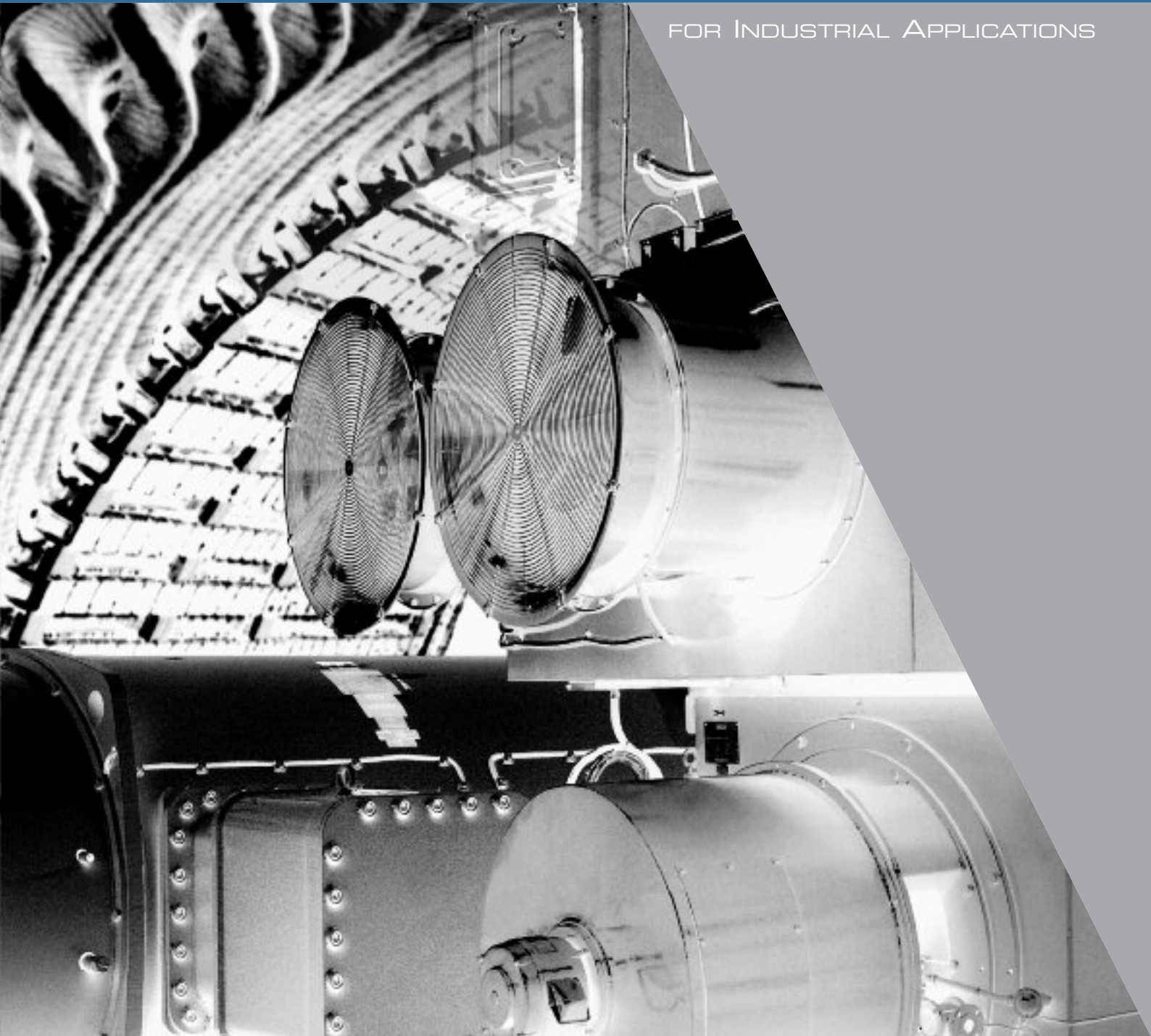




Ansaldo Sistemi Industriali
RESULTS TO THE POWER OF THREE

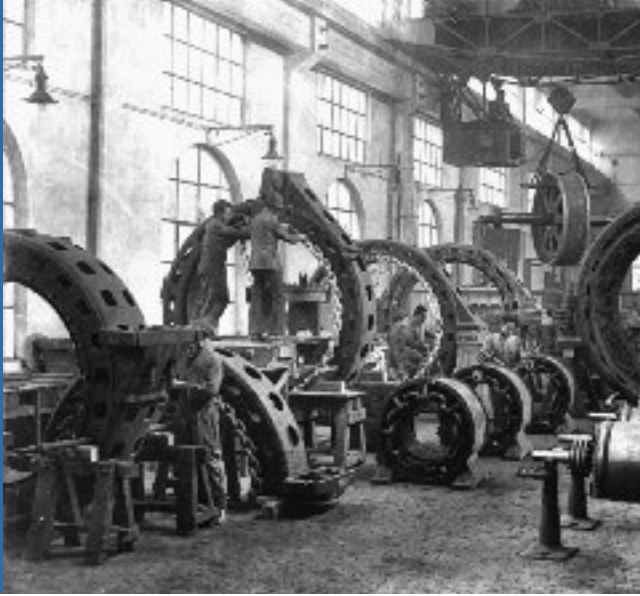
ELECTRIC MOTORS & GENERATORS

FOR INDUSTRIAL APPLICATIONS



Brief History

from 1853 to Present

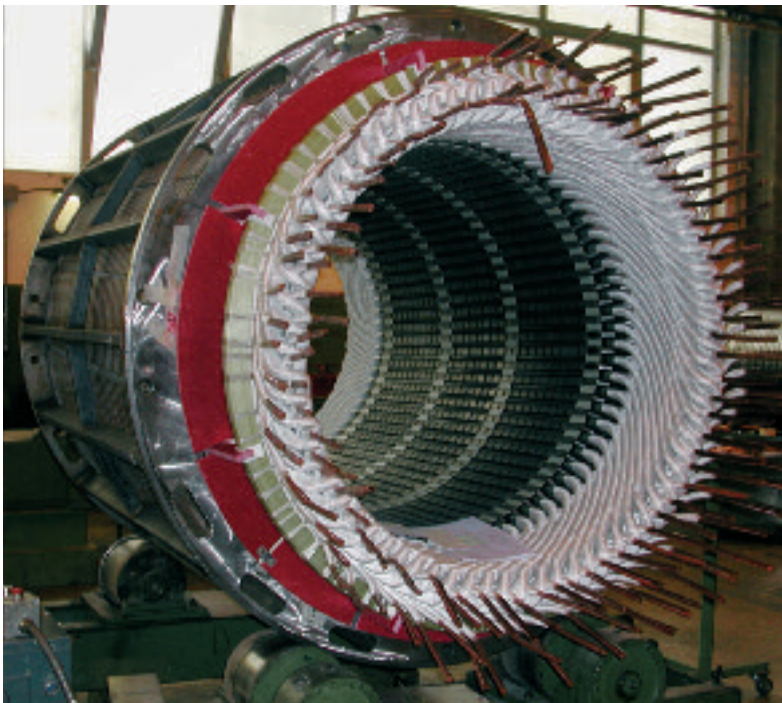


The origins of the Ansaldo name trace back over 150 years when the company was founded as a respected ship builder in 1853.

Through diversification and expansion, Ansaldo established itself as one of the pioneers and founders of Italian manufacturing, engineering and industry. Ansaldo Sistemi Industriali (ASI) was born as a branch of Ansaldo that extended the group's expertise and business in power electronics, motors & generators and automation. Over the past century, ASI has specialized in providing innovative power control and system solutions that have satisfied hundreds of customers worldwide.

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.

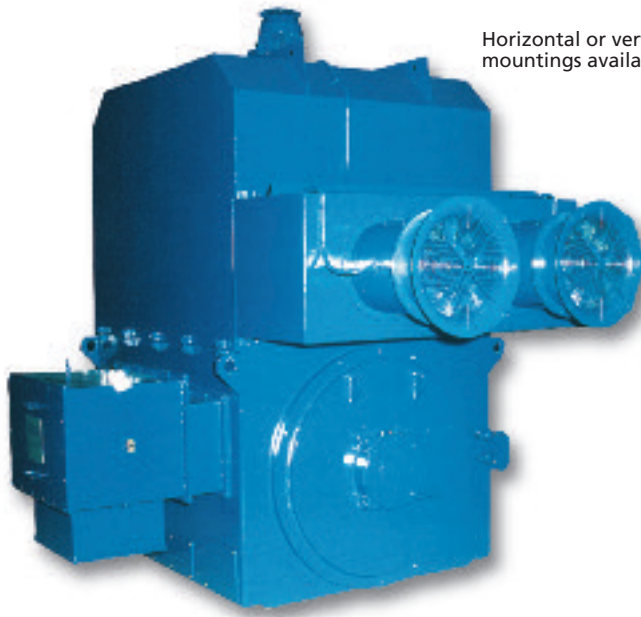
This permits our engineering staff to efficiently configure the right machine for our Customer's application.

Our strengths:

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

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.



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 epoxy 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.

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 - 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

Hazardous area machines - Series CAD/ET



Our standard explosion proof protection is:
EEx d IIB T3/T4
Sleeve or antifriction bearings available.
EEx d IIB H2 or IIC upon request



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

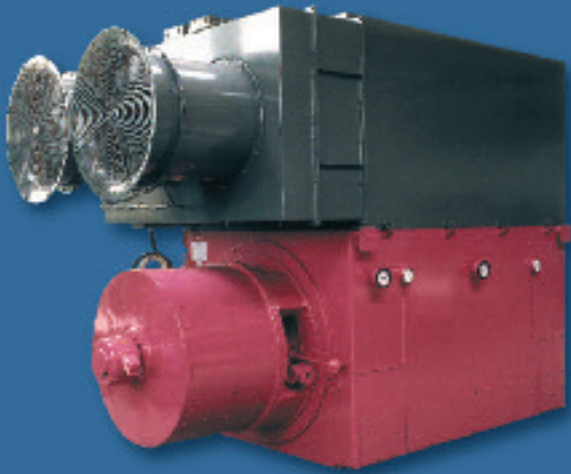
Frame size:
355 - 800 mm

Type of cooling:
IC 511, IC 411



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

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.

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

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

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

Series GS



Power rating:
1000 - 40,000 kVA

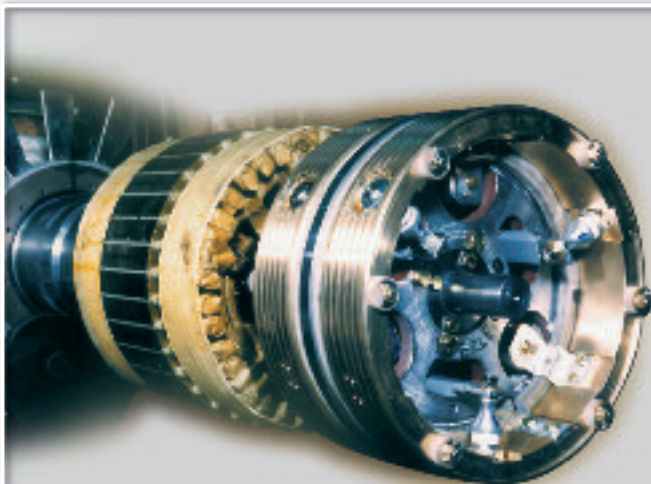
Voltage:
up to 15 kV

Mass:
3,500 - 250,000 kg

Number of poles:
4 - 36

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

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



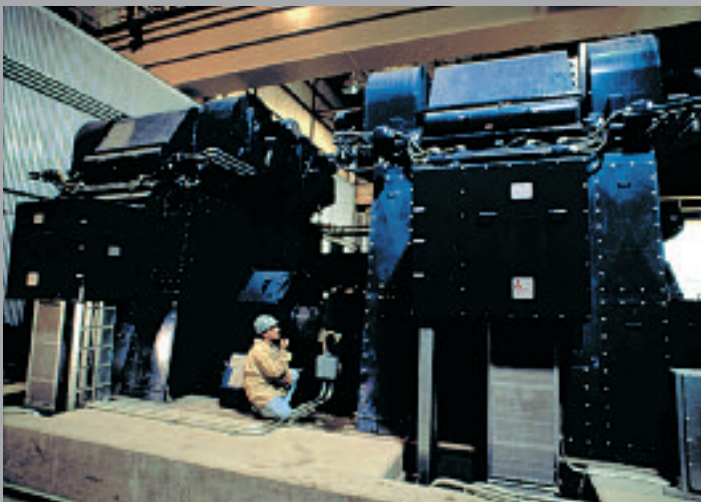
Brushless excitation system:

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.



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.

<p>Power rating: 500-20,000 kW 670 - 26,800 HP</p> <p>Voltage: up to 15 kV</p> <p>Mass: 4000-40,000 kg</p> <p>Speed range: 70% - 105%</p> <p>Top speed: 20,000 r/min</p> <p>Type of cooling: IC 86 W, IC 37, IC 616, IC 06</p>	<h2>Series HS</h2> 	<p>Power rating: 5000 - 60,000 kW 6700 - 81,400 HP</p> <p>Voltage: up to 15 kV</p> <p>Mass: 10,000-60,000 kg</p> <p>Speed range: 70% - 105%</p> <p>Top speed: 8,000 r/min</p> <p>Type of cooling: IC 86 W, IC 37, IC 616, IC 06</p>	<h2>Series MS</h2> 
--	--	---	--



Our service commitment:

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.

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

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

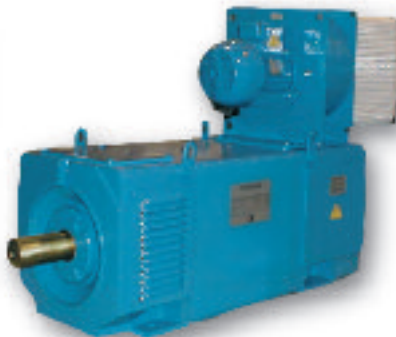
Voltage:
up to 1,000 V

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

Series GH/DH



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 for 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.
- Electric Motors and Generators for marine applications: propulsion, thruster, auxiliary services. These machines have been installed effectively in low noise vessels, providing optimum performance.

Power rating:
up to 500 kW

Voltage:
up to 500 V

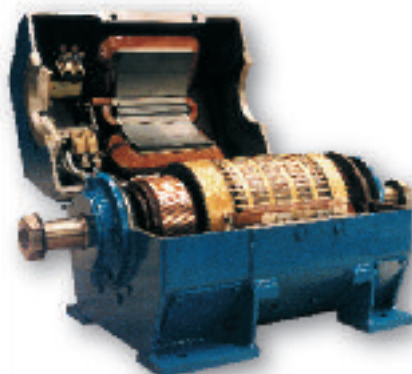
Mass:
400 - 9000 Kg

Number of poles:
2 - 12

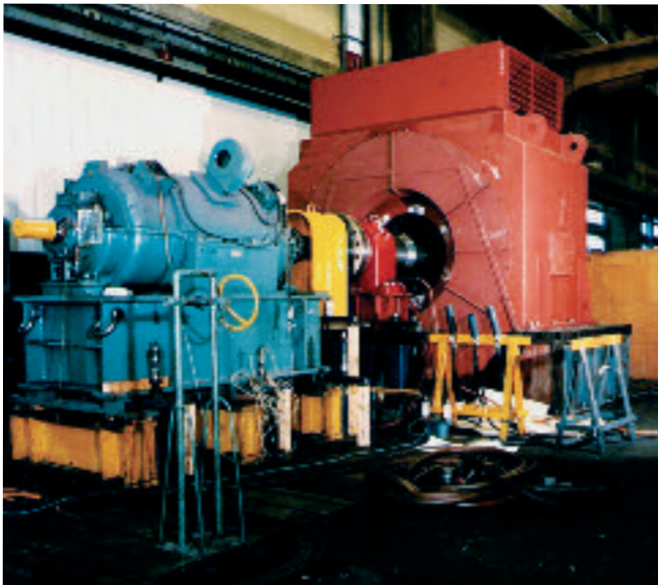
Frame size: 804 - 824
(split frame) 810 - 816
(laminated frame)

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

Series MD 800 - MDL 800



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



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).

CORPORATE

Viale Sarca, 336
I - 20126 Milano
Phone +39 02 6445 1
Fax +39 02 6445 4401
www.asiansaldo.com

CUSTOMER SERVICE AND SUPPORT

Viale Sarca, 336
I - 20126 Milano
Phone +39 02 6445 4254
Fax +39 02 6445 4274
service@asiansaldo.com

BUSINESS UNITS & MAIN OFFICES**ITALY****Motors, Generators & Drives**

Via Marconi, 1
I - 34074 Monfalcone (GO)
Phone +39 0481 717 111
Fax +39 0481 717 330

Viale Sarca, 336
I - 20126 Milano
Phone +39 02 6445 1
Fax +39 02 6445 4401

Industrial Systems & Automation

Corso Perrone, 11
I - 16152 Genova
Phone +39 010 6063 1
Fax +39 010 6063 773

S.S. 11 - Via Cà Sordis, 4
I - 36054 Montebello Vicentino (VI)
Phone +39 0444 449 100
Fax +39 0444 400 001

Service

Viale Sarca, 336
I - 20126 Milano
Phone +39 02 6445 4254
Fax +39 02 6445 4274

Centro di Ricerca in Elettronica

di Potenza (CRELP)
Corso Perrone, 11
I - 16152 Genova
Phone +39 010 6063 1
Fax +39 010 6063 740

Answer Drives S.r.l.

S.S. 11 - Via Cà Sordis, 4
I - 36054 Montebello Vicentino (VI)
Phone +39 0444 449 268
Fax +39 0444 449 276
www.answerdrives.com

For information on the sales office
or sales representative nearest you
contact us at: info@asiansaldo.com

INTERNATIONAL**CHINA**

ASI Industrial Systems Beijing Co. Ltd.
(subsidiary of Ansaldo Sistemi Industriali S.p.A.)
Room 3206 – 3208 / Beijing Silver Tower
No. 2 Dong San Huan Bei Road-Chaoyang District
Beijing People's Republic of China
Phone +86 10 6554 4490/91/92
Fax +86 10 6554 4493

FRANCE

Ansaldo Sistemi Industriali SA
Z.I. du Buisson, Rue de la Poudrière
F-42230 Roche-La-Molière
Phone (+33 4) 77907600
Fax (+33 4) 77907629

GERMANY

Ansaldo Sistemi Industriali GmbH
Im Teelbruch 104
D-45219 Essen - Kettwig
Phone +49 (0) 2054 104980
Fax +49 (0) 2054 1049811

ROMANIA

Ansaldo Sistemi Industriali RO
235b Darzei II St. - Crevedia, Jud. Dambovita
137180 Romania
Phone +40 374 00 33 54
Fax +40 757 71 02 04

RUSSIA

AO Ansaldo - VEI
Krasnokazarmennaya Ul 12
111250 Moscow, Russia
Phone (+7 495) 3619163
Fax (+7 495) 2734391

THAILAND

Ansaldo Sistemi Industriali SpA Thailand Branch
Muang Thai-Phatra Office Tower II 24th Fl
252/119 Rachadaphisek Rd, Huaywang
Bangkok 10310 Thailand
Phone +66 2 6932930
Fax +66 2 6932934

USA

Anselectric LLC
an Ansaldo Sistemi Industriali SpA Company
4900 Woodway Dr., Suite 680
Houston, Texas
77056 USA
Phone +1 832 214 4185
Fax +1 713 583 7775

VIETNAM

**ASI Industrial Systems - Representative Office of
Ansaldo Sistemi Industriali S.p.A.**
Room 702 – Floor 7th No. 3 Mai Hac De street,
Hai Ba Trung district - Hanoi
Phone +84 4 394 47415
Fax +84 4 394 47415

UAE

Anselectric LLC
an Ansaldo Sistemi Industriali SpA Company
P.O.Box 45265 - Abu Dhabi
Phone/Fax +971 (2) 6740723
Mobile +971 50 6227095