

Marine applications

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The company

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Our vision

To become the global market leader of electric rotating machines in all our core markets.

Our mission

Our mission is to aid the sustainable growth of our customers' businesses.

We will provide innovative solutions inspired by relentless efforts to understand our customers' needs and their specific applications.

We will leverage our extensive technical knowledge, product performance and service to increase the competitiveness, efficiency and productivity of our partners worldwide.

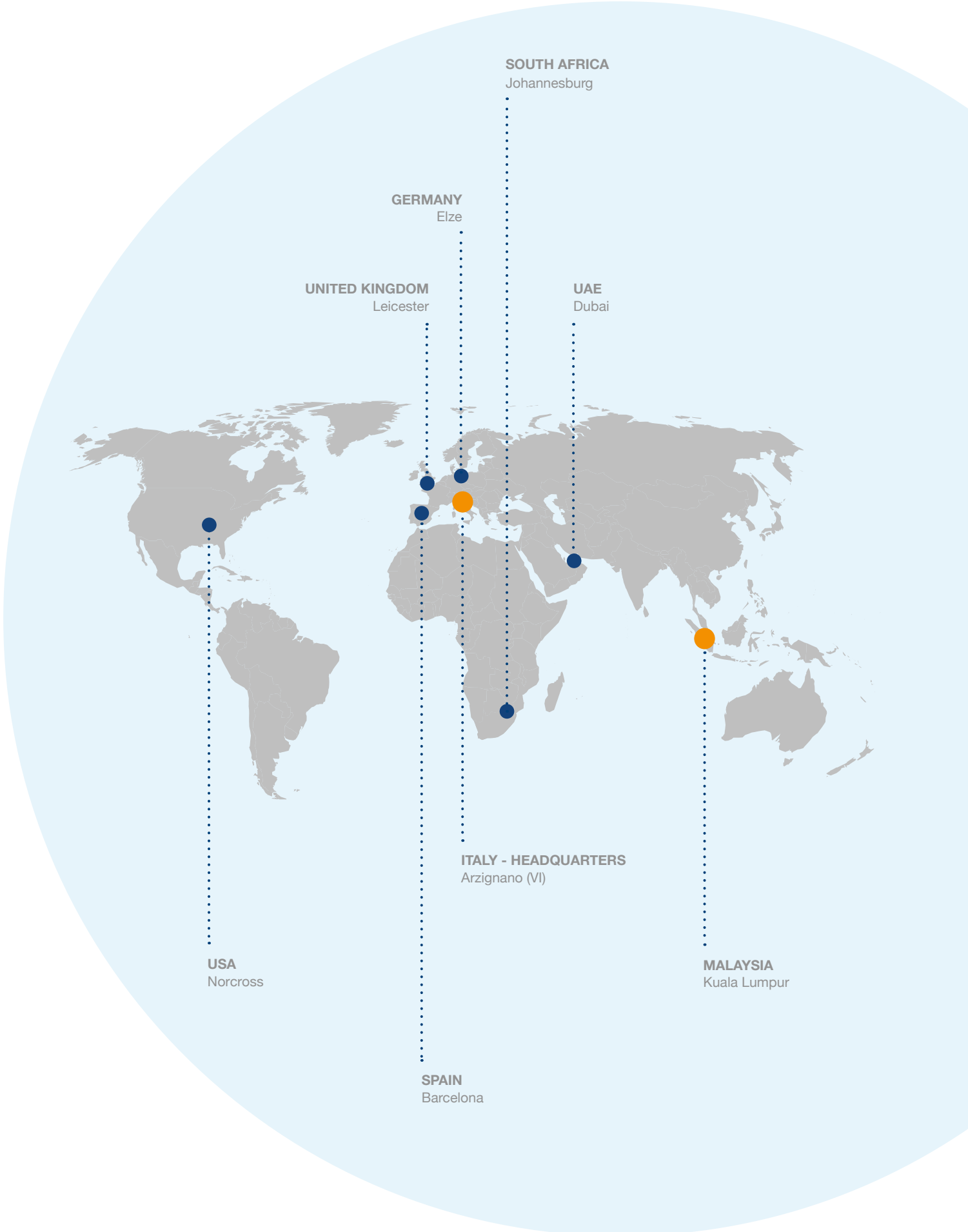


Marelli Motori Group of Companies

The Marelli Motori Group is one of the world's leading designers and manufacturers of generators and electric motors. The company was founded in 1891 and nowadays enjoys worldwide brand recognition thanks to its extended sales, distribution and service networks across four continents and two manufacturing facilities, based in Italy and Malaysia, which produce technologically advanced products sold in more than 120 countries.

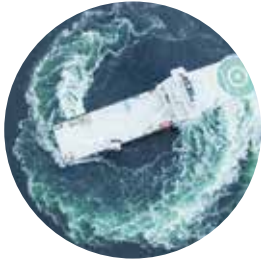
Our business model is based on a successful combination of four key elements that enable Marelli Motori to offer innovative and inspired solutions which create value for our customers:

- wide range of innovative products
- skilled people providing sales & support globally
- local for local approach
- continuous investment in R&D.



Core markets

Marelli Motori operates in six key markets:



Marine

Marelli Motori manufactures electric motors and generators for all marine applications where power is required.

Our product applications include:

- propulsion, thrusters, FI-FI system, auxiliaries, dredge pumps, winch and PTO-PTI system
- shaft generators, hybrid machines, offshore, generators at variable speed and emergency.

Motors up to 10.000 kW

Generators up to 12.500 kVA



Power generation

Marelli Motori manufactures generators for all applications where energy is required.

Our product applications include:

- Prime Rated Power (PRP) and Continuous Operating Power (COP)
- stand by
- emergency
- Uninterruptible Power Supply (UPS)
- telecom.

Generators up to 12.500 kVA



Cogeneration (CHP)

Marelli Motori manufactures electric generators for combined heat and power applications.

Our product applications include:

- internal combustion (diesel and gas) engines
- steam and gas turbines.

Generators up to 12.500 kVA



Oil & Gas

Marelli Motori manufactures electric motors and generators for the oil and gas market.

Our product applications include:

- power generation, auxiliary generators and emergency
- centrifugal & reciprocating compressor motors
- heat exchangers & blowers
- pumps (pipeline, water, transfer, cooling, booster)
- extruders / expanders, conveyor system
- mixers, mills and cranes.

Motors up to 1.600 kW

Generators up to 12.500 kVA



Hydropower

Marelli Motori manufactures electric synchronous and asynchronous generators for hydro power plants which can be utilized in any turbine installation.

Our product applications include:

- Pelton turbines
- Francis turbines
- Kaplan turbines
- Turgo turbines
- Cross-Flow turbines.

Asynchronous generators up to 2.800 kW

Synchronous generators up to 9.000 kVA



Industrial

Marelli Motori manufactures electric motors for a wide variety of industrial applications.

Our product applications include:

- power
- metals
- pulp and paper
- cement
- sugar mill
- water pumping and treatments
- manufacturing processes
- mining
- chemical.

Motors up to 10.000 kW

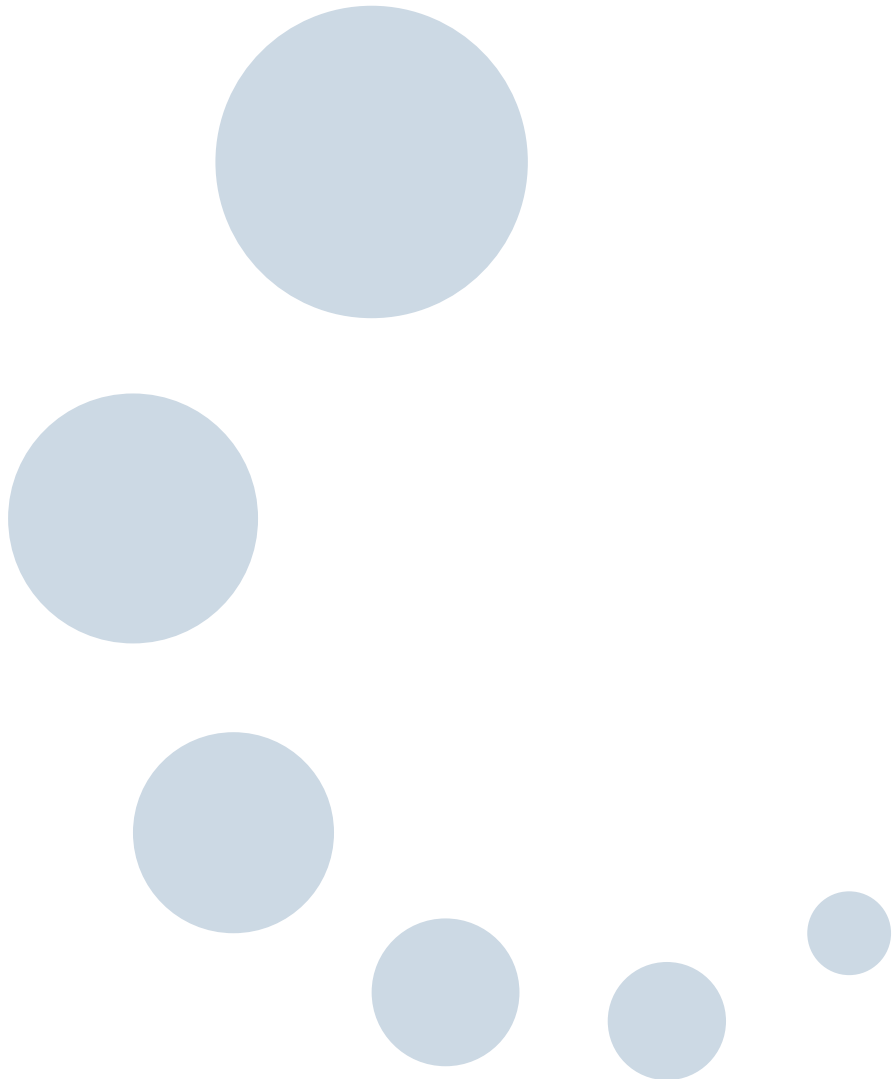
Our commitment to quality

Quality certifications

The Marelli Motori Group uses an Integrated Management System (IMS) which monitors quality, health and safety and environment standards according to ISO 9001, ISO 14001 and OHSAS 18001.

Our quality certifications guarantee the highest standards in all areas of our operations to ensure:

- outstanding product quality allied to best-in-class service performance
- market leading customer satisfaction by ensuring compliance with all customer requirements from product reliability through to durability and ease of maintenance
- a safe place to work in
- minimal environmental impact in all our operations.

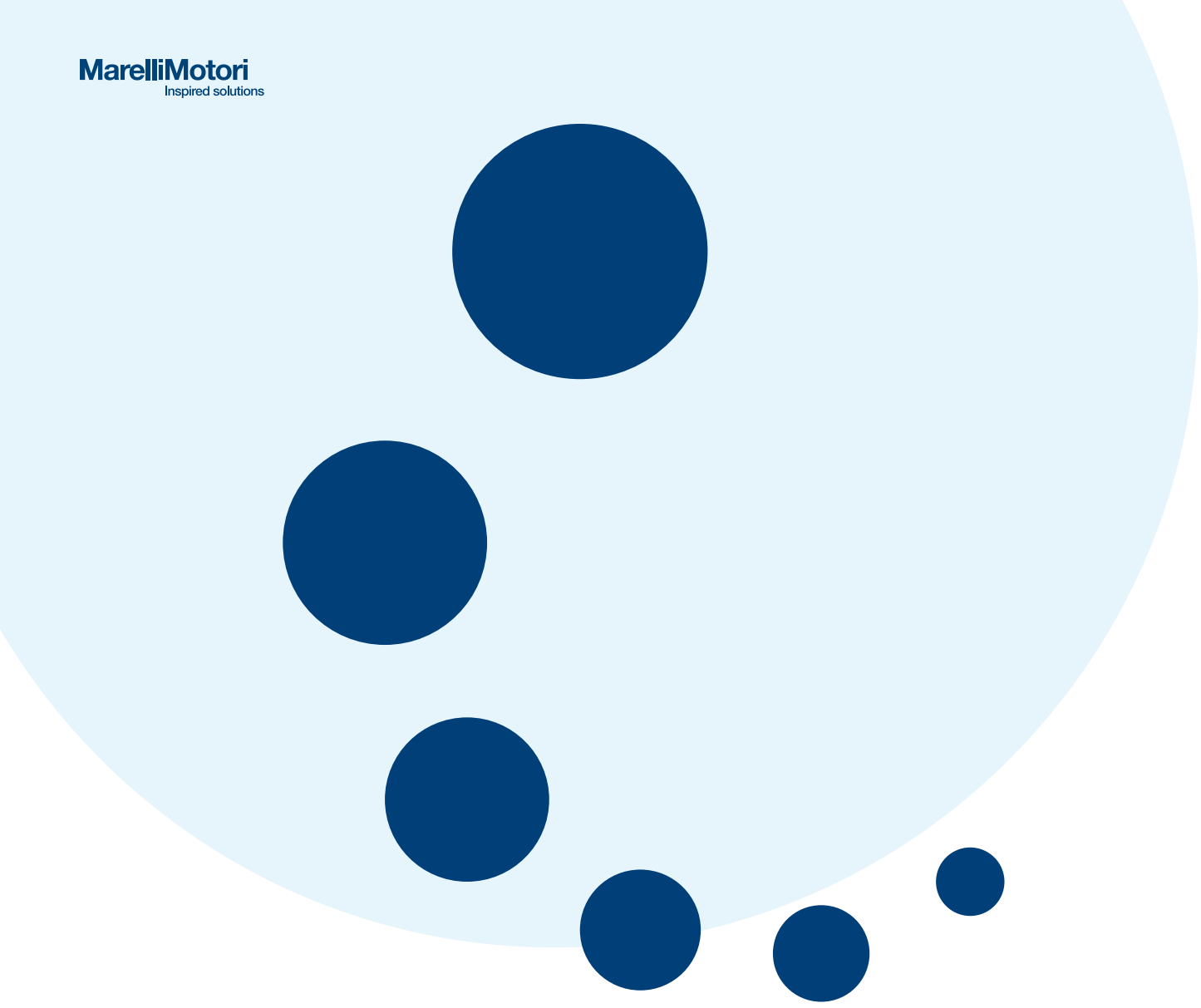


Our quality strategy

The Marelli Motori commitment to quality involves all employees from the boardroom to the shopfloor. Our aim is to help our employees to:

- develop a culture of quality, heightening awareness of quality issues, skills with appropriate and information
- ensure all employees comply with relevant quality regulations and procedures for the highest product quality, health and safety, and environmental standards
- plan and organise their activities with customer-oriented logic with customer satisfaction the ultimate goal at all times
- continuous evaluation of employee proposals for the improvement of processes defining key objectives and goals for the minimisation of environmental impact and health and safety risks of the personnel involved
- develop a culture where individual behavior leads to a safer and healthier workplace
- increase the awareness and involvement of all employees in work-related safety issues
- promote the Marelli Motori commitment to health and safety amongst the entire supply base ensuring a mutually beneficial relationship, enhancing the ability of both to create value.





Inspired solutions

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No compromise on quality

Vertical manufacturing

Marelli Motori's manufacturing process is vertically integrated which ensures we retain control of our supply chain both upstream and downstream.

High quality materials

Our products are manufactured using the highest quality materials and components from internationally recognised brands which are regularly audited to maintain standards.

Our electrical machines are designed and engineered to ensure a long production life, using components, such as bearings, which have been developed for the most demanding customer requirements.

Outstanding vibration resistance

Our products are required to work in very harsh environments, whilst maintaining the highest standards of reliability and efficiency. As a result, we have developed a range of sturdier mechanical designs, able to withstand extreme vibration levels and shock, above 16 mm/sec RMS.

Special impregnation process

The durability of our electrical core components is vitally important in maintaining uptime and productivity. As a result we have developed our own VPI (Vacuum Pressure Impregnation) process in-house, which ensures that the machine windings are sealed against moisture and vibration, in turn aiding mechanical strength and reliability.

International marine certifications

Independent accreditation is important for your peace of mind. All of our motors and generators comply with all major international marine certifying societies, such as ABS, KR, BV, DNV, CCS, GL, LR, NKK, RINA, RS etc. and our testing activities can be witnessed first-hand by customers.

Highest efficiency standards

We specialise in offering marine customers the highest levels of generator and motor efficiency via the use of technologically advanced solutions.

Our motors and generators are specifically designed to reach exceptionally high performance standards at any speed and during partial load operations.

Machine arrangements are suitable for variable speed applications, offering best-in-class energy efficiency levels to keep energy costs under control with no compromise on productivity.

Marelli Motori dedicated solutions can exceed 98% efficiency.

Reliable expertise

Extensive and diverse product range

Our comprehensive range of motors and generators have been specifically designed to match the diverse requirements of our customers, offering state-of-the-art solutions backed by outstanding application expertise.

Continuous enhancement through R&D

Our R&D focus is driven by a deep customer understanding which is then converted into product development and continuous range enhancement. We often develop projects in partnership with customers, for example by optimising the integrated system vibration level to avoid critical resonances.

Design flexibility

Our flexibility even reaches final assembly, a point at which customers are still able to adapt a design to meet the requirements of their specific application.

Once in the field, our products can be equipped with a range of retrofit devices enabling the continuous refinement and upgrading of machine performance.

Reliable performance

Marelli Motori products are 100% rated power in emergency mode.

Non-stop operations can be undertaken during ancillaries replacement and mirror system devices for back-up are standard features.

All of our products are extensively tested in our in-house laboratories, with tests including the string test type, to ensure the correct evaluation of electrical and mechanical performances in any working conditions.

Serviceability

Our motors and generators have been specifically designed for ease-of-maintenance, offering quick access to key components to facilitate MRO activities and reduce servicing costs.

All of our products have a friendly user-interface which, together with a global service network available worldwide, ensures best-in-class performance and high ROI.

Sustainable approach

Safety first

All Marelli Motori manufacturing sites comply with the International Standards for Safety OH SAS ISO 18000 (Occupational Health and Safety Assessment Series).

Low carbon footprint

Marelli Motori products are designed to deliver maximum performance and high energy efficiency to achieve the lowest carbon footprint possible.

For example, the energy recovery process in place during test room activities enables us to reduce the impact on the environment and mitigate global warming.

Social responsibility

Marelli Motori's approach to social responsibility is based upon minimising our impact on the environment and preserving the world's natural resources.

A key part of this approach is engage, with all of our stakeholders, including our supply chain and customers, partnering with universities for research and development and supporting local communities with charity activities.





Marine applications

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Motor applications

Propulsion



TEWAC
B4V
up to 10.000 kW



TEWC
B4J - B5J
up to 4.000 kW

Thrusters



TEWAC
B4V
up to 10.000 kW



ODP
C3M - C4M - C3W - C4W
up to 10.000 kW



TEWC
B4J - B5J
up to 4.000 kW



TEFC
B5M
up to 1.900 kW

Fi - Fi system



TEWAC
B4V
up to 10.000 kW



ODP
C3M - C4M - C3W - C4W
up to 10.000 kW



TEWC
B4J - B5J
up to 4.000 kW



TEFC
B5M
up to 1.900 kW

Auxiliaries



TEFC
A5M - B5M
up to 1.900 kW

Dredge pumps



TEWAC
B4V
up to 10.000 kW



TEWC
B4J - B5J
up to 4.000 kW

Winch



TEWAC
B4V
up to 10.000 kW



TEFC
A5M - B5M
up to 1.900 kW



TEWC
B4J - B5J
up to 4.000 kW

PTO - PTI system



TEWC
B4V
up to 10.000 kW



TEWAC
B4J - B5J
up to 4.000 kW

Generator applications

Propulsion generators



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA

Shaft generators



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA

Auxiliary generators



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA

Hybrid machines



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA

Offshore



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA



TEAAC
MJVM
up to 5.600 kVA

Variable speed generators



TEWAC
MJHRM
up to 11.000 kVA



ODP
MJHM
up to 12.500 kVA



TEWAC
MJRM
up to 6.500 kVA



ODP
MJBM
up to 6.500 kVA



TEAAC
MJVM
up to 5.600 kVA

Emergency



ODP
MJBM
up to 6.500 kVA



TEAAC
MJVM
up to 5.600 kVA

Key

TEWAC Totally Enclosed Water to Air Cooled

TEWC Totally Enclosed Water Cooled

ODP Open Drip Proof

TEFC Totally Enclosed Fan Cooled

TEAAC Totally Enclosed Air to Air Cooled

AVRs

Digital Regulators

Marelli Motori digital regulation systems provide functional and reliable solutions for the excitation control of synchronous generators. These highly integrated and robust AVRs are fully configurable and guarantee easy commissioning, monitoring and maintenance by user-friendly proprietary HMI (human-machine interface) software.

A wide range of built-in control functions, protections and operating modes make Marelli Motori digital AVRs flexible and suitable for a wide range of applications, including marine, hydro and cogeneration. Our automatic voltage regulator, MEC 100 is DNV type approved.

MEC 100

MEC 20
Three Phase

Analogue Voltage Regulators

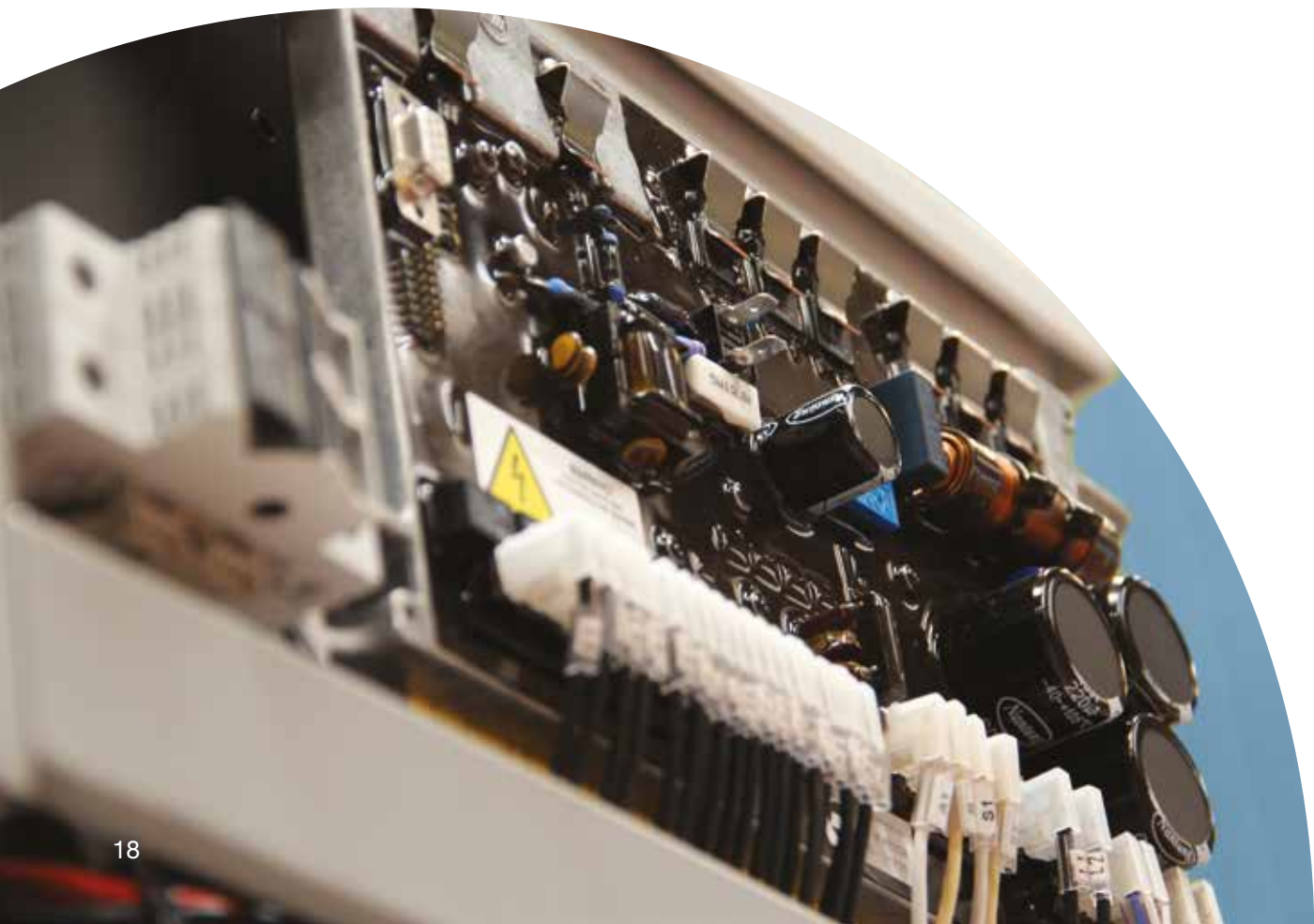
Marelli Motori analogue regulation systems are suitable for low and medium voltage machines. The regulators are fully insulated in order to maintain high reliability also with severe ambient conditions (high level of humidity, dust, salt atmosphere) and in case of high vibration level. The AVRs can work both for single and three phase operations.

MARK V
Single Phase

MGC I
Single Phase

MGC II
Single Phase

MARK X
Three Phase



Services

When you partner with Marelli Motori, customers not only gain access to our outstanding portfolio of motors and generators but also world class aftersales support.



Technical support

Marelli Motori prides itself on providing outstanding technical and application support for all its motors and generators. Qualified technical support personnel are always on hand to help with design, retrofitting and revamping solutions for machines and voltage/control systems.



Field Service

Our highly trained aftersales service technicians are capable of deploying, at short notice, anywhere in the world, rapidly diagnosing faults and ensuring fast and efficient maintenance and repair.



Spare parts

Genuine Marelli Motori spare parts are available at the Marelli headquarters, branch offices and service centres located all over the world.



Repairs

When a machine fails it is vital that a repair is performed quickly to ensure a swift return to operation. Marelli Motori can perform repairs of low, medium and high voltage machines either at our manufacturing facility or at the customer premises.



Commissioning

We understand that correct machine commissioning is vital in ensuring that our generators work to the best of their ability from day one. Marelli Motori provides hands-on assistance during the commissioning phase, guaranteeing that start-up takes place safely and that correct functional parameters for each machine are applied.



Training

Training courses are available all year to users and maintenance people to ensure the correct operation and maintenance of our electrical machines.

Industry standards

IP Code - Degree of protection (IEC - 60034 - 5)

First number		Second number	
2	Machine protected against solid objects greater than 12 mm	2	Dripping water shall have no harmful effect from the vertical up to an angle up to 15°
3	Machine protected against solid objects greater than 2,5 mm	3	Spraying water shall have no harmful effect from the vertical up to an angle up to 60°
4	Machine protected against solid objects greater than 1 mm	4	Splashing water from any direction shall have no harmful effect
5	Machine protected against dust	5	Jets of water from any direction shall have no harmful effect
6	Machine totally protected against tight dust	6	Jets of water from heavy seas from any direction shall have no harmful effect

Example of designation - IP 44

- IP** Code IP
- 4** First number (protection against dust)
- 4** Second number (protection against liquid)

IC Code - Cooling (IEC - 60034 - 6)

Typical fluids

- A** Air

- W** Water

Typical circuit arrangements

- 0** Free circulation

- 4** Machine surface - cooled

- 6** Heat exchanger machine mounted (using the motor surrounding coolant)

- 7** Heat exchanger built in the machine (not using the motor surrounding coolant)

- 8** Heat exchanger machine mounted (not using the motor surrounding coolant)

Typical methods of circulation

- 0** Free circulation

- 1** Self circulation

- 6** Circulation with independent device

Example of designation - IC 411

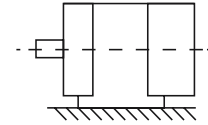
- IC** Code IC
- 4** Circuit arrangement
- A** Primary fluid
- 1** Method of circulation for primary fluid
- A** Secondary fluid
- 1** Method of circulation for secondary fluid

Mounting

IEC - 60034 - 7

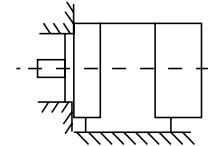
IM B3

Code II: IM 1001
 N° of bearings: 2
 Feet: With feet
 Flange: -
 Details: -
 Mounting arrangement: Mounting by feet
 (Feet down)



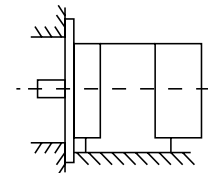
IM B34

Code II: IM 2101
 N° of bearings: 2
 Feet: With feet
 Flange: With flange
 Details: End Shield spigot
 No access to back
 Flange at D - End
 Mounting arrangement: Mounting by feet
 (Feet down with additional
 mounting on D - End Side of
 flange)



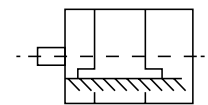
IM B35

Code II: IM 2001
 N° of bearings: 2
 Feet: With feet
 Flange: With flange
 Details: End Shield spigot
 No access to back
 Flange at D - End
 Mounting arrangement: Mounting by feet
 (Feet down with
 additional mounting
 on D - End Side)



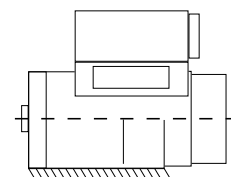
IM B20

Code II: IM 1101
 N° of bearings: 2
 Feet: With raised feet
 Flange: -
 Details: -
 Mounting arrangement: Mounting by feet
 (Feet down)



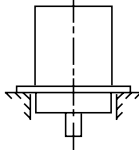
IM B2

Code II: IM 2105
 N° of bearings: 1
 Feet: With feet
 Flange: With flange
 Details: -
 Mounting arrangement: -



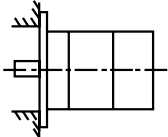
IM V10

Code II: IM 1411
 N° of bearings: 2
 Feet: -
 Flange: With flange
 Details: Special flange on D - End.
 Mounting arrangement: Mounted on D -End
 Side of flange,
 D - End down



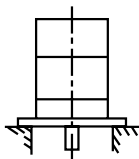
B5

Code II: -
 N° of bearings: 2
 Feet: With feet
 Flange: -
 Details: Endshield flange at D -
 End with access to back
 Mounting arrangement: Mounted on D -End
 Side of flange



V1

Code II: -
 N° of bearings: 2
 Feet: -
 Flange: With flange
 Details: Endshield flange at D -
 End with access to back
 Mounting arrangement: Mounted on D -End
 Side of flange D - End
 down



IM B16

Code II: IM 1301
 N° of bearings: 1
 Feet: With raised feet
 Flange: -
 Details: Horizontal shaft - One
 bearing
 Mounting arrangement: -





Motor applications

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TEWAC motors: B4V.....	26
ODP motors: C3M - C4M - C3W - C4W.....	29
TEWC motors: B4J - B5J.....	32
TEFC motors: A5M - B5M	35

Product map

Product	Propulsion	Thrusters	Fi-Fi System	Auxiliaries	Dredge Pumps	Winch	PTO - PTI system
TEWAC B4V	•	•	•		•	•	•
ODP C3M C4M C3W C4W		•	•				
TEWC B4JH -B5JH - B4J - B5J	•	•	•		•	•	•
TEFC A5M				•		•	
TEFC B5M		•	•	•		•	

Motor range

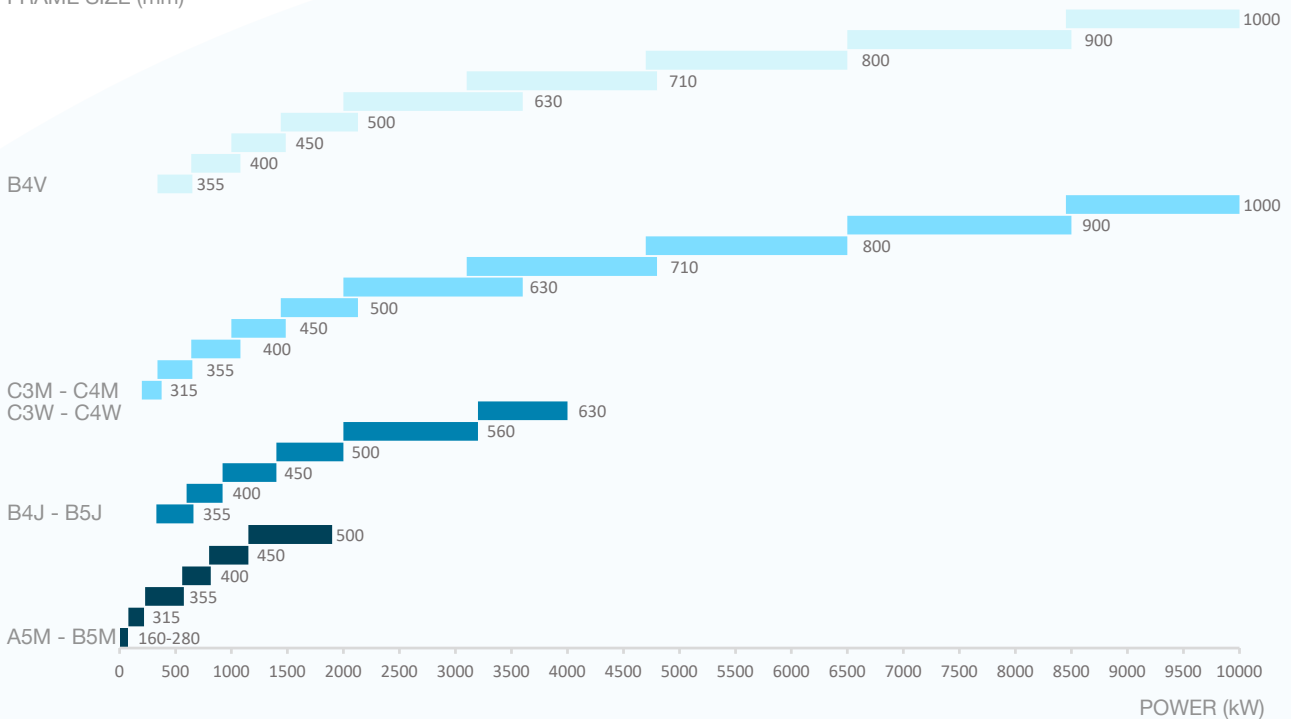
Key

- TEWAC - Totally Enclosed Water to Air Cooled
- ODP - Open Drip Proof
- TEWC - Totally Enclosed Water Cooled
- TEFC - Totally Enclosed Fan Cooled

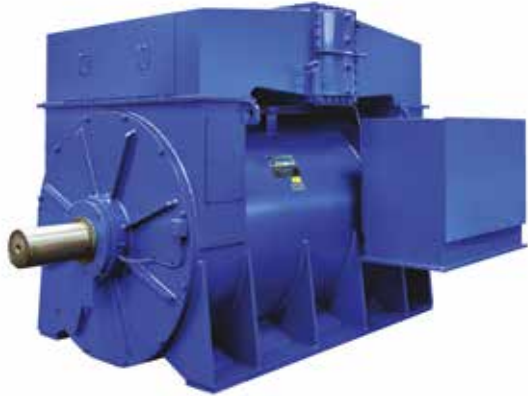
Motor model

- B4V**
- C3M - C4M - C3W - C4W**
- B4JH - B5JH - B4J - B5J**
- A5M - B5M**

FRAME SIZE (mm)



TEWAC motors: B4V



Model	B4V
Power	Up to 10.000 kW
Voltages	Up to 15.000 V
Frame	355 ÷ 1.000
Pole	4, 6, 8, 10 and 12
Cooling	IC 81W / IC 86W
IP	IP 44/ 54/ 55/ 56
Main applications	Propulsion, dredge pumps, winch, hybrid machine, PTO-PTI system
Other applications	Thrusters, Fi-Fi system, auxiliaries

	4 POLES	6 POLES	8 POLES	10 POLES
kW (at 60 Hz)	7.000	10.000	9.000	7.500

Certificates and testing

Certificate

Marine Survey Certificate supplied with the machine.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Motori motors for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
.....	
Shield	Made of grey cast-iron (EN 1561 – GJL 200) up to 500 frame size motors. Made of hot-rolled structural steel (EN 10025 – S235 JR) from size 560 and above.
.....	
Shaft	<p>General data Made in carbon steel (EN 10083 – 2 C40 – TN) up to 450 frame and hot-rolled structural steel from 500 frame (EN 10025 – S355 JR).</p> <p>Shaft design Cylindrical shaft with key.</p>
.....	
Main terminal box	Mounted on side (right or left to be selected). Made of formable steels EN 10130.
.....	
Internal fan	Made of aluminum alloy up to 400 frame. Made of hot-rolled structural steel above (EN 10025 – S235 JR).
.....	
Heat Exchanger	<p>Construction</p> <ul style="list-style-type: none"> • mounted on top of the machine • double tube made of CuNi 90/10 • copper fins housing • equipped with water leakage detector • certified by registers of shipping in compliance with Rules for Classification of Ship • coolant can be both fresh or sea water • suitable to be treated with corrosion inhibitors, PH regulators and anti freeze as appropriate to site conditions. <p>Exchanger data</p> <ul style="list-style-type: none"> • designed pressure 6 bar • test pressure 10 bar • max glycol: 30% • type of water: fresh water or marine (salt) water • flanges: PN6 – PN10 – Special (ANSI).

Construction

Enclosure	TEWAC – Totally Enclosed Water to Air Cooled
.....	
Cooling system	IC 81W as per IEC60034-6. Primary fluid (water) is flowing by external water system. Internal air is flowing by a fan mounted on the shaft of the generator at the driven side.
.....	
Degree of protection	IP 44 as per IEC60034-5. (Available up to IP 56)
.....	
Mounting	IM B3, V1 and V10 as per IEC60034-7.

Technical data

Stator/Rotor core

Laminated and enamel-insulated on both sides to minimise eddy-current losses. The stator winding is made of flat copper or round copper wire depending on the machine size.

The completely wound stator pack is thereby impregnated in an epoxy-resin VPI. The subsequent heat treatment hardens the resin.

Rotor

Squirrel cage rotor type.

Depending on machine size, the rotor construction is either a solid shaft or welded ribbed shaft.

The rotor winding can be either a pressure die cast aluminum or a copper bar construction.

Bearing

General data

Antifriction bearings grease lubricated (ball or roller type) or oil lubricated sleeve bearing.

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.

Locating bearings are on the D end side and floating bearings on the ND end side.

Both bearings are fitted with a regreasing system.

The used grease is removed through a valve locked in the outer bearing cover. Sleeve bearings available as an option.

On request special bearings are designed where high radial and axial forces are applied. All configurations are designed to withstand the following marine inclination

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system

Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerisation in oven.

Insulation system

Low voltage

Stator: F class insulated with a synthetic enamel.

(H class insulation available on request)

Protective treatments

Marine dedicated protective enamel is applied on the winding.

Optional features

- Dual/multiple winding configuration
- flanged shaft or special shaft end on both sides
- increase protection degree up to IP 56
- encoder
- vibration sensors
- special frame design to suite the application
- special bearings (sleeve or angular contact bearings)
- reinforced winding for VFD operation
- insulated bearings design for VFD application
- shaft earth brush for VFD application
- other options available on request.

ODP motors: C3M - C4M - C3W - C4W



Model	C3M - C4M - C3W - C4W
Power	Up to 10.000 kW
Voltages	Up to 15.000 kV
Frame	315 ÷ 1000
Pole	4, 6, 8, 10 and 12
Cooling	IC 01 / IC 06
IP	IP 23 / IP 44
Main applications	Thrusters, Fi-Fi
Other applications	Small Propulsion

	4 POLES	6 POLES	8 POLES	10 POLES
kW (at 60 Hz)	7.000	10.000	9.000	7.500

Certificates and testing

Certificate

Marine Survey Certificate supplied with the machine.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Motori motors for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
Shield	Made of grey cast-iron (EN 1561 – GJL 200) up to 500 frame size motors. Made of hot-rolled structural steel (EN 10025 – S235 JR) from size 560 and above.
Shaft	General data Made in carbon steel (EN 10083 – 2 C40 – TN) up to 450 frame and hot-rolled structural steel from 500 frame (EN 10025 – S355 JR). Shaft design Cylindrical shaft with key.
Main terminal box	Mounted on top. Made of cold-rolled formable steels EN 10025 – S235JR.
Internal fan	Made of aluminum alloy up to 400 frame. Made of hot-rolled structural steel above (EN 10025 – S235 JR).

Construction

Enclosure	ODP – Open Drip Proof Motors.
Cooling system	IC 01 as per IEC60034-6 Free circulation. Internal air is flowing by a fan mounted on the shaft of the motor at the driven side. The cooling air is taken on the ND-end, the air outlet is on the D-end. On request for variable speed application an external ventilation unit can be supplied to get the IC 06 cooling type.
Degree of protection	IP 23 as per IEC60034-5. The series can be supplied with air inlet filters to achieve the IP 44 rating. The motor series name will be C3W - C4W.
Mounting	IM B3, V1 and V10 as per IEC60034-7.

Technical data

Stator/Rotor core

Laminated and enamel-insulated on both sides to minimise eddy-current losses. The stator winding is made of flat copper or round copper wire depending on the machine size. The completely wound stator pack with housing is thereby impregnated in an epoxy-resin VPI. The subsequent heat treatment hardens the resin.

Rotor

Short circuit rotor type.
 Depending on machine size, the rotor construction is either a solid shaft or welded ribbed shaft.
 The rotor winding can be either a pressure die cast aluminum or a copper bar construction.

Bearing

General data

Antifriction bearings grease lubricated (ball or roller type) or oil lubricated sleeve bearing.
 The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.
 Locating bearings are on the D end side and floating bearings on the ND end side. Both bearings are fitted with a regreasing system. The used grease is removed through a valve locked in the outer bearing cover. Sleeve bearings available as an option. On request special bearings are designed where high radial and axial forces are applied. All configurations are designed to withstand the following marine inclination.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values

Impregnation system

Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.

Insulation system

Low voltage.
 Stator: F class insulated with a synthetic enamel.
 (H class insulation available on request)

Protective treatments

Marine dedicated protective enamel is applied on the winding.

Optional features

- Dual/multiple winding configuration
- flanged shaft or special shaft end on both sides
- increase protection degree up to IP 56
- encoder
- vibration sensors
- special frame design to suite the application
- special bearings (sleeve or angular contact bearings)
- reinforced winding for VFD operation
- insulated bearings design for VFD application
- shaft earth brush for VFD application
- other options available on request.

TEWC motors: B4J - B5J



Model	B4J - B5J (LV)
Model	B4JH - B5JH (MV)
Power	Up to 4.000 kW
Voltages	B4J - B5J Up to 690 V B4JH - B5JH Up to 6.600 V
Frame	355 ÷ 630
Pole	4, 6, 8 and 10
Cooling	IC 71W
IP	IP 55/ 56
Main applications	Propulsion, thruster, dredge pump, hybrid machine, PTO-PTI system
Other applications	Fi - Fi system

	4 POLES	6 POLES	8 POLES
kW (at 60 Hz)	4.000	3.800	2.900

Certificates and testing

Certificate

Marine Survey Certificate supplied with the machine.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.
Motors are ABS, RRR and DNV type approved.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Motori motors for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
.....	
Shield	Made of grey cast-iron (EN 1561 – GJL 200) up to 500 frame size motors. Made of hot-rolled structural steel (EN 10025 – S235 JR) from size 560 and above
.....	
Shaft	<p>General data Made in carbon steel (EN 10083 – 2 C40 – TN) up to 450 frame and hot-rolled structural steel from 500 frame (EN 10025 – S355 JR).</p> <p>Shaft design Cylindrical shaft with key</p>
.....	
Main terminal box	Mounted on top or side (with vertical mounting) and made in cast iron or cold rolled formable steels depending from size.
.....	
Internal fan	Made of aluminium alloy for 450 and 500 frame size. Made of hot-rolled structural steel from frame size 560 and above (EN 10025 – S235 JR).
.....	
Heat Exchanger	<p>General data Heat exchanger is part of the housing and built on the machine. The material of the frame is carbon steel according to the standard EN 10025-S275JR. Equipped with water leakage detector as standard.</p> <p>Exchanger data Working pressure < 6 bar Test pressure 9 bar Max glycol : 20% Coolant : fresh water only</p>

Construction

Enclosure	TEWC – Totally Enclosed Water Cooled
.....	
Cooling system	<p>IC 71W as per IEC60034-6.</p> <p>7 : Heat exchanger. The primary coolant is circulated in a closed circuit which is built as integral part of the machine.</p> <p>1 : Self-circulation. The coolant is moved by a fan mechanically driven by the rotor.</p> <p>W : Coolant. Cooling water must be clean water.</p>
.....	
Degree of protection	IP 55 as per IEC60034-5.
.....	
Mounting	IM B3, V1 and V10 as per IEC60034-7.

Technical data

Stator/Rotor core

Laminated and enamel-insulated on both sides to minimise eddy-current losses. The stator winding is made of flat copper or round copper wire depending on the machine size. The completely wound stator pack with housing is thereby impregnated in an epoxy-resin VPI. The subsequent heat treatment hardens the resin.

Rotor

Squirrel cage rotor type.
Depending on machine size, the rotor construction is either a solid shaft or welded ribbed shaft.
The rotor winding can be either a pressure die cast aluminum or a copper bar construction.

Bearing

General data

Antifriction bearings grease lubricated (ball or roller type) or oil lubricated sleeve bearing.

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.

Locating bearings are on the D end side and floating bearings on the ND end side.

Both bearings are fitted with a regreasing system.

The used grease is removed through a valve locked in the outer bearing cover. Sleeve bearings available as an option.

On request special bearings are designed where high radial and axial forces are applied. All configurations are designed to withstand the following marine inclination.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system

Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.

Insulation system

Low voltage

Stator: F class insulated with a synthetic enamel.

(H class insulation available on request)

Protective treatments

Marine dedicated protective enamel is applied on the winding.

Optional features

- Dual/multiple winding configuration
- flanged shaft or special shaft end on both sides
- increase protection degree up to IP 56
- encoder
- vibration sensors
- special frame design to suite the application
- special bearings (sleeve or angular contact bearings)
- reinforced winding for VFD operation
- insulated bearings design for VFD application
- shaft earth brush for VFD application
- other options available on request.

TEFC motors: A5M - B5M



Model	A5M - B5M
Power	Up to 1.900 kW
Voltages	Up to 11.000 V
Frame	71 ÷ 500
Pole	2, 4, 6 and 8
Cooling	IC 411 (or IC 416)
IP	IP 55/ IP 56/ IP 65
Main applications	Auxiliaries, Fi-Fi system
Other applications	Winch

	2 POLES	4 POLES	6 POLES	8 POLES
kW (at 60 Hz)	1.000	1.900	1.500	1.000

Certificates and testing

Certificate

Marine Survey Certificate supplied with the machine.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Motors from size 71 to 132 are made in cast iron. Motors from size 160 to 280 are made or in cast iron or in aluminium. Starting from frame 315 and up to 500 the frame is in cast iron only. (EN 1561-GJL – 200)
Shield	Made of grey cast-iron (EN 1561 – GJL 200) up to 500 frame size motors.
Shaft	General data Made in carbon steel (EN 10083 – 2 C40 – TN) up to 500 frame Shaft design Cylindrical shaft with key.
Main terminal box	Mounted on top and made of cold-rolled formable steels EN 10025 – S235JR or cast iron depending from size.
Fan	Made of aluminum alloy up to 500 frame.

Construction

Enclosure	TEFC MOTORS – Totally Enclosed Eater Cooled
Cooling system	IC 411 as per IEC60034-6 Totally enclosed standard motor, frame surface cooled with fan 4: Frame surface cooled 1: Self circulation of primary coolant 1: Self circulation of secondary coolant On request for variable speed application an external ventilation unit can be supplied to get the IC 416 cooling type.
Degree of protection	IP 55 as per IEC60034-5
Mounting	IM B3 and V1 per IEC60034-7

Technical data

Stator/Rotor core Laminated and enamel-insulated on both sides to minimise eddy-current losses. The stator winding is made of flat copper or round copper wire depending on the machine size. The completely wound stator pack with housing is thereby impregnated in an epoxy-resin VPI. The subsequent heat treatment hardens the resin.

Rotor Short circuit rotor type.
Depending on machine size, the rotor construction is either a solid shaft or welded ribbed shaft.
The rotor winding can be either a pressure die cast aluminum or a copper bar construction.

Bearing **General data**
Antifriction bearings grease lubricated (ball or roller type) or oil lubricated sleeve bearing.
The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.
Locating bearings are on the D end side and floating bearings on the ND end side. Both bearings are fitted with a regreasing system. The used grease is removed through a valve locked in the outer bearing cover. Sleeve bearings available as an option. On request special bearings are designed where high radial and axial forces are applied.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.

Insulation system Low voltage
Stator: F class insulated with a synthetic enamel.
(H class insulation available on request)

Protective treatments Marine dedicated protective enamel is applied on the winding.

Optional features

- Dual/multiple winding configuration
- flanged shaft or special shaft end on both sides
- increase protection degree up to IP56
- encoder
- vibration sensors
- special frame design to suite the application
- special bearings (sleeve or angular contact bearings)
- reinforced winding for VFD operation
- insulated bearings design for VFD application
- shaft earth brush for VFD application
- other options available on request.



Generator applications

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Product map

Product	Propulsion generator	Shaft generator	Auxiliary generator	Hybrid machine	Offshore	Variable speed generator	Emergency
TEWAC MJHRM	•	•	•	•	•	•	
ODP MJHM	•	•	•	•	•	•	
TEWAC MJRM	•	•	•	•	•	•	
ODP MJBM	•	•	•	•	•	•	•
TEAAC MJVM					•	•	•

Generator range

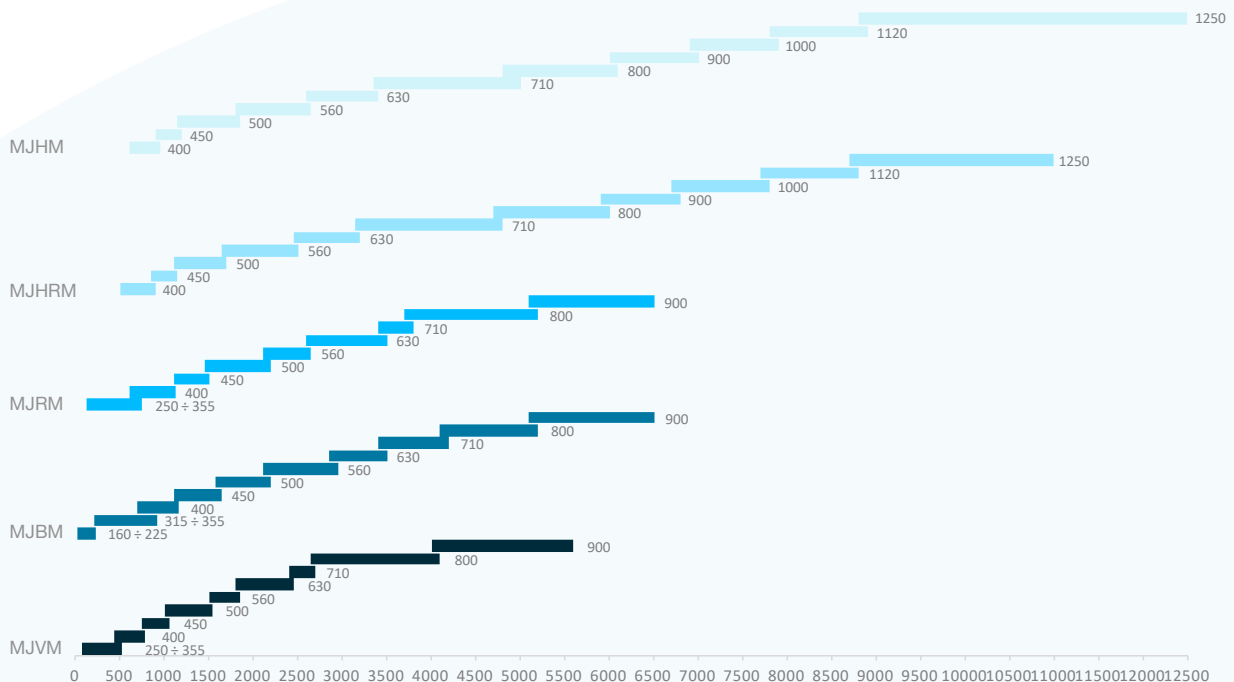
Key

- ODP - Open Drip Proof
- TEWAC - Totally Enclosed Water to Air Cooled
- TEWAC - Totally Enclosed Water to Air Cooled
- ODP - Open Drip Proof
- TEAAC - Totally Enclosed Air to Air Cooled

Generator model

- MJHM**
- MJHRM**
- MJRM**
- MJBM**
- MJVM**

FRAME SIZE (mm)



POWER (kVA)

TEWAC generators: MJHRM



Model	MJHRM
Power	Up to 11.000 kVA
Voltages	Up to 15.000 V
Frame	400 ÷ 1.250
Pole	4, 6, 8, 10 and 12 (over contact MM)
Cooling	IC 81W
IP	IP 44. Available up to IP 56.
Main applications	Propulsion generator, shaft generator, hybrid machine, auxiliary generator, off-shore and variable speed generator.

	4 POLES	6 POLES	8 POLES	10 POLES	12 POLES
kVA (at 60 Hz)	10.000	9.000	11.000	11.000	10.000

Certificates and testing

Applicable standards

Generators are designed in compliance with:
IEC EN 60034 - 1
BS 4999 - 5000
VDE 0530
NF 51 - 100
NF 51 - 111
OVE M - 10
NEMA MG 1.32
Generators conform to EU rules.
UL/CSA certifications available on request.

Certificate

Marine Survey Certificate supplied with the machine.
Marelli Motori has the ABS design assessment.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Motori generators for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
.....	
Shield	Made of spheroidal graphite cast-iron (EN 1563) or grey cast-iron (EN 1561) up to 630 frame size. Made of structural steel (EN 10025 – S235 JR) above.
.....	
Shaft	<p>General data Made in carbon steel and obtained by lamination (EN 10083–2 C40–TN). Shaft is obtained by forging from 290 mm diameter and above. The shaft is tested at the manufacturer in order to check it is defect-free.</p> <p>Shaft design Double bearing generator: cylindrical shaft with key.</p>
.....	
Main terminal box	Mounted on side (right or left will be selected). Made of formable steels EN 10130.
.....	
Fan	Made of aluminum alloy (EN 1706) or structural steel (EN 10025 – S235 JR) depending upon application requirements.
.....	
Heat Exchanger	<p>Construction Mounted on top of alternator. Double tube made of CuNi 90/10. Copper fins housing. Equipped with water leakage detector.</p> <p>Exchanger data</p> <ul style="list-style-type: none"> • Designed pressure 6 bar • test pressure 10 bar • power: up to 200 kW • water flow: up to 18 m³/h • max glycol: 30% • type of water: fresh water or marine (salt) water • flanges: PN6 – PN10 – Special (ANSI) <p style="padding-left: 40px;">Position can be adjusted to site conditions.</p>
.....	
Construction	
Enclosure	TEWAC - Totally Enclosed Water to Air Cooled.
.....	
Cooling system	IC 81W as per IEC60034-6. Primary fluid (water) is flowing by external water system. Internal air is flowing by a fan mounted on the shaft of the generator at the driven side.
.....	
Degree of protection	IP 44 as per IEC60034-5. (Available up to IP 56)
.....	
Mounting	Horizontal - IM 1001 or IM 1101 as per IEC 60034-7

Technical data

Stator/Rotor core Laminated and enamel-insulated on both sides to minimise eddy-current losses.

Rotor Salient pole type.
Made by copper flat wire.
H class insulated with enamel coating.
Winding retaining by pass-through bars of high quality steel.
Rotating rectifier: Graetz diode bridge with 6 diodes.
Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal A. Special vibration level construction is available.

Bearing

General data

Single or double antifriction bearing grease lubricated (ball or roller type) or oil lubricated sleeve bearing.

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.

Locating bearings are on the D end side and floating bearings on the ND end side.

Bearing selection

Antifriction bearings up to 560 frame size included.

Sleeve bearings from 630 frame size included (available for smaller frame sizes)

Antifriction bearings can be mounted on 630/710 frame size according to site working conditions.

Regreasing system (for antifriction bearing)

Both bearings are fitted with grease nipple.

Bearing insulation

ND end bearing can be insulated to prevent any harmful circulating current from passing through the bearing surfaces.

Insulated antifriction bearings in standard configuration:

- 4, 6 poles: insulated ND end bearing from 630 frame size
- 8 poles: insulated bearing from 400 frame size
- 10 poles: insulated bearing from 500 frame size

All ND end sleeve bearings are insulated as standard.

All configurations are designed to withstand the following marine inclination.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.

Insulation system Stator: F class insulated with a synthetic enamel.
Rotor: H class insulated with a synthetic enamel.

Protective treatments Specific marine treatment.
Epoxivinilic and polyacrylic. Total minimum thickness 120 micromillimeters.
Epoxivinilic: Epoxy two component products, with vinyl change.
Polyacrylic: Two components polyurethane product formulated with unmodified hydroxyl acrylic resin.

Operating conditions

Overloads	<p>During continuous duty (S1), the following overloads are allowed: 10% for 1 hour 15% for 10 minutes 30% for 4 minutes 50% for 2 minutes These overloads must be occasional and followed by one hour of running at normal load or less.</p>
Parallel operations	<p>All generators are provided with an amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit. A power factor regulator (to work in parallel with the main) is available on request.</p>
Transient ratings	<p>All generators comply with marine rules regarding transient performance. The voltage drop due to the application of 60% of nominal load is within 15%.</p>
Three phase short circuit current	<p>All generators equipped with an overboosting device ensure a three phase short circuit current (I_{cc}) higher than three times the rated current (I_n): $I_{cc} > 300\% I_n$</p>
Radio interference	<p>All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.</p>
THD (Total Harmonic Distortion)	<p>The no-load voltage wave form is sinusoidal with THD content less than 2%.</p>
Vibrations	<p>Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.</p>

Auxiliary device

AVR

Automatic voltage regulator mounted on board.

Size	Type
400 - 450	MEC 20 analog/ digital
500 - 560	M40FA610A analog
630 - 710	M63FA310A analog
800 - 1.250	MEC 100 digital

Overboosting device

	Size	Type
Medium voltage	All	CT + Overboosting device
High voltage	All	PMG

Space heaters

Size	Power (W)
400 - 560	400
630 - 710	600
800 - 900	800
1.000	1.000
1.120	1.200
1.250	1.400

Heaters installed at ND end side.

RTD - PT100

RTD devices in standard configuration:

- 1+1 RTD on each phase of stator winding
- 1 RTD on each bearing

Terminals in auxiliary terminal box.

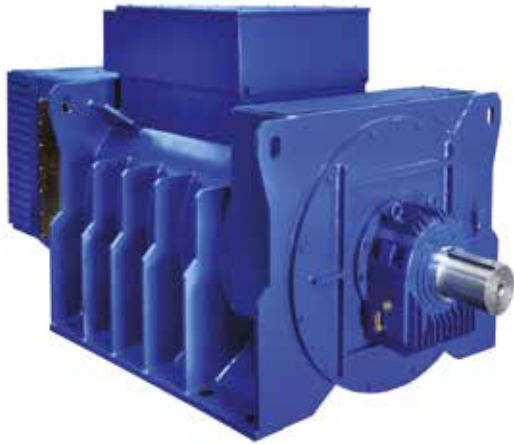
Other configurations available:

- DUPLEX type
- RTD for inlet / outlet air
- RTD for inlet / outlet water

Optional features

- Reinforced construction for high linear vibrations
- flanged shaft for direct coupling with engine flywheel (in case of single bearing solution)
- neutral point terminals in separate terminal box
- terminal box inside air duct (internal terminal box)
- cooling system IC 86W with additional forced ventilation
- cooler mounted on side
- increase protection degree up to IP 54, IP 55 or IP 56
- lifted feet to couple the generator with engine on existing baseframe
- redundant rotating rectifier with 12 diodes
- insulated bearing and earthing brush
- AVR supplied loose
- automatic power factor control (analog type)
- digital AVR MEC100 for frame 400 – 710 (supplied loose)
- digital AVR MEC100D with diode failure monitoring
- redundant AVR system
- excitation/overboosting PMG mounted on generator
- lubrication system for sleeve bearing
- other options available on request.

ODP generators: MJHM



Model	MJHM
Power	Up to 12.500 kVA
Voltages	Up to 15.000 V
Frame	400 ÷ 1.250
Pole	4, 6, 8, 10 and 12 (over contact MM)
Cooling	IC 01
IP	IP 23. Available up to IP 44 with filters
Main applications	Propulsion generator, shaft generator, hybrid machine, auxiliary generator, off-shore and variable speed generator.

	4 POLES	6 POLES	8 POLES	10 POLES	12 POLES
kVA (at 60 Hz)	10.000	9.000	11.000	11.000	10.000

Certificates and testing

Applicable standards

Generators are designed in compliance with:
 IEC EN 60034 - 1
 BS 4999 - 5000
 VDE 0530
 NF 51 - 100
 NF 51 - 111
 OVE M - 10
 NEMA MG 1.32
 All generators conform to EU rules.
 UL/CSA certifications available on request.

Certificate

Marine Survey Certificate supplied with the machine.
 Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test Room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Generators for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
Shield	Made of spheroidal graphite cast-iron (EN 1563) or grey cast-iron (EN 1561) up to 630 frame size. Made of structural steel (EN 10025 – S235 JR) above.
Shaft	General data Made in carbon steel and obtained by lamination (EN 10083–2 C40–TN). Shaft is obtained by forging from 290 mm diameter and above. The shaft is tested to ensure defect-free performance. Shaft design Double bearing generator: cylindrical shaft with key.
Main terminal box	Mounted on top. Made of formable steels EN 10130.
Fan	Made of aluminum alloy (EN 1706) or structural steel (EN 10025 – S235 JR) depending upon application requirements.

Construction

Enclosure	ODP - Open Drip Proof
Cooling system	IC 01 as per IEC60034-6
Degree of protection	IP 23 as per IEC60034-5
Mounting	Horizontal - IM 1001 or IM 1101 as per IEC 60034-7

Technical data

Stator/Rotor core Laminated and enamel-insulated on both sides to minimise eddy-current losses

Rotor Salient pole type.
 Made by copper flat wire.
 H class insulated with enamel coating.
 Winding retaining by pass-through bars of high quality steel.
 Rotating rectifier: Graetz diode bridge with 6 diodes.
 Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal A.
 Special vibration level constructions are available.

Bearing

General data
 Single or double antifriction bearing grease lubricated (ball or roller type) or oil lubricated sleeve bearing.
 The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.
 Locating bearings are on the D end side and floating bearings on the ND end side.

Bearing selection
 Antifriction bearings up to 560 frame size included.
 Sleeve bearings from 630 frame size included (available for smaller frame sizes)
 Antifriction bearings can be mounted on 630/710 frame size according to site working conditions.

Regreasing system (for antifriction bearing)
 Both bearings are fitted with grease nipple.

Bearing insulation
 ND end bearing can be insulated to prevent any harmful circulating current from passing through the bearing surfaces.
 Insulated antifriction bearings in standard configuration:

- 4, 6 poles: insulated ND end bearing from 630 frame size
- 8 poles: insulated bearing from 400 frame size
- 10 poles: insulated bearing from 500 frame size

All ND end sleeve bearings are insulated as standard. All configurations are designed to withstand the following marine inclination.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerized in an oven.

Insulation system Stator: F class insulated with a synthetic enamel
 Rotor: H class insulated with a synthetic enamel

Protective treatments Specific marine treatment.
 Epoxivinilic and polyacrylic.Total minimum thickness 120 micromillimeters.
 Epoxivinilic: Epoxy two component products, with vinyl change
 Polyacrylic: Two components polyurethane product formulated with unmodified hydroxyl acrylic resin.

Operating conditions

Overloads	During continuous duty (S1), the following overloads are allowed: 10% for 1 hour 15% for 10 minutes 30% for 4 minutes 50% for 2 minutes These overloads must be occasional and followed by 1 hour of running at normal load or less.
Parallel operations	All generators are provided with an amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit. A power factor regulator (to work in parallel with the main) is available on request.
Transient ratings	All generators comply with marine rules regarding transient performance. The voltage drop due to the application of 60% of nominal load is within 15%.
Three phase short circuit current	All generators equipped with an overboosting device ensure a three phase short circuit current (I_{cc}) higher than 3 times the rated current (I_n): $I_{cc} > 300\% I_n$
Radio interference	All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.
THD (Total Harmonic Distortion)	The no-load voltage wave form is sinusoidal with THD content less than 2%.
Vibrations	Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.

Auxiliary devices

AVR

Automatic voltage regulator mounted on board.

Size	Type
400 - 450	MEC 20 analog/ digital
500 - 560	M40FA610A analog
630 - 710	M63FA310A analog
800 - 1250	MEC 100 digital

Overboosting device

	Size	Type
Medium voltage	All	CT + Overboosting device
High voltage	All	PMG

Space heaters

Heaters installed at ND-end side.

Size	Power (W)
400 - 560	400
630 - 710	600
800 - 900	800
1000	1000
1120	1200
1250	1400

RTD - PT100

RTD devices in standard configuration:

- 1+1 RTD on each phase of stator winding
- 1 RTD on each bearing

Terminals in auxiliary terminal box.

Other configurations available:

- DUPLEX type
- RTD for inlet / outlet air

Optional features

- Reinforced construction for high linear vibrations
- flanged shaft for direct coupling with engine flywheel (in case of single bearing solution)
- neutral point terminals in separate terminal box
- increase protection degree up to IP 44 with filters
- lifted feet to couple the generator with engine on existing baseframe
- redundant rotating rectifier with 12 diodes
- insulated bearing and earthing brush
- AVR supplied loose
- automatic power factor control (analog type)
- digital AVR MEC100 for frame 400 – 710 (supplied loose)
- digital AVR MEC100D with diode failure monitoring
- redundant AVR system
- excitation/overboosting PMG mounted on generator
- lubrication system for sleeve bearing
- other options available on request.

TEWAC generators: MJRM



Model	MJRM
Power	Up to 6.500 kVA
Voltages	Up to 1.000 V
Frame	250 ÷ 900
Pole	4, 6, 8, 10 and 12 (over contact MM)
Cooling	IC 81W/ IC 86W
IP	IP 44. Available up to IP 56.
Main applications	Propulsion generator, shaft generator, hybrid machine, auxiliary generator, off-shore and variable speed generator.

	4 POLES	6 POLES	8 POLES	10 POLES	12 POLES
kVA (at 60 Hz)	4.000	5.000	6.500	6.000	5.400

Certificates and testing

Applicable standards

Generators are designed in compliance with:
IEC EN 60034 - 1
BS 4999 - 5000
VDE 0530
NF 51 - 100
NF 51 - 111
OVE M - 10
NEMA MG 1.32
All generators conform to EU rules.
UL/CSA certifications available on request.

Certificate

Marine Survey Certificate supplied with the machine.
Marelli Motori is DNV type approved and has the ABS design assessment.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Motori generators for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
.....	
Shield	Made of spheroidal graphite cast-iron (EN 1563) or grey cast-iron (EN 1561) up to 630 frame size. Made of structural steel (EN 10025 – S235 JR) above.
.....	
Shaft	<p>General data Made in carbon steel and obtained by lamination (EN 10083–2 C40–N). Shaft is obtained by forging from 290 mm diameter and above. The shaft is tested at the manufacturer in order to check it is defect-free.</p> <p>Shaft design Double bearing generator: cylindrical shaft with key.</p>
.....	
Main terminal box	Mounted on side (right or left will be selected). Made of formable steels EN 10130.
.....	
Fan	Made of aluminum alloy (EN 1706) or structural steel (EN 10025–S235 JR) depending on application requirements.
.....	
Heat Exchanger	<p>Construction Mounted on top of alternator. Double tube made of CuNi 90/10. Copper fins housing. Equipped with water leakage detector.</p> <p>Exchanger data Designed pressure 6 bar. Test pressure 10 bar Power: up to 200 kW Water flow: up to 18 m³/h Max glycol: 30% Type of water: fresh water or marine (salt) water Flanges: PN6 – PN10 – Special (ANSI) Position can be adjusted to site conditions.</p>

Construction

Enclosure	TEWAC - Totally Enclosed Water to Air Cooled
.....	
Cooling system	IC81W as per IEC60034-6. Primary fluid (water) is flowing by external water system. Internal air is flowing by a fan mounted on the shaft of the generator at the driven side.
.....	
Degree of protection	IP 44 as per IEC60034-5. (Available up to IP 56)
.....	
Mounting	Horizontal - IM 1001 or IM 1101 as per IEC 60034-7

Technical data

Stator/Rotor core	Laminated and enamel-insulated on both sides to minimise eddy-current losses.												
.....													
Rotor	<p>Salient pole type. Made by copper flat wire. H class insulated with enamel coating. Winding retaining by pass-through bars of high quality steel. Rotating rectifier: Graetz diode bridge with 6 diodes. Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal A. Special vibration level construction are available.</p>												
.....													
Bearing	<p>General data Single or double antifriction bearing grease lubricated (ball or roller type) or oil lubricated sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours. Locating bearings are on the D end side and floating bearings on the ND end side.</p> <p>Bearing selection Antifriction bearings up to 560 frame size included. Sleeve bearings from 630 frame size included (available for smaller frame sizes) Antifriction bearings can be mounted on 630/710 frame size according to site working conditions.</p> <p>Regreasing system (for antifriction bearing) Both bearings are fitted with a grease nipple.</p> <p>Bearing insulation ND end bearing can be insulated to prevent any harmful circulating current from passing through the bearing surfaces. Insulated antifriction bearings in standard configuration:</p> <ul style="list-style-type: none"> • 4, 6 poles: insulated ND end bearing from 630 frame size • 8 poles: insulated bearing from 400 frame size • 10 poles: insulated bearing from 500 frame size <p>All ND end sleeve bearings are insulated as standard. All configurations are designed to withstand the following marine inclination.</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 30%; text-align: center;">Static</th> <th style="width: 30%;"></th> <th style="width: 30%; text-align: center;">Dynamic</th> </tr> </thead> <tbody> <tr> <td>List</td> <td style="text-align: center;">15°</td> <td>Rolling</td> <td style="text-align: center;">±22.5°</td> </tr> <tr> <td>Trim</td> <td style="text-align: center;">5°</td> <td>Pitch</td> <td style="text-align: center;">±7.5°</td> </tr> </tbody> </table> <p>Dedicated constructions available for different values.</p>		Static		Dynamic	List	15°	Rolling	±22.5°	Trim	5°	Pitch	±7.5°
	Static		Dynamic										
List	15°	Rolling	±22.5°										
Trim	5°	Pitch	±7.5°										
.....													
Impregnation system	Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.												
.....													
Insulation system	<p>Stator: H class insulated with a synthetic enamel. Rotor: H class insulated with a synthetic enamel.</p>												
.....													
Protective treatments	<p>Specific marine treatment. Epoxivinilic and polyacrylic. Total minimum thickness 120 micromillimeters. Epoxivinilic: Epoxy two component products, with vinyl change. Polyacrylic: Two components polyurethane product formulated with unmodified hydroxyl acrylic resin.</p>												

Operating conditions

Overloads	<p>During continuous duty (S1), the following overloads are allowed: 10% for 1 hour 15% for 10 minutes 30% for 4 minutes 50% for 2 minutes These overloads must be occasional and followed by one hour of running at normal load or less.</p>
Parallel operations	<p>All generators are provided with a amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit. A power factor regulator (to work in parallel with the main) is available on request.</p>
Transient ratings	<p>All generators comply with marine rules regarding transient performance. The voltage drop due to the application of 60% of nominal load is within 15%.</p>
Three phase short circuit current	<p>All generators equipped with overboosting device to ensure a three phase short circuit current (I_{cc}) higher than 3 times the rated current (I_n): $I_{cc} > 300\% I_n$</p>
Radio interference	<p>All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.</p>
THD (Total Harmonic Distortion)	<p>The no-load voltage wave form is sinusoidal with THD content less than 2%.</p>
Vibrations	<p>Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.</p>

Auxiliary devices

AVR

Automatic voltage regulator mounted on board.

Size	Type
250	MARK V analog
315 - 450	MEC 20 analog/ digital
500 - 560	M40FA610A analog
630 - 710	M63FA310A analog
800 - 900	MEC 100 digital

Overboosting device

Size	Type
Low voltage 250 - 450 (4 poles)	Auxiliary winding
400 - 450 (>4 poles)	Varicomp
500 - 710 (all polarities)	Varicomp
800 - 900	PMG

Space heaters

Heaters installed at ND-end side.

Size	Power (W)
400 - 560	400
630 - 710	600
800 - 900	800

RTD - PT100

RTD devices in standard configuration:

- 1+1 RTD on each phase of stator winding
- 1 RTD on each bearing

Terminals in auxiliary terminal box.

Other configurations available:

- DUPLEX type
- RTD for inlet / outlet air
- RTD for inlet / outlet water

Optional features

- Reinforced construction for high linear vibrations
- flanged shaft for direct coupling with engine flywheel (in case of single bearing solution)
- neutral point terminals in separate terminal box
- terminal box inside air duct (internal terminal box)
- cooling system IC 86W with additional forced ventilation
- cooler mounted on side
- increase protection degree up to IP 54, IP 55 or IP 56
- lifted feet to couple the generator with engine on existing baseframe
- redundant rotating rectifier with 12 diodes
- insulated bearing and earthing brush
- AVR supplied loose
- automatic power factor control (analog type)
- digital AVR MEC100 for frame 400 – 710 (supplied loose)
- digital AVR MEC100D with diode failure monitoring
- redundant AVR system
- excitation/overboosting PMG mounted on generator
- lubrication system for sleeve bearing
- other options available on request.

ODP generators: MJBM



Model	MJBM
Power	Up to 6.500 kVA
Voltages	Up to 1.000 V
Frame	160 ÷ 900
Pole	4, 6, 8, 10 and 12 (over contact MM)
Cooling	IC 01
IP	IP 23. Available up to IP 44 with filters.
Other applications	Propulsion generator, shaft generator, hybrid machine, auxiliary generator, off-shore, variable speed generator and emergency

	4 POLES	6 POLES	8 POLES	10 POLES	12 POLES
kVA (at 60 Hz)	4.000	5.000	6.500	6.000	5.400

Certificates and testing

Applicable standards

Generators are designed in compliance with:
 IEC EN 60034 - 1
 BS 4999 - 5000
 VDE 0530
 NF 51 - 100
 NF 51 - 111
 OVE M - 10
 NEMA MG 1.32
 Generators conform to EU rules.
 UL/CSA certifications available on request.

Certificate

Marine Survey Certificate supplied with the machine.
 Marelli Motori is DNV type approved and has the ABS design assessment.
 Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.
 SOLAS compliance declaration.

Test and survey

See complete list on Test room chapter



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase the strength. Marelli Generators for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
Shield	Made of spheroidal graphite cast-iron (EN 1563) or grey cast-iron (EN 1561) up to 630 frame size. Made of structural steel (EN 10025 – S235 JR) above.
Shaft	General data Made in carbon steel and obtained by lamination (EN 10083 – 2 C40 – TN). Shaft is obtained by forging from 290 mm diameter and above. The shaft is tested at the manufacturer in order to check it is defect-free. Shaft design Double bearing generator: cylindrical shaft with key.
Main terminal box	Mounted on top up to 630 frame size. Mounted on side from 710 frame size. Made of formable steels EN 10130.
Fan	Made of aluminum alloy (EN 1706) or structural steel (EN 10025–S235 JR) depending on application requirements.

Construction

Enclosure	ODP - Open Drip Proof
Cooling system	IC 01 as per IEC60034-6
Degree of protection	IP 23 as per IEC60034-5
Mounting	Horizontal - IM 1001 or IM 1101 as per IEC 60034-7

Technical data

Stator/Rotor core Laminated and enamel-insulated on both sides to minimise eddy-current losses

Rotor

Salient pole type.
 Made by copper flat wire.
 H class insulated with enamel coating.
 Winding retaining by pass-through bars of high quality steel.
 Rotating rectifier: Graetz diode bridge with 6 diodes.
 Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal. A. Special vibration level construction are available.

Bearing

General data

Single or double antifriction bearing grease lubricated (ball or roller type) or oil lubricated sleeve bearing.

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.

Locating bearings are on the D end side and floating bearings on the ND end side.

Bearing selection

Antifriction bearings up to 560 frame size included.

Sleeve bearings from 630 frame size included (available for smaller frame sizes).

Antifriction bearings can be mounted on 630/710 frame size according to site working conditions.

Regreasing system (for antifriction bearing)

Both bearings are fitted with a grease nipple.

Bearing insulation

ND end bearing can be insulated to prevent any harmful circulating current from passing through the bearing surfaces.

Insulated antifriction bearings in standard configuration:

- 4, 6 poles: insulated ND end bearing from 630 frame size
- 8 poles: insulated bearing from 400 frame size
- 10 poles: insulated bearing from 500 frame size

All ND end sleeve bearings are insulated as standard. All configurations are designed to withstand the following marine inclination.

	Static		Dynamic
List	15°	Rolling	±22.5°
Trim	5°	Pitch	±7.5°

Dedicated constructions available for different values.

Impregnation system

Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.

Insulation system

Stator: H class insulated with a synthetic enamel.

Rotor: H class insulated with a synthetic enamel.

Protective treatments

Specific marine treatment.

Epoxivinilic and polyacrylic. Total minimum thickness 120 micromillimeters.

Epoxivinilic: Epoxy two component products, with vinyl change.

Polyacrylic: Two components polyurethane product formulated with unmodified hydroxyl acrylic resin.

Operating conditions

Overloads	During continuous duty (S1), the following overloads are allowed: 10% for 1 hour 15% for 10 minutes 30% for 4 minutes 50% for 2 minutes These overloads must be occasional and followed by one hour of running at normal load or less.
Parallel operations	All generators are provided with a amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit. A power factor regulator (to work in parallel with the main) is available on request.
Transient ratings	All generators comply with marine rules regarding transient performance. The voltage drop due to the application of 60% of nominal load is within 15%.
Three phase short circuit current	All generators equipped with overboosting device ensure a three phase short circuit current (I _{cc}) higher than 3 times the rated current (I _n): $I_{cc} > 300\% I_n$
Radio interference	All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.
THD (Total Harmonic Distortion)	The no-load voltage wave form is sinusoidal with THD content less than 2%.
Vibrations	Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.

Auxiliary devices

AVR

Automatic voltage regulator mounted on board.

Size	Type
160 - 250	MARK V analog
315 - 450	MEC 20 analog/ digital
500 - 560	M40FA610A analog
630 - 710	M63FA310A analog
800 - 900	MEC 100 digital

Overboosting device

Size	Type
Low voltage 160 - 450 (4 poles)	Auxiliary winding
160 - 450 (>4 poles)	Varicomp
500 - 710 (all polarities)	Varicomp
800 - 900	PMG

Space heaters

Heaters installed at ND end side.

Size	Power (W)
400 - 560	400
630 - 710	600
800 - 900	800

RTD - PT100

RTD devices in standard configuration:

- 1+1 RTD on each phase of stator winding
- 1 RTD on each bearing

Terminals in auxiliary terminal box.

Other configurations available:

- DUPLEX type
- RTD for inlet / outlet air

Optional features

- Reinforced construction for high linear vibrations
- flanged shaft for direct coupling with engine flywheel (in case of single bearing solution)
- neutral point terminals in separate terminal box
- increase protection degree up to IP 44
- lifted feet to couple the generator with engine on existing baseframe
- redundant rotating rectifier with 12 diodes
- insulated bearing and earthing brush
- AVR supplied loose
- automatic power factor control (analog type)
- digital AVR MEC100 for frame 400 – 710 (supplied loose)
- digital AVR MEC100D with diode failure monitoring
- redundant AVR system
- excitation/overboosting PMG mounted on generator
- lubrication system for sleeve bearing
- other options available on request.

TEAAC generators: MJVM



Model	MJVM
Power	Up to 5.500 kVA
Voltages	Up to 1.000 V
Frame	250 ÷ 900
Pole	4, 6, 8, 10 and 12 (over contact MM)
Cooling	IC 611
IP	IP 44. Available up to IP 56
Main applications	Off-shore and emergency

	4 POLES	6 POLES	8 POLES	10 POLES	12 POLES
kVA (at 60 Hz)	3.500	4.300	5.600	5.600	4.600

Certificates and testing

Applicable standards

Generators are designed in compliance with:
IEC EN 60034 - 1
BS 4999 - 5000
VDE 0530
NF 51 - 100
NF 51 - 111
OVE M - 10
NEMA MG 1.32
All generators conform to EU rules.
UL/CSA certifications available on request.

Certificate

Marine Survey Certificate supplied with the machine.
Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.

Test and survey

See complete list on pages on Test room chapter.



Main components

Housing	Rigid frame, rugged welded steel fabrication (EN 10025 - S235 JR). Frame is provided with side ribs to increase strength. Marelli Generators for continuous duty operation are designed to meet vibration levels per IEC 60034-14, ISO 10816-1 and BS 5000-3.
.....	
Shield	Made of spheroidal graphite cast-iron (EN 1563) or grey cast-iron (EN 1561) up to 630 frame size. Made of structural steel (EN 10025 – S235 JR) above.
.....	
Shaft	<p>General data Made in carbon steel and obtained by lamination (EN 10083 – 2 C40 – TN). Shaft is obtained by forging from 290 mm diameter and above. The shaft is tested by the manufacturer to ensure it is defect-free.</p> <p>Shaft design Double bearing generator: cylindrical shaft with key.</p>
.....	
Main terminal box	Mounted on side (right or left will be selected). Made of formable steels EN 10130.
.....	
Fan	Made of aluminum alloy (EN 1706) or structural steel (EN 10025 – S235 JR) depending on application requirements.
.....	
Internal fan	Made of structural steel (EN 10025 - 5235 JR)
.....	
Heat Exchanger	<p>Construction Mounted on top of alternator. Tube made of P - AlMgSi UNI 3569 Housing: EN 10025 - 5235JR</p>
.....	
Construction	
Enclosure	TEAAC – Totally Enclosed Air to Air Cooled
.....	
Cooling system	IC 611 as per IEC60034-6. Primary fluid (air) driven by a second fan (internal fan) mounted on shaft at ND end side. Internal air is flowing by a fan mounted on the shaft of the generator at the driven side.
.....	
Degree of protection	IP 44 as per IEC60034-5
.....	
Mounting	Horizontal - IM 1001 or IM 1101 as per IEC 60034-7

Technical data

Stator/Rotor core	Laminated and enamel-insulated on both sides to minimise eddy-current losses												
Rotor	<p>Salient pole type. Made by copper flat wire. H class insulated with enamel coating. Winding retaining by pass-through bars of high quality steel. Rotating rectifier: Graetz diode bridge with 6 diodes. Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal A. Special vibration level construction are available.</p>												
Bearing	<p>General data Single or double antifriction bearing grease lubricated (ball or roller type) or oil lubricated sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction generators, without external forces (radial and / or axial) is in excess of 50.000 hours. On request, the lifetime of bearings, L10h can be in excess of 100.000 hours. Locating bearings are on the D end side and floating bearings on the ND end side.</p> <p>Bearing selection Antifriction bearings up to 560 frame size included. Sleeve bearings from 630 frame size included (available for smaller frame sizes). Antifriction bearings can be mounted on 630/710 frame size according to site working conditions.</p> <p>Regreasing system (for antifriction bearing) Both bearings are fitted with grease nipple.</p> <p>Bearing insulation ND end bearing can be insulated to prevent any harmful circulating current from passing through the bearing surfaces. Insulated antifriction bearings in standard configuration:</p> <ul style="list-style-type: none"> • 4, 6 poles: insulated ND end bearing from 630 frame size • 8 poles: insulated bearing from 400 frame size • 10 poles: insulated bearing from 500 frame size <p>All ND end sleeve bearings are insulated as standard. All configurations are designed to withstand the following marine inclination.</p> <table border="1"> <thead> <tr> <th></th> <th>Static</th> <th></th> <th>Dynamic</th> </tr> </thead> <tbody> <tr> <td>List</td> <td>15°</td> <td>Rolling</td> <td>±22.5°</td> </tr> <tr> <td>Trim</td> <td>5°</td> <td>Pitch</td> <td>±7.5°</td> </tr> </tbody> </table> <p>Dedicated constructions available for different values.</p>		Static		Dynamic	List	15°	Rolling	±22.5°	Trim	5°	Pitch	±7.5°
	Static		Dynamic										
List	15°	Rolling	±22.5°										
Trim	5°	Pitch	±7.5°										
Impregnation system	Stator and rotor are VPI treated with an unsaturated polyester amide resin which is polymerised in an oven.												
Insulation system	<p>Stator: H class insulated with a synthetic enamel Rotor: H class insulated with a synthetic enamel</p>												
Protective treatments	<p>Specific marine treatment. Epoxivinilic and polyacrylic. Total minimum thickness 120 micromillimeters. Epoxivinilic: Epoxy two component products, with vinyl change Polyacrylic: Two components polyurethane product formulated with unmodified hydroxyl acrylic resin.</p>												

Operating conditions

Overloads	<p>During continuous duty (S1), the following overloads are allowed:</p> <p>10% for 1 hour 15% for 10 minutes 30% for 4 minutes 50% for 2 minutes</p> <p>These overloads must be occasional and followed by one hour of running at normal load or less.</p>
Parallel operations	<p>All generators are provided with a amply sized damper cage and are suitable for parallel operations with other generators, when equipped with the paralleling unit. A power factor regulator (to work in parallel with the main) is available on request.</p>
Transient ratings	<p>All generators comply with marine rules regarding transient performance. The voltage drop due to the application of 60% of nominal load is within 15%.</p>
Three phase short circuit current	<p>All generators equipped with overboosting device ensure a three phase short circuit current (I_{cc}) higher than three times the rated current (I_n):</p> $I_{cc} > 300\% I_n$
Radio interference	<p>All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.</p>
THD (Total Harmonic Distortion)	<p>The no-load voltage wave form is sinusoidal with THD content less than 2%.</p>
Vibrations	<p>Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.</p>

Auxiliary devices

AVR

Automatic voltage regulator mounted on board.

Size	Type
160 - 250	MARK V analog
315 - 450	MEC 20 analog/ digital
500 - 560	M40FA610A analog
630 - 710	M63FA310A analog

Overboosting device

Size	Type
Low voltage 160 - 450 (4 poles)	Auxiliary winding
160 - 450 (>4 poles)	Varicomp
500 - 710 (all polarities)	Varicomp
800 - 900	PMG

Space heaters

Heaters installed at ND end side.

Size	Power (W)
400 - 560	400
630 - 710	600
800 - 900	800

RTD - PT100

RTD devices in standard configuration:

- 1+1 RTD on each phase of stator winding
- 1 RTD on each bearing

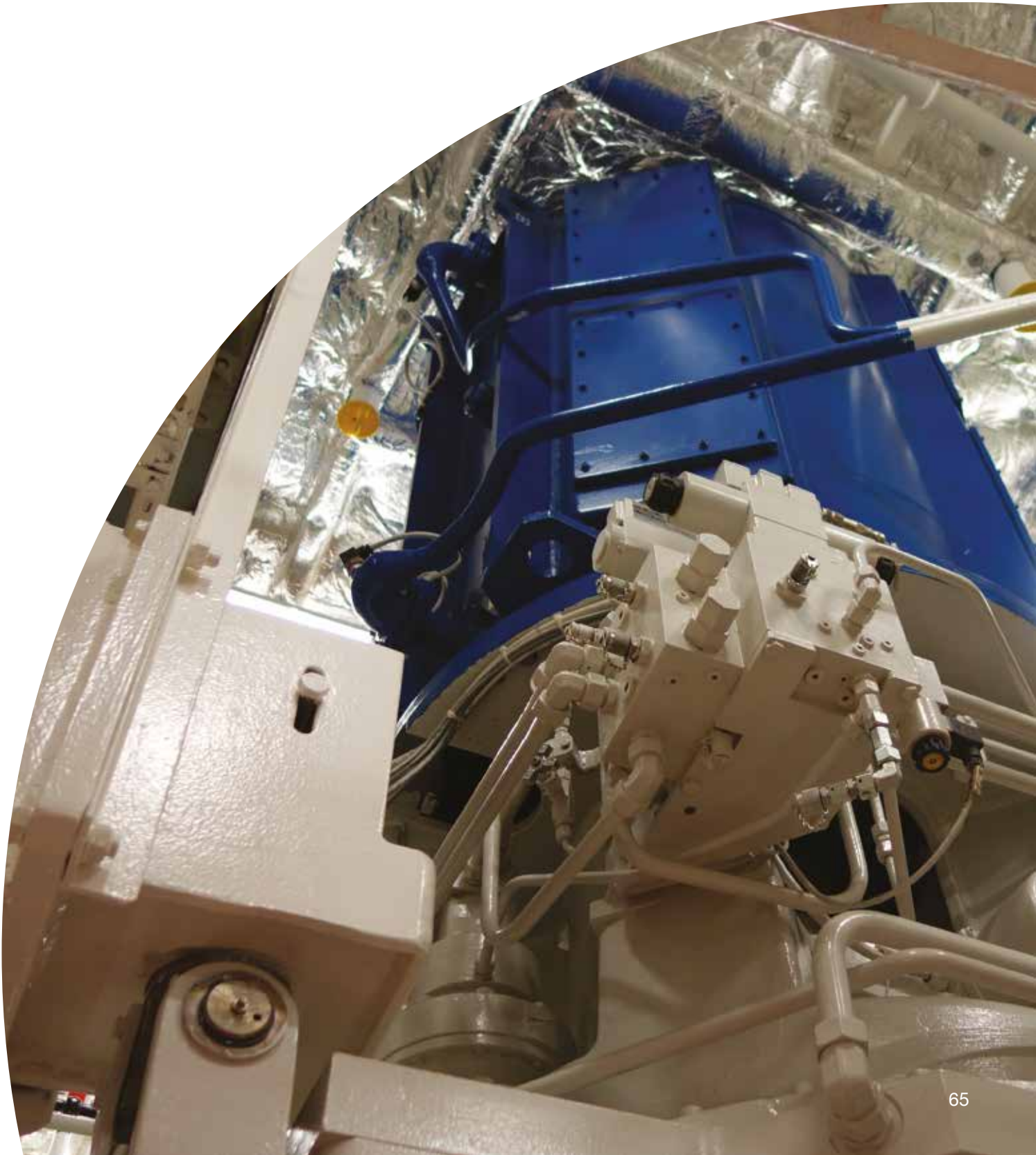
Terminals in auxiliary terminal box.

Other configurations available:

- DUPLEX type
- RTD for inlet / outlet air
- RTD into oil tank for sleeve bearing

Optional features

- Flanged shaft for direct coupling with engine flywheel (in case of single bearing solution)
- neutral point terminals in separate terminal box
- cooling system IC 616 with additional forced ventilation
- increase protection degree up to IP 54, IP 55 or IP 56
- lifted feet to couple the generator with engine on existing baseframe
- redundant rotating rectifier with 12 diodes
- insulated bearing and earthing brush
- AVR supplied loose
- automatic power factor control (analog type)
- digital AVR MEC100 for frame 400 – 710 (supplied loose)
- digital AVR MEC100D with diode failure monitoring
- redundant AVR system
- excitation/overboosting PMG mounted generator
- other options available on request.





Testing facilities

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Facilities

Testing surface is 2.800 sqm. Load testing capacity up to 8 MW. Voltage range during test from 400 to 15.000 V. Test benches designed for testing machines up to 35 t in horizontal and vertical configuration.

Routine and type test

Routine test and type test are carried out in compliance with all major international standards (IEC60034, IEEE, UNI-EN-ISO, MIL-STD), marine and navy societies, ATEX rules, UL certification and customer specifications.

Test for generators

Standard test < 500 frame (factory line)

- Name plate check
- voltage balance
- phase sequence
- no-load voltage regulation
- load test at power factor 0,1
- quadrature voltage drop test (test for parallel operation)
- low speed protection
- permanent short-circuit test with AVR
- winding insulation resistance test
- high voltage test.

Standard test ≥ 500 frame (test room)

- Name plate check
- winding resistance measurement at cold
- voltage balance
- phase sequence
- no-load voltage regulation
- load test at power factor 0,1
- quadrature voltage drop test (test for parallel operation)
- low speed protection
- permanent short-circuit test with AVR
- winding insulation resistance test
- high voltage test.

Routine test (standard test included)

- No load characteristic (magnetic curve)
- short circuit characteristics
- auxiliary check.

Type test (routine test included)

- Full load heat run test at power factor 0,1
- vibration
- over speed test
- heat run test.

Marine test (type test included)

- Waveform deviation and distortion test
- voltage response with sudden load change at power factor 0,1
- overload / overcurrent.

Test for motors

Standard test for motors

- Name plate check
- phase sequence
- winding insulation resistance test
- high voltage test
- no-load run test at nominal voltage.

Routine test for motors (standard test included)

- Winding resistance measurement at cold
- auxiliary check
- visual and dimensional check.

Type test for motors (routine test included)

- Full load heat run test at power factor 0,1
- vibration
- over speed test
- heat run test.

Special testing

Special tests for the measurement of mechanical and structural vibration and overspeed tests for high-voltage machines (dissipation factor and partial discharges).

We are able to test drive-motor systems in-house in order to ensure perfect compatibility to customer site conditions.

Special test for generators

- Determination of efficiency and losses
- sudden short-circuit test
- waveform deviation and distortion test
- measurement of noise level
- measurement of dissipation factor
- partial discharge test
- shaft voltage measurement
- visual and dimensional check
- voltage response with sudden load change at power factor 0,1
- overload / overcurrent
- IP test.

Special test for motors

- Measurement of noise level
- measurement of dissipation factor
- partial discharge test
- measurement of curve $C=f(n)$
- shaft voltage measurement
- visual and dimensional check.

Type approval and design assessment certificates

Type approval in accordance with the major marine certifying bodies : ABS, Bureau Veritas, Det Norske Veritas and Lloyd's Register.

Testing can be conducted at 50/60 Hz and variable frequency as the facility is provided with a large power – high frequency AFE inverter (regenerative).

Marine certifications

Marelli Motori motors and generators are compatible with the standards requested by the International Association of Classification Societies' members (as of May 2004):

ABS	American Bureau of Shipping
KR	Korean Register of Shipping
BV	Bureau Veritas
DNV	Det Norske Veritas
CCS	China Classifications Society
GL	Renewables Certifications
LR	Lloyd's Register
NKK	NK Certifications
RINA	Registro Italiano Navale
RS	Russian Maritime Register of Shipping
RRR	Russian River Register





MarelliMotori
Services

Services

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Our Service team

Marelli Motori offers all-around support throughout the entire operational life of a product.

Our service team is committed to providing a fast, efficient and reliable service that keeps your motors and generators working productively, minimising downtime and lowering whole life costs.

We work closely with our manufacturing facilities to provide the highest levels of aftersales service worldwide, including commissioning, repairs, spare parts supply, technical support, performance enhancements, training courses and maintenance contracts of electrical machines of all makes.

Our service team offers technical advice to help improve performance, reduce operating costs, improve energy efficiency, minimising downtime and improve reliability.

We operate worldwide and are fully in compliance with the international quality rules, utilising highly skilled technicians and precision instruments to keep your machines working.

Aftersales services

Field service

Marelli Motori service personnel are trained to react quickly to any situation anywhere in the world. We rapidly analyse the source of machine problems and prescribe solutions which can get you 'up and running' quickly, minimising downtime and production losses.

We understand that, for a plant to operate efficiently, disruption must be kept to a minimum and that, when problems do occur, corrective action must be implemented quickly and effectively.

Marelli Motori Service is the solution to electrical machine problems, offering prompt technical support and ultra-fast response no matter where in the world you are located:

- diagnostic and functional tests
- start-up of brand-new machines
- revamping of regulation systems
- on the spot repairs
- custom-made maintenance programmes
- periodical inspections.

Commissioning

The Marelli Motori Commissioning Service includes all activities required for the efficient start-up of the machine during installation, to ensure maximum operational effectiveness from the start.

Our inspection processes during commissioning guarantee that the start-up phase takes place safely and that the correct functional parameters are applied.

The full commissioning option is available to buy with every machine purchase.

Repairs

Marelli Motori Service also offers repairs and complete refurbishing of motors and generators of any make or model.

Repairs of low, medium and high voltage machines can take place at the Marelli Motori manufacturing facility or at customer premises, delivered by our constantly expanding service network.

Our high tech facilities, which include computerised machine centres, VPI plants, 3D measurement systems, digital and infrared diagnostics tools, along with our long experience in designing and manufacturing machines, offer the highest quality of repairs and absolute reliability.

All repairs and testing take place in our modern test room that can handle machines up to 5 MW and a 13.8 kV before issuing functional test certificates and detailed repair reports.

Marelli Motori Service overhauls and tests any rotating electrical machine, including third party machines.

The characteristics of the overhaul procedure are:

- manufacturer know-how
- guarantee on the reparation
- original parts used
- tests in the internal testing room
- reports and about the reparations.

In addition Marelli Motori keeps an available stock of machines with common configurations, which can be supplied to customers for temporary use whilst their own machines are overhauled.

Spare parts

Genuine Marelli Motori spare parts are available at the Marelli headquarters, branch offices, and service centres located all over the world, with specific characteristics:

- original and guaranteed parts.
- branded package.
- major equipment assemblies (complete rotors, stators).
- kits of recommended spare parts.
- spare stocks on Marelli Motori branches.

This policy covers all spare parts manufactured by Marelli Motori.

In the event that a component is out-of-production, Marelli Motori Spa will source and propose the suitable interchangeable spare parts. All spare parts are certified by Marelli Motori Spa for the operating conditions proposed.

Technical support

Marelli Motori customers can access our outstanding technical support at all times to ensure their machines are safety, reliable and productive.

Our service engineers and technicians, from headquarter or subsidiaries, are always at our customer's disposal to assist in solving technical issues by either phone or email.

Training

Training courses are available all year round to users and maintenance personnel to ensure the correct operation and maintenance of machines.

Our customised training sections are tailor-made for:

- customers
- users
- operators for the selection operation and maintenance of electrical equipment.

Training courses

Our training courses include:

- electrical generator working principle and troubleshooting
- electric generator setting and maintenance
- digital voltage regulation with MEC100.
- ATEX directive for maintenance of hazardous area motors.

In addition to the training in this brochure, it is possible to specify customised training based on a customer's own requirements. Training language is either in Italian or English. At the end of each course, each participant will receive a personalised certificate, based on the result of a final test.

Contacts

Italy HQ

Marelli Motori S.p.A.
Via Sabbionara 1
36071 Arzignano (VI)
Italy
(T) +39 0444 479 711
(F) +39 0444 479 888
info@MarelliMotori.com
sales@MarelliMotori.com

Asia Pacific

Marelli Motori Asia Sdn Bhd
Lot 1-8, Persiaran Jubli Perak,
Seksyen 22, 40300 Shah Alam,
Selangor D.E.
Malaysia
(T) +60 355 171 999
(F) +60 355 171 883
Malaysia@MarelliMotori.com
sales.MY@MarelliMotori.com

Central Europe

Marelli Motori Central Europe GmbH
Heilswannenweg 50
31008 Elze
Germany
(T) +49 5068 462 400
(F) +49 5068 462 409
Germany@MarelliMotori.com
sales.DE@MarelliMotori.com

Middle East

Marelli Motori Middle East
4403-18, 44th Floor, BB2
Mazaya Business Avenue
Jumeirah Lakes Towers
Dubai - UAE
(T) +971 4 426 4263
(F) +971 4 362 4345
UAE@MarelliMotori.com
sales.UAE@MarelliMotori.com

South Africa

Marelli Motori South Africa (Pty) Ltd
Unit 2, corner Director & Megawatt Road
Spartan Ext. 23
Kempton Park 1619 Gauteng
Republic of South Africa
(T) +27 11 392 1920
(F) +27 11 392 1668
SouthAfrica@MarelliMotori.com
sales.ZA@MarelliMotori.com

Spain

08195 Sant Cugat
Barcelona
Spain
(T) +34 664 464 121
Spain@MarelliMotori.com

United Kingdom

Marelli UK
Main Street, The Old Rectory
Glenfield
Leicester LE3 8DG
United Kingdom
(T) +44 116 232 5167
(F) +44 116 232 5193
UK@MarelliMotori.com
sales.UK@MarelliMotori.com

USA

Marelli USA, Inc.
2200 Norcross Parkway, Suite 290
Norcross, GA 30071
USA
(T) +1 859 734 2588
(F) +1 859 734 0629
USA@MarelliMotori.com
sales.USA@MarelliMotori.com