







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.

The company • Marine applications





Core markets

Marelli Motori operates in six key markets:





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, variable speed generators and emergency.

Motors up to 10.000 kW Generators up to 11.000 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, boster)
- 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 a-synchronous 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, safety, 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

TEWAC

B4V

up to 10.000 kW



TEWC B4J - B5J up to 4.000 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

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

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



TEFC A5M - B5M up to 10.000 kW 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

TEWAC

MJRM



ODP MJBM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA

Shaft generators



TEWAC MJHRM up to 11.000 kVA

ODP

MJHM



ODP MJBM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA



TEWAC MJHRM up to 11.000 kVA



ODP MJHM



TEWAC

MJRM

TEWAC MJRM



ODP MJBM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA

18



TEWAC

MJHRM

up to 11.000 kVA



ODP

MJHM





TEWAC

MJRM



ODP MJBM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA

Offshore



up to 11.000 kVA

TEWAC MJHRM

ODP MJHM

TEWAC MJRM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA

ODP MJBM



TEAAC MJVM up to 5.600 kVA

Variable speed generators









ODP

MJBM



TEAAC MJVM up to 5.600 kVA

TEWAC MJHRM up to 11.000 kVA

ODP MJHM

TEWAC MJRM up to 11.000 kVA up to 6.500 kVA up to 6.500 kVA

Emergency



ODP

MJBM

up to 6.500 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 mantain 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 motors and generators work to the best of their ability from day one.

Marelli Motori provides handson 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		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
Α	Primary fluid
1	Method of circulation for primary fluid
Α	Secondary fluid
1	Method of circulation for secondary fluid



Mounting

IEC - 60034 - 7 Code II: IM 1001 N° of bearings: 2 Feet: With feet **IM B3** Flange: -Details: -Mounting arrangement: Mounting by feet (Feet down) Code II: IM 2101 N° of bearings: 2 Feet: With feet Flange: With flange Details: End Shield spigot **IM B34** No access to back Flange at D - End Mounting arrangement: Mounting by feet (Feet down with additional mounting on D - End Side of flange) Code II: IM 2001 N° of bearings: 2 Feet: With feet Flange: With flange Details: End Shield spigot **IM B35** No access to back Flange at D - End Mounting arrangement: Mounting by feet (Feet down with additional mounting on D - End Side) Code II: IM 1101 N° of bearings: 2 Feet: With raised feet **IM B20** Flange: -Details: -Mounting arrangement: Mounting by feet (Feet down) Code II: IM 2105 N° of bearings: 1 Feet: With feet **IM B2** Flange: With flange Details: -Mounting arrangement: -

IM V10	Code II: N° of bearings: Feet: Flange: Details: Mounting arrangement:	IM 1411 2 - With flange Special flange on D - End. Mounted on D -End Side of flange, D - End down	
В5	Code II: N° of bearings: Feet: Flange: Details: Mounting arrangement:	- 2 With feet - Endshield flange at D - End with access to back Mounted on D -End Side of flange	
V1	Code II: N° of bearings: Feet: Flange: Details: Mounting arrangement:	- 2 - With flange Endshield flange at D - End with access to back Mounted on D -End Side of flange D - End down	
IM B16	Code II: N° of bearings: Feet: Flange: Details: Mounting arrangement:	IM 1301 1 With raised feet - Horizontal shaft - One bearing -	



Motor applications

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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

Motor model

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

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





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	7.000	10.000	9.000	7.500
(at 60 Hz)			0.000	

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	B4V
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 mo- tors. 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 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	 Construction 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. Exchanger data 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.



B4V **Technical data** Laminated and enamel-insulated on both sides to minimise eddy-Stator/Rotor core 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 epoxyresin 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 Rolling 15° List ±22.5° ____ 5° ±7.5° Trim Pitch 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. Dual/multiple winding configuration **Optional features** 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 applicationother 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.

 Image: Image:



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 mo- tors. 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 ra- ting. The motor series name will be C3W - C4W.
Mounting	IM B3, V1 and V10 as per IEC60034-7.

C3M

Technical data	C4M
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 subse- quent heat treatment hardens the resin.
Deter	·····
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 cop-
	per bar construction.
Bearing	General data Antifriction bearings grease lubricated (ball or roller type) or oil lubrica- ted sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 stan- dard, 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 be- arings 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 fol- lowing marine inclination.
	Static Dvnamic
	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 ma- chine, 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.

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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 mo- tors.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 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	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.		
	Exchanger data Working pressure < 6 bar Test pressure 9 bar Max glycol : 20% Coolant : fresh water only		

Construction

Enclosure	TEWC – Totally Enclosed Water Cooled
Cooling system	 IC 71W as per IEC60034-6. 7 : Heat exchanger. The primary coolant is circulated in a closed circuit which is built as integral part of the machine. 1 : Self-circulation. The coolant is moved by a fan mechanically driven by the rotor. W : Coolant. Cooling water must be clean water.
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 cop- per bar construction.			ither a solid shaft minum or a cop-		
Bearing	General data Antifriction bearings grease lubricated (ball or roller type) or oil lubrica- ted sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 stan- dard, 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 fol- lowing marine inclination.					
	Static Dynamic			mic		
	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





Up to 11.000 V 71 ÷ 500 2, 4, 6 and 8 IC 411 (or IC 416) • IP 55/ IP 56/ IP 65 <u>.</u>.... Auxiliaries, Fi-Fi system . Other Winch applications

	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

A5M

Technical data	B5M
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 subse- quent 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 cop- per bar construction.
Bearing	General data Antifriction bearings grease lubricated (ball or roller type) or oil lubrica- ted sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 stan- dard, 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 be- arings 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 $\pm 7.5^{\circ}$ 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.

0	otional	features
\mathbf{v}	puona	i cutui co

• 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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TEAAC generators: MJVM	

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

Product map

Generator range

	Generator model
TEWAC - Totally Enclosed Water to Air Cooled ODP - Open Drip Proof TEWAC - Totally Enclosed Water to Air Cooled ODP - Open Drip Proof TEAAC - Totally Enclosed Air to Air Cooled	MJHRM MJHM MJRM MJBM MJVM
	TEWAC - Totally Enclosed Water to Air Cooled ODP - Open Drip Proof TEWAC - Totally Enclosed Water to Air Cooled ODP - Open Drip Proof TEAAC - Totally Enclosed Air to Air Cooled



500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000 7500 8000 8500 9000 9500 1000010500110001150012000 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 con- tact 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.			
	(i) (ii) (iii) (ii			

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	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.
	Double bearing generator. cylindrical shart with key.
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	Construction Mounted on top of alternator. Double tube made of CuNi 90/10. Copper fins housing. Equipped with water leakage detector. Exchanger data • Designed pressure 6 bar • test pressure 10 bar • power: up to 200 kW • water flow: up to 18 m ³ /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.
Construction	
Enclosure	TEWAC - Totally Enclosed Water to Air Cooled.

Cooling systemIC 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 protectionIP 44 as per IEC60034-5. (Available up to IP 56)MountingHorizontal - 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 win H class insulated with e Winding retaining by pa Rotating rectifier: Graet Rotors are dynamically extension in accordance Special vibration level o	e. namel coating. ss-through bars of higl z diode bridge with 6 d balanced with a half with IEC 60034-14 to onstruction is available	n quality steel. iodes. key applied to the shaft vibration grade normal A.	
••••••••••••				
Bearing	General data Single or double antifit type) or oil lubricated s The theoretical lifetime dard, of standard horiz forces (radial and / or a the lifetime of bearings Locating bearings are of ND end side. Bearing selection Antifriction bearings up Sleeve bearings from 6 me sizes) Antifriction bearings ca to site working condition	iction bearing grease eeve bearing. of bearings, L10h acco ontal construction gen axial) is in excess of 50 L10h can be in excess on the D end side and to 560 frame size inclu 30 frame size included n be mounted on 630/7 ns.	lubricated (ball or roller ording to ISO 281/1 stan- erators, without external 0.000 hours. On request, s of 100.000 hours. floating bearings on the uded. (available for smaller fra- 710 frame size according	
	Regreasing system (for antifriction bearing) Both bearings are fitted with grease nipple.			
	Bearing insulation ND end bearing can be current from passing the Insulated antifriction be 4, 6 poles: insulated 8 poles: insulated 10 poles: insulated	e insulated to prevent rough the bearing surfa arings in standard con d ND end bearing from bearing from 400 frame bearing from 500 frame	any harmful circulating aces. figuration: 630 frame size size le size	
	All ND end sleeve beard All configurations are d nation.	ngs are insulated as st esigned to withstand t	andard. he following marine incli-	
	Static		Dynamic	
	List 15°	Rolling	±22.5°	
	Trim 5°	Pitch	±7.5°	
	Dedicated construction	s available for different	values.	
•••••	••••••	••••••		
Impregnation system	Stator and rotor are VF resin which is polymeric	PI treated with an unsa sed in an oven.	aturated polyester amide	
Insulation system	Stator: F class insulated with a synthetic enamel. Rotor: H class insulated with a synthetic enamel.			
•••••	•••••••	•••••		
Protective treatments	Specific marine treatme Epoxivinilic and polyac meters.	ent. rylic. Total minimum th	nickness 120 micromilli-	

MJHRM

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. All generators are provided with an amply sized damper cage and are **Parallel operations** 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 All generators equipped with an overboosting device ensure a three circuit current phase short circuit current (Icc) higher than three times the rated current (In): Icc > 300% In All generators are equipped with Class B Group 1 radio interference **Radio interference** filters as defined by EN 55011. The no-load voltage wave form is sinusoidal with THD content less than **THD (Total Harmonic** 2%. **Distortion**) Vibrations Vibration level is in accordance with ISO 10816. Measurement, evaluation and limits of vibration severity are in accordance with IEC 60034-14.



Auxiliary device



AVR	Automatic voltage regulator mounted on board.		
		Size	Туре
		400 - 450	MEC 20 analog/ digital
		500 - 560	M40FA610A analog
		630 - 710	M63FA310A analog
		800 - 1.250	MEC 100 digital
Overboosting device		Size	Туре
	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 N	D end side.
RTD - PT100	RTD devices in stand 1+1 RTD on each 1 RTD on each b Terminals in auxiliary Other configurations	lard configuration: h phase of stator wir pearing terminal box. available:	nding

- 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
- Iubrication system for sleeve bearing
- other options available on request.

ODP generators: MJHM





Model	MJHM
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 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	10 000	9 000	11 000	11 000	10 000
(at 60 Hz)		0.000			

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.
	Egister ClassNK ABS



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-cur- rent losses			
Rotor	Salient pole type. Made by copper fla H class insulated w Winding retaining b Rotating rectifier: C Rotors are dynam extension in accord Special vibration le	at wire. vith enamel coatir by pass-through b Graetz diode bridg ically balanced v dance with IEC 60 evel construction	ng. pars of high quality ge with 6 diodes. vith a half key app 0034-14 to vibratio s are available.	steel. plied to the shaft n grade normal A.
Bearing	 General data Single or double antifriction bearing grease lubricated (ball or r type) or oil lubricated sleeve bearing. The theoretical lifetime of bearings, L10h according to ISO 281/1 s dard, of standard horizontal construction generators, without exter forces (radial and / or axial) is in excess of 50.000 hours. On require the lifetime of bearings, L10h can be in excess of 100.000 hours. Locating bearings are on the D end side and floating bearings or ND end side. Bearing selection Antifriction bearings up to 560 frame size included. Sleeve bearings from 630 frame size included (available for smaller me sizes) Antifriction bearings can be mounted on 630/710 frame size accor 		ted (ball or roller o ISO 281/1 stan- , without external ours. On request, 0.000 hours. g bearings on the ole for smaller fra- me size according	
	Regreasing system (for antifriction bearing)			
	 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.			
	Stat	ic	Dyna	ımic
	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 tre Epoxivinilic and pol Epoxivinilic: Epoxy Polyacrylic: Two o unmodified hydrox	eatment. yacrylic.Total mini v two component components poly syl acrylic resin.	mum thickness 120 products, with vin vurethane product) micromillimeters. iyl change : formulated with



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 perfor- mance. 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 (lcc) higher than 3 times the rated current (ln): lcc $> 300\%$ ln
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	Туре
		400 - 450	MEC 20 analog/ digital
		500 - 560	M40FA610A analog
		630 - 710	M63FA310A analog
		800 - 1250	MEC 100 digital
•••••	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	
Overboosting device		Size	Туре
	Medium voltage	All	CT + Overboosting device
	High voltage	All	PMG
••••••			••••••
Space heaters	Heaters installed a	t 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 sta • 1+1 RTD on each • 1 RTD on each Terminals in auxilia	ndard configuration: ach phase of stator h bearing rry terminal box.	winding

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
- Iubrication 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 genera- tor.

	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 asses- sment. Shaft, housing (propulsion) and exchanger are certified by the Marine Classification Society.
Test and survey	See complete list on Test room chapter.
	CassNK ABS

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 JB) above.
• • • • • • • • • • • • • • • • • • • •	
Shaft	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.
	Shaft design Double bearing generator: cylindrical shaft with key.
••••••	
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	Construction Mounted on top of alternator. Double tube made of CuNi 90/10. Copper fins housing. Equipped with water leakage detector. Exchanger data Designed pressure 6 bar. Test pressure 10 bar Power: up to 200 kW Water flow: up to 18 m ³ /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.
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	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.			
Description	Concercial dista			
Bearing	 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 500 frame size All ND end sleeve bearings are insulated as standard. All configurations 			
	Static Dynamic			
	List15°Rolling±22.5°Trim5°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 micromilli- meters. 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 run- ning 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%.
There is a second set	
circuit current	All generators equipped with overboosting device to ensure a three phase short circuit current (lcc) higher than 3 times the rated current (ln): $lcc > 300\%$ In
Radio interference	All generators are equipped with Class B Group 1 radio interference filters as defined by EN 55011.
THD (Total Harmonic Distortion)	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		Туре
		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		Туре
	Low voltage	250 - 450 (4 poles)		Auxiliary winding
		400 - 450 (>4 poles)		Varicomp
		500 - 710 (all polarities	5)	Varicomp
		800 - 900		PMG
•••••••••••••••••••••••••••••			• • • • • •	• • • • • • • • • • • • • • • • • • • •
Space heaters	Heaters installed a	t ND-end side.		
		Size	Power	· (W)
		400 - 560	400	
		630 - 710	600	
		800 - 900	800	
RTD - PT100	RTD devices in sta 1+1 RTD on e. 1 RTD on each Terminals in auxilia Other configuration DUPLEX type RTD for inlet /	Indard configuration: ach phase of stator w n bearing Iry terminal box. ns available: outlet air	vinding	1

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
- Iubrication 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 stan- dard, 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).				
	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 $\pm 22.5^{\circ}$				
	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 micromilli- meters. 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 performan- ce. 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 (lcc) higher than 3 times the rated current (ln): $lcc > 300\%$ In
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	Туре	
	160 - 250	MARK V analog	
	315 - 450	MEC 20 analog/ di	gital
	500 - 560	M40FA610A analog	9
	630 - 710	M63FA310A analog]
	800 - 900	MEC 100 digital	
Overboosting device	• • • • • • • • • • • • • • • • • • • •	Size	Type
oronocouning dorloo	Low voltage	160 - 450 (4 poles)	
	Low voltage	160 - 450 (> 4 poles)	Varicomp
		100 - 430 (24 poles)	Varicomp
		500 - 7 TO (all polanties)	vancomp
•••••		800 - 900	PMG
Space heaters	Heaters installed a	t 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 BTD for injet / 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
- Iubrication 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	3.500	4.300	5.600	5.600	4,600
(at 60 Hz)	0.000				

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 pages on Test room chapter.
	(i) (ii) (iii) (ii

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	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.
	Shaft design Double bearing generator: cylindrical shaft with key.
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 requirments.
Internal fan	Made of structural steel (EN 10025 - 5235 JR)
Heat Exchanger	Construction Mounted on top of alternator. Tube made of P - AIMgSi UNI 3569 Housing: EN 10025 - 5235JR

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	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). 				
	to site working conditions. Regreasing system (for antifriction bearing)				
	 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°				
•••••					
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 micromilli- meters. 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 perfor- mance. 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 (lcc) higher than three times the rated current (ln): $lcc > 300\%$ ln
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	-	Туре	
	160 - 250	I	MARK V analog	
	315 - 450	I	MEC 20 analog/ digi	tal
	500 - 560	I	M40FA610A analog	
	630 - 710	I	M63FA310A analog	
		•••••	•••••	• • • • • • • • • • • • • • • • • • • •
Overboosting device		Size		Туре
	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





Services

Our service team	
Aftersales services	
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 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 the 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
- eports 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.



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