DNV·GL

Certificate No:
TAE0000395
File No:
821.10
Job Id:
262.1-008560-3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Generator

with type designation(s)
MJBM, MJR

Issued to
Marelli Motori S.P.A.
Arzignano, VI, Italy

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Degree of protection	Insulation class	Temp. class (°C)	Voltage (V)	Power (kW)	Frequency (Hz)	Speed (RPM)
MJBM	**IP 23 / 44**	**H**	**F**	**380 - 690 V**	**36,5 - 4500 kVA**	**50 or 60 Hz**	**600 - 1800 RPM**
MJR	**IP 44 / 54 / 55**	**H**	**F**	**380 - 690 V**	**830 - 4500 kVA**	**50 or 60 Hz**	**600 - 1800 RPM**

This Certificate is valid until **2023-10-23**.

Issued at **Hamburg** on **2018-10-24**
DNV GL local station: **Venice** for **DNV GL**

Approval Engineer: **Andreas Andrecht**

Arne Schaarmann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Product description

Type MJBM 200 - 630, 3 phases, 4 poles, brushless A.C. generator.

Enclosure class:	IP 23 / 44
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	36,5 to 3700 kVA
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 RPM
Ambient temperature:	50 °C

Frame size MJBM	Rated power (kVA) 50 Hz (1500 rpm)	Rated power (kVA) 60 Hz (1800 rpm)
200 SA4	36,5	44,5
200 SB4	42	52
200 MA4	54	64
200 MB4	63	76
225 SA4	74	91
225 SB4	80	99
225 MA4	92	112
225 LA4	115	136
250 MA4	145	165
250 MB4	160	190
250 LA4	190	220
250 LB4	220	245
315 SA4	260	310
315 SB4	305	355
315 MA4	355	420
315 MB4	390	460
355 SA4	445	515
355 SB4	495	590
355 MA4	595	690
355 MB4	695	815
400 MA4	810	975
400 MB4	915	1090
400 LA4	1005	1205
400 LB4	1135	1345
400 LC4	1160	1400
450 MB4	1310	1505
450 LA4	1440	1655
450 LB4	1635	1875
500 SC4	1740	2100
500 MA4	1800	2200
500 MB4	1930	2250
500MC4	2000	2360
500 LA4	2200	2730
500 LB4	2200	2730

Frame size MJBM	Rated power (kVA) 50 Hz (1500 rpm)	Rated power (kVA) 60 Hz (1800 rpm)
560 MA4	2450	2750
560 LA4	2950	3300
630 SC4	2700	3000
630 MB4	3050	3300
630 LA4	3500	3700
710 SA4	2600	2750

Type MJBM 500 - 710, 3 phases, 6 poles, brushless A.C. generator.

Enclosure class:	IP 23 / 44
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	1200 to 4500 kVA
Frequency class:	50 or 60 Hz
Speed:	1000 or 1200 RPM
Ambient temperature:	50 °C

Frame size MJBM	Rated power (kVA) 50 Hz (1000 rpm)	Rated power (kVA) 60 Hz (1200 rpm)
400 LB6	660	750
450 LA6	950	1100
500 SC6	1200	1450
500 MA6	1300	1600
500 MB6	1400	1700
500 MC6	1450	1800
500 LA6	1680	2000
560 MA6	1800	2050
560 LA6	2000	2400
630 SB6	2100	2500
630 SC6	2200	2600
630 MA6	2400	2900
630 MB6	2500	3000
630 LA6	2700	3200
630 LB6	2900	3400
710 SC6	3200	3600
710 MA6	3750	4000
710 LA6	3900	4200
710 LB6	4200	4500

Type MJBM 500 - 710, 3 phases, 8 poles, brushless A.C. generator.

Enclosure class:	IP 23 / 44
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	830 to 4200 kVA

Frequency class:	50 or 60 Hz
Speed:	750 or 900 RPM
Ambient temperature:	50 °C

Frame size MJBM	Rated power (kVA) 50 Hz (750 rpm)	Rated power (kVA) 60 Hz (900 rpm)
500 SA8	830	950
500 SC8	1000	1150
500 MB8	1100	1300
500 LA8	1300	1500
560 MA8	1500	1900
560 LA8	1800	2150
630 SC8	1750	2000
630 MB8	2200	2500
630 LA8	2450	2800
630 LB8	2600	3125
710 SC8	2400	2750
710 MA8	2850	3300
710 MD8	3200	3800
710 LB8	3600	4200

Type MJBM 630 - 710, 3 phases, 10 poles, brushless A.C. generator.

Enclosure class:	IP 23 / 44
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	1400 to 4200 kVA
Frequency class:	50 or 60 Hz
Speed:	600 or 720 RPM
Ambient temperature:	50 °C

Frame size MJBM	Rated power (kVA) 50 Hz (600 rpm)	Rated power (kVA) 60 Hz (900 rpm)
630 MB10	1400	1600
630 LB10	1800	2200
710 SC10	2150	2500
710 MA10	2400	2800
710 MB10	2850	3300
710 LB10	3400	3900
710 LC10	3850	4200

Type MJRM 400 - 630, 3 phases, 4 poles, brushless A.C. generator with air / water heat exchanger.

Enclosure class:	IP 44 / 54 / 55
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	910 to 3700 kVA
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 RPM

Ambient temperature:	50 °C
Water inlet temperature:	36 °C

Frame size MJRM	Rated power (kVA) 50 Hz (1500 rpm)	Rated power (kVA) 60 Hz (1800 rpm)
315 SB4	255	275
355 MA4	535	561
355 MB4	610	693
400 MB4	910	1040
400 LA4	970	1120
400 LB4	1120	1260
450 MB4	1500	1717
450 LA4	1650	1919
450 LB4	1750	2025
500 SC4	1700	2244
500 MA4	1740	2260
500 MB4	1900	2450
500 MC4	2100	2550
500 LA4	2200	2800
500 LB4	2200	2800
560SC4	1865	2146
560 MA4	2350	2850
560 LA4	2650	3060
630 SA4	2700	3000
630 MA4	3000	3300
630 LA4	3500	3700

Type MJRM 500 - 710, 3 phases, 6 poles, brushless A.C. generator with air / water heat exchanger.

Enclosure class:	IP 44 / 54 / 55
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	1200 to 4500 kVA
Frequency class:	50 or 60 Hz
Speed:	1000 or 1200 RPM
Ambient temperature:	50 °C
Water inlet temperature:	36 °C

Frame size MJRM	Rated power (kVA) 50 Hz (1000 rpm)	Rated power (kVA) 60 Hz (1200 rpm)
500 SC6	1200	1450
500 MA6	1300	1600
500 MB6	1400	1700
500 MC6	1450	1800
500 LA6	1680	2000
560 MA6	1800	2050
560 LA6	2000	2400
630 SB6	2100	2500
630 SC6	2200	2600

Frame size MJRM	Rated power (kVA) 50 Hz (1000 rpm)	Rated power (kVA) 60 Hz (1200 rpm)
630 MA6	2400	2900
630 MB6	2500	3000
630 LA6	2700	3200
630 LB6	2900	3400
710 SC6	3200	3600
710 MA6	3750	4000
710 LA6	3900	4200
710 LB6	4200	4500

Type MJRM 500 - 710, 3 phases, 8 poles, brushless A.C. generator with air / water heat exchanger.

Enclosure class:	IP 44 / 54 / 55
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	830 to 4200 kVA
Frequency class:	50 or 60 Hz
Speed:	750 or 900 RPM
Ambient temperature:	50 °C
Water inlet temperature:	36 °C

Frame size MJRM	Rated power (kVA) 50 Hz (750 rpm)	Rated power (kVA) 60 Hz (900 rpm)
500 SA8	830	950
500 SC8	1000	1150
500 MB8	1100	1300
500 LA8	1300	1500
560 MA8	1500	1900
560 LA8	1800	2150
630 SC8	1750	2000
630 MB8	2200	2500
630 LA8	2450	2800
630 LB8	2600	3125
710 SC8	2400	2750
710 MA8	2850	3300
710 MD8	3200	3800
710 LB8	3600	4200

Type MJRM 630 – 710-800, 3 phases, 10 poles, brushless A.C. generator with air / water heat exchanger.

Enclosure class:	IP 44 / 54 / 55
Winding insulation:	Class H
Temperature rise limits:	Class F
Voltage class:	380 to 690 V
Power class:	1400 to 4200 kVA
Frequency class:	50 or 60 Hz
Speed:	600 or 720 RPM
Ambient temperature:	50 °C

Water inlet temperature:	36 °C

Frame size MJRM	Rated power (kVA) 50 Hz (600 rpm)	Rated power (kVA) 60 Hz (720 rpm)
630 MB10	1400	1600
630 LB10	1800	2200
710 SC10	2150	2500
710 MA10	2400	2800
710 MB10	2850	3300
710 LB10	3400	3900
710 LC10	3850	4200
710 LA10	3125	3409
800 MC10	3750	4262

Application/Limitation

Ratings over 3500 kVA not available at 400 V, 50 Hz

The MJBM serie generators may be equipped with air inlet / outlet filters. The filters will reduce the maximum output power:

With additional IP43 air inlet and outlet filters: derating 15%
With additional IP44 air inlet and outlet filters: derating 20%
With additional single air inlet / outlet filters: derating 8%

For MJBM series the rated output increase with 2,6% if the ambient temperature is 45 °C.

For MJBM and MJRM generator series please consider additional derating factor:
Class B overtemperature: 0,87
55° C ambient temperature: 0,975 (applicable only for MJBM)
38° C water inlet temperature: 0,99 (applicable only for MJRM)
40° C water inlet temperature: 0,98 (applicable only for MJRM)

The generator must be regarded as a component. The voltage regulator is not a part of this type approval. The end user / system responsible must insure that the generator including the voltage regulator fulfills the DNV Rules Pt.4 Ch.8 Sec.5 B 203.

This type approval certificate does not replace the requirement to DNV Product Certificate for generators rated 300 kVA or more.

Type Approval documentation

Tests carried out

No load test, Short circuit test, No load voltage regulation control, Voltage regulation during transient loading and unloading, Under frequency protection control, Load test, Overload test, Overspeed test, Voltage droop check with parallel device, High voltage test, Measurement of winding resistance (cold) of main stator, rotor and exciter, Insulation resistance test, Steady state short circuit test, Temperature rise test, Vibration test.

Marking of product

MarelliGenerators, type designation. serial number, ingress protection (IP), ambient temperature, power factor, voltage, current, frequency, speed, output apparent power, winding insulation class, maximum permissible cooling medium temperature (when relevant), total mass.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate

END OF CERTIFICATE