



دیزل نیرو

واردات و فروش انواع دیزل ژنراتورهای صنعتی

Three phase Synchronous and Asynchronous Generators

HYDROPOWER APPLICATIONS



 **MarelliGenerators®**

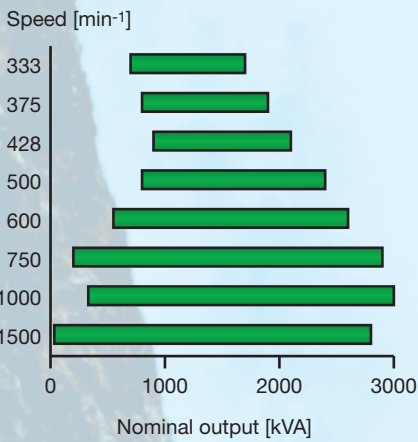
HYDROPOWER PLANT GENERATORS

MarelliGenerators offers a wide range of solutions for hydropower applications. Our synchronous and asynchronous generators represent the best choice due to their certified quality, their versatile design allowing the generator to be customised to your needs, and to the experience acquired by more than 100 years of production. The undisputed quality proved by all MarelliGenerators products is shown by their high reliability, high efficiency and by their unchanged performance during many years of service.

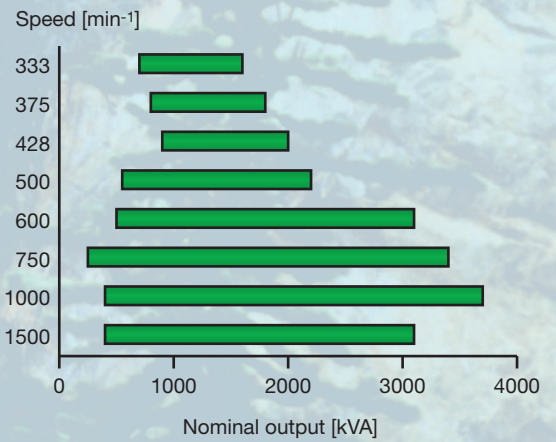


SYNCHRONOUS GENERATORS

Power range @ 50 Hz - Low voltage

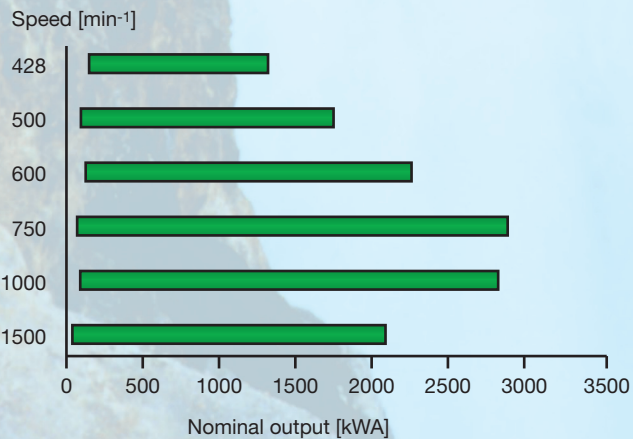


Power range @ 50 Hz - Medium voltage



ASYNCHRONOUS GENERATORS

Power range @ 50 Hz - Low voltage



MarelliGenerators represents the best know-how within the hydropower field by ensuring our product has outstanding technical features.

RELIABILITY

- Long life endurance of electrical components and bearings.
- Class H insulation system for synchronous and class F for asynchronous generators. Impregnation with polyester resin using the Vacuum Pressure Impregnation (VPI) system. A further protection from any corrosion phenomenon is guaranteed by a tropicalization treatment.
- High safety factors to warrant the functionality of generators even in the worst working conditions.

HIGH PERFORMANCE

- Active parts are designed using the latest technologies and the best materials available in order to ensure high efficiency values.

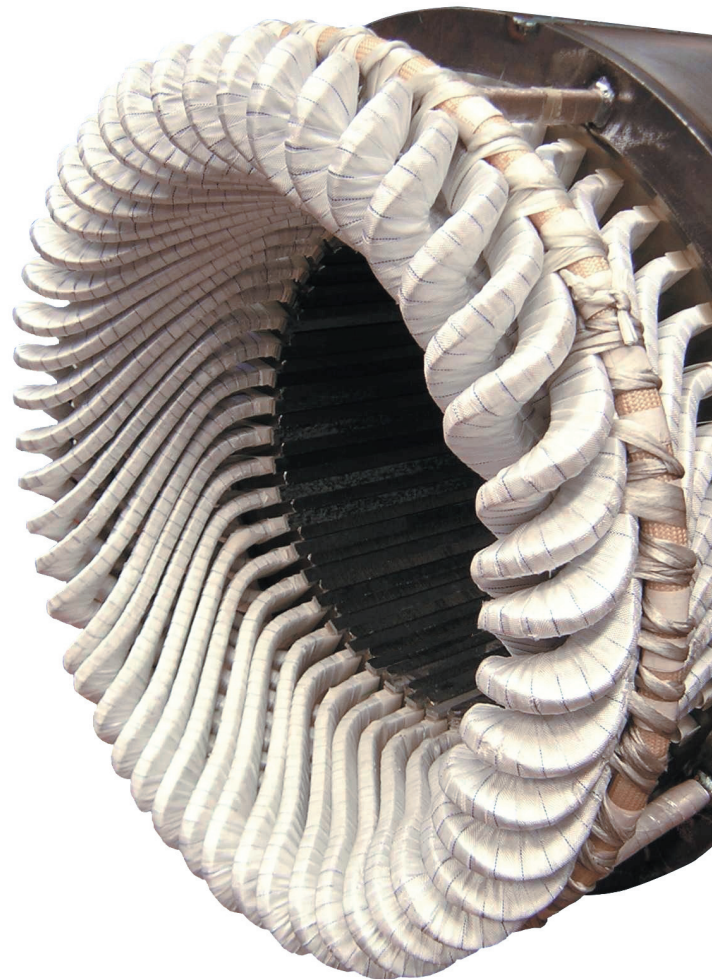
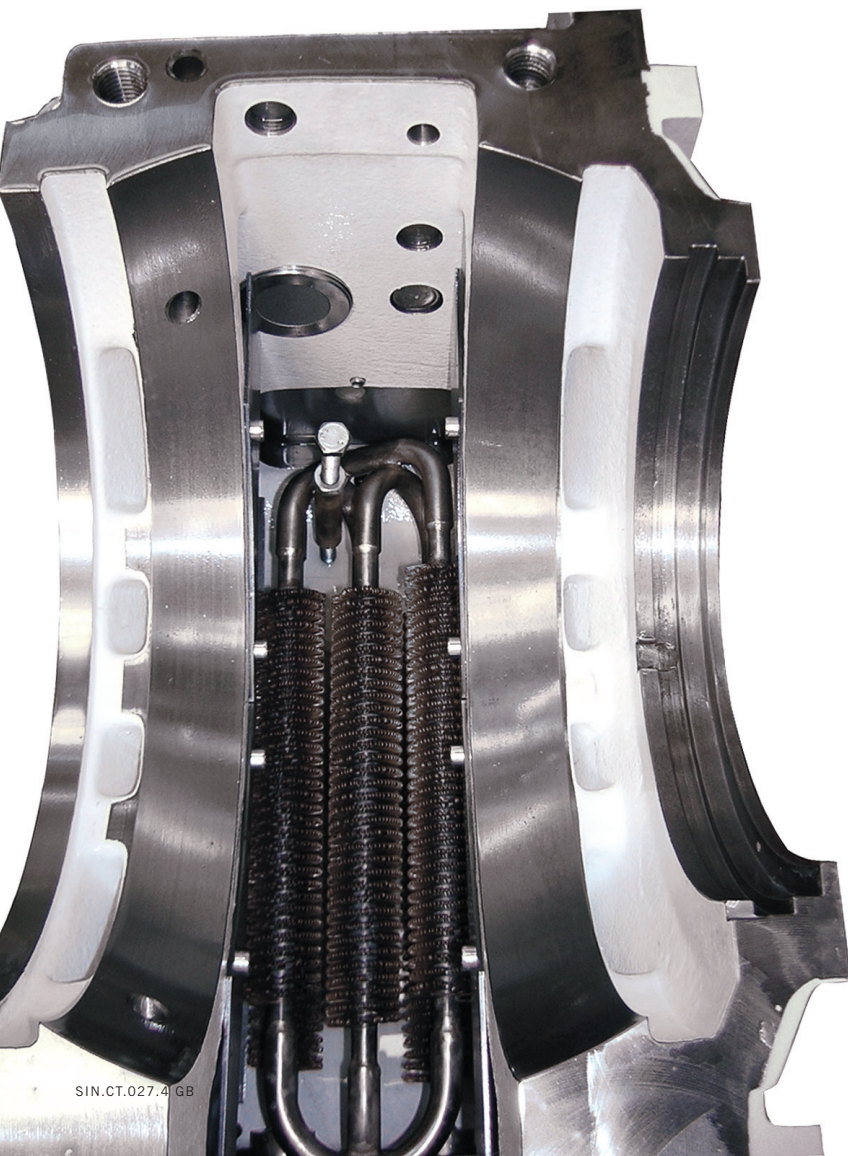
SAFETY

- Space heaters are installed to avoid the risk of condensate inside generators.
- Bearings and stator windings temperatures are totally supervised by using a wide range of sensors.
- Synchronous generators can be equipped with electronic control devices for particular working conditions and to ensure real time monitoring.

TOTALLY CUSTOMISABLE

All generators are totally customisable.

- Nominal voltage from 380 to 6.600 V.
- From 4 to 18 poles; polarities not mentioned in the following pages might be available on request.
- Horizontal or vertical shaft.
- Degree of protection up to IP 55 using a heat exchanger.
- Runner directly connected to the generator shaft to avoid all the supports of the runner shaft.
- Bushings are used in strong hydraulic load applications to eliminate all the maintenance operations required by the rolling bearings.
- Use of flywheels to rise the proper inertial momentum of the generator.
- Wide set of control and adjustment devices (also with digital logic unit, if required) for synchronous generators.



FRAME SIZES 400 - 710 SYNCHRONOUS GENERATORS: TECHNICAL FEATURES

STANDARDS

All generators are designed according to the IEC 60034-1, CEI EN 60034-1, BS 4999-5000, VDE 0530, NF 51-100, OVE M-10 and NEMA MG 1.22 standards and can be incorporated in the "CE" marked machinery.

AVAILABLE VOLTAGE

Generators can be supplied with the following voltage range:

- Low voltage (380 - 480 V)
- Medium voltage (3.000 - 6.600 V)

Voltages not listed can be supplied on request.

EXCITATION SYSTEM

Generators are self-excited through a brushless type excitation system.

The voltage is maintained within $\pm 0,5\%$ of the nominal value in steady state conditions.

Generators are equipped with an auxiliary winding, or with the Varicomp overexcitement device, in order to supply a three-phase short circuit current 2,5 times greater than the nominal current of the generator.

OVERLOADS

The following overloads are permitted: 10% for one hour, 15% for ten minutes, 30% for four minutes and 50% for two minutes. All overloads must occur occasionally and must be followed by a minimum of one hour of running at nominal load or less.

OPERATING CONDITIONS

Parallel operation

All generators are provided with an oversized damper cage and are suitable for parallel operation with other generators, when equipped with a paralleling unit. An automatic power factor regulator is available on request.

Environmental conditions

The rated outputs refer to an installation height up to 1.000 m asl and to a maximum ambient temperature of 40°C. For higher altitudes and different temperature values the rated outputs must be re-calculated using the factors listed in the following table.

| Altitude [m asl] | Ambient temperature [°C] | | | |
|------------------|--------------------------|------|------|------|
| | 30 | 40 | 45 | 50 |
| 1000 | 1,04 | 1,00 | 0,98 | 0,95 |
| 1500 | 1,03 | 0,97 | 0,95 | 0,92 |
| 2000 | 0,99 | 0,93 | 0,91 | 0,88 |
| 2500 | 0,95 | 0,90 | 0,88 | 0,86 |
| 3000 | 0,91 | 0,86 | 0,84 | 0,82 |

Power factor

The nominal power factor is 0,8 lagging. For different power factor values the following derating factors must be applied:

| Power factor | 1,0 | +0,8 | +0,7 | +0,6 | +0,5 | +0,3 | 0 |
|--------------|-----|------|------|------|------|------|------|
| K_{pf} | 1,0 | 1,0 | 0,93 | 0,88 | 0,84 | 0,82 | 0,80 |

For negative power factors please contact MarelliMotori.

DEGREE OF PROTECTION

Standard generators are air-cooled with an IP 23 degree of protection (IC 01 cooling type). Inlet and outlet air filters (IC 01 cooling type) are available on request to upgrade the index to IP 44.

To obtain a higher index of protection (IP 44, IP 54) generators can be supplied with an air-to-water heat exchanger installed on the body of the machinery (IC 81W cooling type).

SHAFT ORIENTATION

Generators are supplied with a horizontal (IM B3) or vertical (IM V10) shaft configuration. The vertical generators are equipped with a thrust bearing on the no-drive-end (NDE) side.

BEARINGS

Standard generators are supplied with grease-lubricated rolling bearings. All bearings are oversized to guarantee a minimum lifetime of 100.000 h ($L_{10h} = 100.000$ h), value obtained concerning to an unloaded standard shaft. The NDE bearing is conveniently insulated ⁽¹⁾ to avoid shaft currents.

RUNNER DIRECTLY CONNECTED TO THE SHAFT

Generators can be equipped with a special shaft extension to directly connect the hydraulic turbine runner. In this configuration all bearings and the shaft are designed to withstand to axial and radial loads caused by the hydraulic thrust and by the weight of the runner. Depending on the loads applied and on the runaway speed of the runner, generators can be supplied with oil-lubricated rolling bearings or sleeve bearings.

ROTOR BALANCING

Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal (N) in standard execution. Generators can be supplied with reduced (R) or special (S) vibration levels on request.

INSULATION

Class H standard insulation system allows a maximum winding temperature rise of 125°C referring to an ambient temperature of 40°C. Windings are impregnated with polyester resin using the latest technology (VPI system). An enamel insulator (tropicalization treatment) coats all inner parts of the generator in order to protect it from corrosion.

TEMPERATURE SENSORS

Generators are equipped with three PT100 temperature sensors (one for each phase) installed into the slots to supervise the stator winding temperature and with a PT100 for each bearing to monitor its temperature (**). To control inlet and outlet air temperature of the air-to-water heat exchanger, PT100's are installed both on the NDE side and on the drive-end (DE) side on request. If the air-to-water heat exchanger is installed, PT100's are used to control the inlet and outlet water temperature.

FLYWHEEL

When the requested inertial momentum is higher than the actual inertial momentum of the generator, it is possible to extend the shaft on the NDE side in order to connect a flywheel.

TERMINAL BOXES

Generators are supplied with terminal boxes of appropriate dimensions in order to allow easy connection to the main leads. All generators allow the connection to the main leads and to the star point.

Two different terminal boxes, one for the star point and one for the leads for the auxiliary devices, are available on request.

Generators can be equipped with current transformers both on the main leads and the star point leads.

The standard degree of protection for terminal boxes is IP 44; the IP 55 can be installed on request.

EQUIPMENT

Standard

- Class H insulation
- VPI impregnation type
- Windings protected from corrosion (tropicalization)
- Six leads stator winding into the terminal box
- Parallel device between generators
- N° 3 PT100 into the stator winding
- N° 1 PT100 for each bearing (**)
- Anti-condensation thermal heaters
- IP 23 degree of protection
- IP 44 degree of protection for the terminal box
- Bearings: more than 100.000 h lifetime
- NDE side bearing insulated to avoid shaft currents (*)

Electric options

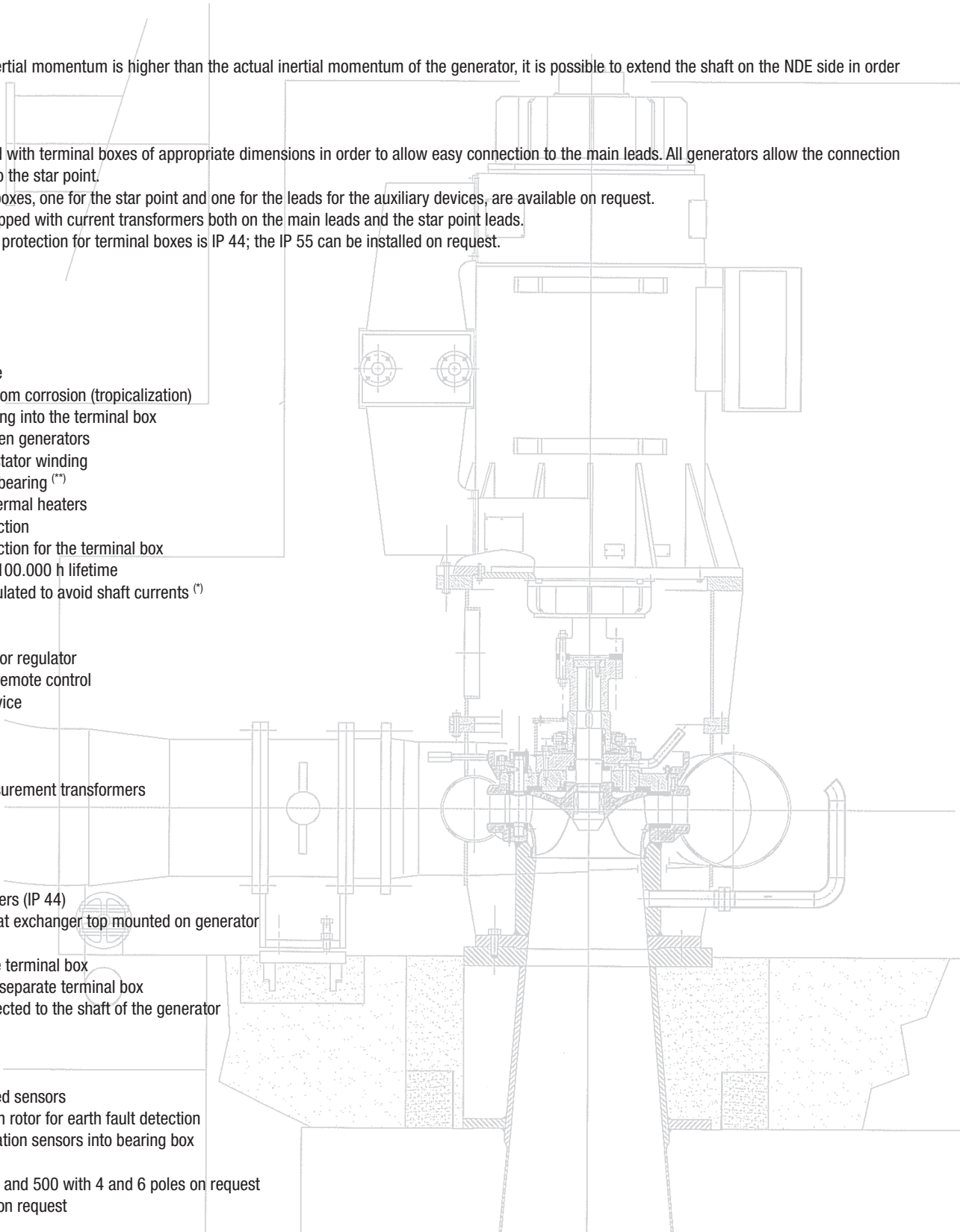
- Automatic power factor regulator
- Rheostat for voltage remote control
- Manual excitation device
- Excitement control
- Diode failure monitor
- Digital AVR
- In-terminal-box measurement transformers
- Encoder
- Tachometric dynamo

Mechanical options

- Inlet and outlet air filters (IP 44)
- Air-to-fresh water heat exchanger top mounted on generator
- IP 55 terminal box
- Star-point in separate terminal box
- Auxiliary leads into a separate terminal box
- Runner directly connected to the shaft of the generator
- Sleeve bearings
- Shaft extension
- Flywheel
- Arrangement for speed sensors
- Brush connection with rotor for earth fault detection
- Arrangement for vibration sensors into bearing box

(*) for frame sizes 400 and 500 with 4 and 6 poles on request

(**) for 400 frame size on request



SYNCHRONOUS GENERATORS / LOW VOLTAGE

| Type | Leads | kVA rating @ Temperature Rise / Ambient Temp. (°C) | | | | Moment of inertia (**) [kgm ²] | Weight (**) [kg] | Max overspeed [min ⁻¹] |
|---------------|-------|--|---------------------|--|---------------------|--|------------------------|---------------------------------------|
| | | Continuous duty | | | | | | |
| | | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | | | |
| 4 pole | | 400V 50Hz - 1500 min⁻¹ | | 480V 60Hz - 1800 min⁻¹ | | | | |
| MJT | | | | | | | | |
| 400 MA4 | 6 | 725 | 635 | 870 | 760 | 16,3 | 2.250 | 3.000 |
| 400 MB4 | 6 | 815 | 710 | 980 | 855 | 17,0 | 2.300 | 3.000 |
| 400 LA4 | 6 | 895 | 780 | 1.075 | 940 | 19,3 | 2.550 | 3.000 |
| 400 LB4 | 6 | 1.010 | 880 | 1.210 | 1.055 | 22,5 | 2.800 | 3.000 |
| 450 MB4 | 6 | 1.100 | 960 | 1.320 | 1.150 | 29,0 | 3.200 | 2.700 |
| 450 LA4 | 6 | 1.210 | 1.055 | 1.450 | 1.265 | 34,0 | 3.600 | 2.700 |
| 450 LB4 | 6 | 1.340 | 1.170 | 1.610 | 1.405 | 38,0 | 4.000 | 2.700 |
| 500 SC4 | 6 | 1.460 | 1.275 | 1.750 | 1.530 | 46,7 | 3.700 | 2.700 |
| 500 MB4 | 6 | 1.675 | 1.460 | 2.010 | 1.755 | 52,5 | 4.400 | 2.700 |
| 500 LA4 | 6 | 1.945 | 1.700 | 2.335 | 2.040 | 61,5 | 5.100 | 2.700 |
| 560 MA4 | 6 | 2.145 | 1.870 | 2.465 | 2.150 | 83 | 5.000 | 2.700 |
| 560 LA4 | 6 | 2.555 | 2.230 | 2.940 | 2.565 | 95 | 5.700 | 2.700 |
| 630 SA4 | 6 | 2.350 | 2.050 | 2.705 | 2.360 | 117 | 6.350 | 2.400 |
| 630 MA4* | 6 | 2.550 | 2.225 | 2.935 | 2.560 | 151 | 7.500 | 2.400 |
| 630 LA4* | 6 | 2.780 | 2.425 | 3.200 | 2.795 | 163 | 8.000 | 2.400 |
| 6 pole | | 400V 50Hz - 1000 min⁻¹ | | 480V 60Hz - 1200 min⁻¹ | | | | |
| MJT | | | | | | | | |
| 400 SA6 | 6 | 330 | 290 | 395 | 345 | 11,8 | 1.450 | 2.200 |
| 400 SB6 | 6 | 380 | 330 | 455 | 395 | 14,1 | 1.600 | 2.200 |
| 400 MA6 | 6 | 510 | 445 | 610 | 530 | 17,9 | 2.200 | 2.200 |
| 400 MB6 | 6 | 575 | 500 | 690 | 600 | 19,4 | 2.260 | 2.200 |
| 400 LA6 | 6 | 660 | 575 | 790 | 690 | 20,9 | 2.530 | 2.200 |
| 400 LB6 | 6 | 815 | 710 | 980 | 855 | 24,2 | 2.750 | 2.200 |
| 500 SA6 | 6 | 865 | 755 | 1.040 | 910 | 50,5 | 3.200 | 2.200 |
| 500 SC6 | 6 | 1.100 | 960 | 1.320 | 1.150 | 64,7 | 3.800 | 2.200 |
| 500 MB6 | 6 | 1.320 | 1.150 | 1.585 | 1.385 | 70,0 | 4.100 | 2.200 |
| 500 LA6 | 6 | 1.540 | 1.345 | 1.850 | 1.615 | 88,9 | 5.100 | 2.200 |
| 560 MA6 | 6 | 1.595 | 1.390 | 1.835 | 1.600 | 111 | 5.000 | 2.200 |
| 560 LA6 | 6 | 1.900 | 1.660 | 2.185 | 1.905 | 137 | 5.700 | 2.200 |
| 630 SC6 | 6 | 1.690 | 1.475 | 1.945 | 1.700 | 145 | 6.500 | 2.200 |
| 630 MA6 | 6 | 2.020 | 1.765 | 2.325 | 2.030 | 167 | 8.000 | 2.200 |
| 630 MB6 | 6 | 2.150 | 1.875 | 2.475 | 2.160 | 183 | 8.500 | 2.200 |
| 630 LA6 | 6 | 2.390 | 2.085 | 2.750 | 2.400 | 200 | 9.500 | 2.200 |
| 710 SC6* | 6 | 2.560 | 2.235 | 2.870 | 2.505 | on request | on request | 2.100 |
| 710 MA6* | 6 | 2.970 | 2.590 | 3.330 | 2.905 | on request | on request | 2.100 |
| 8 pole | | 400V 50Hz - 750 min⁻¹ | | 480V 60Hz - 900 min⁻¹ | | | | |
| MJT | | | | | | | | |
| 400 SA8 | 6 | 200 | 175 | 240 | 210 | 13,5 | 1.450 | 2.000 |
| 400 SB8 | 6 | 255 | 225 | 305 | 265 | 16,2 | 1.600 | 2.000 |
| 400 MA8 | 6 | 355 | 310 | 425 | 370 | 20,6 | 2.200 | 2.000 |
| 400 MB8 | 6 | 420 | 365 | 505 | 440 | 22,4 | 2.260 | 2.000 |
| 400 LA8 | 6 | 500 | 435 | 600 | 525 | 24,1 | 2.530 | 2.000 |
| 400 LB8 | 6 | 610 | 530 | 730 | 635 | 25,4 | 2.750 | 2.000 |
| 500 SA8 | 6 | 675 | 590 | 810 | 705 | 55,1 | 3.200 | 2.000 |
| 500 SC8 | 6 | 840 | 735 | 1.010 | 880 | 74,2 | 3.800 | 2.000 |
| 500 MB8 | 6 | 1.045 | 910 | 1.255 | 1.095 | 77,7 | 4.100 | 2.000 |
| 500 LA8 | 6 | 1.235 | 1.080 | 1.480 | 1.290 | 95,0 | 5.100 | 2.000 |
| 560 MA8 | 6 | 1.245 | 1.085 | 1.430 | 1.250 | 122 | 5.000 | 2.000 |
| 560 LA8 | 6 | 1.485 | 1.295 | 1.710 | 1.495 | 146 | 5.700 | 2.000 |
| 630 SC8 | 6 | 1.280 | 1.115 | 1.470 | 1.285 | 177 | 6.500 | 1.900 |
| 630 MA8 | 6 | 1.530 | 1.335 | 1.760 | 1.535 | 204 | 8.000 | 1.900 |
| 630 LA8 | 6 | 2.020 | 1.765 | 2.325 | 2.030 | 245 | 9.500 | 1.900 |
| 710 SC8 | 6 | 2.270 | 1.980 | 2.540 | 2.215 | on request | on request | 1.800 |
| 710 MA8* | 6 | 2.640 | 2.305 | 2.960 | 2.585 | on request | on request | 1.800 |
| 710 LA8* | 6 | 2.850 | 2.490 | 3.190 | 2.785 | on request | on request | 1.800 |

*: 690 V recommended

** : Showed data could change depending on mounting.

The rated outputs refer to the following conditions: balanced and non deforming load, altitude below 1.000 m asl, power factor from 0,8 to 1.
For values of overspeed greater than as listed, please contact MarelliMotori.

SYNCHRONOUS GENERATORS / LOW VOLTAGE

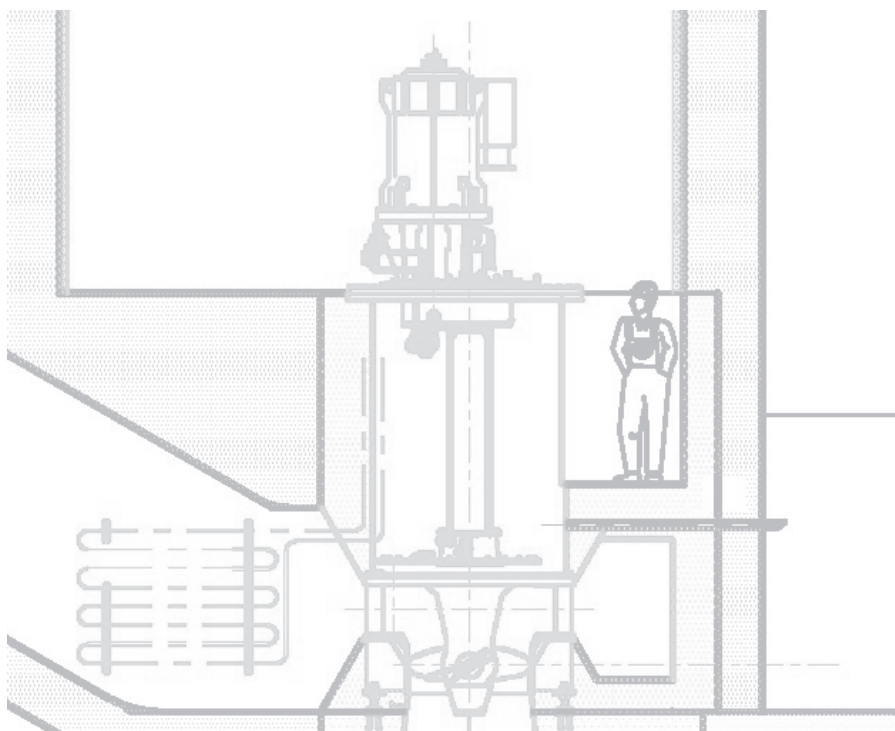
| Type | Leads | kVA rating @ Temperature Rise / Ambient Temp. (°C) | | | | Moment of inertia (**) [kgm ²] | Weight (**) [kg] | Max overspeed [min ⁻¹] |
|----------------|-------|--|---------------------|---|---------------------|--|------------------------|---------------------------------------|
| | | Continuous duty | | | | | | |
| | | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | | | |
| 10 pole | | 400V 50Hz - 600 min⁻¹ | | 480V 60Hz - 720 min⁻¹ | | | | |
| MJT 500 SA10 | 6 | 535 | 465 | 640 | 560 | 63,8 | 3.200 | 1.500 |
| 500 SC10 | 6 | 670 | 585 | 805 | 705 | 81,6 | 3.800 | 1.500 |
| 500 MB10 | 6 | 780 | 680 | 935 | 815 | 85,7 | 4.100 | 1.500 |
| 500 LA10 | 6 | 865 | 755 | 1.040 | 910 | 106,7 | 5.100 | 1.500 |
| 630 SC10 | 6 | 1.020 | 890 | 1.175 | 1.025 | 188 | 6.500 | 1.320 |
| 630 MA10 | 6 | 1.210 | 1.055 | 1.390 | 1.215 | 217 | 8.000 | 1.320 |
| 630 MB10 | 6 | 1.300 | 1.135 | 1.495 | 1.305 | 237 | 8.500 | 1.320 |
| 630 LA10 | 6 | 1.420 | 1.240 | 1.635 | 1.425 | 260 | 9.500 | 1.320 |
| 710 SC10 | 6 | 2.010 | 1.755 | 2.240 | 1.955 | on request | on request | 1.320 |
| 710 MA10 | 6 | 2.420 | 2.110 | 2.720 | 2.375 | on request | on request | 1.320 |
| 710 MB10* | 6 | 2.580 | 2.250 | 2.890 | 2.525 | on request | on request | 1.320 |
| 12 pole | | 400V 50Hz - 500 min⁻¹ | | 480V 60Hz - 600 min⁻¹ | | | | |
| MJT 630 SC12 | 6 | 720 | 630 | 820 | 715 | 206 | 6.500 | 1.100 |
| 630 MA12 | 6 | 870 | 760 | 1.000 | 875 | 238 | 8.000 | 1.100 |
| 630 MB12 | 6 | 1.100 | 960 | 1.270 | 1.110 | 260 | 8.500 | 1.100 |
| 630 LA12 | 6 | 1.280 | 1.115 | 1.490 | 1.300 | 285 | 9.500 | 1.100 |
| 710 SA12 | 6 | 1.380 | 1.205 | 1.580 | 1.380 | on request | on request | 1.100 |
| 710 MA12 | 6 | 1.780 | 1.555 | 2.040 | 1.780 | on request | on request | 1.100 |
| 710 LA12 | 6 | 2.200 | 1.920 | 2.530 | 2.210 | on request | on request | 1.100 |
| 14 pole | | 400V 50Hz - 428 min⁻¹ | | 480V 60Hz - 514 min⁻¹ | | | | |
| MJT 710 SA14 | 6 | 750 | 655 | 850 | 740 | on request | on request | 950 |
| 710 SC14 | 6 | 1.020 | 890 | 1.180 | 1.030 | on request | on request | 950 |
| 710 MA14 | 6 | 1.220 | 1.065 | 1.410 | 1.230 | on request | on request | 950 |
| 710 LA14 | 6 | 1.500 | 1.310 | 1.730 | 1.510 | on request | on request | 950 |
| 710 LB14 | 6 | 1.700 | 1.485 | 1.960 | 1.710 | on request | on request | 950 |
| 16 pole | | 400V 50Hz - 375 min⁻¹ | | 480V 60Hz - 450 min⁻¹ | | | | |
| MJT 710 SA16 | 6 | 660 | 575 | 750 | 655 | on request | on request | 825 |
| 710 SC16 | 6 | 900 | 785 | 1.040 | 910 | on request | on request | 825 |
| 710 MA16 | 6 | 1.070 | 935 | 1.240 | 1.080 | on request | on request | 825 |
| 710 LA16 | 6 | 1.330 | 1.160 | 1.520 | 1.325 | on request | on request | 825 |
| 710 LB16 | 6 | 1.500 | 1.310 | 1.720 | 1.500 | on request | on request | 825 |
| 18 pole | | 400V 50Hz - 333 min⁻¹ | | 480V 60Hz - 400 min⁻¹ | | | | |
| MJT 710 SA18 | 6 | 590 | 515 | 680 | 595 | on request | on request | 740 |
| 710 SC18 | 6 | 810 | 705 | 940 | 820 | on request | on request | 740 |
| 710 MA18 | 6 | 970 | 845 | 1.110 | 970 | on request | on request | 740 |
| 710 LA18 | 6 | 1.190 | 1.040 | 1.370 | 1.195 | on request | on request | 740 |
| 710 LB18 | 6 | 1.350 | 1.180 | 1.550 | 1.355 | on request | on request | 740 |

*: 690 V recommended

** : Showed data could change depending on mounting.

The rated outputs refer to the following conditions: balanced and non deforming load, altitude below 1.000 m asl, power factor from 0,8 to 1.

For values of overspeed greater than as listed, please contact MarelliMotori.



SYNCHRONOUS GENERATORS / MEDIUM VOLTAGE

| Type | Leads | kVA rating @ Temperature Rise / Ambient Temp. (°C) | | | | | | | | Moment of inertia (**) [kgm ²] | Weight (**) [kg] | Max overspeed [min ⁻¹] | |
|---------------|---------|--|---------------------|-------------------------------------|---------------------|-------------------------------------|---------------------|-------------------------------------|---------------------|--|------------------------|---------------------------------------|-------|
| | | 3000V | | | | 6000V | | | | | | | |
| | | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | | | | |
| 4 pole | | 50Hz - 1500 min⁻¹ | | 60Hz - 1800 min⁻¹ | | 50Hz - 1500 min⁻¹ | | 60Hz - 1800 min⁻¹ | | | | | |
| MJHT | 400 SA4 | 6 | 375 | 335 | 450 | 395 | - | - | - | - | 10,2 | 1.850 | 3.000 |
| | 400 MA4 | 6 | 540 | 480 | 650 | 565 | 500 | 440 | 600 | 525 | 14,6 | 2.300 | 3.000 |
| | 400 LA4 | 6 | 750 | 665 | 900 | 785 | 665 | 590 | 800 | 700 | 19,3 | 2.600 | 3.000 |
| | 400 LB4 | 6 | 920 | 810 | 1.105 | 965 | 835 | 740 | 1.000 | 875 | 22,5 | 2.850 | 3.000 |
| | 450 MB4 | 6 | 960 | 840 | 1.150 | 1.005 | 895 | 780 | 1.075 | 940 | 29,0 | 3.250 | 2.700 |
| | 450 LA4 | 6 | 1.060 | 925 | 1.270 | 1.110 | 985 | 860 | 1.180 | 1.030 | 34,0 | 3.650 | 2.700 |
| | 450 LB4 | 6 | 1.185 | 1.035 | 1.420 | 1.240 | 1.105 | 965 | 1.325 | 1.155 | 38,0 | 4.050 | 2.700 |
| | 500 MA4 | 6 | 1.290 | 1.145 | 1.550 | 1.355 | 1.105 | 975 | 1.325 | 1.155 | 46,7 | 3.900 | 2.700 |
| | 500 MB4 | 6 | 1.540 | 1.365 | 1.850 | 1.615 | 1.290 | 1.145 | 1.550 | 1.355 | 52,5 | 4.500 | 2.700 |
| | 500 LA4 | 6 | 1.665 | 1.475 | 2.000 | 1.745 | 1.530 | 1.350 | 1.835 | 1.600 | 61,5 | 5.200 | 2.700 |
| | 560 MA4 | 6 | 1.980 | 1.730 | 2.275 | 1.985 | 1.800 | 1.570 | 2.070 | 1.805 | 83 | 5.100 | 2.700 |
| | 560 LA4 | 6 | 2.250 | 1.965 | 2.590 | 2.260 | 2.045 | 1.785 | 2.350 | 2.050 | 95 | 5.800 | 2.700 |
| | 630 SA4 | 6 | 1.770 | 1.550 | 2.035 | 1.775 | 1.610 | 1.410 | 1.850 | 1.615 | 80 | 6.000 | 2.400 |
| | 630 MA4 | 6 | 2.040 | 1.780 | 2.345 | 2.045 | 1.850 | 1.620 | 2.130 | 1.860 | 120 | 7.000 | 2.400 |
| | 630 MB4 | 6 | 2.310 | 2.020 | 2.655 | 2.315 | 2.100 | 1.830 | 2.415 | 2.110 | 155 | 7.700 | 2.400 |
| | 630 LA4 | 6 | 2.640 | 2.300 | 3.035 | 2.650 | 2.400 | 2.090 | 2.760 | 2.410 | 163 | 8.200 | 2.400 |
| | 630 LB4 | 6 | 3.090 | 2.700 | 3.555 | 3.105 | 2.810 | 2.450 | 3.230 | 2.820 | 177 | 8.700 | 2.400 |
| 6 pole | | 50Hz - 1000 min⁻¹ | | 60Hz - 1200 min⁻¹ | | 50Hz - 1000 min⁻¹ | | 60Hz - 1200 min⁻¹ | | | | | |
| MJHT | 400 MA6 | 6 | 385 | 340 | 460 | 400 | - | - | - | - | 17,9 | 2.300 | 2.200 |
| | 400 LA6 | 6 | 560 | 495 | 670 | 585 | 490 | 435 | 590 | 515 | 20,9 | 2.650 | 2.200 |
| | 400 LB6 | 6 | 600 | 530 | 720 | 630 | 525 | 465 | 630 | 550 | 24,2 | 2.850 | 2.200 |
| | 500 SA6 | 6 | 685 | 605 | 820 | 715 | 590 | 520 | 710 | 620 | 50,5 | 3.300 | 2.200 |
| | 500 MA6 | 6 | 840 | 745 | 1.010 | 880 | 735 | 650 | 880 | 770 | 70,0 | 4.200 | 2.200 |
| | 500 MB6 | 6 | 1.000 | 885 | 1.200 | 1.045 | 875 | 775 | 1.050 | 915 | 73,6 | 4.500 | 2.200 |
| | 500 LA6 | 6 | 1.125 | 995 | 1.350 | 1.180 | 1.000 | 885 | 1.200 | 1.045 | 88,9 | 5.200 | 2.200 |
| | 560 MA6 | 6 | 1.710 | 1.490 | 1.965 | 1.715 | 1.575 | 1.375 | 1.810 | 1.580 | 111 | 5.100 | 2.200 |
| | 560 LA6 | 6 | 1.890 | 1.650 | 2.175 | 1.900 | 1.735 | 1.515 | 1.995 | 1.740 | 137 | 5.800 | 2.200 |
| | 630 SA6 | 6 | 1.320 | 1.150 | 1.520 | 1.325 | 1.200 | 1.050 | 1.380 | 1.205 | 94 | 6.000 | 2.200 |
| | 630 MA6 | 6 | 1.610 | 1.400 | 1.850 | 1.615 | 1.460 | 1.280 | 1.680 | 1.465 | 145 | 6.700 | 2.200 |
| | 630 MB6 | 6 | 1.900 | 1.660 | 2.185 | 1.905 | 1.720 | 1.510 | 1.980 | 1.730 | 167 | 8.100 | 2.200 |
| | 630 LA6 | 6 | 2.000 | 1.750 | 2.300 | 2.010 | 1.820 | 1.590 | 2.095 | 1.830 | 190 | 9.000 | 2.200 |
| | 630 LB6 | 6 | 2.100 | 1.840 | 2.415 | 2.110 | 1.910 | 1.670 | 2.195 | 1.915 | 200 | 9.600 | 2.200 |
| | 710 SA6 | 6 | 2.180 | 1.910 | 2.505 | 2.185 | 1.990 | 1.730 | 2.290 | 2.000 | on request | on request | 2.100 |
| | 710 MA6 | 6 | 2.930 | 2.560 | 3.370 | 2.940 | 2.660 | 2.320 | 3.060 | 2.670 | on request | on request | 2.100 |
| | 710 LA6 | 6 | 3.220 | 2.810 | 3.705 | 3.235 | 2.920 | 2.550 | 3.360 | 2.935 | on request | on request | 2.100 |
| | 710 LB6 | 6 | 3.710 | 3.240 | 4.265 | 3.725 | 3.370 | 2.950 | 3.875 | 3.380 | on request | on request | 2.100 |
| 8 pole | | 50Hz - 750 min⁻¹ | | 60Hz - 900 min⁻¹ | | 50Hz - 750 min⁻¹ | | 60Hz - 900 min⁻¹ | | | | | |
| MJHT | 400 MA8 | 6 | 245 | 220 | 295 | 255 | - | - | - | - | 20,6 | 2.300 | 2.000 |
| | 400 LA8 | 6 | 425 | 375 | 510 | 445 | 365 | 325 | 440 | 385 | 24,1 | 2.630 | 2.000 |
| | 400 LB8 | 6 | 485 | 430 | 580 | 505 | 420 | 370 | 505 | 440 | 25,4 | 2.850 | 2.000 |
| | 500 SA8 | 6 | 620 | 545 | 745 | 650 | 530 | 475 | 635 | 555 | 55,1 | 3.300 | 2.000 |
| | 500 MA8 | 6 | 745 | 665 | 895 | 780 | 650 | 575 | 780 | 680 | 77,7 | 4.200 | 2.000 |
| | 500 MB8 | 6 | 880 | 780 | 1.055 | 920 | 765 | 675 | 920 | 805 | 82,2 | 4.500 | 2.000 |
| | 500 LA8 | 6 | 1.010 | 895 | 1.210 | 1.055 | 880 | 780 | 1.055 | 920 | 95,0 | 5.200 | 2.000 |
| | 560 MA8 | 6 | 1.330 | 1.160 | 1.530 | 1.335 | 1.235 | 1.080 | 1.420 | 1.240 | 122,0 | 5.100 | 2.000 |
| | 560 LA8 | 6 | 1.475 | 1.285 | 1.695 | 1.480 | 1.370 | 1.195 | 1.575 | 1.375 | 146,0 | 5.800 | 2.000 |
| | 630 SA8 | 6 | 1.090 | 950 | 1.255 | 1.095 | 990 | 860 | 1.140 | 995 | 114 | 6.000 | 1.900 |
| | 630 MA8 | 6 | 1.220 | 1.060 | 1.405 | 1.225 | 1.110 | 970 | 1.275 | 1.115 | 177 | 6.700 | 1.900 |
| | 630 MB8 | 6 | 1.350 | 1.180 | 1.555 | 1.355 | 1.230 | 1.070 | 1.415 | 1.235 | 204 | 8.100 | 1.900 |
| | 630 LA8 | 6 | 1.500 | 1.310 | 1.725 | 1.505 | 1.360 | 1.200 | 1.565 | 1.365 | 231 | 9.000 | 1.900 |
| | 630 LB8 | 6 | 1.650 | 1.440 | 1.900 | 1.660 | 1.500 | 1.310 | 1.725 | 1.505 | 245 | 9.600 | 1.900 |
| | 710 SA8 | 6 | 1.980 | 1.730 | 2.275 | 1.985 | 1.800 | 1.580 | 2.070 | 1.805 | on request | on request | 1.800 |
| | 710 MA8 | 6 | 2.610 | 2.280 | 3.000 | 2.620 | 2.370 | 2.070 | 2.725 | 2.380 | on request | on request | 1.800 |
| | 710 MB8 | 6 | 2.960 | 2.580 | 3.405 | 2.970 | 2.690 | 2.350 | 3.095 | 2.700 | on request | on request | 1.800 |
| | 710 LB8 | 6 | 3.340 | 2.920 | 3.840 | 3.350 | 3.040 | 2.650 | 3.495 | 3.050 | on request | on request | 1.800 |

** : Shown data could change depending on mounting.

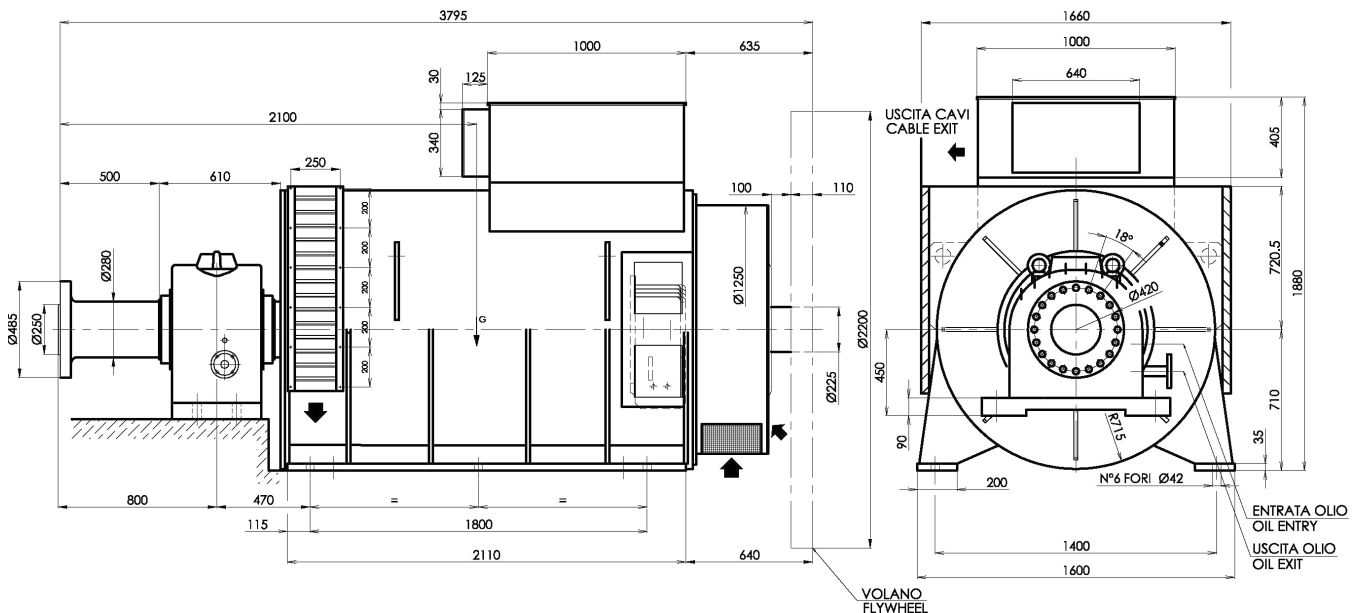
The rated outputs refer to the following conditions: balanced and non deforming load, altitude below 1.000 m asl, power factor from 0,8 to 1.
For values of overspeed greater than as listed, please contact MarelliMotori.

SYNCHRONOUS GENERATORS / MEDIUM VOLTAGE

| Type | Leads | kVA rating @ Temperature Rise / Ambient Temp. (°C) | | | | | | | | Moment of inertia (**) [kgm ²] | Weight (**) [kg] | Max overspeed [min ⁻¹] |
|----------------|-------|--|---------------------|------------------------------------|---------------------|------------------------------------|---------------------|------------------------------------|---------------------|--|------------------------|---------------------------------------|
| | | 3000V | | | | 6000V | | | | | | |
| | | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | 105 / 40 ΔT cl. F | 80 / 40 ΔT cl. B | | | |
| 10 pole | | 50Hz - 600 min⁻¹ | | 60Hz - 720 min⁻¹ | | 50Hz - 600 min⁻¹ | | 60Hz - 720 min⁻¹ | | | | |
| MJHT 500 SA10 | 6 | 465 | 410 | 560 | 490 | 400 | 360 | 480 | 420 | 63,8 | 3.300 | 1.500 |
| 500 MA10 | 6 | 565 | 500 | 680 | 595 | 490 | 435 | 590 | 515 | 85,7 | 4.200 | 1.500 |
| 500 MB10 | 6 | 665 | 590 | 800 | 700 | 580 | 515 | 695 | 605 | 89,7 | 4.700 | 1.500 |
| 500 LA10 | 6 | 740 | 660 | 890 | 775 | 645 | 570 | 775 | 675 | 106,7 | 5.200 | 1.500 |
| 630 SA10 | 6 | 920 | 800 | 1.060 | 925 | 830 | 730 | 955 | 835 | 120 | 6.000 | 1.320 |
| 630 MA10 | 6 | 1.030 | 900 | 1.185 | 1.035 | 940 | 820 | 1.080 | 945 | 188 | 6.700 | 1.320 |
| 630 MB10 | 6 | 1.150 | 1.000 | 1.325 | 1.155 | 1.040 | 910 | 1.195 | 1.045 | 217 | 8.100 | 1.320 |
| 630 LA10 | 6 | 1.210 | 1.060 | 1.390 | 1.215 | 1.100 | 960 | 1.265 | 1.105 | 245 | 9.000 | 1.320 |
| 630 LB10 | 6 | 1.400 | 1.220 | 1.610 | 1.405 | 1.270 | 1.110 | 1.460 | 1.275 | 260 | 9.600 | 1.320 |
| 710 SA10 | 6 | 1.600 | 1.400 | 1.840 | 1.605 | 1.460 | 1.270 | 1.680 | 1.465 | on request | on request | 1.320 |
| 710 MA10 | 6 | 2.200 | 1.920 | 2.530 | 2.210 | 2.000 | 1.750 | 2.300 | 2.010 | on request | on request | 1.320 |
| 710 LA10 | 6 | 2.500 | 2.180 | 2.875 | 2.510 | 2.270 | 1.990 | 2.610 | 2.280 | on request | on request | 1.320 |
| 710 LB10 | 6 | 3.090 | 2.700 | 3.555 | 3.105 | 2.810 | 2.450 | 3.230 | 2.820 | on request | on request | 1.320 |
| 12 pole | | 50Hz - 500 min⁻¹ | | 60Hz - 600 min⁻¹ | | 50Hz - 500 min⁻¹ | | 60Hz - 600 min⁻¹ | | | | |
| MJHT 630 SA12 | 6 | 650 | 570 | 750 | 655 | 590 | 520 | 680 | 595 | 133 | 6.000 | 1.100 |
| 630 MA12 | 6 | 740 | 640 | 850 | 740 | 670 | 590 | 770 | 670 | 206 | 6.700 | 1.100 |
| 630 MB12 | 6 | 820 | 720 | 945 | 825 | 750 | 660 | 865 | 755 | 238 | 8.100 | 1.100 |
| 630 LA12 | 6 | 920 | 800 | 1.060 | 925 | 830 | 730 | 955 | 835 | 269 | 9.000 | 1.100 |
| 630 LB12 | 6 | 1.100 | 960 | 1.265 | 1.105 | 1.000 | 870 | 1.150 | 1.005 | 285 | 9.600 | 1.100 |
| 710 SA12 | 6 | 1.250 | 1.090 | 1.440 | 1.255 | 1.130 | 990 | 1.300 | 1.135 | on request | on request | 1.100 |
| 710 MA12 | 6 | 1.790 | 1.560 | 2.060 | 1.800 | 1.620 | 1.420 | 1.865 | 1.630 | on request | on request | 1.100 |
| 710 LA12 | 6 | 2.230 | 1.940 | 2.565 | 2.240 | 2.020 | 1.770 | 2.325 | 2.030 | on request | on request | 1.100 |
| 14 pole | | 50Hz - 428 min⁻¹ | | 60Hz - 514 min⁻¹ | | 50Hz - 428 min⁻¹ | | 60Hz - 514 min⁻¹ | | | | |
| MJHT 710 SA14 | 6 | 810 | 705 | 940 | 820 | 740 | 645 | 850 | 740 | on request | on request | 950 |
| 710 SC14 | 6 | 1.060 | 925 | 1.220 | 1.065 | 970 | 845 | 1.120 | 980 | on request | on request | 950 |
| 710 MA14 | 6 | 1.250 | 1.090 | 1.440 | 1.255 | 1.150 | 1.005 | 1.180 | 1.030 | on request | on request | 950 |
| 710 LA14 | 6 | 1.610 | 1.405 | 1.850 | 1.615 | 1.470 | 1.285 | 1.520 | 1.325 | on request | on request | 950 |
| 710 LB14 | 6 | 1.750 | 1.530 | 2.010 | 1.755 | 1.630 | 1.425 | 1.650 | 1.440 | on request | on request | 950 |
| 16 pole | | 50Hz - 375 min⁻¹ | | 60Hz - 450 min⁻¹ | | 50Hz - 375 min⁻¹ | | 60Hz - 450 min⁻¹ | | | | |
| MJHT 710 SA16 | 6 | 720 | 630 | 830 | 725 | 670 | 585 | 770 | 670 | on request | on request | 825 |
| 710 SC16 | 6 | 960 | 840 | 1.100 | 960 | 880 | 770 | 1.010 | 880 | on request | on request | 825 |
| 710 MA16 | 6 | 1.130 | 985 | 1.290 | 1.125 | 1.030 | 900 | 1.180 | 1.030 | on request | on request | 825 |
| 710 LA16 | 6 | 1.440 | 1.255 | 1.650 | 1.440 | 1.320 | 1.150 | 1.520 | 1.325 | on request | on request | 825 |
| 710 LB16 | 6 | 1.570 | 1.370 | 1.800 | 1.570 | 1.440 | 1.255 | 1.650 | 1.440 | on request | on request | 825 |
| 18 pole | | 50Hz - 333 min⁻¹ | | 60Hz - 400 min⁻¹ | | 50Hz - 333 min⁻¹ | | 60Hz - 400 min⁻¹ | | | | |
| MJHT 710 SA18 | 6 | 650 | 565 | 750 | 655 | 600 | 525 | 690 | 600 | on request | on request | 740 |
| 710 MA18 | 6 | 860 | 750 | 980 | 855 | 790 | 690 | 900 | 785 | on request | on request | 740 |
| 710 MB18 | 6 | 1.010 | 880 | 1.160 | 1.015 | 930 | 810 | 1.070 | 935 | on request | on request | 740 |
| 710 LA18 | 6 | 1.290 | 1.125 | 1.490 | 1.300 | 1.190 | 1.040 | 1.370 | 1.195 | on request | on request | 740 |
| 710 LB18 | 6 | 1.430 | 1.250 | 1.640 | 1.430 | 1.310 | 1.145 | 1.500 | 1.310 | on request | on request | 740 |

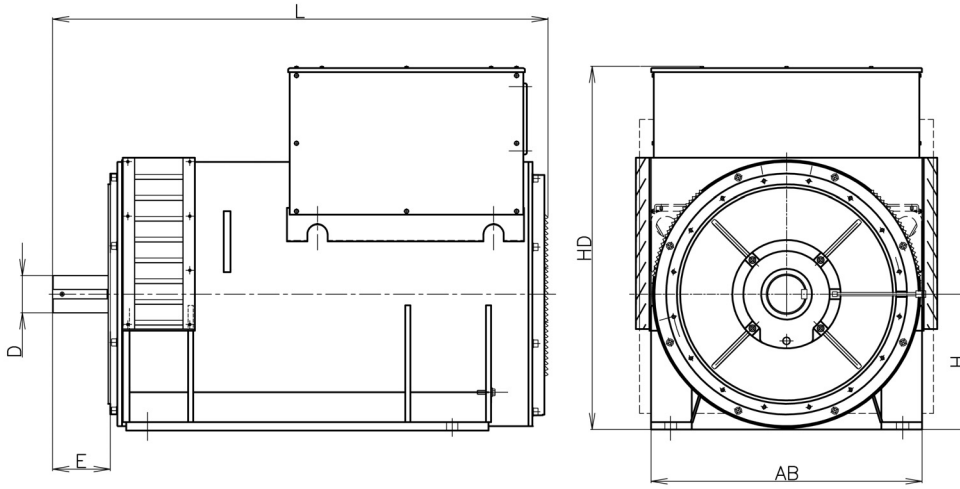
** : Showed data could change depending on mounting.

The rated outputs refer to the following conditions: balanced and non deforming load, altitude below 1.000 m asl, power factor from 0,8 to 1.
For values of overspeed greater than as listed, please contact MarelliMotori.



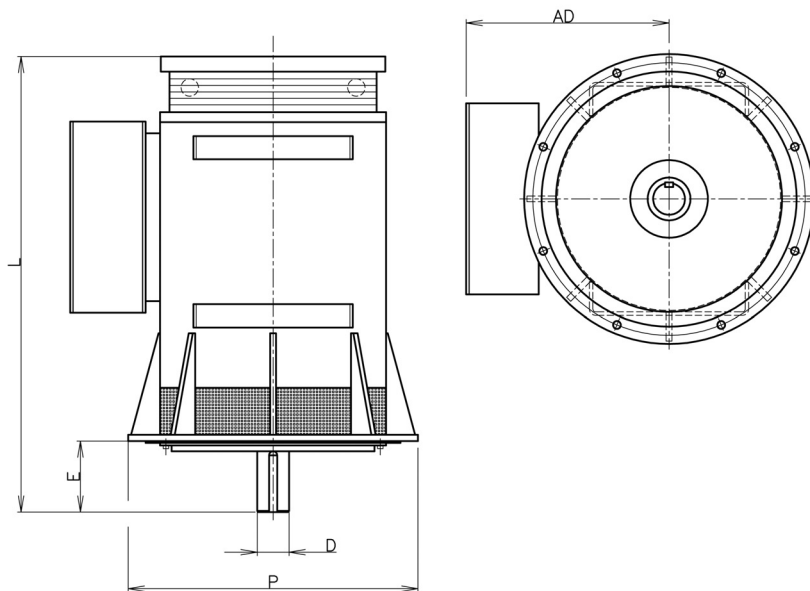
SYNCHRONOUS GENERATORS / OVERALL DIMENSIONS [mm]

Mounting: IM B3 - Air cooled (IC01)



| Dimension | 400 | | | 450 | | | 500 | | | 560 | | | 630 | | | 710 | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| | S | M | L | M | L | S | M | L | M | L | S | M | L | S | M | L | | |
| H | 400 | 400 | 400 | 450 | 450 | 500 | 500 | 500 | 560 | 560 | 630 | 630 | 630 | 710 | 710 | 710 | | |
| HD | 1100 | 1100 | 1100 | 1190 | 1190 | 1370 | 1370 | 1370 | 1430 | 1430 | 1580 | 1580 | 1580 | 1880 | 1880 | 1880 | | |
| AB | 800 | 800 | 800 | 900 | 900 | 1000 | 1000 | 1000 | 1100 | 1100 | 1280 | 1280 | 1280 | 1500 | 1500 | 1500 | | |
| L | 1360 | 1560 | 1760 | 1807 | 1987 | 1920 | 2170 | 2270 | 2305 | 2405 | 2150 | 2350 | 2450 | 2450 | 2650 | 2650 | | |
| D | 110 | 110 | 110 | 125 | 125 | 130 | 130 | 130 | 150 | 150 | 160 | 160 | 160 | 180 | 180 | 180 | | |
| E | 170 | 170 | 170 | 210 | 210 | 210 | 210 | 210 | 230 | 230 | 210 | 210 | 210 | 300 | 300 | 300 | | |

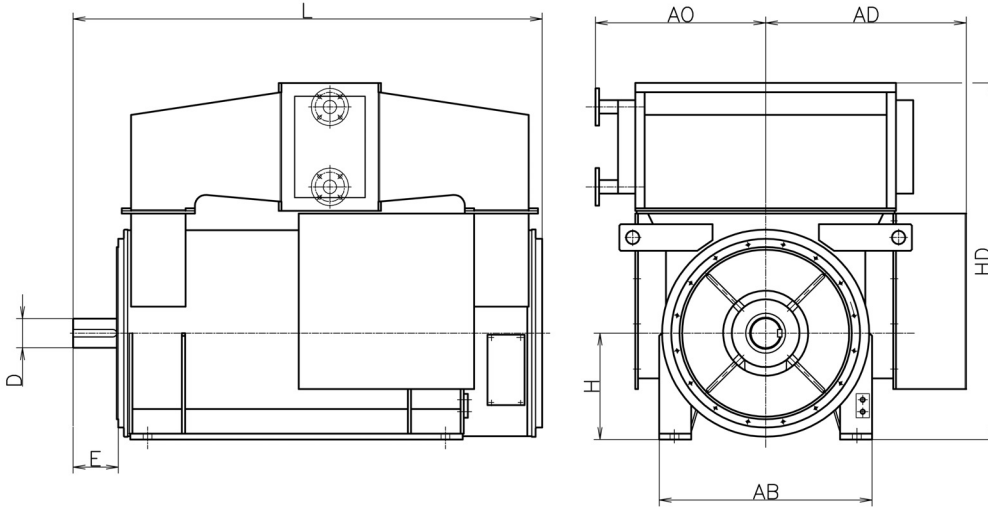
Mounting: IM V10 - Air cooled (IC01)



| Dimension | 400 | | | 450 | | | 500 | | | 560 | | | 630 | | | 710 | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| | S | M | L | M | L | S | M | L | M | L | S | M | L | S | M | L | | |
| P | 1000 | 1000 | 1000 | 1150 | 1150 | 1250 | 1250 | 1250 | 1400 | 1400 | 1600 | 1600 | 1600 | 1800 | 1800 | 1800 | | |
| AD | 700 | 700 | 700 | 740 | 740 | 780 | 780 | 780 | 700 | 700 | 1125 | 1125 | 1125 | 1150 | 1150 | 1150 | | |
| L | 1540 | 1740 | 1940 | 2030 | 2210 | 2250 | 2500 | 2600 | 2340 | 2440 | 2430 | 2630 | 2730 | 2470 | 2670 | 2770 | | |
| D | 110 | 110 | 110 | 125 | 125 | 130 | 130 | 130 | 150 | 150 | 160 | 160 | 160 | 180 | 180 | 180 | | |
| E | 170 | 170 | 170 | 210 | 210 | 210 | 210 | 210 | 230 | 230 | 210 | 210 | 210 | 300 | 300 | 300 | | |

SYNCHRONOUS GENERATORS / OVERALL DIMENSIONS [mm]

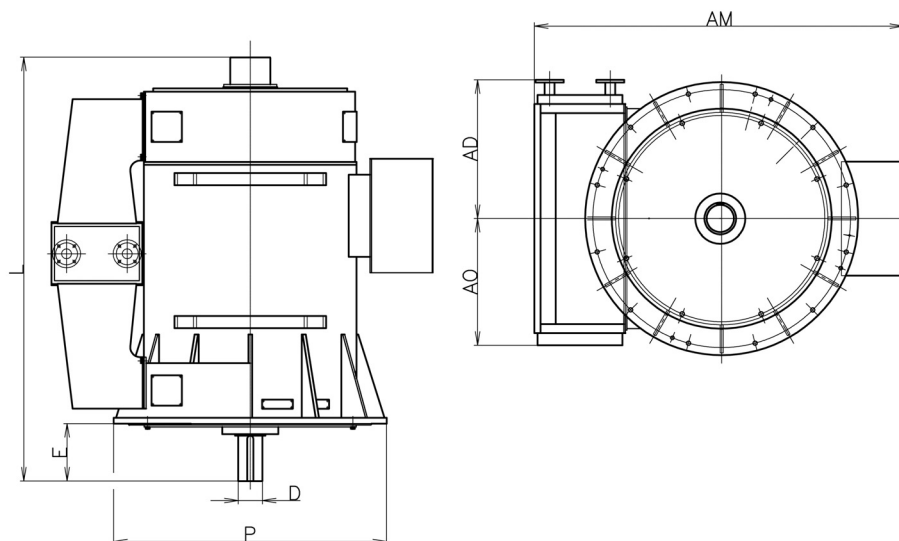
Mounting: IM B3 - Air-to-water heat exchanger (IC81W)



| Dimension | 400 | | | 500 | | | 560 | | | 630 | | | 710 | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | S | M | L | S | M | L | M | L | S | M | L | S | M | L | |
| H | 400 | 400 | 400 | 500 | 500 | 500 | 560 | 560 | 630 | 630 | 630 | 710 | 710 | 710 | |
| HD | 1340 | 1340 | 1340 | 1610 | 1610 | 1610 | 1750 | 1750 | 1880 | 1880 | 1880 | 2060 | 2060 | 2060 | |
| AB | 800 | 800 | 800 | 1000 | 1000 | 1000 | 1100 | 1100 | 1280 | 1280 | 1280 | 1500 | 1500 | 1500 | |
| L | 1345 | 1545 | 1745 | 1830 | 2080 | 2180 | 2180 | 2280 | 2150 | 2350 | 2450 | 2440 | 2640 | 2740 | |
| AO | 640 | 640 | 640 | 685 | 685 | 685 | 685 | 685 | 825 | 825 | 825 | 915 | 915 | 915 | |
| AD | 750 | 750 | 750 | 800 | 800 | 800 | 800 | 800 | 850 | 850 | 850 | 900 | 900 | 900 | |
| D | 110 | 110 | 110 | 130 | 130 | 130 | 150 | 150 | 160 | 160 | 160 | 180 | 180 | 180 | |
| E | 170 | 170 | 170 | 210 | 210 | 210 | 230 | 230 | 210 | 210 | 210 | 300 | 300 | 300 | |

Dimensions for 450 frame size on demand

Mounting: IM V10 - Air-to-water heat exchanger (IC81W)



| Dimension | 400 | | | 500 | | | 560 | | | 630 | | | 710 | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | S | M | L | S | M | L | M | L | S | M | L | S | M | L | |
| P | 1000 | 1000 | 1000 | 1250 | 1250 | 1250 | 1400 | 1400 | 1600 | 1600 | 1600 | 1800 | 1800 | 1800 | |
| AM | 1650 | 1650 | 1650 | 1800 | 1800 | 1800 | 1950 | 1950 | 2100 | 2100 | 2100 | 2435 | 2435 | 2435 | |
| L | 1540 | 1740 | 1940 | 2250 | 2500 | 2600 | 2340 | 2440 | 2470 | 2670 | 2770 | 2470 | 2670 | 2770 | |
| AO | 640 | 640 | 640 | 685 | 685 | 685 | 685 | 685 | 825 | 825 | 825 | 915 | 915 | 915 | |
| AD | 555 | 555 | 555 | 605 | 605 | 605 | 605 | 605 | 745 | 745 | 745 | 835 | 835 | 835 | |
| D | 110 | 110 | 110 | 130 | 130 | 130 | 150 | 150 | 160 | 160 | 160 | 180 | 180 | 180 | |
| E | 170 | 170 | 170 | 210 | 210 | 210 | 230 | 230 | 210 | 210 | 210 | 300 | 300 | 300 | |

Dimensions for 450 frame size on demand

FRAME SIZES 250 - 630 ASYNCHRONOUS GENERATORS: TECHNICAL FEATURES

STANDARDS

All generators are designed according to the IEC 60034-1 and CEI EN 60034-1 standards and can be incorporated in the "CE" marked machinery.

AVAILABLE VOLTAGE

Generators can be supplied with nominal voltages from 380 V up to 690 V.
Voltages not listed can be supplied on request.

ENVIRONMENTAL CONDITIONS

Rated outputs refer to an installation height up to 1.000 m asl and to a maximum ambient temperature of 40°C. For higher altitudes and different temperature values the rated outputs must be recalculated using the factors listed in the following table.

| Altitude [m asl] | Ambient temperature [°C] | | | |
|------------------|--------------------------|------|------|------|
| | 30 | 40 | 45 | 50 |
| 1000 | 1,04 | 1,00 | 0,98 | 0,95 |
| 1500 | 1,03 | 0,97 | 0,95 | 0,92 |
| 2000 | 0,99 | 0,93 | 0,91 | 0,88 |
| 2500 | 0,95 | 0,90 | 0,88 | 0,86 |
| 3000 | 0,91 | 0,86 | 0,84 | 0,82 |

DEGREE OF PROTECTION

Standard generators are air-cooled with an IP 23 degree of protection (IC 01 cooling type). To upgrade the index to IP 44 inlet and outlet air protections are available on request (IC 01 cooling type).

To obtain a higher degree of protection (IP 44 or IP 54), generators can be supplied with an air-to-fresh water heat exchanger installed on the body of the machinery (IC 81W cooling type).

SHAFT ORIENTATION

Generators are supplied with a horizontal (IM B3) or vertical (IM V10) shaft configuration.

BEARINGS

Standard generators are supplied with grease-lubricated rolling bearings. All bearings are oversized to guarantee a minimum lifetime of 100.000 h ($L_{10h} = 100.000$ h), value obtained concerning to an unloaded standard shaft.

RUNNER DIRECTLY CONNECTED TO THE SHAFT

Generators can be equipped with a special shaft extension to directly connect the hydraulic turbine runner. In this configuration all bearings and the shaft are designed to withstand to axial and radial loads caused by the hydraulic thrust and by the weight of the runner. Depending on the loads applied and on the runaway speed of the runner, generators can be supplied with oil-lubricated rolling bearings or sleeve bearings.

ROTOR BALANCING

Rotors are dynamically balanced with a half key applied to the shaft extension in accordance with IEC 60034-14 to vibration grade normal (N) in standard execution. Generators can be supplied with reduced (R) or special (S) vibration levels on request.

INSULATION

Class F standard insulation system allows a maximum winding temperature rise of 105°C referring to an ambient temperature of 40°C. The windings are impregnated with polyester resin using the latest technology (VPI system). An enamel insulator (tropicalization treatment) coats all inner parts of generators in order to protect it from corrosion.

TEMPERATURE SENSORS

Generators are equipped with three PTC thermistors (one for each phase) to supervise the stator winding temperature. Generators can be supplied with a PT100 for each bearing in order to control their temperature. To control inlet and outlet air temperature, PT100's are installed both on the NDE side and on the DE side on request. If the air-to-water heat exchanger is installed, it's possible to control the inlet and outlet water temperature by PT100's and to install a flow meter to check presence or absence of water.

FLYWHEEL

When the requested inertial momentum is higher than the actual inertial momentum of the generator, it is possible to extend the shaft on the NDE side in order to connect a flywheel (not supplied).

TERMINAL BOXES

Generators are supplied with terminal boxes of appropriate dimensions in order to allow easy connection to the main leads. All the generators have six leads in the terminal box.

An additional terminal box for the leads of the auxiliary devices is available on request.

Generators can be equipped with current transformers both on the main leads and the star point leads.

The standard index of protection for the terminal boxes is IP 55; the IP 56 can be installed on request.

EQUIPMENT

Standard

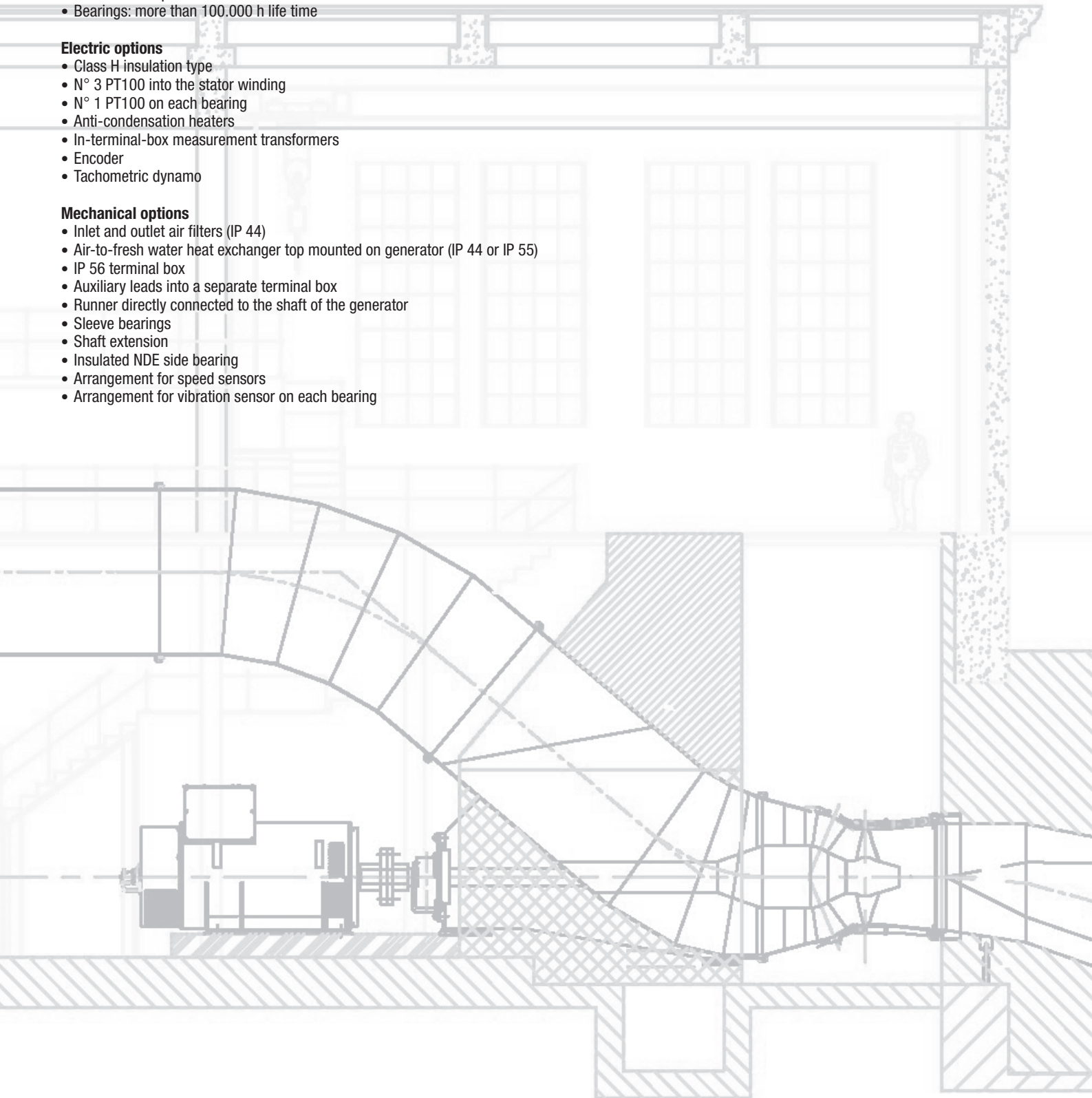
- Class F insulation
- VPI impregnation type
- Windings protected against corrosion (tropicalization)
- Six-leads stator winding into the terminal box
- N° 3 PTC into the stator winding
- IP 23 index of protection
- IP 55 index of protection for the terminal box
- Bearings: more than 100.000 h life time

Electric options

- Class H insulation type
- N° 3 PT100 into the stator winding
- N° 1 PT100 on each bearing
- Anti-condensation heaters
- In-terminal-box measurement transformers
- Encoder
- Tachometric dynamo

Mechanical options

- Inlet and outlet air filters (IP 44)
- Air-to-fresh water heat exchanger top mounted on generator (IP 44 or IP 55)
- IP 56 terminal box
- Auxiliary leads into a separate terminal box
- Runner directly connected to the shaft of the generator
- Sleeve bearings
- Shaft extension
- Insulated NDE side bearing
- Arrangement for speed sensors
- Arrangement for vibration sensor on each bearing



ASYNCHRONOUS GENERATORS / Insulations class F - IP 23 - IC 01

| Power Pn kW | Type | Speed rpm min ⁻¹ | Voltage Vn V | Current In A | Torque Tn N m | Efficiency [%] | | | Power factor | | | Moment of Inertia J kg m ² | Weight IM B3 kg | Max overspeed rpm min ⁻¹ | |
|---|-------------|-----------------------------------|--------------------|--------------------|---------------------|----------------|------|------|--------------|------|------|--|-----------------------|--|-------|
| | | | | | | 4/4 | 3/4 | 2/4 | 4/4 | 3/4 | 2/4 | | | | |
| 4 poles 1500 min⁻¹ - 50Hz | | | | | | | | | | | | | | | |
| 55 | C3G 250 S4 | 1.535 | 400 | 92 | 372 | 92,0 | 92,0 | 90,5 | 0,86 | 0,84 | 0,79 | 0,5 | 275 | 3.000 | |
| 75 | | 1.520 | 400 | 126 | 509 | 92,5 | 92,3 | 91,0 | 0,86 | 0,83 | 0,75 | 0,8 | 350 | 3.000 | |
| 90 | 280 S4 | 1.520 | 400 | 148 | 608 | 93,0 | 93,0 | 92,0 | 0,88 | 0,86 | 0,79 | 0,9 | 405 | 3.000 | |
| 110 | | 280 M4 | 1.520 | 400 | 181 | 743 | 93,0 | 93,0 | 92,0 | 0,88 | 0,86 | 0,79 | 1,1 | 445 | 3.000 |
| 132 | 315 S4 | 1.520 | 400 | 214 | 883 | 93,9 | 94,3 | 94,1 | 0,89 | 0,88 | 0,84 | 1,7 | 570 | 2.750 | |
| 160 | 315 MA4 | 1.520 | 400 | 263 | 1.067 | 94,2 | 94,5 | 94,1 | 0,88 | 0,87 | 0,81 | 2,1 | 705 | 2.750 | |
| 200 | 315 MB4 | 1.517 | 400 | 328 | 1.332 | 94,5 | 94,9 | 94,6 | 0,88 | 0,87 | 0,83 | 2,5 | 750 | 2.750 | |
| 250 | 315 MD4 | 1.517 | 400 | 401 | 1.656 | 95,0 | 95,3 | 95,0 | 0,90 | 0,88 | 0,83 | 3,1 | 850 | 2.750 | |
| 315 | 315 ME4 | 1.517 | 400 | 506 | 2.085 | 95,1 | 95,2 | 95,0 | 0,90 | 0,88 | 0,83 | 3,3 | 930 | 2.750 | |
| 315 | 355 LA4 | 1.510 | 400 | 511 | 2.089 | 95,4 | 95,3 | 94,5 | 0,89 | 0,87 | 0,82 | 6,6 | 1.150 | 2.750 | |
| 400 | | 355 LB4 | 1.510 | 400 | 642 | 2.637 | 95,9 | 95,8 | 94,8 | 0,90 | 0,89 | 0,85 | 8,0 | 1.260 | 2.750 |
| 450 | | 355 LC4 | 1.508 | 400 | 731 | 2.965 | 96,1 | 96,0 | 95,3 | 0,89 | 0,87 | 0,86 | 10,3 | 1.450 | 2.750 |
| 550 | | 355 LD4 | 1.508 | 400 | 893 | 3.620 | 96,2 | 96,0 | 95,4 | 0,89 | 0,87 | 0,81 | 12,0 | 1.670 | 2.750 |
| 700 | C4G 400 LA4 | 1.507 | 400 | 1.137 | 4.573 | 96,9 | 96,9 | 96,4 | 0,89 | 0,85 | 0,70 | 12,2 | 2.333 | 2.750 | |
| 800 | | 400 LB4 | 1.507 | 400 | 1.299 | 5.221 | 97,0 | 97,0 | 96,5 | 0,89 | 0,84 | 0,66 | 13,7 | 2.491 | 2.750 |
| 900 | | 400 LC4 | 1.506 | 400 | 1.445 | 5.871 | 97,1 | 97,0 | 96,5 | 0,90 | 0,88 | 0,83 | 15,7 | 2.691 | 2.750 |
| 1100 | 450 LA4 | 1.507 | 690 | 1.035 | 7.179 | 97,0 | 96,8 | 96,2 | 0,89 | 0,88 | 0,83 | 28,9 | 3.666 | 2.500 | |
| 1250 | 450 LB4 | 1.507 | 690 | 1.164 | 8.149 | 97,1 | 97,0 | 96,4 | 0,90 | 0,89 | 0,85 | 33,3 | 3.889 | 2.500 | |
| 1400 | 450 LC4 | 1.506 | 690 | 1.318 | 9.133 | 97,1 | 97,0 | 96,1 | 0,89 | 0,87 | 0,81 | 37,6 | 4.271 | 2.500 | |
| 1600 | 500 LA4 | 1.505 | 690 | 1.541 | 10.445 | 97,1 | 96,8 | 96,0 | 0,87 | 0,85 | 0,80 | 53,0 | 5.353 | 2.500 | |
| 1800 | 500 LB4 | 1.505 | 690 | 1.694 | 11.715 | 97,4 | 97,3 | 96,7 | 0,89 | 0,86 | 0,86 | 59,9 | 5.728 | 2.500 | |
| 2000 | 500 LC4 | 1.505 | 690 | 1.926 | 13.030 | 97,3 | 97,0 | 96,3 | 0,87 | 0,86 | 0,81 | 68,8 | 6.003 | 2.500 | |

| | | | | | | | | | | | | | | | |
|---|-------------|---------|-------|-------|--------|--------|------|------|------|------|------|-------|-------|-------|-------|
| 6 poles 1000 min⁻¹ - 50Hz | | | | | | | | | | | | | | | |
| 110 | C3G 315 MA6 | 1.010 | 400 | 187 | 1.115 | 93,3 | 93,5 | 93,0 | 0,85 | 0,85 | 0,81 | 2,9 | 750 | 2.550 | |
| 132 | | 315 MB6 | 1.013 | 400 | 224 | 1.331 | 93,5 | 93,8 | 93,2 | 0,85 | 0,85 | 0,81 | 4,1 | 850 | 2.550 |
| 160 | | 315 MC6 | 1.013 | 400 | 272 | 1.609 | 93,7 | 94,0 | 93,4 | 0,85 | 0,84 | 0,80 | 5,1 | 920 | 2.550 |
| 225 | 355 LA6 | 1.007 | 400 | 383 | 2.241 | 95,2 | 95,1 | 94,3 | 0,85 | 0,82 | 0,74 | 8,2 | 1.160 | 2.550 | |
| 270 | | 355 LB6 | 1.007 | 400 | 459 | 2.681 | 95,5 | 95,4 | 94,6 | 0,85 | 0,82 | 0,74 | 10,6 | 1.340 | 2.550 |
| 315 | | 355 LC6 | 1.007 | 400 | 529 | 3.121 | 95,7 | 95,6 | 94,9 | 0,86 | 0,83 | 0,75 | 12,3 | 1.460 | 2.550 |
| 375 | | 355 LD6 | 1.006 | 400 | 638 | 3.719 | 95,7 | 95,5 | 94,8 | 0,85 | 0,82 | 0,73 | 13,7 | 1.800 | 2.550 |
| 540 | C4G 400 LA6 | 1.010 | 400 | 907 | 5.313 | 96,0 | 96,2 | 96,0 | 0,86 | 0,86 | 0,82 | 19,0 | 2.278 | 2.550 | |
| 610 | | 400 LB6 | 1.010 | 400 | 1.025 | 5.989 | 96,2 | 96,4 | 96,1 | 0,86 | 0,86 | 0,82 | 21,6 | 2.421 | 2.550 |
| 670 | | 400 LC6 | 1.010 | 400 | 1.113 | 6.572 | 96,3 | 96,4 | 96,1 | 0,87 | 0,86 | 0,81 | 23,6 | 2.564 | 2.550 |
| 720 | | 400 LD6 | 1.009 | 400 | 1.196 | 7.062 | 96,4 | 96,5 | 96,2 | 0,87 | 0,86 | 0,82 | 25,5 | 2.732 | 2.550 |
| 800 | 450 LA6 | 1.006 | 400 | 1.344 | 7.854 | 96,6 | 96,5 | 96,0 | 0,86 | 0,85 | 0,80 | 38,1 | 3.569 | 2.000 | |
| 900 | 450 LB6 | 1.006 | 400 | 1.512 | 8.826 | 96,7 | 96,6 | 96,1 | 0,86 | 0,85 | 0,80 | 43,5 | 3.843 | 2.000 | |
| 1000 | 450 LC6 | 1.006 | 400 | 1.680 | 9.797 | 96,8 | 96,7 | 96,2 | 0,86 | 0,85 | 0,80 | 48,8 | 4.128 | 2.000 | |
| 1200 | 500 LA6 | 1.005 | 690 | 1.169 | 11.743 | 97,0 | 96,8 | 96,3 | 0,86 | 0,85 | 0,80 | 66,2 | 5.039 | 1.800 | |
| 1400 | 500 LB6 | 1.005 | 690 | 1.348 | 13.686 | 97,1 | 97,0 | 96,4 | 0,87 | 0,86 | 0,80 | 77,1 | 5.525 | 1.800 | |
| 1600 | 500 LC6 | 1.005 | 690 | 1.541 | 15.642 | 97,1 | 97,0 | 96,5 | 0,87 | 0,86 | 0,80 | 88,9 | 6.015 | 1.800 | |
| 2000 | 630 LA6 | 1.005 | 690 | 1.883 | 19.532 | 97,2 | 97,1 | 96,6 | 0,89 | 0,88 | 0,86 | 154,3 | 7.476 | 1.800 | |
| 2300 | | 630 LB6 | 1.004 | 690 | 2.165 | 22.461 | 97,3 | 97,2 | 96,6 | 0,89 | 0,88 | 0,86 | 178,7 | 8.271 | 1.800 |
| 2700 | | 630 LC6 | 1.004 | 690 | 2.513 | 26.340 | 97,4 | 97,3 | 96,8 | 0,90 | 0,89 | 0,87 | 206,9 | 8.981 | 1.800 |

ASYNCHRONOUS GENERATORS / Insulations class F - IP 23 - IC 01

| Power Pn kW | Type | Speed rpm min ⁻¹ | Voltage Vn V | Current In A | Torque Tn N m | Efficiency [%] | | | Power factor | | | Moment of Inertia J kg m ² | Weight IM B3 kg | Max overspeed rpm min ⁻¹ |
|-------------------|------|-----------------------------------|--------------------|--------------------|---------------------|----------------|-----|-----|--------------|-----|-----|--|-----------------------|--|
| | | | | | | 4/4 | 3/4 | 2/4 | 4/4 | 3/4 | 2/4 | | | |

8 poles 750 min⁻¹ - 50Hz

| | | | | | | | | | | | | | | |
|------|-------------|-----|-----|-------|--------|------|------|------|------|------|------|-------|--------|-------|
| 90 | C3G 315 MA8 | 765 | 400 | 163 | 1.201 | 93,5 | 93,6 | 93,0 | 0,80 | 0,75 | 0,66 | 3,0 | 780 | 1.950 |
| 110 | | 765 | 400 | 196 | 1.465 | 93,7 | 93,9 | 93,1 | 0,81 | 0,76 | 0,67 | 3,7 | 800 | 1.950 |
| 132 | | 764 | 400 | 230 | 1.757 | 93,9 | 94,0 | 93,1 | 0,83 | 0,78 | 0,69 | 4,4 | 830 | 1.950 |
| 160 | 355 LA8 | 757 | 400 | 282 | 2.142 | 94,2 | 94,1 | 93,2 | 0,82 | 0,77 | 0,68 | 9,6 | 1.160 | 1.950 |
| 200 | | 756 | 400 | 352 | 2.667 | 94,7 | 94,5 | 93,6 | 0,82 | 0,77 | 0,67 | 12,3 | 1.340 | 1.950 |
| 250 | | 756 | 400 | 441 | 3.327 | 94,9 | 94,8 | 93,9 | 0,82 | 0,78 | 0,68 | 14,2 | 1.460 | 1.950 |
| 280 | 355 LD8 | 756 | 400 | 493 | 3.722 | 95,0 | 94,8 | 94,0 | 0,82 | 0,78 | 0,68 | 15,9 | 1.570 | 1.950 |
| 315 | 400 LA8 | 757 | 400 | 542 | 4.213 | 94,3 | 94,1 | 92,9 | 0,84 | 0,82 | 0,76 | 20,5 | 1.900 | 1.950 |
| 375 | | 757 | 400 | 638 | 5.000 | 94,6 | 94,4 | 93,4 | 0,85 | 0,83 | 0,77 | 24,5 | 2.100 | 1.950 |
| 450 | | 758 | 400 | 765 | 5.979 | 94,8 | 94,7 | 93,9 | 0,85 | 0,84 | 0,78 | 27,5 | 2.300 | 1.950 |
| 500 | 400 LD8 | 758 | 400 | 840 | 6.637 | 94,9 | 94,9 | 94,3 | 0,86 | 0,85 | 0,79 | 30,6 | 2.450 | 1.950 |
| 580 | C4G 450 LA8 | 756 | 400 | 986 | 7.624 | 96,0 | 95,9 | 95,2 | 0,85 | 0,83 | 0,77 | 44,1 | 3.341 | 1.500 |
| 650 | | 756 | 400 | 1.105 | 8.535 | 96,1 | 96,0 | 95,3 | 0,85 | 0,83 | 0,77 | 50,3 | 3.578 | 1.500 |
| 730 | | 756 | 400 | 1.241 | 9.576 | 96,2 | 96,1 | 95,5 | 0,85 | 0,84 | 0,77 | 56,5 | 3.812 | 1.500 |
| 850 | 500 LA8 | 755 | 400 | 1.462 | 11.141 | 96,4 | 96,3 | 95,6 | 0,84 | 0,82 | 0,77 | 78,0 | 5.058 | 1.400 |
| 1000 | | 755 | 400 | 1.720 | 13.053 | 96,8 | 96,6 | 96,0 | 0,84 | 0,82 | 0,76 | 90,8 | 5.533 | 1.400 |
| 1150 | | 754 | 400 | 1.978 | 15.016 | 96,9 | 96,8 | 96,2 | 0,84 | 0,82 | 0,76 | 104,7 | 6.045 | 1.400 |
| 1350 | 630 LA8 | 754 | 690 | 1.300 | 17.627 | 96,9 | 96,8 | 96,2 | 0,87 | 0,86 | 0,82 | 201,8 | 7.362 | 1.300 |
| 1500 | | 754 | 690 | 1.444 | 19.566 | 97,0 | 96,8 | 96,1 | 0,87 | 0,86 | 0,80 | 233,8 | 8.078 | 1.300 |
| 1800 | | 753 | 690 | 1.733 | 23.486 | 97,1 | 97,0 | 96,4 | 0,87 | 0,86 | 0,81 | 270,7 | 8.911 | 1.300 |
| 2000 | 710 LA8 | 752 | 690 | 1.948 | 26.023 | 97,5 | 97,3 | 97,6 | 0,86 | 0,83 | 0,76 | 455,0 | 11.067 | - |
| 2400 | | 752 | 690 | 2.311 | 31.164 | 97,7 | 97,5 | 97,0 | 0,87 | 0,85 | 0,78 | 535,0 | 12.320 | - |
| 2800 | | 752 | 690 | 2.696 | 36.357 | 97,7 | 97,6 | 97,1 | 0,87 | 0,85 | 0,79 | 632,0 | 13.662 | - |

10 poles 600 min⁻¹ - 50Hz

| | | | | | | | | | | | | | | |
|------|--------------|-----|-----|-------|--------|------|------|------|------|------|------|-------|--------|-------|
| 132 | C3G 355 LA10 | 610 | 400 | 235 | 2.207 | 93,6 | 93,9 | 93,6 | 0,81 | 0,79 | 0,71 | 9,6 | 1.160 | 1.525 |
| 160 | | 609 | 400 | 285 | 2.663 | 94,2 | 94,3 | 93,7 | 0,81 | 0,77 | 0,68 | 12,3 | 1.340 | 1.525 |
| 180 | | 609 | 400 | 317 | 2.993 | 94,3 | 94,5 | 94,0 | 0,82 | 0,78 | 0,69 | 14,2 | 1.460 | 1.525 |
| 200 | | 609 | 400 | 352 | 3.318 | 94,5 | 94,6 | 94,1 | 0,82 | 0,78 | 0,69 | 15,9 | 1.570 | 1.525 |
| 240 | 400 LA10 | 607 | 400 | 439 | 4.003 | 94,3 | 94,3 | 93,5 | 0,79 | 0,75 | 0,67 | 20,5 | 1.900 | 1.525 |
| 280 | | 607 | 400 | 512 | 4.666 | 94,4 | 94,5 | 93,7 | 0,79 | 0,76 | 0,67 | 24,5 | 2.110 | 1.525 |
| 315 | | 606 | 400 | 576 | 5.235 | 94,8 | 94,7 | 93,9 | 0,79 | 0,75 | 0,66 | 27,5 | 2.280 | 1.525 |
| 350 | | 606 | 400 | 640 | 5.811 | 94,9 | 94,8 | 94,0 | 0,79 | 0,75 | 0,66 | 30,6 | 2.450 | 1.525 |
| 450 | C4G 450 LA10 | 606 | 400 | 783 | 7.418 | 95,5 | 95,5 | 94,9 | 0,83 | 0,82 | 0,75 | 50,7 | 3.267 | 1.500 |
| 500 | | 605 | 400 | 881 | 8.239 | 95,7 | 95,6 | 94,8 | 0,82 | 0,80 | 0,72 | 57,8 | 3.507 | 1.500 |
| 570 | | 605 | 400 | 1.005 | 9.382 | 95,8 | 95,7 | 94,9 | 0,82 | 0,80 | 0,72 | 65,0 | 3.760 | 1.500 |
| 650 | 500 LA10 | 604 | 400 | 1.160 | 10.717 | 95,8 | 95,5 | 94,5 | 0,81 | 0,78 | 0,69 | 97,0 | 4.924 | 1.300 |
| 750 | | 604 | 400 | 1.322 | 12.340 | 96,0 | 95,7 | 94,8 | 0,82 | 0,79 | 0,70 | 112,9 | 5.404 | 1.300 |
| 880 | | 604 | 400 | 1.532 | 14.448 | 96,2 | 96,0 | 95,3 | 0,83 | 0,80 | 0,73 | 130,2 | 5.915 | 1.300 |
| 1050 | 630 LA10 | 604 | 400 | 1.806 | 17.186 | 96,5 | 96,3 | 95,6 | 0,84 | 0,82 | 0,75 | 212,5 | 7.232 | 1.100 |
| 1200 | | 604 | 400 | 2.040 | 19.621 | 96,6 | 96,5 | 96,0 | 0,85 | 0,83 | 0,77 | 246,2 | 7.880 | 1.100 |
| 1400 | | 604 | 400 | 2.380 | 22.867 | 96,7 | 96,6 | 96,1 | 0,85 | 0,83 | 0,77 | 285,0 | 8.682 | 1.100 |
| 1500 | 710 LA10 | 603 | 400 | 1.478 | 24.415 | 97,2 | 97,1 | 96,7 | 0,85 | 0,84 | 0,78 | 485,0 | 10.943 | - |
| 1800 | | 603 | 400 | 1.753 | 29.268 | 97,3 | 97,3 | 96,9 | 0,86 | 0,85 | 0,80 | 570,0 | 12.144 | - |
| 2100 | | 603 | 400 | 2.022 | 34.111 | 97,4 | 97,4 | 97,0 | 0,87 | 0,85 | 0,80 | 673,0 | 13.523 | - |

ASYNCHRONOUS GENERATORS / Insulations class F - IP 23 - IC 01

| Power Pn kW | Type | Speed rpm min ⁻¹ | Voltage Vn V | Current In A | Torque Tn N m | Efficiency [%] | | | Power factor | | | Moment of Inertia J kg m ² | Weight IM B3 kg | Max overspeed rpm min ⁻¹ |
|---|--------------|-----------------------------------|--------------------|--------------------|---------------------|----------------|------|------|--------------|------|------|--|-----------------------|--|
| | | | | | | 4/4 | 3/4 | 2/4 | 4/4 | 3/4 | 2/4 | | | |
| 12 poles 500 min⁻¹ - 50Hz | | | | | | | | | | | | | | |
| 110 | C3G 355 LA12 | 508 | 400 | 224 | 2.233 | 92,6 | 92,7 | 92,0 | 0,71 | 0,67 | 0,56 | 9,6 | 1.160 | 1.300 |
| 132 | | 507 | 400 | 269 | 2.667 | 93,2 | 93,1 | 92,2 | 0,71 | 0,65 | 0,54 | 12,3 | 1.340 | 1.300 |
| 160 | | 507 | 400 | 326 | 3.233 | 93,2 | 93,3 | 92,4 | 0,71 | 0,66 | 0,54 | 14,2 | 1.460 | 1.300 |
| 180 | | 508 | 400 | 356 | 3.618 | 93,5 | 93,6 | 92,9 | 0,73 | 0,68 | 0,57 | 15,9 | 1.570 | 1.300 |
| 200 | 400 LA12 | 507 | 400 | 391 | 4.033 | 93,4 | 93,6 | 92,9 | 0,74 | 0,71 | 0,61 | 20,5 | 1.900 | 1.300 |
| 225 | | 507 | 400 | 439 | 4.517 | 93,8 | 93,9 | 93,1 | 0,74 | 0,70 | 0,60 | 24,5 | 2.110 | 1.300 |
| 250 | | 507 | 400 | 488 | 5.009 | 94,0 | 94,1 | 93,4 | 0,74 | 0,71 | 0,61 | 27,5 | 2.280 | 1.300 |
| 280 | | 507 | 400 | 547 | 5.604 | 94,1 | 94,2 | 93,5 | 0,74 | 0,71 | 0,61 | 30,6 | 2.450 | 1.300 |
| 340 | C4G 450 LA12 | 505 | 400 | 614 | 6.768 | 94,9 | 94,7 | 93,8 | 0,80 | 0,76 | 0,67 | 58,1 | 3.230 | 1.300 |
| 380 | | 505 | 400 | 686 | 7.548 | 95,1 | 95,0 | 94,2 | 0,80 | 0,77 | 0,70 | 66,2 | 3.469 | 1.300 |
| 430 | | 505 | 400 | 777 | 8.542 | 95,1 | 94,9 | 94,0 | 0,80 | 0,78 | 0,70 | 74,4 | 3.690 | 1.300 |
| 480 | 500 LA12 | 504 | 400 | 856 | 9.524 | 95,4 | 95,2 | 94,4 | 0,81 | 0,78 | 0,70 | 103,0 | 4.924 | 1.200 |
| 580 | | 504 | 400 | 1.035 | 11.484 | 95,6 | 95,4 | 94,6 | 0,81 | 0,78 | 0,70 | 119,9 | 5.391 | 1.200 |
| 650 | | 504 | 400 | 1.160 | 12.856 | 95,7 | 95,6 | 94,8 | 0,81 | 0,78 | 0,70 | 138,2 | 5.906 | 1.200 |
| 750 | 630 LA12 | 504 | 400 | 1.322 | 14.788 | 96,0 | 95,8 | 95,0 | 0,82 | 0,80 | 0,72 | 223,6 | 7.207 | 1.100 |
| 850 | | 504 | 400 | 1.498 | 16.742 | 96,1 | 95,9 | 95,1 | 0,82 | 0,80 | 0,72 | 259,0 | 7.887 | 1.100 |
| 1000 | | 503 | 400 | 1.762 | 19.695 | 96,3 | 96,0 | 95,2 | 0,82 | 0,80 | 0,71 | 299,9 | 8.700 | 1.100 |
| 1150 | 710 LA12 | 503 | 400 | 1.932 | 22.626 | 96,4 | 96,2 | 95,5 | 0,86 | 0,84 | 0,78 | 527,0 | 10.871 | - |
| 1350 | | 503 | 400 | 2.242 | 26.451 | 96,8 | 96,9 | 96,5 | 0,87 | 0,87 | 0,81 | 620,0 | 12.073 | - |
| 1650 | | 503 | 400 | 2.710 | 32.295 | 96,9 | 97,0 | 96,7 | 0,88 | 0,87 | 0,83 | 732,0 | 13.443 | - |

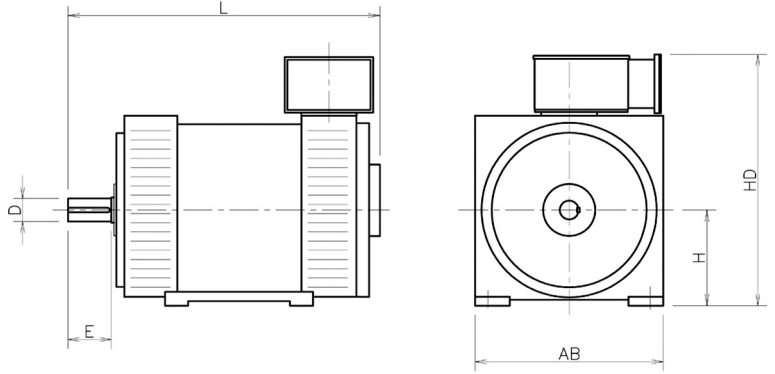
14 poles 428,57 min⁻¹ - 50Hz

| | | | | | | | | | | | | | | |
|------|--------------|-----|-----|-------|--------|------|------|------|------|------|------|-------|--------|-------|
| 150 | C3G 400 LA14 | 436 | 400 | 289 | 3.502 | 93,8 | 94,2 | 94,1 | 0,75 | 0,73 | 0,62 | 28,0 | 1.950 | 1.100 |
| 180 | | 435 | 400 | 347 | 4.203 | 94,0 | 94,3 | 94,1 | 0,75 | 0,75 | 0,62 | 35,0 | 2.120 | 1.100 |
| 200 | | 435 | 400 | 385 | 4.655 | 94,3 | 94,5 | 94,2 | 0,75 | 0,73 | 0,62 | 40,0 | 2.300 | 1.100 |
| 230 | | 435 | 400 | 443 | 5.342 | 94,5 | 94,7 | 94,3 | 0,75 | 0,73 | 0,62 | 45,0 | 2.550 | 1.100 |
| 260 | C4G 450 LA14 | 434 | 400 | 488 | 6.048 | 94,5 | 94,4 | 93,4 | 0,77 | 0,72 | 0,61 | 58,1 | 3.286 | 1.100 |
| 300 | | 434 | 400 | 556 | 6.964 | 94,7 | 94,6 | 93,8 | 0,78 | 0,73 | 0,63 | 66,2 | 3.542 | 1.100 |
| 330 | | 434 | 400 | 619 | 7.652 | 94,8 | 94,7 | 93,7 | 0,77 | 0,72 | 0,61 | 74,4 | 3.802 | 1.100 |
| 380 | 500 LA14 | 433 | 400 | 732 | 8.860 | 94,5 | 94,1 | 92,8 | 0,75 | 0,71 | 0,60 | 103,0 | 4.869 | 1.000 |
| 440 | | 433 | 400 | 837 | 10.237 | 94,7 | 94,3 | 93,1 | 0,76 | 0,71 | 0,60 | 119,9 | 5.345 | 1.000 |
| 500 | | 432 | 400 | 963 | 11.660 | 94,7 | 94,2 | 92,8 | 0,75 | 0,70 | 0,58 | 138,2 | 5.857 | 1.000 |
| 580 | 630 LA14 | 432 | 400 | 1.075 | 13.454 | 95,2 | 94,8 | 93,5 | 0,78 | 0,74 | 0,63 | 223,6 | 7.168 | 900 |
| 680 | | 432 | 400 | 1.244 | 15.741 | 95,4 | 95,1 | 94,0 | 0,79 | 0,75 | 0,65 | 259,0 | 7.852 | 900 |
| 780 | | 432 | 400 | 1.427 | 18.018 | 95,6 | 95,2 | 94,1 | 0,79 | 0,75 | 0,65 | 299,9 | 8.653 | 900 |
| 900 | 710 LA14 | 431 | 400 | 1.626 | 20.687 | 96,3 | 96,0 | 95,0 | 0,80 | 0,76 | 0,65 | 527,0 | 10.680 | - |
| 1050 | | 431 | 400 | 1.897 | 24.109 | 96,4 | 96,1 | 95,1 | 0,80 | 0,76 | 0,65 | 620,0 | 11.916 | - |
| 1200 | | 431 | 400 | 2.141 | 27.496 | 96,6 | 96,4 | 95,6 | 0,81 | 0,78 | 0,68 | 734,0 | 13.307 | - |

ASYNCHRONOUS GENERATORS - OVERALL DIMENSIONS [mm]

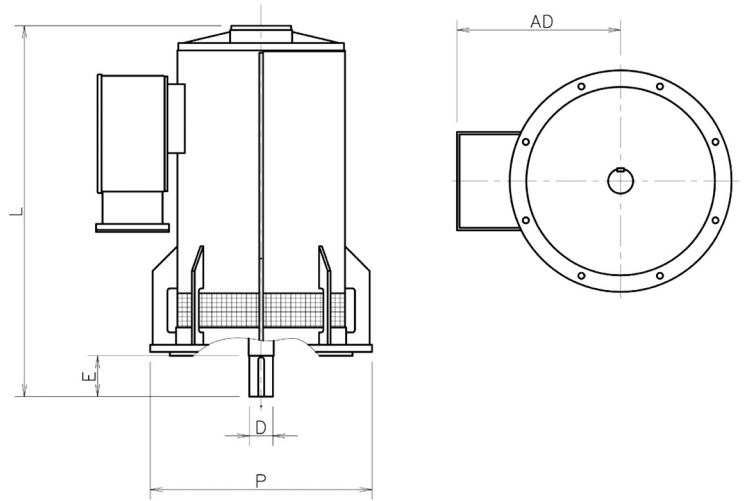
Air cooled (IC01) - Horizontal mounting

| Dimension (mm) | 250 | | 280 | | 315 | 355 | 400 | 450 | 500 | 630 |
|----------------|-----|-----|-----|-----|------|------|------|------|------|------|
| | S | M | S | M | | | | | | |
| H | 250 | 250 | 280 | 280 | 315 | 355 | 400 | 450 | 500 | 630 |
| HD | 573 | 629 | 701 | 701 | 888 | 1000 | 1206 | 1320 | 1402 | 1656 |
| AB | 460 | 480 | 520 | 520 | 600 | 800 | 890 | 900 | 1040 | 1300 |
| L | 808 | 789 | 901 | 901 | 1125 | 1525 | 1790 | 2160 | 2145 | 2200 |
| D | 75 | 75 | 80 | 80 | 90 | 100 | 110 | 120 | 130 | 160 |
| E | 140 | 140 | 170 | 170 | 170 | 210 | 210 | 210 | 250 | 300 |



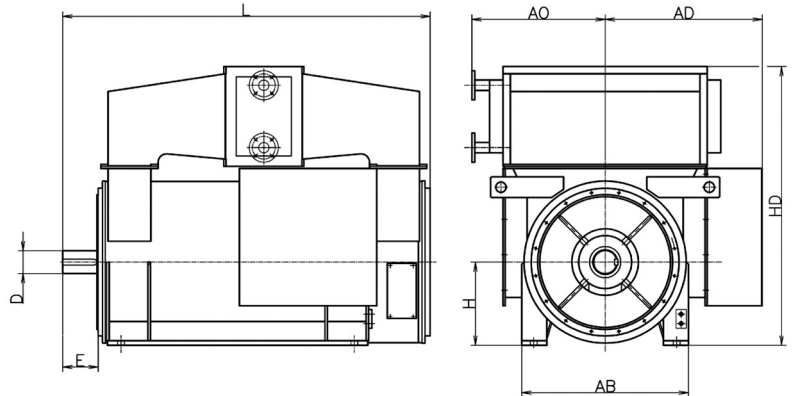
Air cooled (IC01) - Vertical mounting

| Dimension (mm) | 250 | | 280 | | 315 | 355 | 400 | 450 | 500 | 630 |
|----------------|-----|-----|-----|-----|------|------|------|------|------|------|
| | S | M | S | M | | | | | | |
| P | 660 | 660 | 660 | 660 | 800 | 800 | 1000 | 1150 | 1150 | 1600 |
| AD | 858 | 858 | 969 | 969 | 550 | 685 | 750 | 835 | 830 | 1080 |
| L | 323 | 379 | 421 | 421 | 1115 | 1590 | 1840 | 2300 | 2095 | 2500 |
| D | 75 | 75 | 80 | 80 | 90 | 100 | 110 | 120 | 130 | 160 |
| E | 140 | 140 | 170 | 170 | 170 | 210 | 210 | 210 | 250 | 300 |



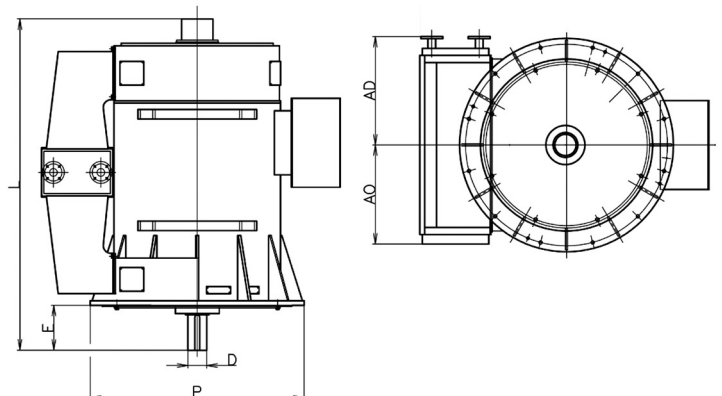
Air-to-water heat exchanger (IC81W) - Horizontal mounting

| Dimension (mm) | 400 | 450 | 500 | 630 |
|----------------|------|------|------|------|
| H | 400 | 450 | 500 | 630 |
| HD | 1430 | 1320 | 1630 | 2120 |
| AB | 890 | 900 | 1040 | 1300 |
| L | 1672 | 2160 | 2100 | 2220 |
| AO | 640 | 700 | 825 | 915 |
| AD | 860 | 835 | 1030 | 1300 |
| D | 110 | 120 | 130 | 160 |
| E | 210 | 210 | 250 | 300 |



Air-to-water heat exchanger (IC81W) - Vertical mounting

| Dimension (mm) | 355 | 400 | 450 | 500 | 630 |
|----------------|------|------|------|------|------|
| P | 800 | 1150 | 1150 | 1400 | 1600 |
| L | 1665 | 1900 | 2300 | 2150 | 2300 |
| AO | 460 | 640 | 700 | 825 | 915 |
| AD | 720 | 860 | 835 | 1030 | 1300 |
| D | 100 | 110 | 120 | 130 | 160 |
| E | 210 | 210 | 210 | 250 | 300 |





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