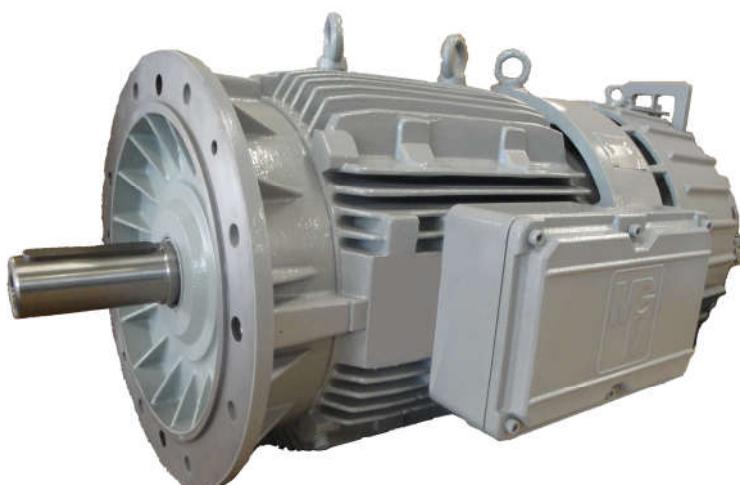




M.G.M. motori elettrici S.p.A.

# BAH 225-280 series

## Use and Maintenance Manual



**M.G.M. motori elettrici S.p.A.**

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We would like to thank you for trusting us and buying our product.



Before starting the motor, it's necessary to read these instructions carefully, which should be kept with the Motor. Should any difficult arise, please contact the MGM organization, specifying the type of product and the serial number.

## Field of application

These instructions are valid for electric motors belonging to the BAH (BAH, BAHE, BAHX, BAHXE) 225÷280 series. BAH series includes asynchronous three-phase totally enclosed fan cooled brake motors. The motor brake is activated in the case of power supply failure. Performance and characteristics shown on the motor nameplate are guaranteed for installations having an ambient temperature range between -15°C and +40°C at an altitude below 1000 m. above sea level.

## **CE Marking**



The motor shows on its nameplate the CE mark to attest the conformity of the product to the 2014/35/UE "Low voltage" directive and 2014/30/UE "Electromagnetic compatibility" directive.

## General safety information



During operation, motors have live or moving parts. Therefore, removal of electrical or mechanical guards, improper use, or inadequate maintenance may cause serious damage to persons or property.



Installation, Maintenance, Adjustment and Replacement operations of components must be carried out by qualified personnel, using proper tools and working instruments. Above all, it is essential to verify that the motor or plant is disconnected from the supply line and that there is no voltage left on board terminals.



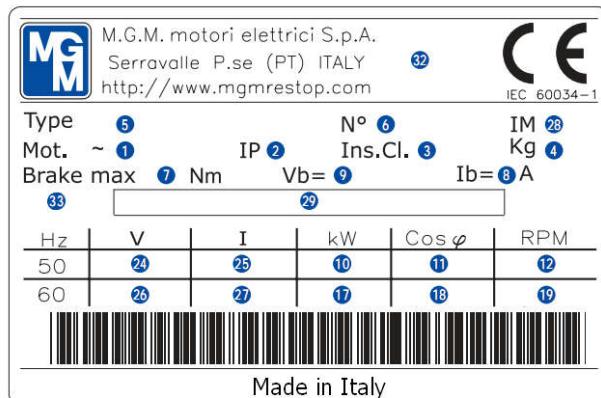
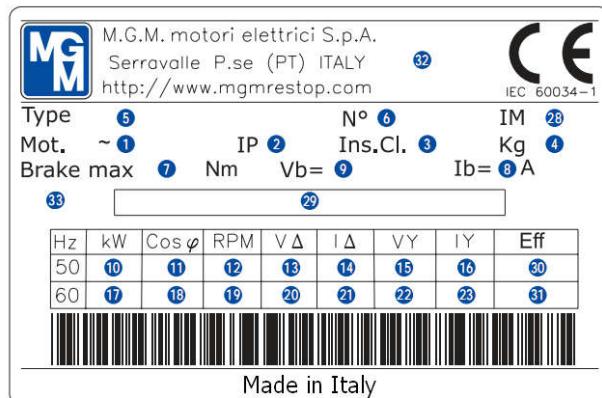
In case of ineffective braking or during maintenance or replacement operations of components, check that no load is applied to the driveshaft.



Avoid contact with the motor case since the temperature under normal operating conditions may exceed 50°C.

## **Motor identification nameplate**

Every motor is provided with an identifying nameplate, on which specific motor information are given. Motor nameplates are shown below with motor data and explanatory notes. The nameplate shown on the left is used for single speed motors while the nameplate on the right is used for two speed motors.





- 1 Duty type
- 2 Protection degree
- 3 Insulation Class, the letters TR following the insulation class means tropicalized treatment
- 4 Weight (Kg)
- 5 Motor type Designation
- 6 Serial Number
- 7 Maximum Static Brake Torque obtainable with proper regulation of the springs (Nm)
- 8 Brake current (A).
- 9 Brake Voltage Supply (V). On brake motors with AC brake, the symbol “ $V_b = V_m$ ” indicates that the motor and brake have the same voltage supply.
- 10 Rated Power (kW) at 50 Hz
- 11 Power Factor at 50 Hz
- 12 Motor Speed (RPM) at 50 Hz
- 13 Motor Voltage Supply at 50 Hz, Delta connected
- 14 Motor Amps at 50 Hz, Delta connected
- 15 Motor Voltage Supply at 50 Hz, Star connected
- 16 Motor Amps at 50 Hz, Star connected
- 17 Rated Power (kW) at 60 Hz
- 18 Power Factor at 60 Hz
- 19 Motor Speed (RPM) at 60 Hz
- 20 Motor Voltage Supply at 60 Hz, Delta connected
- 21 Motor Amps at 60 Hz, Delta connected
- 22 Motor Voltage Supply at 60 Hz, Star connected
- 23 Motor Amps at 60 Hz, Star connected
- 24 Motor voltage supply at 50 Hz
- 25 Motor Amps at 50 Hz
- 26 Motor voltage supply at 60 Hz
- 27 Motor Amps at 60 Hz
- 28 Mounting
- 29 Motor special execution identification. For motors with additional cooling fans, the fan voltage supply is shown in this location, preceded by the letters “VENT”. The letters “TP” indicate the presence of bimetallic thermal protectors, “TM” indicate thermistors, and “SCALD” indicates anti-condensation heaters, all followed by the voltage supply.
- 30 Efficiency and efficiency class at 50Hz
- 31 Efficiency and efficiency class at 60Hz
- 32 Certification marks (cCSAus, etc.)
- 33 DM, if present, means double terminal board for separate supply of the brake from the motor.

## Receipt and Storage

When receiving the motor, it is essential to check that:

- all the characteristics shown on the motor nameplate correspond to those requested;
- that the motor has not been damaged during transportation; any damage must be pointed out to the carrier immediately.

During transport, the two lifting eyes (M16 for 225-250 frame size, M20 for 280 frame size) on the motor frame body are to be used.



The two eyes which are screwed in must be firmly tightened. They are designed to bear the weight of the motor alone and therefore no additional loads should be added.

Check that the eyebolts are undamaged before lifting.

Ensure that proper lifting equipment is used and that the sizes of the hooks are suitable for the lifting eyes.

If necessary, use suitable rated transport materials such as lifting straps.

Motors must be stored in a sheltered, dry and dust-free place.

## Installation

Before starting the installation, be sure that the motor expected characteristics match the ones shown on the motor nameplate, with special care to the motor voltage supply and to the brake torque. Be sure that the braking torque provided by the brake assembly is suitable for the intended application.

Please verify that the brake type is suitable for the application and complies with standards or regulations in force on the machine on which the motor will be incorporated.



BAH series does not include motors suitable for hazardous environments. Misapplication of a motor in a hazardous environment can cause fire or explosions and hence resulting in serious injuries.

Verify that the IP protection degree stated on the nameplate is suitable for the required application. For outdoor installations, it's recommended to protect the motor against exposure to the sun and bad weather conditions.

Please check that the cable entries are never located on the top of the terminal box. We suggest in any case that the connection cables come from the bottom upwards in order to avoid drip and water stagnation at cable entry.

Check that all gaskets are in perfect conditions and well housed into their seats; check that the cable inlet openings are tightly closed and the terminal box screws are well tightened so that the protection level shown on the nameplate is respected.

The eyebolts, if removed, must be replaced with screws with the same length and pitch to guarantee the IP protection degree.

The motor must be installed in a ventilated room away from heat sources and in such a position to allow free air intake for proper ventilation. The motor must also be mounted in such a position that easy inspection and maintenance are allowed, avoiding possible dangers arising from contact with moving parts.

Before starting the motor or after long periods of inactivity or storage, check that the earth insulation resistance is not less than 25 MΩ (the measuring must be done with a 500V DC Megger instrument).



Never touch the terminals during and immediately after measurement since they may carry dangerous voltages.

The motor is balanced with a fitted half key (60034-14).

When mounting the motor, check that the fixing screws have suitable material and proper diameter to be fitted with the holes provided on flange or feet. If the motor is equipped with feet a rigid and solid surface is to be used, in order to have minimum vibrations during operation. During the mounting operation, check that motor and machine coupling is accurately aligned, as an imperfect alignment might cause vibrations. In the case of motors with flanges, make sure that coupling surfaces are thoroughly cleaned and that the centering (Spigot) is properly aligned as to allow screws going through easily. In case of motors with feet, when using couplings with joints, check that the motor axis and the driven machine axis are in line. When using pulleys, check that the belt tension is not too high.

## Maintenance

Maintenance operations must be carried out by qualified personnel only, and only after having disconnected the plant or the motor from the electrical supply (including any possible auxiliary powers and especially anti-condensation heaters voltage supply) and after having checked that no load is applied to the driveshaft.

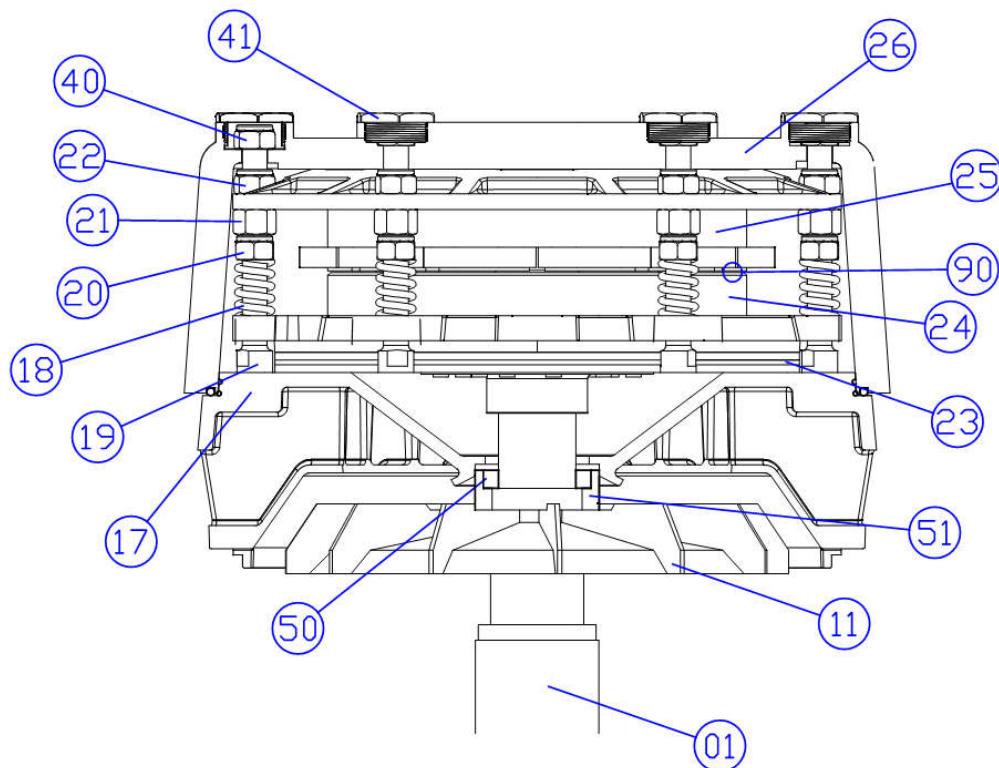
Prevent uncontrolled restarting of the motor as this may be extremely hazardous for the operator and may cause serious damage.

The operations which must be carried out periodically in order to ensure the correct functioning of the MGM brake motor are listed further on. The frequency of inspection depends on the particular motor duty (number of start/stop, applied moment of inertia, environment conditions and so on). Generally it's advisable to proceed to the first inspection after few weeks of working and to draw up a periodical maintenance plan. Either way it's recommended to provide inspections at least twice a year. For specific information pls. contact the M.G.M. motori elettrici S.p.A. organization.

- The motor is equipped with ball bearings with double rubber gaskets. They are lubricated for life and they don't need greasing. Periodically check that the motor properly operates without abnormal noise or vibrations which could mean deterioration of bearings.
- Check that motor is tightly fixed through flange and/or feet.
- Check that current doesn't exceed the value written on the nameplate.
- Check that air openings for ventilation are not obstructed.
- Check that feeding cables and earth grounding are correctly connected and tightened.
- Periodically check the Brake Disc (the frequency of inspection depends on the particular motor duty, it's generally recommended to provide inspections with a frequency of 6÷12 months):
  - as a result of normal wear of the brake disc lining, check that the air gap does not surpass 1.1 mm. (Please note that the brake linings wear is greater during the brake-in period). If the Air Gap exceeds the maximum value it is necessary to adjust the airgap.
  - as a result of normal wear of the brake disc lining, the brake disc thickness tends to decrease. Check that the thickness of the brake disc where there are the brake disc linings is not less than 9.5 mm. If less or close to this minimum value it is necessary to replace the brake disc.
  - verify also that there are no damages on disc surfaces and on the hub.



- Verify periodically that the brake torque is suitable for the application. Due to the wear of the brake disc it is necessary to periodically check the brake torque in order to verify that it is in the required range. This is particularly important during the run in because the brake torque is more susceptible to rapid changes. The frequency of inspection depends on the particular motor duty. Generally it is advisable to proceed with the first inspection after few weeks of working and to draw up a periodical inspection plan. Anyway it's recommended to perform inspections at least twice a year.
- In consideration of safety, all brake assembly components must be replaced periodically as a preventive action. The frequency of replacement depends on the particular brake motor duty (number of start/stop, applied moment of inertia, environment conditions and so on). We recommend however to replace them at least every 18 months. If during the periodical inspections any damage, visible wear or corrosion on those components is noted, they must be replaced immediately.
- Periodically Check that the Terminal Box Gasket is in good condition and guarantees a proper enclosure of the Terminal Box cover. It's recommended to perform inspections at least once a year.
- Each gasket must be in good condition in order to guarantee the protection degree. If one is damaged it must be replaced with a new one. It is recommended to perform periodical inspections.
- It is necessary to set a painting maintenance plan in order to assure the proper protection against corrosion.

**Brake assembly general description**

26	Iron Cast Brake Cover
41	Brake Adjusters Plug
40	Brake Cover Locknut
22	Brake Coil Locknut
25	Brake Coil
90	Air Gap
21	Air Gap Adjusting Nut
20	Brake Torque Adjuster Locknut
18	Spring
24	Brake Moving Element
23	Brake Disc
19	Brake Adjuster
17	Brake Friction Surface
51	Seal Seat
50	Seal
11	Fan
01	Rotor Shaft

**Remark: photos shown in this manual are just an indicative reference of the operation to be performed.  
The photos shown do not necessarily represent all types of BAH motors.**

### Brake cover removing

Unscrew the brake adjuster plug (41). Unscrew the brake cover locknut (40). Remove the brake cover (26). To reassemble the brake cover (26) proceed backward.

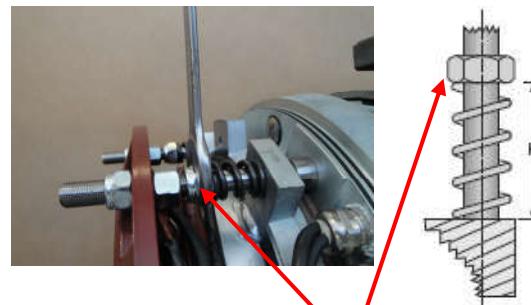
For the BAHE-BAHXE series motors, as first step, it is necessary to proceed taking the encoder off following the instructions described in the relative paragraph 'Encoder replacement'.

### Brake Torque

Since the brake assembly is a motor component subject to wear, we recommend periodical inspections on the motor in order to verify that the braking torque is kept between the required values. Generally it is advisable to proceed to the first inspection after a short period of functioning (run-in period) since it is in the first working period where it is possible to have the greater deviation of this value. Afterwards schedule the succeeding periodical inspections with longer intervals. The inspections frequency is strictly related to the particular application of the motor. Anyway after the first inspection it is recommended to provide the following checks at least once every 6 months.

Remove the brake cover following the instructions described in the relative paragraph. The brake torque is proportional to the springs (18) compression ( $H$  in the drawing on side) and it can be adjusted through the locknuts (20). We suggest to make the adjustment, step by step, by rotations of  $90^\circ$  of the 6 locknuts (20) in the same direction till the required value is obtained.

The compression of the 6 springs must be as uniform as possible.



brake torque adjuster locknut (20)

### Air Gap check and adjustment

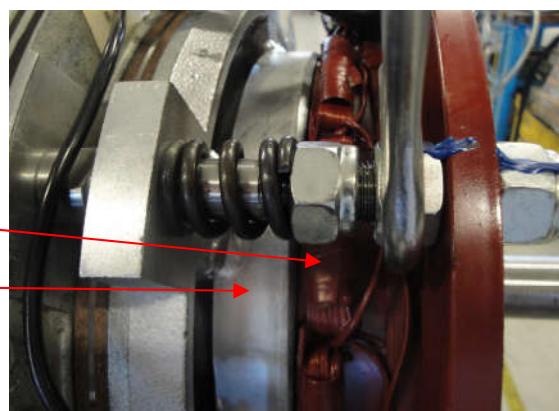
#### Air gap check

Remove the brake cover following the instructions described in the relative paragraph.

The Air Gap (90) is the space between the brake moving element (24) and the brake coil (25). The Air Gap must always remain between 0.7 mm and 1.1 mm. If the Air Gap (90) exceeds the maximum value it is necessary to adjust it. To measure the Air Gap use feeler gauges.



Airgap (90)



Brake coil (25)

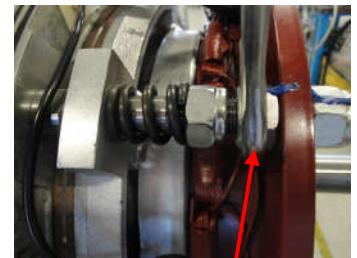
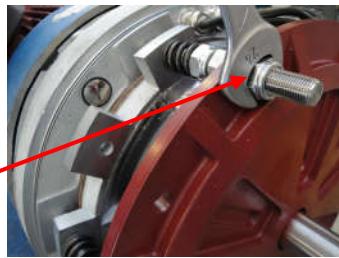
Brake moving element (24)

## Airgap adjustment

Remove the brake cover following the instructions described in the relative paragraph.

- As first step to adjust the airgap the nuts (21) and the locknuts (22) on the 6 brake adjusters should be loosened so that the brake coil can slide.

locknut (22)



- Put 1 feeler of 0,7 mm between the two magnetic cores of the brake coil (25) and the brake moving element (24) near one brake adjuster. Then operate on the nuts (21) and the locknuts (22) so that the feeler is really adherent but not completely locked between the two magnetic cores.
- Repeat this operation on the other two couples of nuts (21-22) at 120°. After having regulated the position on these 3 brake adjusters, to complete the operation go on with the other 3 brake adjusters and first bring the nuts (21) close to the brake coil and then tighten the locknuts (22).
- Then check the airgap: if the airgap is accurately adjusted a feeler of 0.7 mm will enter easily between the two magnetic cores of the brake coil and the brake moving element but a feeler of 0.8 mm should not be able to enter. It is important to check the air gap in three different position at 120°near the brake adjusters (19). The air gap must be uniform.

Please consider that the operations 1-2 might necessary be repeated multiple times till the airgap required is obtained.

- When the air gap adjustment has been settled, be sure that the locknuts (22) are tightened (tightening torque  $130 \pm 5$  Nm). Please note that the airgap could change during the tightening and for this reason check again the airgap with the feelers. If the airgap is correct the job is approaching completion.
- When the operation is completed it is necessary to check that the brake disc can rotate freely when the motor and the brake coil are supplied.
- Reassemble the brake cover (26) following the pertinent paragraphs.

## Brake Coil Replacement

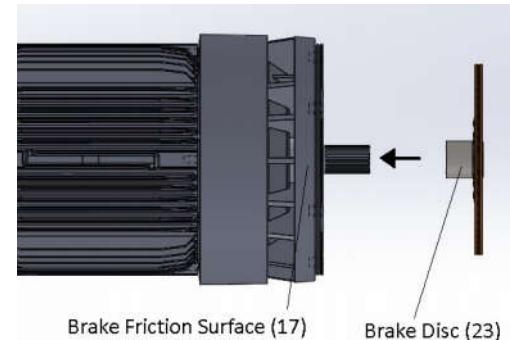
Unscrew the locknuts (22) and pull off the brake coil (25) from the brake adjusters (19). Reassemble the new brake coil on the brake adjusters (19) and reconnect the electrical connectors. The AC brake coil has two terns of three wires. For the connection pay attention to respect for each tern of wires the same colour. Verify that the connections and relative cables are properly tightened. Proceed with the air gap adjustment as stated in the respective paragraph. Verify that the brake coil functions correctly; when the brake is energized, the brake coil (25) should attract the brake moving element (24) with a quick stroke.



To reassemble the brake cover follow the pertinent paragraph.

## Brake Disc Replacement

Remove the brake cover (see the pertinent paragraph). Disconnect the brake coil (25) and unscrew the locknuts (22). Take off the brake coil (25) from the brake adjusters (19), remove the nuts (20-21) and the springs (18). Remove the brake moving element (24) sliding it through the brake adjusters (19). Take off the old brake disc (23) and put in the new one.



Verify that the new brake disc has been placed in the correct side.

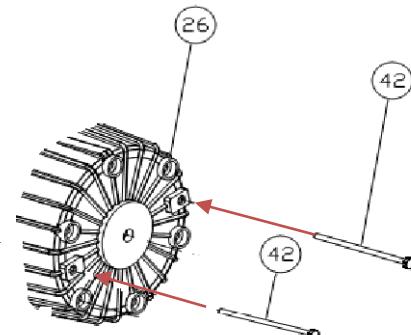
We recommend that the new brake disc must be handled with clean hands. For re-assembling, proceed backwards. For the air gap adjustment and the brake torque adjustment see the pertinent paragraph.

## Brake hand release (optional)

Unscrew the two plugs (58) on the brake cover (see the photograph).



When the two plugs are removed screw the two brake release screws (42).



Brake release screw (42)



Check that no load is applied to the drive shaft before releasing the brake.

**Encoder disassembly and/or its replacement (only for BAHE, BAHXE series motors).**

To remove the encoder pls follow the instructions here below:

Unscrew the encoder protective cover fixing screws

Encoder protective cover fixing screws



Encoder protective cover

Unscrew the encoder arm fixing screw and remove the the encoder arm.

Unscrew the encoder fixing grains which fix the encoder to the motor shaft.

Encoder arm fixing screw

Encoder reaction arm

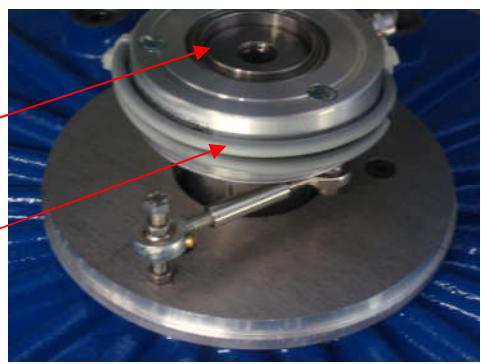


Encoder fixing grain

Slide the encoder through the motor shaft.

Motor shaft

Encoder



To put the new encoder proceed backwards..

## Wiring



Before connecting the motor to the power supply it is necessary to wire the earth connectors. This operation can be carried out using the terminals inside the terminal box or on the motor frame. Earth terminals must always stay clean and protected from corrosion.

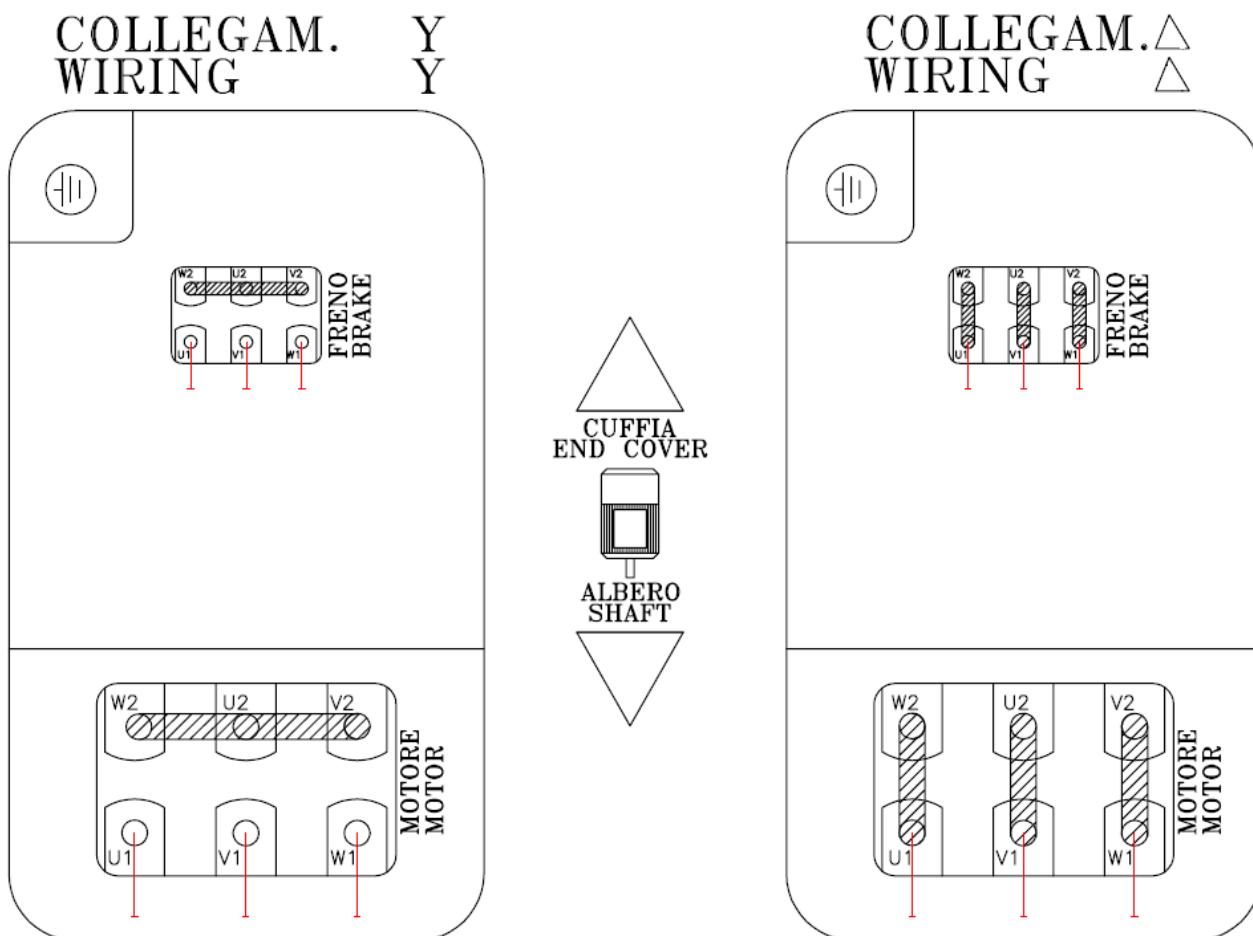
After reading the nameplate data, properly sized wires must be used to connect the motor to the power supply terminals and to the ground connectors. Cables size and Connections must comply with all the applicable standards and regulations.

To connect the auxiliaries, if on board (auxiliaries like thermal protectors, heaters, forced ventilation etc.,..) consider the identification of the wires inside the terminal box as described in the relevant paragraph.

The overall Wiring Diagram is shown below.

Once the wiring is completed check that all the terminals nuts are properly tightened and secured. In the event that motor is driven by an inverter (Variable Frequency Drive), please follow the inverter manufacturer wiring instructions and ensure that the brake is supplied through a separate line from the motor (the Brake coil must not be supplied through the inverter).

**Connection Diagram  
(AC brake coil)**



**Note:** On motor frame sizes 250-280 the position of the motor terminal block is rotated 90° in comparison with the drawing.

## Auxiliaries devices wires identification

The below chart provides indications about the markers applied on the auxiliaries wires, which are easily detectable inside the terminals box (see an example on the picture shown on the side). The power supply f.e. of the heaters or of the forced ventilation is stated on the motor name plate. For any doubts on the auxiliaries connection we please you to contact us.

Dispositivi ausiliari - Auxiliary devices - Hilfsvorrichtungen - Dispositivos auxiliares - Appareils auxiliaires	Identificazione cavi - Wires identification - Kabelidentifizierung Identification des fils - Identificación de los cables
Scaldiglie motore - Motors heaters - Motorstillstandsheizung - Calefactores anticondensacion motor – Résistances de rechauffage moteur	HT
Temoprotettori bimetallici - Thermal protectors Bimetalle - Thermokontakt (PTO) - Termoprotectores bimetalicos – Sondes thermiques à bilames	TP
Termistori - Thermistors - Kaltleiter (PTC)- Thermistance – Termistores	TM
Servoventilazione - Forced Ventilation - Fremdbelüftung - Servoventilacion - Ventilation forcée	SV
Microswitch sblocco freno - Brake release microswitch - Überwachungsschalter für die Entriegelung der Bremse - Microinterruptor para la detección del desbloqueo del freno – Microswitch pour signalisation de déblocage du frein	MS
Scaldiglie freno - Brake coil heaters - Stillstandsheizung für die Bremse - Calefactores anticondensacion freno – résistances de rechauffage frein	HB
Microswitch usura disco freno - Brake disc wear microswitch - Überwachungsschalter für die Abnutzung der Bremsscheibe - Microinterruptor para la detección del desgaste del disco del freno – Microswitch pour signalisation usure disque frein	MB



The anti-condensation heaters can be powered only when the motor is turned off.  
Never power the heaters while the motor is on.



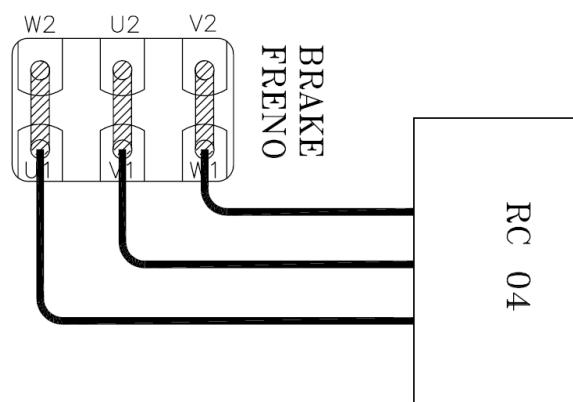
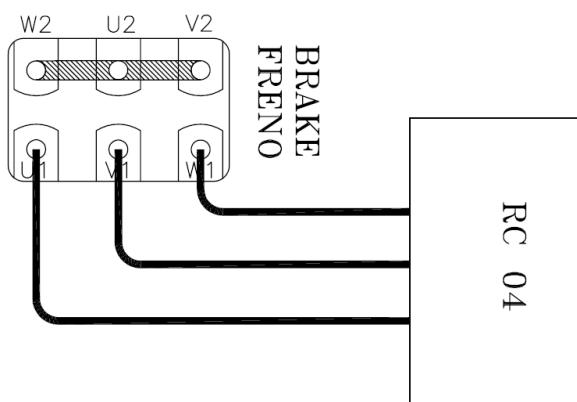
Forced ventilation during operation ensure the good functioning of the motor taking away the motor heat dissipation. Make sure that the forced ventilation is kept on for a sufficient time (according to the motor temperature) after the motor has been turned off.



Air blowers work properly only if rotating in one direction towards the motor splines. Make sure that the blower is connected in order to have the correct direction of rotation (see the arrow indicating the direction of rotation on the fans)

## RC filter

We suggest to use a RC filter to protect the AC brake coil from overvoltage. The RC filter wiring diagram is shown below





## Disposal

Motor disposal must comply with the regulations of the country where the motor is being used. Contact MGM for further information.

## Spare parts

To identify the proper spare part, please provide the below item number, motor type and serial number.

1 - Rotor Shaft	26 – Cast Iron Brake Cover
2 - Key	28 - Terminal board box screws (6 units)
3 - Front bearing	29 - Terminal board box
4 - Endshield Drive End	30 - Terminal board
7 - Frame	32 - Cable gland
8 - Circlip	34 - Terminal box/brake coil connection
9 - Rear cover	36 - Flange cover (B5)
11 - Fan	38 - Elastic washer
12 – Rear cover seal	40 - Brake Cover Locknut (6 units)
15 - Rear bearing	41- Brake Adjuster Plug (6 units)
17 - Brake friction surface	42 - Brake release screw (2 units)
18 - Spring (6 units)	46 – Encoder fixing plate (BAHE, BAHXE)
19 - Brake adjuster (6 units)	51 - Fan Seal
20 - Brake torque adjuster locknut (6 units)	56 - Brake Friction Surface Seal
21 - Air gap adjusting nut (6 units)	57 - Brake cover plug
22 - Brake Coil Locknut (6 units)	58 - Brake release plug
23 - Brake disc	102 - Encoder (BAHE, BAHXE)
24 - Brake moving element	103 - Encoder protective cover (BAHE, BAHXE)
25 - Brake coil	

