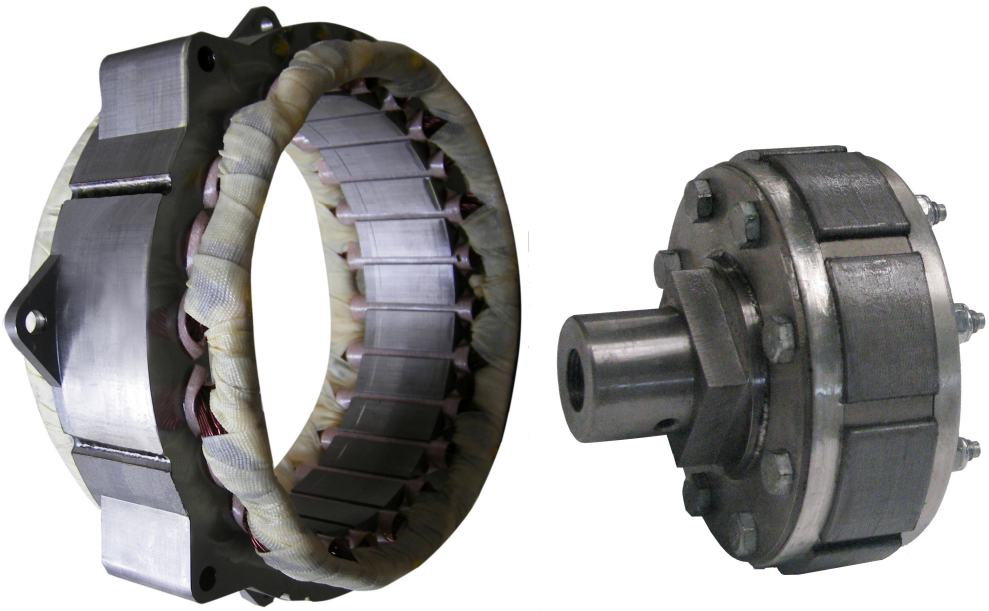
Permanent Magnet Generator (PMG) User's Manual



Type designation: PMG 0120A08, PMG 0120B08, PMG 0120C08
PMG 0120D08, PMG 0120E08, PMG 0120F08

Application: AMG 0200__04~AMG 0450__04

Prep. PEYA	07.02.2012	Permanent Magnet Generator (PMG) User's Manual			No. of sh. 8
Appr. TUTU	09.02.2012				
Resp. dept. R&D					
ABB Generators Ltd.		Document identification 8AMG 5856731	Lang. en	Rev. ind. D	Sheet 1

1 GENERAL INFORMATION

1.1 SAFETY

Carrying out certain operations, maintenance procedures and some operation procedures can be dangerous or harmful if the correct safety precautions are not observed.

Before attempting to set up, operate or adjust synchronous machines, operators and maintenance people must be technically qualified and must have received the appropriate training. Before carrying out any operations and maintenance for the PMG, personnel must go through the *User's Manual- AMG Synchronous Generator Industrial Application Series*, which is attached with each machine supplied by ABB, and follow all the safety instructions.

Symbols and decals

Personnel must be familiar with all the warning symbols and decals fitted to the machinery. Failure to recognize a warning and read the associated safety instructions may result in injury or death.

Electrical hazard

The PMG will induce high voltage when the rotational speed is on certain level. During PMG installation, maintenance or setting-up, prevent touching all voltage parts without protective insulation.

Moving parts

Covers must only be removed by qualified personnel as part of an installation, maintenance or setting-up procedure. They must be re-fitted as soon as possible. Keep hands and loose clothing clear of all moving parts.

High temperatures

PMG will reach high temperatures. Avoid contact with them. Always wear protective gloves when working in the vicinity.

Magnetic fields

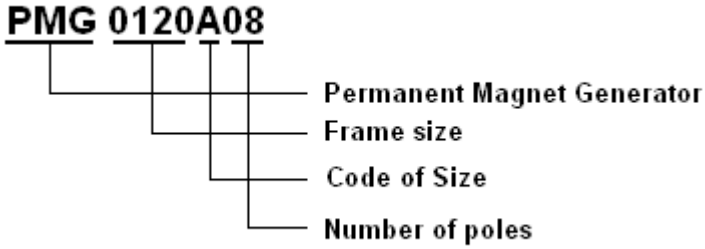
There is a magnetic field presence in the immediate area surrounding PMG, even it is not under operating. Ensure that devices that can be influenced or wiped (e.g. magnetic disks, credit cards, watches etc.) by the effects of electro-magnetism are removed from the area. The magnetic field from PMG may affect the operation of some medicine device (e.g. pacemaker). Therefore, personnel with this kind of devices should avoid operating close to the PMG.

1.2 DESCRIPTION

The PMG (Permanent Magnet Generator) is a system which is used for secondary exciting. The PMG provides stable and reliable electric energy for AVR regardless the generator's terminal voltage. The generator with PMG excitation system can provide 300 % rated current during short-circuit, which occurs for 5-10 seconds.

1.3 TYPE DESIGNATION

ABB PMG type designation is defined as follows:



1.4 TYPE SPECIFICATION

There are 6 types of PMG which are designed for standard industrial generators AMG 0200__04~AMG0450__04:

- PMG 0120A08 for AMG 0200__04
- PMG 0120B08 for AMG 0250__04
- PMG 0120C08 for AMG 0280__04
- PMG 0120D08 for AMG 0315__04
- PMG 0120D08 for AMG 0355__04
- PMG 0120E08 for AMG 0400__04
- PMG 0120F08 for AMG 0450__04

1.5 STRUCTURE

All the PMG consist of a PMG rotor, a PMG stator, a retainer and a cover (see: Figure 1)

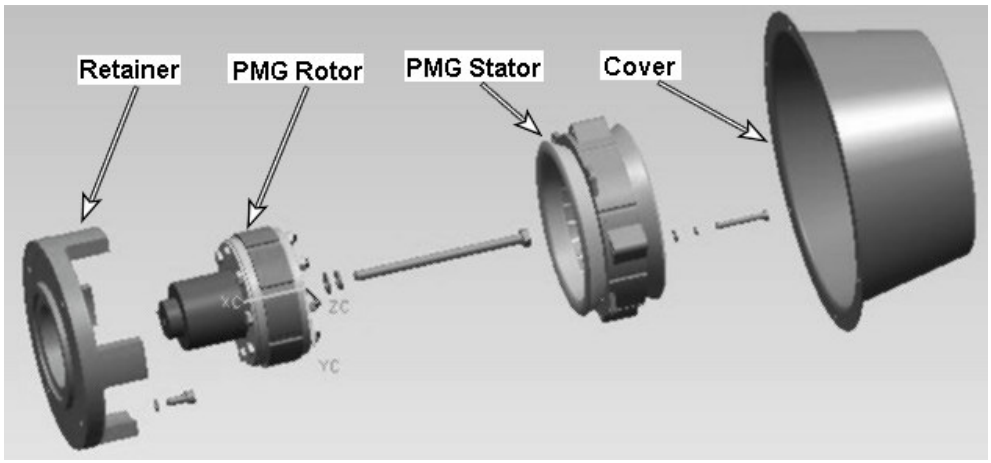


Figure 1: PMG structure.

1.6 OPERATION TEMPERATURE

Since the performance of permanent magnet is sensitive to the high temperature, pay attention to storage and operational conditions as follows:

- Operation temperature -20℃ to +75℃
- Storage temperature -55℃ to +85℃

2 CONNECTION

ABB PMG 0120A08 – PMG 0120F08 devices running with the AVR. Before carrying out any adjustment, maintenance or operation, please go through the *AVR User's Manual* and *Main connection diagram*, which is attached for each machine delivered by ABB.

Attention!
Incorrect setting of the AVR may damage the generator or generating set. Make sure the personnel who do changes in the AVR-setting are technically qualified and go through the user's manual carefully.

The principle of PMG excitation system is shown in Figure 2.

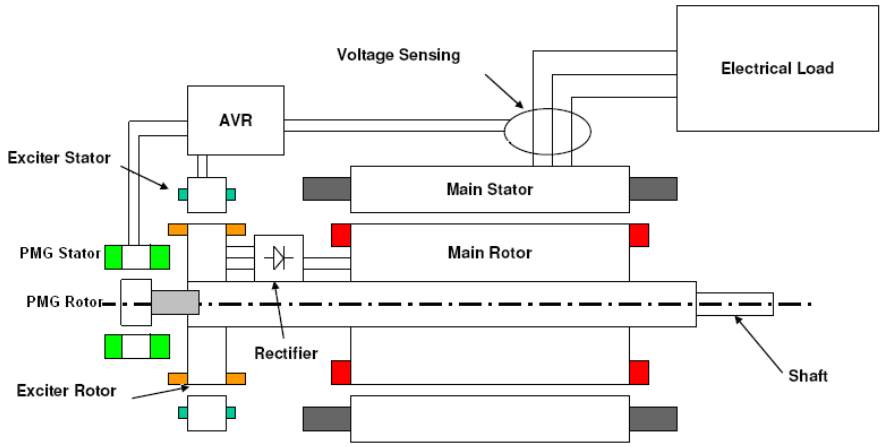


Figure 2: Principle of generator with PMG excitation system

3 TECHNICAL CHARACTERISTICS

The PMG technical characteristics are shown in Table 1: PMG technical characteristics.

Table 1: PMG technical characteristics

	Stator L-L resistance at 20℃/[Ω]	No-load voltage at 1500 rpm/[V_{RMS}]	No-load voltage at 1800 rpm/[V_{RMS}]
PMG 0120A08	2,3	130	155
PMG 0120B08	2,5	135	160
PMG 0120C08	2,5	155	185
PMG 0120D08	2,5	155	185
PMG 0120E08	2,5	175	215
PMG 0120F08	2,5	175	215

4. Installation

4.1 Mounting the PMG 0120A08

- Remove the ND-end shield grille.
- Install the retainer of PMG stator on the NDE shield, then tighten 4 pcs of hexagonal M8 screws (Figure 3).
- Use the spanner to fasten the PMG rotor on the main shaft.
- Tighten the screw connecting the PMG rotor to the main rotor ND-end.
- Using 2 M6 threaded rods to lead the stator (Figure 4).
- Once the stator is in position, tighten 2 pcs of hexagonal M6 screws.
- Remove the M6 threaded rods (Figure 4), tighten the other 2 pcs of hexagonal M6 screws.
- Connect the PMG outlet wire to the AVR.
- Cover the PMG with the NDE shield grille.

Figure 3: PMG retainer attached to the NDE-shield

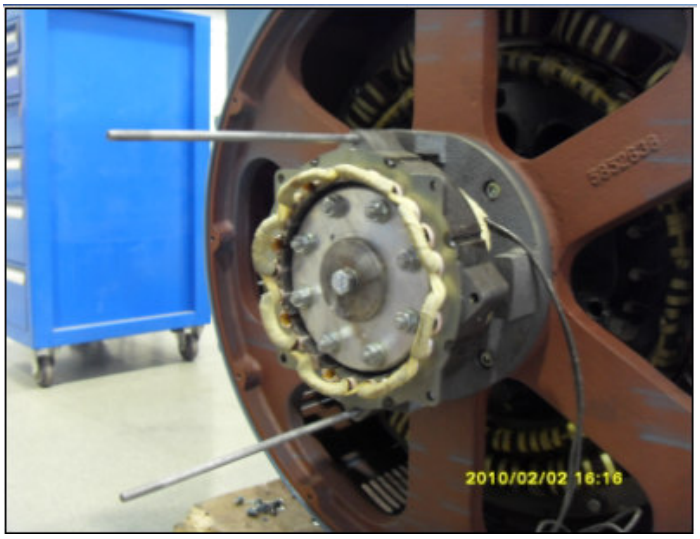


Figure 4: Using 2 M6 threaded rods the stator is led to the assembly.

4.2 MOUNTING of PMG 0120B08, 0120C08, 0120D08, 0120E08

- Remove the ND-end shield grille.
- Install the retainer of PMG stator in the NDE shield, then tighten 4 pcs of hexagonal M8 screws (see: Figure 3).
- Hammer the cylindrical pin in the ND-end of the shaft (see: Figure 5).
- Install the shaft of PMG rotor in main shaft, then tighten the long hexagonal M10 screw (see: Figure 6).
- Use 2 pcs of M6 threaded rods to lead the stator in correct position (see: Figure 4).
- Once the stator is in right position, tighten 2 pcs of M6 hexagonal screws.
- Remove the M6 threaded rods (Figure 4), and tighten the other 2 pcs of M6 hexagonal screws.
- Connect the PMG outlet wire to the AVR.
- Cover the PMG with the NDE shield grille.

Figure 5: Cylindrical pin attached to the shaft ND-end.

Figure 6: The PMG shaft pressed in and attached with main rotor with the hexagonal M10 screw.

4.3 Mounting the PMG 0120F08

- Remove the ND-end shield grille.
- Install the retainer of PMG stator and end cover in the NDE shield, then tighten 4 pcs of socket M12 screws and 4 pcs of hexagonal M6 screws (see: Figure 7).
- Install the shaft of PMG rotor in main shaft, then tighten the 3 pcs of hexagonal M8 screw (see: Figure 7).
- Use 2 pcs of M6 threaded rods to lead the stator in correct position (see: Figure 4).
- Once the stator is in right position, tighten 2 pcs of M6 hexagonal screws.
- Remove the M6 threaded rods (Figure 4), and tighten the other 2 pcs of M6 hexagonal screws.
- Install the grease box with 2 pcs of hexagonal M6 screws.
- Connect the PMG outlet wire to the AVR.
- Cover the PMG with the NDE shield grille.

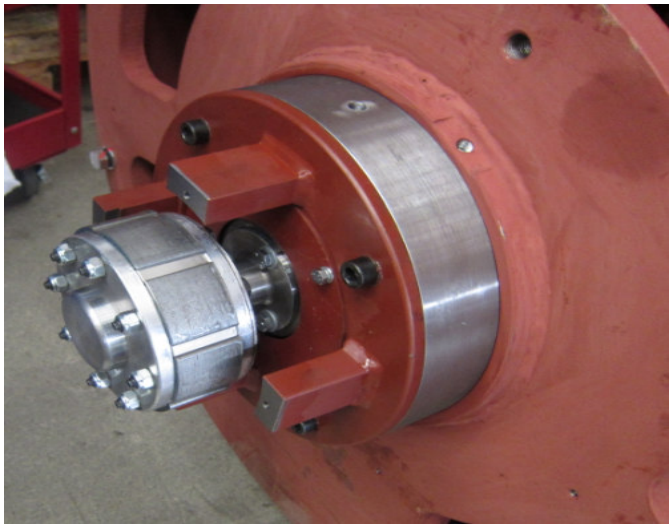


Figure 7: The PMG shaft pressed in and attached with main rotor with 3 pcs hexagonal M8 screw.

Attention!
Pay attention to intense magnetic field of PMG unit in every assembling step described above in this Chapter 4. Installation.