Safety Instructions

PERMANENT MAGNET SYNCHRONOUS MACHINES INTENDED FOR VARIABLE SPEED DRIVES

1 General

General safety regulations, safety precautions and specific agreements made for each work site shown in this document must be observed at all times.

2 Intended use

Electric machines have dangerous live and rotating parts and may have hot surfaces. All operations serving transport, storage, installation, connection, commissioning, operation and maintenance should be carried out by skilled personnel (in conformity with EN 50 110-1 / DIN VDE 0105 / IEC 60364). Improper handling may cause serious personal injury and damage to property.

These machines are intended for use as components for industrial and commercial installations as defined in the Machinery Directive (MD) 89/392/EEC. Commissioning is prohibited until conformity of the end product with this directive has been established (follow particular local safety and installation rules e.g. EN 60204).

These machines comply with the harmonized series of standards EN 60034 / DIN VDE 0530. Their use in hazardous areas is prohibited unless they are expressly designed for such use.

On no account, should degrees of protection of ≤ IP 23 or less be used outdoors.

Air-cooled models are typically designed for ambient temperatures of -20°C or -25°C up to +40°C and altitudes of ≤ 1000 m above sea level, (Please refer to product specific instructions. Ambient temperature for air-/water-cooled models should be no lower than +5°C (for sleeve-bearing machines, see manufacturer's documentation). Do take note of deviating information on the rating plate. Field conditions must conform to all rating plate markings.

3 Transport, storage

Report damage immediately to the transport company if damage is discovered upon delivery and stop commissioning, if necessary. Lifting eyes are only dimensioned for the weight of the machine, therefore do not apply extra loads. Ensure the use of correct lifting eyes and if needed, use suitable lifting equipment (e.g. rope guides). Remove shipping braces (e.g. bearing locks, vibration dampers) before commissioning and store these for further use.

When storing machines make sure that the location is dry, and free from dust and vibration to avoid bearing damage. Measure insulation resistance before commissioning. Limit values for the insulation resistance can be found from the product specific manuals. If limit values are not reached, dry the winding according to the manufacturer's instructions.

4 Installation

Ensure even support, solid foot or flange mounting and exact alignment in the case of direct coupling. Avoid resonances with rotational and double mains frequency as a result of assembly. Turn rotor and listen for abnormal slip noises and check direction of rotation in uncoupled state.

Follow the manufacturer's instructions when mounting or removing couplings or other drive elements and cover them with a touch guard. To do a trial run without output elements, lock or remove the shaft end key. Avoid excessive radial and axial bearing loads (note manufacturer's documentation). The type of balancing is indicated in the shaft,(see product specific manuals). In case of protruding, visible part of the shaft end key, establish mechanical balance.

Make the necessary ventilation and cooling system connections making sure that the ventilation does not get obstructed and that exhaust air either from the current machine or other machines, is not drawn into the ventilation intake.

5 Electrical connection

When the machine shaft is rotating, a permanent magnet machine induces voltage to the terminals. The induced voltage is proportional to the rotational speed, and can be hazardous even at low speeds. Prevent any rotation of the shaft before opening the terminal box and/or working at the unprotected terminals.

Warning
The terminals of a machine with frequency converter supply may be energized even when the machine is at a standstill.

Warning
Beware of reverse-power when working at the supply system.

Warning
Machines covered by this instruction are not suitable for direct online use (DOL).

Operations must only be carried out by skilled persons while the machine is non-operational. Before starting work, the following safety rules must be strictly applied:

- De-energize!
- Provide safeguard against reclosing!
- Prevent any rotation of the shaft before opening the terminal box and/or working at the unprotected terminals.
- Verify safe isolation from supply!
- Connect to earth and short!
- Cover or provide barriers against neighbouring live parts!
- De-energize auxiliary circuits (e.g. anti-condensation heating)!

Rating plate markings and connection diagrams must be followed. Check the compatibility of the machine and the frequency converter.

The connection must be made so that a permanent safe electrical connection is maintained. Use appropriate cable terminals. Establish and maintain safe equipotential bonding.

No foreign bodies, dirt or moisture is allowed in the terminal box. Always close unused cable entrance holes and the box itself in a dust and watertight manner. Lock the key when the machine is run without coupling. For machines with accessories, check that they function before commissioning.

The proper installation (e.g. segregation of signal and power lines, screened cables etc.) lies within the installer's responsibility.

6 Operation

Warning
Do not exceed the maximum allowed speed of the machine. See product specific manuals.

Check the vibration level of the machine regularly. In case of deviations from normal operation - e.g. elevated temperature, noises, vibrations - disconnect machine. If necessary establish cause and consult manufacturer, if necessary.

Do not override protective devices, not even in trial run. In case of heavy dirt deposits, clean the cooling system at regular intervals. Open closed condensate drain holes from time to time.

Grease the bearings during commissioning before start-up. Follow the regreasing and oil-change instructions mentioned in the product specific manuals. If the machine is equipped with grease automate or oil supply system, make sure the system is working.

7 Maintenance and servicing

Warning
Only qualified personnel familiar with the relevant safety requirements are allowed to open and maintain permanent magnet synchronous machines.

Warning
It is not allowed to remove the rotor of a permanent magnet synchronous machine without the special tools designed for this purpose.

Warning
Magnetic stray fields, caused by an open or disassembled permanent magnet synchronous machine or by a separate rotor of such a machine, may disturb or damage other electrical or electromagnetic equipment and components, such as cardiac pacemakers, credit cards and equivalent.

Warning
Loose metallic parts and waste must be prevented from entering the interior of the permanent magnet synchronous machine as well as getting into contact with the rotor.

Warning
Before closing an opened permanent magnet synchronous machine, all parts which does not belong to the machine and wastes must be removed from the interior of the machine.

Note
Beware of magnetic stray fields and possible induced voltages when rotating the separate rotor of a permanent magnet synchronous machine as they may cause damage to surrounding equipment, for example lathes or balancing machines.

Permanent magnet synchronous machines must only be serviced by repair shops qualified and authorised by ABB. For more information concerning service of permanent magnet synchronous machines, please contact ABB.

Follow manufacturer's operating instructions. For further details see product specific manuals or contact ABB.

Preserve these safety instructions!