



## Safety precautions and commissioning instructions for geared motors and low- voltage motors including their modified versions and additional components in accordance with the Low- Voltage Directive 73/23/EEC

### 1. General hazards

During operation, electrical machines have dangerous live parts or rotating parts and, in part, hot surfaces, resp. Improper assembly, installation, commissioning, operation and maintenance and the inappropriate removal of covers and other protective measures may result in serious injury or property damage. All work in connection with transport, connection, start-up and maintenance has to be performed by qualified personnel only which must be qualified in accordance with DIN VDE 0105 or IEC 364.

These instructions are not meant to cover all details concerning any possible design and applications. In case of doubt, contact the manufacturer.

### 2. Intended use

These low- voltage machines have been designed for industrial plants and are in accordance with the harmonised standards of series EN 60 034 (VDE 0530) in addition EN 60 146 and 50 178 (VDE 0558 and 0160) for converter drives. They must not be used for explosive gas atmospheres, unless they are intended for this purpose by identification marking.

The conditions on site must conform to all rating plate data. This applies in particular to the system of protection, ambient temperature and installation heights.

**Geared motors/motors are components designed to be installed in machines in accordance with the purpose of the Machine Directive 89/392/EEC. Commissioning is not permitted until the conformity of the final product with this Directive has been verified (See also EN 60 204- 1 Safety of Machines).**

### 3. Storage and transport

- All products are subjected to a functional test at the manufacturer's works. Any damage found to have been caused during transport should be notified to the freight forwarder without delay; damaged products must not be taken into operation.
- The lifting lugs provided have only be designed for the weight of the geared motor/motor, additional loads must not be attached.
- The products may only be stored in closed, dry rooms, protected from mechanical damage and vibration.
- Do not move or store the machines with the fan guard in its bottom position.
- Prior to commissioning, check the insulation resistance; in case of values of  $\leq 1.5 \text{ M}\Omega$  let the winding dry.

### 4. Mechanical installation

- Prior to installation, remove the rust protection from the output shaft and slightly grease the adjoining surfaces.
- Mount the geared motors/motors free from vibration, firmly and without distortion, make sure to have an exact alignment in case of a direct coupling.
- Be sure to observe the structural shapes and oil amounts in accordance with the rating plate and the proper gear ventilation. The gear models G1, G2, G3, ZG0, ZG1, ZG2, F3, S0, S1, and S2 are permanently lubricated and have no gear ventilation.
- Couplings or other elements of transmission may only be mounted using the front tapped hole in the output shaft. Avoid impact and shocks while mounting elements of transmission (warm up if necessary). Coupling elements should be covered during operation.
- When mounting shrink discs make sure to observe the specified screwing torque.
- Make sure to keep the maximum length of the flange mounting screws (end windings damage!) used for motors of design B14.
- Keep the ventilation apertures free, make sure to observe the minimum distances to the cooling air supply in accordance with manufacturers' instructions. Avoid the repeated intake of the warmed up cooling air. Care should be taken for versions with vertically arranged motors to avoid the falling in of foreign matter.
- Components to be mounted on the motor shaft end should be dynamically balanced. Motor armatures have been factory balanced with half the feather.

### 5. Electrical connection

- All connection work has to be performed in dead state (cleared and secured against re- closing) by qualified personnel observing the applicable provisions. Voltage and frequency must conform with the rating plate data. If the permissible tolerances according to EN 60 034- 1 – voltage  $\pm 5 \%$ , frequency  $\pm 2 \%$ , course of the curve and symmetry are exceeded, the heating will be increased and the electromagnetic compatibility can be affected.
- Use a motor protection switch or full motor protection!
- Exactly observe any deviating data on the circuit diagram or the rating plate, the connection diagram in the terminal box and any data sheets supplied. The connection has to be made such that a permanent safe electrical connection is ensured. Provide for a safe protective conductor connection. Observe the following minimum air gaps in the terminal box:  $U_n \leq 550 \text{ V} - 8 \text{ mm}$ ,  $U_n \leq 725 \text{ V} - 10 \text{ mm}$  (avoid wire ends that stick out!)
- The connecting box must not contain any foreign matter, dirt or humidity. Cable entries not used and the box itself should be closed dust- and waterproof.
- Motor protection with PTC temperature probes type TW: Load  $\leq 2.5 \text{ V}$  or  $\leq 1 \text{ mA}$  - max. 25VDC
- Motor protection with bimetal temperature controller TS: Load max. 250VAC; 1.0A
- Incremental encoder: see attached Operating Instructions
- Forced ventilation: note the direction of rotation.
- For motors with attached inverter, note the accompanying book supplied with each machine when making the electrical connection.

### 6. Start- up

- Prior to start- up, check the braking motors for proper function of the brake.
- Run the drive shortly with no load and check for irregularities.
- In the trial run of the motor without coupling elements: **secure the key.**
- Connect to load – vibration severities between 3 and 4mm/sec in coupled operation are negligible.
- Check the current consumption under load, in case of changes (vibration, noise, rise in temperature) find the cause, contact the manufacturer if required.

### 7. Inspection and maintenance

- In case of heavy contamination, periodically clean the air intakes.
- Recommended lubrication periods:
  - Change the gear oil every 10,000 – 12,000 operating hours or every 2 years for gears not permanently lubricated.
  - Change the bearings of permanently lubricated motor bearings every 3 to 4 years.
- Brake: occasionally check the air gap, re- adjust if the air gap has reached the dimension  $X_n$  (see rating plate).

For further details, refer to our comprehensive Operating and Maintenance Instructions.