

# 1. Safety

## 1.1. Qualification of personnel

Only technicians who are familiar with and understand the contents of this manual and the other relevant documentation are authorized to work on and with this drive system. The technicians must be able to detect potential dangers that may be caused by setting parameters, changing parameter values, creating and changing events and generally by the operation of mechanical, electrical and electronic equipment. The technicians must have sufficient technical training, knowledge and experience to recognize and avoid dangers. The technicians must be familiar with the relevant standards, regulations and safety regulations that must be observed when working on the drive system (etc. EMC Directive, Low Voltage directive and Machinery Directive). If the system is used outside the EU, international, national and regional directives must be observed.

## 1.2. Intended Use

The integrated servomotors systems described here are products for general use that conform to the state of the art in technology and are designed to prevent any dangers. However, drives and drive controllers that are not specifically designed for safety functions are not approved for applications where the functioning of the drive could endanger persons. The possibility of unexpected or unbraked movements can never be totally excluded without additional safety equipment.

For this reason, personnel must never be in the danger zone of the servomotors unless additional suitable safety equipment prevents any personal danger. This applies to operation of the machine during production and also to all service and maintenance work on servomotors and the machine. The machine design must ensure personal safety. Suitable measures for prevention of property damage are also required.

In all cases the applicable safety regulations and the specified operating conditions, such as environmental conditions and specified technical data, must be observed.

The servomotor system must not be commissioned and operated until completion of installation in accordance with the EMC regulations and the specifications in this manual. To prevent personal injury and damage to property damaged servomotors systems must not be installed or operated until this is done.

Changes and modifications of the servomotor systems are not permitted and if made no warranty and liability will be accepted.

The drive systems must not be operated in an environment subject to explosion hazard.

### 1.3. Hazard Categories

Safety notes and general information are indicated by hazard messages in the manual. In addition there are symbols and instructions affixed to the product that warn of possible hazards and help to operate the product safely. Depending on the seriousness of the hazard, the messages are divided into three hazard categories.

<b>⚠ DANGER</b>
DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death, serious injury, or equipment damage.

<b>⚠ WARNING</b>
WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death, serious injury, or equipment damage

<b>⚠ CAUTION</b>
CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in injury or equipment damage.

### 1.4. General safety instructions

<b>⚠ DANGER</b>
<b>EXPOSED SIGNALS</b> Hazardous voltage levels may be present if using an open frame power supply to power the product.  Failure to follow these instructions will result in death or serious injury.

<b>⚠ WARNING</b>
<b>EMERGENCY STOP</b> If connecting the motor to the machine, build an external emergency stop circuit that immediately stops operation and shuts down power in case of an emergency.  <b>ACCESS TO MOVING PART</b> Always ensure that no personnel can access the motor before operation as it has accessible moving parts.  <b>LOSS OF CONTROL</b> <ul style="list-style-type: none"> <li>The system manufacturer must take the potential error possibilities of the signals and the critical functions into account to ensure a safe status during and after errors. Some examples are: emergency stop, final position limitation, power failure and restart.</li> <li>The assessment of error possibilities must also include unexpected delays and the failure of signals or functions.</li> <li>Suitable redundant control paths must be in place for dangerous functions.</li> <li>Check that measures taken are effective.</li> </ul> <b>HEAT</b> The motor will become hot during operation, so do not touch the motor with bare hands. Failure to observe this caution may result in burns.  <b>MODIFICATIONS</b> Do not attempt to disassemble, repair, or modify the product. Do not change any wiring while power is being supplied.  Failure to follow these instructions can result in death or serious injury

<b>⚠ CAUTION</b>
<b>FAST CHANGES IN MOVMENT</b> Always attach the motor to a fixed structure before use. Large torques can be generated if target values is changed. The self-weight of the motor is then not enough to hold it stable.  <b>HOT PLUGGING!</b> Do not connect or disconnect power, logic, or communication while the device is in a powered state. Remove DC power by powering down at the AC side of the DC power supply.  <b>ENVIRONMENT</b> <ul style="list-style-type: none"> <li>Install the servomotor only in environments that meet the requirements for its protection class.</li> <li>Do not step on or place a heavy object on the motor. Failure to observe this caution may result in injury.</li> <li>Be sure to prevent any foreign objects from entering the product. Failure to observe this caution may result in malfunction or fire.</li> </ul> <b>CABLES</b> Do not damage the cables or subject them to excessive stress such as bending or stretching. Do not place heavy objects on the cables or the cables between other objects where they might be pinched.  Check the wiring to be sure it has been performed correctly. Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.  Failure to follow these instructions can result in equipment damage.