



## Preventing defeating by using appropriate modes of operation

### Problem:

During operation of a machine it is necessary to carry out tasks in the danger zone. This refers to tasks such as setting up, adjusting, measuring and fault finding. The protective devices are neutralized in order to permit the presence of persons in the danger zone while the machine is running in automatic mode.

### Measures:

There are special operating modes provided for the presence of persons in the danger zone. They help to achieve a sufficient level of safety (see Machinery Directive, Annex 1, par. 1.2.5), a.o. by

- using a manual control device
- motion possible only by using limited speed/rpm
- motion possible only in inching mode/acknowledgment mode
- motion of one single axis only

Here, it is helpful to use power drive systems with integrated safety functions such as „SLS Safely-Limited Speed“ and „SOS Safe Operating Stop“ (see BGIA Report 2/2008, 5.3.1, <http://www.dguv.de/ifa/en/pra/en13849/index.jsp> ; BIA Report 5/2003, <http://www.dguv.de/ifa/de/pub/rep/rep04/biar0503/index.jsp>).

### Example: Setting-up mode on machine tools

When setting up a machine tool, the operator has to stop the machining process and to enter the working area for the purpose of carrying out measurements on the workpiece. A hazard of injury due to unexpected motor start-up is present. On such machinery, it is not possible to switch off the energy to the spindle, as this would lead to an unacceptable loss of position. The spindle must be held in position by the drive control. In order to avoid hazards generated by an unexpected spindle start-up, a drive control with the safety function „SOS Safe Operating Stop“ is used. Also all other drives are at standstill, be it by

safety function SOS or by „STO Safe Torque Off“. The safety functions fulfil usually performance level d of EN 13849-1. Prior to opening the safety guard, the safety functions are activated by selecting position "set-up" on the mode selector switch; at the same time, safety guard monitoring is disabled. The measures described here prevent an unexpected start-up with sufficient safety. The operator is not hampered in his work; there is no incentive to defeat protective devices.

