

## Unidrive SP and Digitax ST Safe Torque Off function

### Safety integrity data

This data supplements the Declaration of Conformity according to the Machinery Directive of the European Union, 2006/42/EC.

These products comply with European standards EN 61800-5-2:2007 and EN ISO 13849-1:2008 and the corresponding international standards IEC 61800-5-2:2007 and ISO 13849-1:2006, in respect of the Safe Torque Off function.

#### Safety function definition

Safe Torque Off is a function according to the definition in EN 61800-5-2:2007 whereby when the Enable input is not asserted, the drive will not produce torque in the motor.

#### Integrity parameters

This data has been independently verified by BGIA, except for the Control Techniques estimate of PFH which is outside of the range allowed in EN 61800-5-2:2007.

For EN 61800-5-2 the relevant parameters are given below.

SIL	3	
PFH	$< 10^{-8}$	(Control Techniques estimate $8 \times 10^{-10}$ )

For EN ISO 13849-1 the relevant parameters are given below:

PL	e
Category	4
MTTF <sub>D</sub>	$> 10^5$ yr
MT	20 yr
B10d	Not applicable - there are no significant wearout mechanisms of the safety function
DC	Not applicable - see note below

#### Note on DC (Diagnostic Coverage) according to EN ISO 13849-1:2008

Control Techniques Safe Torque Off function achieves its high MTTF<sub>D</sub> by using a single channel "fail safe" interface where no single component failure and no combinations of two component failures result in a loss of the safety function. It does not rely on the use of two channels with diagnostic functions to detect potentially dangerous faults, but instead is designed to ensure that such faults are extremely unlikely. Therefore strictly there is no Diagnostic Coverage.

Some system design tools such as SISTEMA (published by IFA in Germany) are designed to demand a value for DC and do not offer the option to ignore it. In order to use this tool Control Techniques suggests that a value of 99% be used for DC, which is the highest value available in EN ISO 13849-1:2008. This is based on the fact that when considering single component failures the Safe Failure Fraction is 100%, which gives the equivalent of a DC of 100%.

#### Important note regarding the protection of the STO electrical circuit

Since this is a single channel input, measures must be taken to prevent the input from being inadvertently energised by a wiring fault. According to the fault exclusions listed in EN ISO 13849-2:2008, this may be achieved by using a screened (shielded) wire for the STO input, with the screen connected to ground. Alternatively the wires may be segregated from all other wires in a separate physical housing.

#### Electrical parameters

Please see the User Guide for full information regarding the STO input.

#### Safety-related electrical parameter

The maximum low-state input voltage for SIL3 is 2.0V.