

# Twincat Library: CNC Configuration

## Application Note

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## 1 Target and Purpose

The Triamec TwinCat library comes with basic settings for CNC. This application note describes the configuration of the Beckhoff-TwinCAT-CNC.

## 2 General Hints

### 2.1 PLC-Tasks

The first SPS task must always be the MAIN\_STANDARD task which contains the interface to CNC-COM. But this task must have a lower prio than MAIN\_FAST, SDA and GEO, i.e., its prio number must be higher.

The MAIN\_FAST task must have the same rate as GEO for proper position data interpolation.

### 2.2 Connecting PLC with the CNC

The sercos state information is a slow update signal in the plc. Nevertheless, it enters the CNC through a fast GEO task interface and as such must be updated in the fast process. Therefore, connect the SercosStatus and SercosPhase signals as a MAIN\_FAST signal in the TwinCat System manager. Otherwise, we receive task exceeds when MAIN\_SLOW is heavily loaded.

### 2.3 Axis Parameters

We suggest the following axis parameters

- kenngr.abs\_pos\_gueltig = 0. Otherwise the axis is always considered referenced
- no difference between cnc and plc caused by setPosition
  - kenngr.set\_refpos\_mode = OFFSET
  - kenngr.set\_refpos\_offset = 0

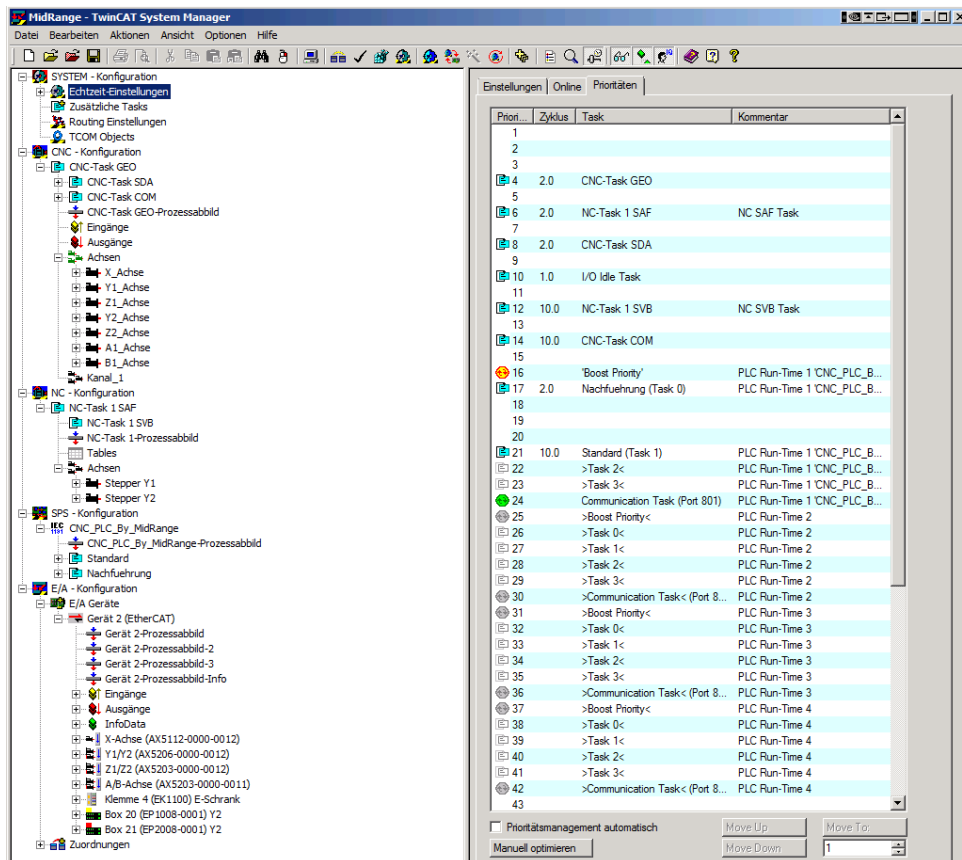
### 2.4 Heavy Load Situation

When using the TwinCAT CnC under heavy load conditions check the "Überschreitungsähler" of all tasks including GEO, SDA, MAIN\_FAST. Any count is an indication, that a task has been discarded ones which may cause instantaneous wrong position data being sent to the drive.

### 2.5 Heavy G-Code Load

At a very fast G-code block rate, Beckhoff mentions: Exceed counters can be an indication, that there is a collision between GEO and SDA. While with the standard setup the SDA-task is slower than GEO it has improved data consistency when making SDA as fast as GEO.

- Turn off RealTimeSettings/Prio/automatic
- Use the same cycle time for GEO and SDA.
- The prio of SDA may be lower than GEO, i.e., its number may be higher, but not more than two levels. See figure for an example
- SPS tasks should have a lower prio (higher number) than GEO and SDA



### 3 CNC Parameters

Some interesting Cnc-Parameters

- the following channel parameter sets default dynamic profile trapez-acceleration:  
prog\_start.slope.profile 1
- To manually move axes, the sample code requires  
HMI/option/settings/Cnc Page/ManualMode="HMI to NC"
- Regelfenster  
getriebe[0].window the tolerance in 0.1 um resolution  
getriebe[0].pos\_einschw\_zeit in ms

### 4 Special Behavior causing CNC-Error 70091

If an axis is disabled then displaced and enabled again and the HMI-mode is "Manual" or "Auto", the CNC issues this error.

This might be a wanted behaviour, if the axis should continue at the old position in a G-code program. It does not appear, if the axis is hold by brakes when disabled. This behavior may not be desired, if the axis has been moved by purpose.

The problem may then be addressed by issuing a CNC-Reset between the axis disable (which causes axis tracking) and the next axis enable. Then the CNC does not attempt to move to the old position

anymore.

#### Background info from CNC-Help

Bei aktivem Nachführbetrieb kann die Achse von der Sollposition fortbewegt werden. Damit tritt eine Lagedifferenz zwischen ursprünglichem Sollwert und der aktuellen Position auf. Erfolgt die Aktivierung des Nachführbetriebs bei Ausführen eines Programms oder aktiver Handsteuerung, so wird die Achse nach Beenden des Nachführbetriebs an die ursprüngliche Stelle zurückgefahren, falls die aufgetretene Positionsabweichung kleiner als der in den Achsparametern (s. P-AXIS-00056) angegebene Wert ist. Ansonsten wird diese Fehlermeldung angezeigt.