

SIMOTION

Frequently asked Questions

Realization of a torque coupling with
SIMOTION / SINAMICS

SIEMENS

Torque Coupling with SIMOTION / SINAMICS

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Reference regarding export codes

AL: N

ECCN: N

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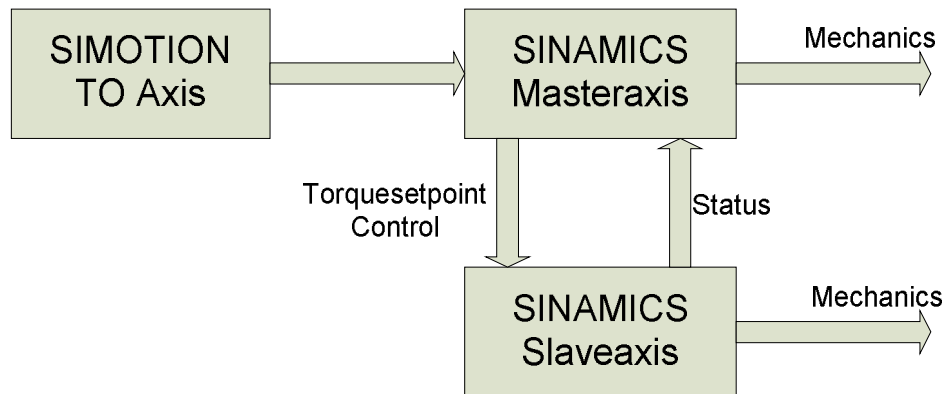
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1 Question

This FAQ describes the possibility of how to operate two SINAMICS axes in one torque coupling on a drive level by a higher-level SIMOTION master.



2 Solution

In the following, the SINAMICS drives are called *master axis* and *slave axis*.

2.1 Basics

For this proposed torque coupling, the master axis is parameterized as a speed-controlled drive and the slave axis as a torque-controlled drive. The drive in the torque control gets the torque set point from the speed controller of the master. So both drives receive the same torque set point.

2.2 Functionality of the solution

- Interconnection of the torque set point of the master axis to the torque set point of the slave axis.
- Scaling of the force distribution between both axes.
- Starting interlock of the axis. The *master axis* is only switched on if the slave axis has also been switched on successfully. This ensures that always both axes are ready for operation.
- Disconnection of both axes in case of a deviation between master and slave axis concerning the actual speed value.
- An error acknowledgement on the *master axis* causes automatically an error acknowledgement on the slave axis.

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2.3 Requirements

If SIMOTION V4.2 or higher is used the symbolic assignment has to be deactivated first.

2.4 Preparation

- Configure both axes on the SINAMICS as speed-controlled drives.
- Create a standard telegram on the master axis, e.g. telegram 105, as a communication to SIMOTION. The slave axis does not require any communication to SIMOTION.
- Assign the *master axis* to the SINAMICS of the corresponding SIMOTION axis.

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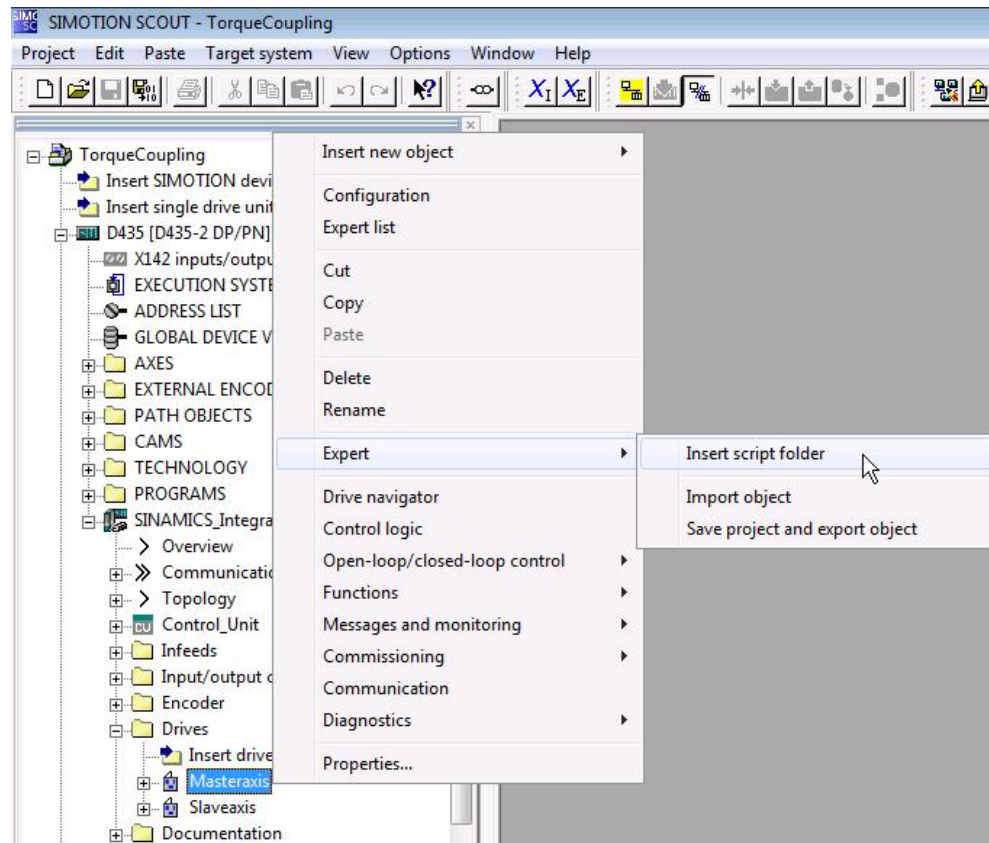
2.5 Implementation of the torque coupling by use of a script

To make it easier to use this application sample, two script files are attached to this FAQ, which can be copied to the SINAMICS via the import function.

Insert script folder

Click the right mouse button onto the drive object which is the master of the torque coupling. In the context menu select *Expert* and then select *Insert script folder*.

Figure 2-1: Insert script folder



Repeat this step on the slave axis.

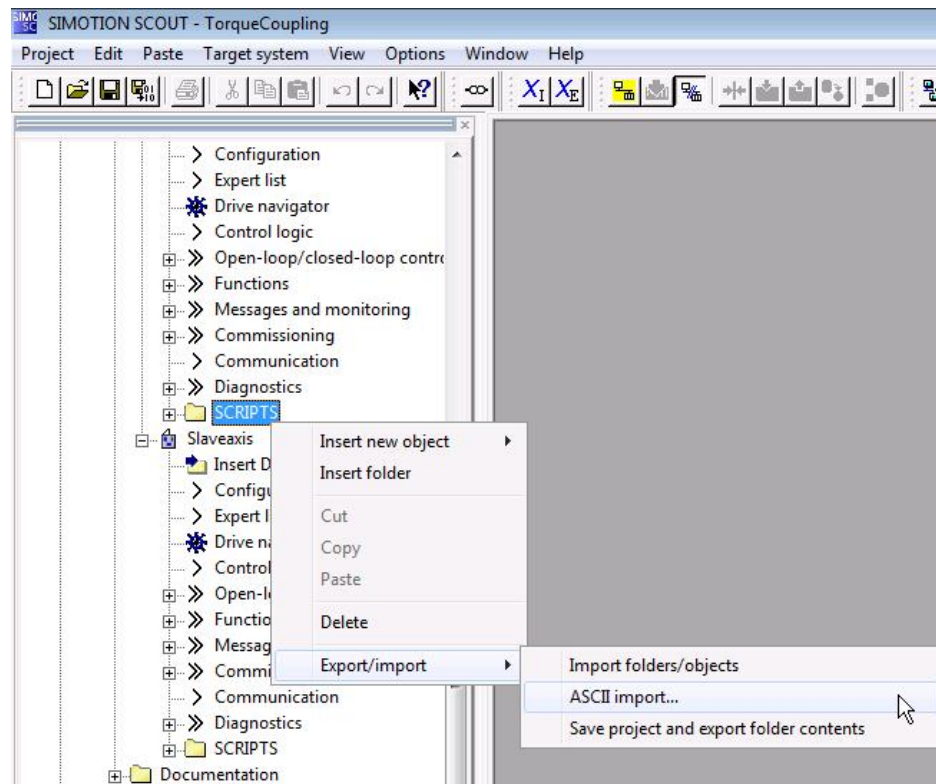
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Import script

Now, click the right mouse key on the folder *SCRIPTS*, select *Export/import* and then *ASCII import...* Then select the script file *Master.txt*.

Figure 2-2: Insert script



Repeat this step on the slave axis with the script file *Slave.txt*.

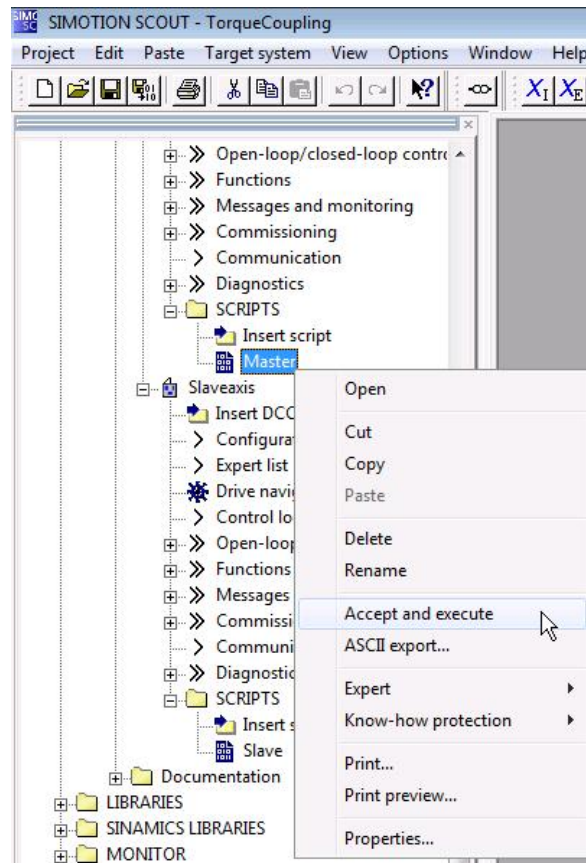
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Execute script

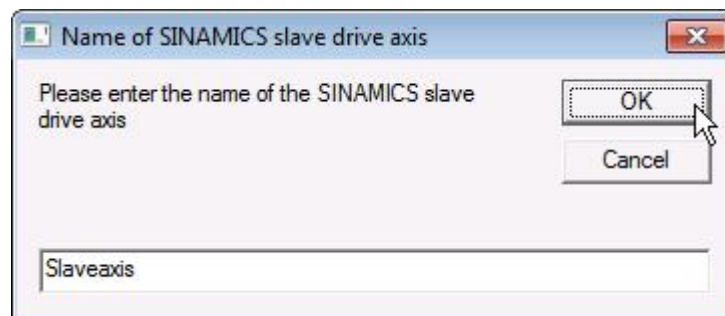
Open the script folder on the master axis. After a right mouse click on the master script, select "Accept and execute" in the context menu.

Figure 2-3: Execute script



The following input box dialog asks you to enter the name of the slave axis. Please enter the name and confirm your entry with OK.

Figure 2-4 Entering drive names



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When the master script is finished, all interconnections on the *master axis*, which are necessary for the torque coupling, are made.

Now run the script *slave* on the slave axis. You are also asked to enter the name of the *master axis*.

NOTICE The master script changes the telegram parameterization of the master axis to *free telegram parameterization*.

An enabling via *ON/OFF 1* ensures that the master axis is only connected when the slave axis has been connected successfully before. If you made a reset to the standard telegram, this protection would not be possible any more.

NOTICE The slave script switches the control mode of the slave axis from closed-loop speed control to torque control by changing p1501.

2.6 Axes with different reference torques

Usually, the function of the torque coupling assumes that both motors are of the same construction and the charge is uniformly distributed among the drives.

In case of reference torques of the motors are not the same or a uniform distribution of the charge among the two drives is not possible, this can be compensated by a scaling factor. On the slave axis, the scaling factor is connected to the parameter p2900 and can be adapted via the parameter p2900 on the master axis.

2.7 Monitoring of the speed deviation between the two axes

The maximum admissible speed deviation is adjusted on the slave axis in the speed threshold 4 (parameter p2163). The monitoring of the actual speed value of the slave axis referred to the master axis makes it possible to recognize an overspeed of the slave axis.

In the event of an error in the speed deviation, an external malfunction alarm is triggered on both axes due to security reasons so that both drives will be stopped.

Appendix

3 Revision

Table 3-1: Revision/authors

Version	Date/Revision
V1.0	15.08.2008 / Creation
V1.1	11.04.2012 / Requirements regarding symbolic assignment
V1.2	24.06.2014 / Switch to torque control

4 Literature index

Literature indications

Of course, this list is not complete, but only reflects a selection of appropriate literature.

Table 4-1: Literature

	Subject	Title
/1/	Product documentation	D4x5-2 Commissioning and Hardware Installation Manual
/2/	Product documentation	SINAMICS S120 Commissioning Manual

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5 Contact partner

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