START-UP
and
UPGRADE GUIDE

valid for

SINUMERIK 810/840D
Software version 06.05.28.00

1 Requirements for Upgrade

Software version 06.05.28.00 (NCK 51.14.00) is a software update release. The NCK functionality corresponds to software version 06.05.27.00 (NCK 51.13.00).
The Upgrade Instructions for software versions 06.04.15.00 and 06.05.11.00 apply to an upgrade to version 06.05.28.00.

The current upgrade instructions are part of the delivery releases in ProdIS Update.

1.1 System software 06.05.28.00

Export versions		
Part number	**Designation** ... on PC card	**For hardware**
6FC5250 - 6AX00 - 3AB0	NCU system software 2 axes	NCU *.4, NCU 573.5
6FC5250-6CY30-5AH0	NCU system software 6 axes	NCU *.4, NCU 573.5
6FC5250-6BY30-5AH0	NCU system software 12 axes	NCU 572.3/573.2/573.3, NCU *.4, NCU 573.5
6FC5250-6AY30-5AH0	NCU system software 31 axes	NCU 572.3/573.2/573.3, NCU *.4, NCU 573.5
6FC5450-6AY03-5AH0	CCU system software	CCU 3
Standard versions (subject to export restrictions)		
Part number	**Designation** ... on PC card	**For hardware**
6FC5250-6CX30-5AH0	NCU system software 6 axes	NCU *.4, NCU 573.5
6FC5250-6BX30-5AH0	NCU system software 12 axes	NCU 572.3/573.2/573.3, NCU *.4, NCU 573.5
6FC5250-6AX30-5AH0	NCU system software 31 axes	NCU 572.3/573.2/573.3, NCU *.4, NCU 573.5
6FC5450-6AX03-5AH0	CCU system software	CCU 3

1.2 Tools

- 6FC5250-6AY00-3AG0 (...-4AG0 available soon) SinuCom NC with SinuCom FFS
  SinuCom FFS must be used to program the PC card with software version 6.4.13 and higher.
- 6FC5252-6AX21-5AG0 toolbox V 06.05.02 with basic PLC program 06.05.02 .
  The basic PLC program of tool box 6.3.3 can be used. An upgrade is not always required.
- PG/PC with STEP7 Version 5.2 and higher and optional online MPI link.
  Current documentation for SW 6 with additional function-related information

2 Data Backup

2.1 General requirements for upgrade

Before upgrading the NCK ensure that at least 50KB dynamic memory is available for each channel. This can be checked in MD18050 INFO_FREE_MEM_DYNAMIC. If less memory is available, additional memory must be provided by extending MD18210 USER_MEM_DYNAMIC. If this is not possible, a more powerful CPU must be used, or unused memory must be released. The machine data, which are identified in the list as D-RAM, are suitable for this purpose.

An additional 50KB of static memory should be available. This can be checked with MD18060 INFO_FREE_MEM_STATIC. If the available memory is insufficient, memory space can be freed by unloading NC programs.

Set machine data 11210 UPLOAD_MD_CHANGES_ONLY = FF, 11220 INI_FILE_MODE = 1 or 2.

2.2 Data backup

- **NCK**
  Before the NCK is upgraded, a back-up must be made to permit recovery of the machine's current database. This is done by creating a series start-up file.

- **PLC**
  In addition to the NCK back-up, a PLC back-up must be created. This back-up must be performed with the PLC in Stop state. Set S4 on the NCU module to position 2. This will switch the PLC to the Stop state.

  If you want to upgrade the basic PLC program you will need STEP7. For this, you will have to install the new tool box via SETUP. You also need the customer project of this system. The required blocks are transferred from the new tool box library to the customer project (or a copy). OBs FC12 and DB 4 must not be transferred (these are blocks for creating new user programs) because they have been modified by the machine manufacturer. After having replaced the NCK software, transfer the blocks to the PLC by using STEP7. A new PLC series start-up file must be created.

- **Replacing the software**
  Switch off the control and replace the PC card. The card stays in the control.
  Set switch S3 to position 1, set S4 to position 3 and switch on the control. When it has powered up, the state "7-Segment display shows digit 6 / PLC LED PS flashes / PF red" is established.
  The NC standard machine data have now been loaded. NC and PLC are cleared.

  The PLC is started up by switching S4 from position 3 to position 0
  => S4 in position 3 => S4 in position 0. Now the PLC must switch to Run mode.
  Set S3 to position 0.
  You can check the software version in menu *Diagnosis/Service Displays/Version*.

- **Loading the back-ups**
  Once the manufacturer password has been set, the NCK back-up can be loaded in menu *Services/ Series start-up/Load start-up archive*/ after selecting the back-up file.
  Once completed, the PLC back-up can be loaded.
  Once the PLC back-up file has been loaded you must switch the system off and on again so that all components are powered up at the same time.

3 CCU 3

3.1 Upgrading from CCU 1 to CCU 3

- NC back-up CCU 1
  The drive boot files must be saved in ASCII format so that they can be loaded into the CCU 3. For that, you will need to create an upgrade archive with the setting "$MN_UPLOAD_MD_CHANGES_ONLY=FF".
- Standard start-up CCU 3
  When standard start-up of the CCU 3 is complete, be sure to note down the value of MD18210 $MN_USER_MEM_DYNAMIC.
- Loading the upgrade archive
  The name of drive machine data 1254 has been changed. That is why the following message is read out when you load the upgrade archive:
  Drive x: Line x: Entry not found in ACC file: N1254 $MD_SPACE_VECTOR_FILTER_TIME
  Notice !
  MD1254 is assigned default values. Check against the data back-up whether the value is now different from the default (0.5 millisecs).

- DRAM expansion
  After loading of the upgrade archive, MD $MN_USER_MEM_DYNAMIC should be reset to the default value of the CCU 3.
- Important changes to standard machine data

CCU 1	CCU 3
MD10072=1	MD10072=0.5
MD10134=3	MD10134=6
MD28070=30	MD28070=38
MD28520=1	MD28520=3

3.2 Upgrading from CCU 2 to CCU 3

Memory problems may occur when upgrading a CCU 3 with a CCU 2 series start-up file because the SRAM memory expansion of the CCU 2 is not defined with option data. On the CCU 3, any SRAM memory greater than the basic complement (768KB) is defined by options. In that case, parts programs must be unloaded from the CCU 2 before the series start-up file is created, so that the series start-up can be reloaded without any problem. If it is not possible to load all the programs again, memory options must be upgraded.
Note:
The CCU3e software **can** be flashed. The flash procedure is marked with number 8 on the 7 segment display and takes about 2 minutes. The end of the flash procedure is displayed with number 9.

4 Upgrading to CCU 3.4 with PLC 314C-2DP

With CCU 3.4, the PLC 314C-2DP has also been introduced for SINUMERIK 810D analog to the *.4 NCUs. The order number is 6FC5410-0AY03-1AA0.

- **Requirements for upgrade:**

- STEP7 version >= 5.1 service pack 2, hotfix 3 or STEP7 on HMI version >= 5.1 with service pack 3
- CCU software version >= 6.5.26
- PLC firmware version >= 10.60.22
- Tool box >= 6.3.2
- Basic PLC program >= 6.3.2
- HMI ADV version >= 5.3.20, >= 6.1.15 or >= 6.2.12, 6.3.xx, 6.4.xx
- HMI EMB version >= 6.2.34.

If PLC projects with S7 hardware configurations shall be accepted, a new PLC hardware configuration will have to be created. For this purpose, the PLC CPU 314C-2DP must be integrated into the hardware configuration (from the tool box). Programming tool STEP7 and knowledge in Simatic are required.

- **PLC changes compared to PLC 315-2DP**

- The performance is faster by an approximate factor of 3
- User memory, max. of 480KB
- Min. of 16, max. of 32 PROFIBUS slaves / size SDB 2000 <= 32KB
- 256 times
- 256 numerators.

- **NC performance**

The GX1 processor is now clocked with 266MHz (previously 233MHz).

5 Note

5.1 Spindle setpoint display

The spindle setpoint display in the HMI spindle window is no longer affected by the content of MD 22410 $MC_F_VALUES_ACTIVE_AFTER_RESET. The response is now as follows:

$MN_DISPLAY_FUNCTION_MASK, bit 1=0
When the spindle is at zero speed, set speed "0" is displayed.
Example:
M3 S100
g4 F2
M5 Setpoint display on HMI "0" rpm

$MN_DISPLAY_FUNCTION_MASK, bit 1=1
When the spindle is at zero speed, set speed "100" is displayed.
Example:
M3 S100
g4 F2

5.2 Upgrading to CCU3 / "handling" function

In SW 6.4 and higher the "handling" function is no longer available in the default version, but can be implemented via loadability. This means that the technological function "handling" must be obtained via eSupport or from Siemens sales. See the upgrade instructions for the compile cycles for additional information.

5.3 Output specifications of predefined auxiliary functions

Machine data $MC_AUXFU_PREDEF_SPEC introduced with software version 6.4 may cause incompatibilities during auxiliary function output. If required, the output specifications of predefined auxiliary functions can be adjusted via machine data $MC_AUXFU_PREDEF_SPEC. The output specifications of user-defined auxiliary functions can be defined via machine data $MC_AUXFU_ASSIGN_SPEC.

The order of the output specifications' significance is as follows:
$MC_AUXFU_PREDEF_SPEC[index]
$MC_AUXFU_GROUP_SPEC[grpindex]
$MC_AUXFU_(M,S,T,H,F,D,DL)_SYNC_TYPE

This means that the predefined output specifications always apply for the predefined auxiliary functions.

Notes:

- In SW 6.4 and higher, the spindle M functions (e.g. M3/M4/M5) are output by default prior to the traversing movement, even though MD $MC_AUXFU_M_SYNC_TYPE=1 (output during the movement). However, the time the spindle M functions are to be output can be adjusted in MD $MC_AUXFU_PREDEF_SPEC.
- The predefined auxiliary functions cannot be overwritten during configuration of user-defined auxiliary functions. Alarm "4185 channel K1 illegal configuration of an auxiliary function…" will be output in this case.
  This alarm will be also be output, if illegal auxiliary function groups have been defined.
  This was not monitored in software versions < 6.4.9.
  Example:
  M3 placed into the fifth auxiliary function group, although only the second group is permissible.
- The spindle auxiliary functions M1=40 through M1=45 are now assigned to the fourth auxiliary function group by default (see MD $MC_AUXFU_PREDEF_GROUP).
- In SW 6.4 and higher, the master spindle address extension is automatically output at the interface on programming M40 through M45.

6 General Restrictions

- If STEP7 version 5.3 is being used, the tool box must be installed if projects (including PLC blocks) containing hardware components of the tool box are to be processed.
- NCU *.4 with PLC 314C:

If master/slave configurations are used, the PLC 314C must not be operated as a slave. If such a configuration is required, it must be implemented with a CP module or an NCU *.5.

- Function G643 (approximate positioning in block) is enabled for applications in the tool change area (e.g. optimizations for approaching the tool change position).
  It is not enabled for applications in the machining process.
- The functions FCUB and FLIN in combination with the compressor COMPCAD are not enabled.
- NCUs nnn.3: The PCU 50 can only be shut down with the Exit button in emergency stop mode if PLC firmware version < 12.30.10 is used.
- NCUs nnn.4 : The PCU 50 can only be shut down with the Exit button in emergency stop mode if PLC firmware version < 10.60.17 is used.
- With the NCU 573.3, it is no longer possible to enable ten channels and 31 axes at the same time. That number is now limited to eight channels.
- The number of channels is limited to 6 for NCU 572.3 / 572.4, 31-axis software.
  The number of axes including the DMP block is limited to 31. If, for example, a DMP block is used with 31-axis software, at total of 30 axes are still possible.

7 Functional Improvements from Version 06.05.28.00 to Version 06.05.27.00

CHMdc09429	CHMdc09531	ERLde61316	ERLde67598	ERLde72139
ERLde72182	ERLde72821	ERLde73327	ERLde73840	ERLde74083
ERLde74167	ERLde74448	ERLde74561	ERLde74571	ERLde74755
ERLde74866	ERLde74903	ERLde74990	ERLde75001	ERLde75002
ERLde75016	ERLde75160	ERLde75169	ERLde75195	ERLde75200
ERLde75210	ERLde75213	ERLde75269	ERLde75308	ERLde75332
ERLde75345	ERLde75354	ERLde75400	ERLde75575	ERLde75602
ERLde75645	ERLde75668	ERLde75712	ERLde75766	MGLdm00998
MGLdm01072	MGLdm01093	MGLdm01128	MGLdm01139	