Installation and Operating Notes

The CNC Software 4.7 SP2 HF1 (internal version 04.07.02.01.015) comprises the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Version</th>
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<tbody>
<tr>
<td>NCK (incl. NRK)</td>
<td>V99.17.05</td>
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<td>SNCK</td>
<td>V02.06.02.00.002</td>
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<tr>
<td>SINAMICS</td>
<td>V04.70.35.46</td>
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<tr>
<td>PLC OpSys (317-3)</td>
<td>V32.83.23</td>
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<td>PLC OpSys (319-3)</td>
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<tr>
<td>FB15(sl)</td>
<td>04.07.26</td>
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<tr>
<td>CP</td>
<td>V02.34.00</td>
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<td>MCP_CLIENT</td>
<td>V01.06.04</td>
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<tr>
<td>SINUMERIK Operate</td>
<td>V04.07.02.01.013</td>
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<td>Linux basic system</td>
<td>V04.70.76.02</td>
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<td>NCK file system driver</td>
<td>V04.07.01.01.001</td>
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<tr>
<td>NCU-Link Config</td>
<td>V03.00.00</td>
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<td>(SDBs for the configuration of NCU-Link)</td>
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<td>Profinet FW</td>
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<td>HMIARC Tool</td>
<td>04.05.02.00.003</td>
</tr>
<tr>
<td>SinIntClient</td>
<td>03.00.04.00.045</td>
</tr>
</tbody>
</table>

Requirements:
- CNC SW 4.7 SP2 HF1 may only be operated on SINUMERIK NCUs 710.3 PN / 710.3B PN, 720.3 PN / 720.3B PN and 730.3 PN / 730.3B PN.
- CF card Smart Modular Xceed 8GB. - For the standard version 6FC5851-1XG41-2YA8.
- Step 7 version as from V5.5 SP4
- Current toolbox from and including V 04.07.23.00
- NCU service system from and including V04.70.47
- For the use of SINUMERIK Operate internally on NCU, you require the option S00 SINUMERIK Operate on /NCU in combination with real drives
- For the use of SINUMERIK Operate externally on PCU or PC, you require the option P87/P88 SINUMERIK Operate on /PCU / PC in combination with real drives
- NCU 7x0.3 modules with boot code of PLC version V2.5 (see also the point "Boot code...")

********************************************************************************************************************

New options:
6FC5800-0AS14-0YB0 Orientation Offset
6FC5800-0AP77-0YB0 CNC user memory expanded
6FC5800-0AP80-0YB0 Extended Touch
6FC5800-0AP73-0YB0 Run MyRobot /Machining
Notes and restrictions:
With SW 4.7 SP2 HF1, an IPO plane overflow may occur in the NCU in individual cases when using the option "Simultaneous recording". In this case, we recommend that you reduce the NCU load by changing some settings (e.g. IPO cycle, position control cycle, etc.) or refrain from using "Simultaneous recording". This only applies for "Simultaneous recording" with internal Operate, not for Operate on PCU 50 / PC.

The Software HMI-Pro sl as from including V04.05.03.04 can be used in combination with CNC SW 4.7 SP2 HFx.

Additional languages V4.5.2 and V4.7 HF1 are supported. New texts from SW 4.7 SP2 HF1 are possibly displayed in English.

The following functions / options have not been released:
- F-PLC, that means no 317F or 319F, nor SINUMERIK with dbSI1 either
- HTL/TTL encoder in combination with HLA and Safety
- The CBA function may only be used together with a declaration regarding the machine-specific approval.
- AST from part program (ASTCMD): no support of gantry axes
- The Easy-XML functionality included in Operate may not be used by customers for configuring.

Functional improvements in NCK SW 4.7 SP2 HF1 compared to SW 4.7 SP1 HF1:

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Functional improvements in Operate SW 4.7 SP2 HF1 compared to SW 4.7 SP1 HF1:

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</table>
The NCU service system is stored as a USB stick image in directory emergency_bootsys_ncu on the supplied USB stick at the NCU or PCU. The instructions can be found in the Create MyConfig manual.

Installing the CNC software:
The NCU service system >= V04.70.47 is required on a USB stick to install the CNC software.

Boostrap stack of the PLC:
Software release 4.7 only starts with PLC boot code V2.5 (or later) internally coded on the NCU hardware. If this PLC boot code has still not been installed, the control will not start (in the 7-segment display "PLC" and SF and DP LED flash red).

In this state, the bootcode upgrade can be initiated by actuating the PLC rotary switch. The bootcode is flashed by turning the PLC rotary switch into position 5. This can be identified by the fact that a rotating wheel is displayed in the 7-segment display. This takes approx. 15 seconds. With this procedure, under no circumstances is it permissible that the NCU is switched off! The 7-segment display goes dark after the boot code upgrade has been completed. The PLC rotary switch can now be turned back to position 3 (memory reset) and the system continues to boot.

Installing the NCU service system on USB stick:
The NCU service system is stored as a USB stick image in directory emergency_bootsys_ncu on the supplied USB stick image.
DVD. The copy program installdisk.exe is also included. Connect a USB stick >= 2 GB to your PG resp. PC and determine the relevant drive letters. Call installdisk to copy the NCU service system to the USB stick: 
installdisk --verbose --blocksize 1m <Image file> <Drive letter:>

It is best if the command specified above is executed in a DOS shell.
For this, you require administrator rights on your PG / PC.

Installation on the NCU:
Upon completion of installdisk, remove the USB stick from the PG / PC, boot once an NCU 7x0 from this stick (this boot process takes a little bit longer; a "P" in the 7-segment display of the NCU indicates that the FAT partition of the USB stick is partitioned) and reinsert the stick in the PG / PC. Under Windows, you can now see an empty USB stick. Now copy the desired CNC software (file with extension .tgz) from directory ncu_sw on the DVD supplied to this USB stick.
The USB stick can be connected to one of the two USB connectors of the NCU 7x0.3. The NCU will boot from this USB stick after power ON. The system is operated either via a TCU that is connected to the NCU, or via PG / PC using WinSCP under "Open Terminal".
Instructions on how to use the NCU service system can be found in documentation /IM7/ on the DVD supplied. We recommend that you use the USB stick "SIMATIC IPC USB Flashdrive, 6ES7648-0DC60-0AA0".
Alternatively, the image can be installed using the AccessMyMaschine /P2P tool V4.6 SP1 HFx via the menu item "Write file system image..." dialog.

Notes on the CNC software:
- The NC option alarm is a Power-On alarm with the standard and export versions. Exception: Simulators without real Drives.
- When upgrading the system from V4.5 SPx and having licensed all options, the options P87 and P88 (Operate on PC resp. PCU 50) may have to be licensed subsequently following the upgrade.
- Before reading in a data backup, perform a general reset of NC and PLC using the switches NCK / PLC.
- Auto Servo Tuning - AST
  When upgrading your system from CNC SW < V4.5 SP3, the stored AST session files (Auto Servo Tuning) are not compatible and the AST settings (strategy, measurement parameters, etc.) get lost.
- SinuComARC
  Series commissioning archives can no longer be edited with SinuComArc. Alternatively, you can use Create MyConfig (e.g.: also CMC Diff) resp. AMM /P2P V4.6 SP1 HF2: Does not claim to be a compatible successor.
- In the screen "Logical drives", display faults regarding the configured USB interfaces may occur.
- In the screen "Logical drives " , you should not configure network drives which are not permanently available.
- Restrictions with EES:
  When using a USB stick on the TCU in combination with a PCU, you can currently not edit any files on the USB stick with active EES mode. These files can, however, be executed.
  If a USB stick on a TCU is accessed by several HMIs / NCUs in parallel, the components are not coordinated. This entails the danger that a program being processed is modified / destroyed by another component.
- When using SinuComNC trace, you must ensure with PLC signals that the configured signals (data blocks, data bytes) are provided in the PLC.
- Problem solution for S5_FETCH / S5_WRITE in the CP:
  As from SW 4.7 SP1, the file cp_param.ini, which contains the following contents, is stored on the CF
card in the directory /siemens/sinumerk/cp:

[IniFile_ID]
Version = 100
Type = 'CosCP'
Comment = 'Select fetch/write version'

If you modify this file, don't remove the section [IniFile_ID] above
cHECK 'cp_param.log' to verify that your settings are accepted.

[FetchWrite]
# Selection of the S5 fetch/write implementation
# Version = 1 : the previous behavior
# Version = 2 : the new as far as possible CP 343 compatible behavior
Version = 1

The problem solution becomes active when recopying this file (possible as manufacture) into the directory /user/sinumerik/cp and modifying the entry "Version = 1" to "Version = 2".

- When traversing with low speeds alarm 27011 is triggered during traversing motions in the negative direction.
The following supplementary conditions must be considered as remedy for the described behavior:
The minimum possible resolution (quantization) of the monitoring functions for Safety Integrated is 1 increment per monitoring clock cycle [incr/mcc].
Two increments per monitoring clock cycle are necessary, so that no speed violation alarm is triggered when the axis is stationary.
The minimum speed limit value that can be set for the machine data $MA_SAFE_VELO_LIMIT$ can be determined as follows:
For a rotary axis:


Example 1: Monitoring clock cycle=12ms, LimitMin=2[incr/mcc]
Example 2: Monitoring clock cycle=8ms, LimitMin=2[incr/mcc]
With decimal places the value has to be rounded to be entered for the machine data.
For a linear axis:

$MA_SAFE_VELO_LIMIT[mm/min] = 2[incr/mcc] * 60[sec/min] / 1000[incr/mm] / [MCC[sec/mcc]]$

Example 1: Monitoring clock cycle=12ms, LimitMin=2[incr/mcc]
$MA_SAFE_VELO_LIMIT[mm/min] = 2[incr/mcc] * 60[sec/min] / 1000[incr/mm] / 0.012[s/mcc] = 10[mm/min]
Example 2: Monitoring clock cycle=8ms, LimitMin=2[incr/mcc]
$MA_SAFE_VELO_LIMIT[mm/min] = 2[incr/mcc] * 60[sec/min] / 1000[incr/mm] / 0.008[s/mcc] = 15[mm/min]
With decimal places the value has to be rounded to be entered for the machine data.
Actual speed value:

With very low speeds the possible minimum resolution of the actual speed value must also be considered: this value depends on the encoder pulses per revolution, the gear ratio and the monitoring clock cycle!
SINAMICS display parameters for the speed resolution:
The drive provides a display parameter for the speed resolution, which is also visible with ncSI
r9732[0..1] SI Motion speed resolution
For index 0:
Display of the safe speed resolution (load side). Specification of speed limits or parameter changes for
speeds below this threshold have no effect.
For index 1: Display of the safe speed accuracy based on the safe encoder accuracy. Unit: mm/min or
rpm
Use for ncSi:
With a 1-encoder-system the above mentioned display parameter r9732[0..1] “SI Motion velocity
resolution” can be used as a basis for the setting of the minimum limit values by the user. Double the
value displayed in r9732[0] is necessary for parameterization, so that no speed violation alarm is
triggered when the axis is stationary.
With a 2-encoder-system the value displayed for r9732 is only valid for the encoder parameterized for
SINAMICS. The speed resolution of the encoder for the NCK can vary from this value!
As already stated above, this parameter alone does not provide any information on the actual accuracy
of the speed measurement. This depends on the type of actual value sensing, the gear ratios and the
quality of the encoders used!

o Adjustment of the default machine data in the area “Saving of persistent data”.
With the values set, the number of write processes onto the CF card has been reduced on the CF card.

a) Change of the memory default values for saving persistent data on the system CF card

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<td>30</td>
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</table>

b) In order to keep the preprocess running during the Flush process, the system has been set to
asynchronous flush by default.

N18234 $MN_MM_MEMORY_CONFIG_MASK= 1

Note:
After loading the archive, the new default values remain only topical if the “old” default values are not
changed and an archive has been created with
MD11210=FF
MD11212=1.
Safety/Diagnostics: No display of the SAFE.SPF checksum
If, in SAFE.SPF, the line with the variable SAFE_CHECKSUM is not displayed in line 1, no checksum is displayed for SAFE.SPF under Safety/DIAGNOSTICS/checksums.
Solution:
; SAFE_CHECKSUM = xxxxxx
must be displayed in the first line.

SSH Port 22 on X130 interface
For security reasons, the SSH port 22 on the X130 interface is disabled in the firewall as from SW 4.7 SP1. As a consequence, the controller can no longer be accessed from external sources via this interface. This concerns, among others, Operate on PCU/IPC/PC (which uses this for several functions), WinSCP and AMM.
This port can be permanently activated in Operate (only possible on the NCU) under Commissioning -> Network -> Company network -> Change -> Checkbox “SSH (TCP/22)”, see screenshot:

Alternatively, you can make a manual entry in the file /user/system/etc/basesys.ini (such as the ports 102 and 5900 are activated).

Notes on the Toolbox V04.07.23:
With Toolbox V04.07.23 we recommend the use of STEP7 V5.5 SP4 HF7.
If no new functions from Software 4.7 are used, you need not upgrade the PLC user program to the basic program Version 4.7. PLC basic user programs Version 4.5 (or later) are functional.
When configuring an HLA hardware, you may only change telegrams as from slot (Object) 1 from 136 to 166.
S120 drives on the Profinet isochronous:
Configuring via the NCU is supported, not via the IO device.
With an isochronous alarm of the NCU, select the setting for the Ti/To mode as “fixed” rather than “in IO device”.

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Module replacement STEP7 Hardware Config:

With STEP7 5.5 SP4 HF4, you cannot replace an NCU710.3 PN by another NCU in the HW Config. We recommend that you use STEP7 5.5 SP4 HF3 (or lower).

Notes on the Toolbox V04.07.22:

Upgrading the system SW to 4.7 by using the existing PLC user-program causes a problem to arise with the Toolbox >= 4.7.21 at the call interface of the FB1 in the OB100. Inserting the new parameter "MCP_IF_TCS" results in a change to the call interface of the FB1. This causes the user to receive an error message from Step7 after inserting the blocks from the Toolbox >= 4.7.21. The error message only occurs if the OB100 is opened.
This situation has improved in Toolbox V04.07.23, the block call FB1 "RUN_UP" has to be updated once and then the call parameters are displayed without any time stamp conflict.

Mark block,
Menu Edit > Call > Update

Notes on the use of the Starter:
Starter-Version V4.4 SP1 or higher must be used.

Notes on SINUMERIK Operate:
- When using SIMATIC ITC panels, no touch softkey is available for the help function.
- The mold and die view cannot be used with POLY and G91 statements.
- The mold and die view cannot be used with BSPLINE statements.
- Only the elements 0 to max. 65534 can be displayed or changed in GUD arrays, even if the array is greater in the NC.
- Function "Programlist" without Option EES (P75):
The softkey "Program select" generates a listentry //NC:....
The double point must be deleted:
Programlist for "USER" (in operating area Program manager)
System CF /card/user/sinumerik/hmi/plc/programlist/plc_proglist_user.ppl.
Programlist für "OEM" (in operating area Setup)
System CF /card/oem/sinumerik/hmi/plc/programlist/plc_proglist_manufacturer.ppl

The OEM password is required for these modifications.
New design
A new “skin” has been added to Operate. This new skin changes the appearances of the softkeys incl. the icons on the softkeys, the appearance of the window title bars, various colors (window background colors) and the appearance / behavior of the header – the displays for the operating area and operating mode can be found on the right side of the header line and, with no alarm pending, the header only shows the Siemens logo.

The new skin can be activated via the display MD 9112 HMI_SKIN = 1. After a restart, Operate uses the new skin.

With multi-touch operation (e.g. OP015 black / OP019 black) the functions of the user interface have also been expanded. There are six function keys above the vertical softkeys which are always visible for the functions Undo, Redo, Open/close online help, Open/close virtual keyboard, Open/close calculator, Create screenshot.

We recommend a color depth of 32 bit for the new design.

At the moment, the internal Operate is operated with a color depth of 16 bit. If the color depth is to be increased to 32 bit for use with the new skin, the entry QWS_DEPTH in the [Environment] section of the run_hmi.ini file must be set to the value 32:

[Environment]
QWS_DEPTH=32

A corresponding file with the name run_hmi_colordepth32.ini is supplied in the template directory. Copy this into the /user/sinumerik/hmi/cfg directory and change the name to run_hmi.ini.
- **Cycle packages:**

CNC SW 4.7 SP2 HFx contains the following cycle packages on the CF card:
- Standard cycles (technological cycles)
- Measuring cycles
- ISO cycles
- ShopMill cycles
- ShopTurn cycles
- Grinding cycles
- AST cycles
- Adapting Cycles

All these Siemens cycles are automatically loaded into the NC during the runup of the NCU. The corresponding variables are stored in the definition file PGUD.

**Note:**
The "programGUIDE" in SINUMERIK Operate is based on the cycle packages of CNC SW 4.7 SP1. Cycle calls in part programs for these cycles cannot be recompiled or processed with the cycle support in HMI-Advanced 7.x.

For further information and notes, see siemensd/e_appendix_cycles.pdf.