

### **General notes on installation of the SINUMERIK 840Di sl software:**

#### **Required Hardware preconditions:**

SINUMERIK 840Di sl consisting of:

- PCU50.3-C 1,5 GHz / PCU50.3-P 2,0 GHz
- MC12-Board for SINUMERIK 840Di sl

The software will not operate on other hardware platforms.

#### **Software preconditions:**

Preinstalled PCU Base Software V08.00.01 or later (PCU Base Software for Windows XP SP2).

#### **Special considerations when installing from Hard disk:**

If the 840Di sl software is delivered on hard disk, the installation is automatically started when the control is switched on for the first time.

#### **Software components included:**

- SINUMERIK 840Di sl Base Software Version 04.40.09.00
- PLC Version 01.20.01.00 (PLC: 20.70.31.00, FB15: 01.04.05.00)
- HMI Base Software Version 07.03.00.00 (HMI internal: 07.30.23.00)
- HMI Base Hotfix Version 07.03.00.04 (HMI Base Hotfix internal: 07.30.23.04)
- HMI Advanced Hotfix Version 07.03.00.04 (HMI Advanced Hotfix internal: 07.30.23.04)
- PLC Toolbox CD Version 01.04.05.00
- SinuComNC Version 07.03.00.01 (SinuComNC internal: 07.30.08.00)
- NCK Version 01.30.08.00 (NCK: 67.05.04)
- PCU Base ServicePack Version 08.00.02.00 (PCU Base ServicePack internal: 08.00.31.00)
- PCU Base Hotfix Version 08.00.02.05 (PCU Base Hotfix internal: 08.00.31.11)
- ShopMill Version 07.20.05.00
- ShopTurn Version 07.20.11.00

#### **Important Notes**

- 1.) New functionality in SINUMERIK 840Di sl SW 01.04.00.00
- 2.) Compatibility
- 3.) Modifications for Setup
- 4.) SW licensing
- 5.) Tips and tricks
- 6.) General restrictions compared to catalogue and documentation
- 7.) Software installation from CD Rom via network connection
- 8.) Notes on ShopMill
- 9.) Notes on ShopTurn

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1) New functionality in SINUMERIK 840Di sl SW 01.04.00.00

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- SINUMERIK 840Di sl SW 01.04.00.00 supports ADI4
- SINUMERIK 840Di sl SW 01.04.00.00 can be used with ShopMill 7.2 and ShopTurn 7.2
- SINUMERIK 840Di sl SW 01.04.00.00 supports Ethernet MCP
- faster access by using changed SRAM access method
- SINUMERIK 840Di sl SW 01.04.00.00 supports Step7 and STARTER the control

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2) Compatibility

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- SINUMERIK 840Di sl SW 01.04.00.00 will only run with MCI2 board (for 840Di sl) and Windows XP
- SINUMERIK 840Di sl SW 01.04.00.00 is compatible with HMI Advanced 07.03.00.04 (Please refer to chapter 5, Tips and tricks and the compatibility list).
- SINUMERIK 840Di sl SW 01.04.00.00 is compatible with SIMATIC Step 7 for SINUMERIK Hardware V5.4 SP2.
- SINUMERIK 840Di sl SW 01.04.00.00 is compatible with SINAMICS 2.4. SINAMICS 2.3 can not be used.
- For Details please refer to the compatibility list.

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### 3) Modifications for Setup

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#### **Conversion of existing NC/PLC Archives.**

When converting from 840Di SW 3.x, it is necessary to create a new PLC hardware configuration by using the latest Version of "PLC Base program" (Toolbox V1.3.1).

Further information can be found in the 840Di sl manual.

#### **Communication Settings.**

Generally for communication from outside the PCU between HMI or engineering system (Step 7, Starter) and NC/PLC/drives Ethernet (also local HMI installed on PCU50) is used. Therefore, the program F:\mmc2\cp\_840di.exe must be running. Cp\_840di.exe is started automatically. Step7/STARTER installed on PCU based on Ethernet communication too. After installation of Step7/STARTER the interfaces in "PG/PC-interface" has to be changed. The access points s7online, Starter and SINUMERIK-CP must be set to Ethernet board (TCP/IP –Y Via R....) For local communication, also localhost address (127.0.0.1) is possible. These modifications must be done to connect from outside off the control. All other HMI application communicate via fast internal connection. All communication settings for SINUMERIK 840Di sl were done during installation.

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### 4) SW licensing

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The application of the SINUMERIK 840Di sl system software and its relevant options requires that the software licenses acquired are assigned for the hardware used.

This assignment is carried out via the Internet. You need the Certificate of License (CoL) for all licenses you want to assign. When entering the assignment data, you will receive a "License Key" linking the software and its options to the hardware.

You can easily set and activate the options and enter the "License Key" via the SinuCom NC operator interface. Without a valid "License Key", the control cyclically generates an alarm.

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## 5) Tips and tricks

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The PLC Toolbox is to be installed on the PC with Step7 which is used for programming the PLC for SINUMERIK 840Di sl SW 01.04.00.00. Drive OM is no longer required.

You can find Step7 example projects in "D:\setups\apps\001\000\support\840dismp\" on HD and in "\support\840dismp\" on CD.

840disl_tb145_DPMCP.zip	for using a PROFIBUS machine control panel
840disl_tb145_ETHMCP.zip	for using a PEthernet machine control panel
840disl_tb145_ETHMCP_HT8.zip	for using a PEthernet machine control panel with HT8

for using a PROFIBUS-machine control panel in  
„D:\setups\apps\001\000\support\840dismp\840Di\_sl\_DPMCP\_smpl.zip“ on HD and in  
“\support\840dismp\840Di\_sl\_DPMCP\_smpl.zip “ on CD.

If you intend to use HMI Advanced on your 840Di, you will need Version 7.3.HF4, 7.3.1 SP1 or later.

Fast SRAM access is activated by default, but can be activated or deactivated in 849Di-Startup or HMI HMI-Advanced in Dialog NC/PLC-Diagnosis.

### **Machine data settings for ADI4**

For compatibility with ADI4 drives you have to set the general machine data 13070[..  
Drive\_Function\_mask = 80FH for the corresponding drive.

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## 6) General restrictions compared to catalogue and documentation

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- The PLC configuration has to be loaded also into the CP and afterwards the NCK has to be reset. If the subnet-ID has to be changed in the configuration (e. g. another project), the CP and HMI Advanced have to be stopped and restarted again. It is preferred to reboot the 840Di sl in this case.

- Important information for HD image compatibility:

The PCU50.3 will be shipped with a new revision of the main board, recognizable with type label VERS\_GRBG. If an image created on PCU50.3 with a main board revision VERS\_GRBG <=3 should be loaded on a PCU50.3 with a main board revision VERS\_GRBG =>04, it is required, that the image is created under PCU Base 8.0 SP1 (V08.00.01.00). In order to do this, the PCU50.3 VERS\_GRBG <=3 has to be updated to PCU Base 08.00 SP1 and the image has to be created again. Afterwards this image can be loaded on a PCU50.3 VERS\_GRBG =>04. Please read also the installation guide of PCU Base 08.00 SP1.

Important: After restoring the image on the new PCU50.3 a HW detection will be performed by Windows XP. During this time, the mouse can not be used and a message window will appear. As soon as the mouse is operating again, the message can be acknowledged. Afterwards the PCU50.3 has to be switched off and on again.

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## 7) Software installation from CD Rom via network connection

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This type of installation requires a network connection of the PCU50 in order to transfer data directly to the hard disk of your PCU50.

Detailed information how to set up such a connection is to be found in the 840Di sl Manual chapter 15. The software to be installed is then copied to the directory D:\INSTALL on the PCU50 and will be installed automatically.

Alternatively:

The network connection is established under the Win desktop and the installation performed directly by calling SETUP.EXE from the supplied CD.

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## 8) Notes on ShopMill

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### **General:**

Update in metric system of measurement only!

The "Work step programming" option is necessary so that ShopMill programs can be created.

### **Machine data for ShopMill:**

The file CMM.8x0 no longer exists, hence the listing of the machine data here. An overview is provided under the Tool operating area => Extended softkey bar => Machine data softkey.

N10134 \$MN_MM_NUM_MMC_UNITS=6	;minimum
N10260 \$MN_CONVERT_SCALING_SYSTEM=1	;exact
N10602 \$MN_FRAME_GEOAX_CHANGE_MODE=1	;exact
N10610 \$MN_MIRROR_REF_AX=0	;exact
N10700 \$MN_PREPROCESSING_LEVEL='H25'	;exact: bit0=1, bit2=1, bit5=1
N10702 \$MN_IGNORE_SINGLEBLOCK_MASK='H10'	;exact: bit4=1
N10714 \$MN_M_NO_FCT_EOP=32	;variable
N10715 \$MN_M_NO_FCT_CYCLE[0]=6	;variable
N10716 \$MN_M_NO_FCT_CYCLE_NAME[0]="L6"	;variable
N10722 \$MN_AXCHANGE_MASK='H4'	;exact: bit2=1
N10735 \$MN_JOG_MODE_MASK='H1'	;exact: bit0=1
N11270 \$MN_DEFAULT_VALUES_MEM_MASK='H1'	;exact: bit0=1
N11410 \$MN_SUPPRESS_ALARM_MASK='H7'	;exact: bit0=1, bit1=1, bit2=1
N11415 \$MN_SUPPRESS_ALARM_MASK_2='H20'	;exact: bit5=1
N11450 \$MN_SEARCH_RUN_MODE='H7'	;exact: bit0=1, bit1=1, bit2=1
N11604 \$MN_ASUP_START_PRIO_LEVEL=1	;minimum
N17530 \$MN_TOOL_DATA_CHANGE_COUNTER='HF'	;exact: bit0=1, bit1=1, bit2=1, bit3=1
N18080 \$MN_MM_TOOL_MANAGEMENT_MASK='HB'	;exact: bit0=1, bit1=1, bit3=1
N18088 \$MN_MM_NUM_TOOL_CARRIER=1	;minimum
N18118 \$MN_MM_NUM_GUD_MODULES=7	;minimum
N18120 \$MN_MM_NUM_GUD_NAMES_NCK=20	;minimum
N18130 \$MN_MM_NUM_GUD_NAMES_CHAN=250	;minimum
N18150 \$MN_MM_GUD_VALUES_MEM=50	;minimum
N18160 \$MN_MM_NUM_USER_MACROS=30	;minimum
N18170 \$MN_MM_NUM_MAX_FUNC_NAMES=160	;minimum
N18180 \$MN_MM_NUM_MAX_FUNC_PARAM=2000	;minimum
N18280 \$MN_MM_NUM_FILES_PER_DIR=400	;minimum
N18320 \$MN_MM_NUM_FILES_IN_FILESYSTEM=400	;minimum
N20110 \$MC_RESET_MODE_MASK='H4041'	;exact: bit0=1, bit6=1, bit14=1
N20112 \$MC_START_MODE_MASK='H400'	;exact: bit10=1
N20126 \$MC_TOOL_CARRIER_RESET_VALUE=0	;variable
N20128 \$MC_COLLECT_TOOL_CHANGE=0	;exact
N20130 \$MC_CUTTING_EDGE_RESET_VALUE=1	;exact
N20150 \$MC_GCODE_RESET_VALUES[15]=3	;exact
N20150 \$MC_GCODE_RESET_VALUES[41]=1	;exact
N20150 \$MC_GCODE_RESET_VALUES[51]=2	;exact
N20150 \$MC_GCODE_RESET_VALUES[52]=1	;variable (1=normal, >1 for Hirth-swivelheads)

N20152 \$MC_GCODE_RESET_MODE[5]=1	;exact
N20152 \$MC_GCODE_RESET_MODE[7]=1	;exact
N20152 \$MC_GCODE_RESET_MODE[12]=0	;exact
N20202 \$MC_WAB_MAXNUM_DUMMY_BLOCKS=10	;minimum
N20240 \$MC_CUTCOM_MAXNUM_CHECK_BLOCKS=4	;exact
N20250 \$MC_CUTCOM_MAXNUM_DUMMY_BLOCKS=5	;exact
N20310 \$MC_TOOL_MANAGEMENT_MASK='H80400B'	;exact: bit0,1,3,14,23=1
N20320 \$MC_TOOL_TIME_MONITOR_MASK='H1'	;exact: bit0=1
N20734 \$MC_EXTERN_FUNCTION_MASK='H8'	;exact: bit3=1
N22550 \$MC_TOOL_CHANGE_MODE=1	;exact
N22560 \$MC_TOOL_CHANGE_M_CODE=206	;variable
N21100 \$MC_ORIENTATION_IS_EULER=0	;exact
N24006 \$MC_CHSFRAME_RESET_MASK='H11'	;exact: bit0=1, bit4=1, bit5=0
N24007 \$MC_CHSFRAME_RESET_CLEAR_MASK='H20'	;exact: bit0=0, bit5=1
N24008 \$MC_CHSFRAME_POWERON_MASK='H0'	;exact: bit0=0, bit5=0
N24805 \$MC_TRACYL_ROT_AX_FRAME_1=1	;exact
N24855 \$MC_TRACYL_ROT_AX_FRAME_2=1	;exact
N27860 \$MC_PROCESSTIMER_MODE='H33'	;exact: bit0=1, bit1=1, bit4=1, bit5=1
N27880 \$MC_PART_COUNTER='H101'	;variable
N28000 \$MC_MM_REORG_LOG_FILE_MEM=75	;minimum
N28010 \$MC_MM_NUM_REORG_LUD_MODULES=20	;minimum
N28020 \$MC_MM_NUM_LUD_NAMES_TOTAL=800	;minimum
N28040 \$MC_MM_LUD_VALUES_MEM=200	;minimum
N28082 \$MC_MM_SYSTEM_FRAME_MASK='H3D'	;exact: bit0=1, bit2=1, bit3=1, bit4=1, bit5=1
N28083 \$MC_MM_SYSTEM_DATAFRAME_MASK='H1F'	;exact: bit0=1, bit5=0, bit6=0
N28400 \$MC_MM_ABSBLOCK=1	;exact
N28402 \$MC_MM_ABSBLOCK_BUFFER_CONF[0]=2	;exact
N28402 \$MC_MM_ABSBLOCK_BUFFER_CONF[1]=4	;exact
N28450 \$MC_MM_TOOL_DATA_CHG_BUFF_SIZE=80	;minimum
N28560 \$MC_MM_SEARCH_RUN_RESTORE_MODE='H1'	;exact: bit0=1
N35040 \$MA_SPIND_ACTIVE_AFTER_RESET[?]=2	;exact, ?= axis index for tool spindle
N42440 \$SC_FRAME_OFFSET_INCR_PROG=0	;exact
N42442 \$SC_TOOL_OFFSET_INCR_PROG=0	;exact
N42528 \$SC_CUTCOM_DECEL_LIMIT=0.1	;variable
N42980 \$SC_TOFRAME_MODE=2000	;exact

**Recent additions to range of display machine data:**

**N9718 \$MM\_CMM\_OPTION\_MASK\_2='H200'** ;mask out variable MD  
overview

N9739 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_1\_ON  
N9740 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_1\_OFF  
N9741 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_2\_ON  
N9742 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_2\_OFF  
N9743 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_3\_ON  
N9744 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_3\_OFF  
N9745 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_4\_ON  
N9746 \$MM\_CMM\_M\_CODE\_TOOL\_FUNC\_4\_OFF

When the software is updated, the display machine data are not overwritten with default values. They must therefore be checked according to the Description of Functions.

For using ShopMill and ShopTurn on 840Di sl SW 1.1 you have to set the following machine data in addition:

- For precompiled cycles:  
18351 \$MN\_MM\_DRAM\_FILE\_MEM\_SIZE = 2000
- For spindle load meter:  
With Simodrive 611U and default Profibus telegram you have to set bit 10 in display machine data 9719 (read spindle load from drive).  
Otherwise it is necessary to use free Profibus telegram configuration (optional)

With Sinamics Profibus telegram you have to set bit 10 in display machine data 9719 to 0 (read spindle load from drive). In this case the spindle load will be transferred via Profibus telegram 116 and processed in the 840Di sl.

#### **PLC interface:**

The ShopMill PLC is dispensed with. The adjustment of the interface signals is described in the ShopMill Description of Functions, in Chapter 6.

In the OB100, during the FB1 call, the parameter MMCToIF = True (transfer of the MMC signals to the interface...operating types, program influence) must be set. If the parameter is not set to TRUE, no operating mode change commands (on program selection) or program controls (program test, dryrun...) can be implemented via the interface.

#### **Installation/upgrade on PCU50.3:**

Requirements:

If you wish to install ShopMill on the PCU 50.3, the HMI Advanced software (see SINUMERIK 840D sl compatibility list for version) must already be installed on the PCU 50.3. The internal HMI must be deactivated via WINS CP. Call point "Open Terminal" under Commands. You can now run the command sc disable hmi or sc enable hmi in the command line.

In addition, check the version of the cycle support. The cycle support files for the measuring cycles (MCSUPP.ARC) and standard cycles (SCSUPP.ARC) are stored under Archive\Cycle archives.

#### **Installation/software upgrade with USB on PCU 50.3**

Copy the contents to any directory of the USB hardware (stick; card reader; etc.).

Power up the PCU50 at the desktop.

Power on the PCU50, press key "3" when the message with the PCU Base Software version is displayed (e.g. V08.xx.xx.xx) and enter the password (e.g. SUNRISE).

Connect the USB hardware to the USB front connection of the OP, for example.

After WIN-XP has recognized the hardware, copy the directory contents to D:\INSTALL.

Installing the software:

Power OFF/ON the PCU50. The software is installed automatically when the PCU software is powered up or when SETUP.EXE is called from directory D:\INSTALL.

Call SETUP.EXE during installation to delete the contents of D:\INSTALL prior to PCU50 power OFF in order to avoid duplication of the installation after PCU50 power OFF/ON.



### **Installation/software upgrade on PCU 50.3 via network**

This installation method can be used only if the PCU50 has an existing network link which allows data to be transferred directly to the PCU50 hard disk.

Copy the contents to any directory of a networked PC/PG.

Power up the PCU50 at the desktop.

Power on the PCU50, press key "3" when the message with the PCU Base Software version is displayed (e.g. V08.xx.xx.xx) and enter the password (e.g. SUNRISE).

Then copy all files from the installation package via network to D:\INSTALL of the PCU50.

Installing the software:

Power OFF/ON the PCU50. The software is installed automatically when the PCU software is powered up or when SETUP.EXE is called from directory D:\INSTALL.

Call SETUP.EXE during installation to delete the contents of D:\INSTALL prior to PCU50 power OFF in order to avoid duplication of the installation after PCU50 power OFF/ON.

### **Procedure for NCK update:**

- Save GUD (Global User Data) (NC Active Data => User Data => User Data Complete => Data Out in Archive)

- Create NCK and PLC archives; to do this, switch PLC to stop and back up display machine data

- Load / insert current NCK

- Perform a general reset

- Read in NCK and PLC archives

- Adapt machine data, take note of alarm 4400 if it is displayed!

- Unload / delete definitions

- Cycles and definitions from ShopMill with HMI on NCU:

Read in the Define archives from the Services\Cycle archive\Standard cycles\defines.arc, Swquencer cycles\sm\_def\_e.arc and Measuring cycles\defines.arc and activate the definitions (SMAC.DEF, GUD5.DEF, GUD6.DEF and GUD7.DEF).

Read in the Cycle archives from Services\Cycle Archive\Standard cycles\cycles.arc, sequence cycles\sm\_cyc\_e.arc, Measuring cycles\mcycles.arc & jogmcyc.arc.

- Cycles and definitions from ShopMill with PCU 50.3:

Read in the Define archive from Services\Archive area SM\_DEF.ARC. Load the definitions (GUD7\_JS.DEF, GUD7\_MC.DEF, GUD7\_SC.DEF, GUD7\_SM.DEF, SMAC\_SC.DEF and SMAC\_SM.DEF) and activate definitions SMAC.DEF, GUD5.DEF, GUD6.DEF and GUD7.DEF.

Read in the Cycle archive from Services\Archive area SM\_CYC.ARC and load the cycles to the manufacturer and standard cycles directory if necessary.

(Attention: adapt cycles CYCLE198.SPF and CYCLE199.SPF if necessary after consultation with the machine manufacturer).

- Read in GUD data (Data In => from archive)

- Reset the NCK

- Delete workpiece TEMP

The system cycle "Prog\_Event" is used by the standard cycles and by ShopMill. If

"Prog\_Event" is also required to implement user functions, it must be ended by means of the M function from machine data N10714 \$MN\_M\_NO\_FCT\_EOP. If you create a cycle with the name CYCPE1US.SPF or CYCPE1MA.SPF, it will be called before the Siemens calls in Prog\_Event. If you create a cycle with the name CYCPE\_US.SPF or CYCPE\_MA.SPF, it will be called after the Siemens calls. These cycles can be stored under User cycles or OEM cycles, as "Prog\_Event" is overwritten in the OEM cycle directory during upgrading.

**Restrictions which apply to ShopMill:**

- A successful machine test (segment-specific test according to acceptance protocol) is required for the release of the following function:
  - Automatic measuring systems for tool measuring
- When 0 is entered for the setup feedrate in ShopMill under "Settings", the axes will traverse at the velocity specified in machine data 32020.
- You can only use a TOA area.

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## 9) Notes on ShopTurn

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### **General:**

Update in metric system of measurement only!

The "Machining step programming" option is required to create ShopTurn programs.

Tool type Stop has been assigned number 730. Number 750 was used for the Stop tool in ShopTurn before. The change represents an adaptation to HMI Advanced.

### **Machine data for ShopTurn:**

File ST.8x0 is no longer existing, therefore the machine data are listed here. An overview is provided under the Tool operating area => Extended softkey bar => Machine data softkey.

N10134 \$MN_MM_NUM_MMC_UNITS=6	;minimum
N10260 \$MN_CONVERT_SCALING_SYSTEM=1	;exact
N10602 \$MN_FRAME_GEOAX_CHANGE_MODE=1	;exact
N10610 \$MN_MIRROR_REF_AX=0	;exact
N10700 \$MN_PREPROCESSING_LEVEL='H25'	;exact: bit0=1, bit2=1, bit5=1
N10702 \$MN_IGNORE_SINGLEBLOCK_MASK='H10'	;exact: bit4=1
N10714 \$MN_M_NO_FCT_EOP=32	;variable
N10722 \$MN_AXCHANGE_MASK='H4'	;exact: bit2=1
N10735 \$MN_JOG_MODE_MASK='H1'	;exact: bit0=1
N11270 \$MN_DEFAULT_VALUES_MEM_MASK='H1'	;exact: bit0=1
N11346 \$MN_HANDWH_TRUE_DISTANCE=2	;variable
N11410 \$MN_SUPPRESS_ALARM_MASK='H1007'	;exact: bit0=1, bit1=1, bit2=1, bit12=1
N11415 \$MN_SUPPRESS_ALARM_MASK_2='H20'	;exact: bit5=1
N11450 \$MN_SEARCH_RUN_MODE='H7'	;exact: bit0=1, bit1=1, bit2=1
N11470 \$MN_REPOS_MODE_MASK='H8'	;exact: bit3=1
N11604 \$MN_ASUP_START_PRIO_LEVEL=1	;minimum
N17530 \$MN_TOOL_DATA_CHANGE_COUNTER='HF'	;exact: bit0=1, bit1=1, bit2=1, bit3=1
N18080 \$MN_MM_TOOL_MANAGEMENT_MASK='HB'	;exact: bit0=1, bit1=1, bit3=1
N18118 \$MN_MM_NUM_GUD_MODULES=7	;minimum
N18120 \$MN_MM_NUM_GUD_NAMES_NCK=20	;minimum
N18130 \$MN_MM_NUM_GUD_NAMES_CHAN=300	;minimum
N18150 \$MN_MM_GUD_VALUES_MEM=120	;minimum
N18160 \$MN_MM_NUM_USER_MACROS=30	;minimum
N18170 \$MN_MM_NUM_MAX_FUNC_NAMES=200	;minimum
N18180 \$MN_MM_NUM_MAX_FUNC_PARAM=3000	;minimum
N18280 \$MN_MM_NUM_FILES_PER_DIR=400	;minimum
N18320 \$MN_MM_NUM_FILES_IN_FILESYSTEM=400	;minimum
N20090 \$MC_SPIND_DEF_MASTER_SPIND=? spindle number from MD35000	;exact ?= master
N20110 \$MC_RESET_MODE_MASK='H04041'	;exact: bit0=1, bit6=1, bit14=1, bit16=0

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N20112 $MC_START_MODE_MASK='H400' ;exact: bit10=1
N20128 $MC_COLLECT_TOOL_CHANGE=0 ;exact
N20130 $MC_CUTTING_EDGE_RESET_VALUE=1 ;exact
N20150 $MC_GCODE_RESET_VALUES[5]=2 ;exact
N20150 $MC_GCODE_RESET_VALUES[15]=3 ;variable
N20150 $MC_GCODE_RESET_VALUES[48]=3 ;variable
N20152 $MC_GCODE_RESET_MODE[5]=0 ;exact
N20152 $MC_GCODE_RESET_MODE[7]=1 ;exact
N20152 $MC_GCODE_RESET_MODE[12]=0 ;exact
N20152 $MC_GCODE_RESET_MODE[14]=1 ;exact
N20152 $MC_GCODE_RESET_MODE[15]=0 ;exact
N20202 $MC_WAB_MAXNUM_DUMMY_BLOCKS=10 ;minimum
N20240 $MC_CUTCOM_MAXNUM_CHECK_BLOCKS=4 ;exact
N20250 $MC_CUTCOM_MAXNUM_DUMMY_BLOCKS=5 ;exact
N20310 $MC_TOOL_MANAGEMENT_MASK='H81400B' ;exact: bit0, 1, 3, 14, 16,
23=1
N20320 $MC_TOOL_TIME_MONITOR_MASK='H1' ;exact: bit0=1
N20734 $MC_EXTERN_FUNCTION_MASK='H8' ;exact: bit3=1
N24006 $MC_CHSFRAME_RESET_MASK='H1' ;exact: bit0=1,
bit5=0
N24007 $MC_CHSFRAME_RESET_CLEAR_MASK='H20' ;exact: bit0=0, bit5=1
N24008 $MC_CHSFRAME_POWERON_MASK='H0' ;exact: bit0=0,
bit5=0
N24040 $MC_FRAME_ADAPT_MODE='H7' ;exact: bit0=1,
bit1=1, bit2=1
N24805 $MC_TRACYL_ROT_AX_FRAME_1=2 ;exact
N24855 $MC_TRACYL_ROT_AX_FRAME_2=2 ;exact *1)
N24905 $MC_TRANSMIT_ROT_AX_FRAME_1=2 ;exact
N24911 $MC_TRANSMIT_POLE_SIDE_FIX_1=1 ;exact
N24955 $MC_TRANSMIT_ROT_AX_FRAME_2=2 ;exact *1)
N24961 $MC_TRANSMIT_POLE_SIDE_FIX_2=1 ;exact *1)
N27100 $MC_ABSBLOCK_FUNCTION_MASK='H1' ;exact: bit0=1
N27860 $MC_PROCESSTIMER_MODE='H33' ;exact: bit0=1,
bit1=1, bit4=1, bit5=1
N27880 $MC_PART_COUNTER='H101' ;variable
N28000 $MC_MM_REORG_LOG_FILE_MEM=75 ;minimum
N28010 $MC_MM_NUM_REORG_LUD_MODULES=20 ;minimum
N28020 $MC_MM_NUM_LUD_NAMES_TOTAL=1000 ;minimum
N28040 $MC_MM_LUD_VALUES_MEM=200 ;minimum
N28082 $MC_MM_SYSTEM_FRAME_MASK='H61' ;exact: bit0=1,
bit5=1, bit6=1
N28083 $MC_MM_SYSTEM_DATAFRAME_MASK='H1F' ;exact: bit0, 1, 2, 3, 4=1,
bit5=0, bit6=0
N28400 $MC_MM_ABSBLOCK=1 ;exact
N28402 $MC_MM_ABSBLOCK_BUFFER_CONF[0]=2 ;exact
N28402 $MC_MM_ABSBLOCK_BUFFER_CONF[1]=4 ;exact
N28450 $MC_MM_TOOL_DATA_CHG_BUFF_SIZE=80 ;minimum
N28560 $MC_MM_SEARCH_RUN_RESTORE_MODE='H1' ;exact: bit0=1
N32084 $MA_HANDWH_STOP_COND[?]=0xFF ;variable for X, Z and Y,
if required
N35035 $MA_SPIND_FUNCTION_MASK[?]='H110' ;exact: bit10=0,
?= axis index main spindle

```

N35035 \$MA_SPIND_FUNCTION_MASK[?]='H110'	;exact: bit10=0,
?= axis index counterspindle *1)	
N35035 \$MA_SPIND_FUNCTION_MASK[?]='H110'	;exact: bit10=0,
?= axis index tool spindle *2)	
N35040 \$MA_SPIND_ACTIVE_AFTER_RESET[?]=2	;exact, ?= axis
index for main spindle	
N35040 \$MA_SPIND_ACTIVE_AFTER_RESET[?]=2	bit10=0, ?= axis
index for counterspindle *1)	
N35040 \$MA_SPIND_ACTIVE_AFTER_RESET[?]=2	;exact, ?= axis
index for tool spindle *2)	
N37050 \$MA_FIXED_STOP_ALARM_MASK[?]=2	;exact, ?= axis index for
4 <sup>th</sup> axis *1)	
N41100 \$SN_JOG_REV_IS_ACTIVE=0x0E	;variable *3)
N42440 \$SC_FRAME_OFFSET_INCR_PROG=0	;exact
N42442 \$SC_TOOL_OFFSET_INCR_PROG=0	;exact
N42528 \$SC_CUTCOM_DECEL_LIMIT=0.1	;variable
N42940 \$SC_TOOL_LENGTH_CONST=18	;exact
N42950 \$SC_TOOL_LENGTH_TYPE=2	;exact
N42600 \$SC_JOG_FEED_PER_REV_SOURCE=0	;exact: 0;-3 Default: 0 *3)
N43300 \$SA_ASSIGN_FEED_PER_REV_SOURCE=0	;exact: 0;-3
default: 0 for X, Z and Y, if required *3)	

\*1) with counterspindle only

\*2) with tool spindle only

\*3) with Manual Machine option only

#### **Recent additions to range of display machine data:**

N9428 \$MM_MA_SPIND_MAX_POWER=100	;variable
N9429 \$MM_MA_SPIND_POWER_RANGE=200	;variable
N9718 \$MM_CMM_OPTION_MASK_2='H200'	;mask out
variable MD overview	
N9729 \$MM_CMM_G_CODE_TOOL_CHANGE_PROG=-	;variable
N9777 \$MM_CMM_ENABLE_TIME_DISPLAY='H7F'	;variable
N9836 \$MM_ST_TAILSTOCK_DIAM=0	;variable
N9837 \$MM_ST_TAILSTOCK_LENGTH=0	;variable
N9838 \$MM_ST_BORDER_TOOL_LEN_X_REV_2=0	;variable, >0 for 2
tool holders only	
N9897 \$MM_ST_OPTION_MASK_MAN_FUNC=0	;variable
N9899 \$MM_ST_TRACE=0	;variable

When the software is upgraded, the already existing display machine data are not initialized with defaults. For this reason, they should be checked according to the Description of Functions.

#### **Machine data for a second tool holder on the X axis:**

- A tool length, where the tools start to be located on a 2<sup>nd</sup> turret is defined through a display machine data (= = no 2<sup>nd</sup> turret available): 9838  
\$MM\_ST\_BORDER\_TOOL\_LEN\_X\_REV\_2
- For a proper function of the TNRC in the mirrored coordinate system CUT2DF must always be selected: (is set automatically in F\_HEAD)  
20150 \$MC\_GCODE\_RESET\_VALUES[21]=2 ; exact  
20152 \$MC\_GCODE\_RESET\_MODE[21]=0 ; exact
- The following MD must be set so that LIFTFAST (thread cutting retraction) also reacts to the mirror:  
21202 \$MC\_LIFTFAST\_WITH\_MIRROR = 1 ; exact
- WPFrames are required for mirrors and offsets:  
24006 \$MC\_CHSFRAME\_RESET\_MASK Bit 4=1 (=H11)  
24007 \$MC\_CHSFRAME\_RESET\_CLEAR\_MASK Bit 4=0 (=H00)  
28082 \$MC\_MM\_SYSTEM\_FRAME\_MASK Bit 4=1 (=H31)  
28083 \$MC\_MM\_SYSTEM\_DATAFRAME\_MASK Bit 4=1 (=H1F)
- Tool wear must be mirrored as well:  
42910 \$SC\_MIRROR\_TOOL\_WEAR = 1 ; exact

For using ShopMill and ShopTurn on 840Di sl SW 1.1 you have to set the following machine data in addition:

- For precompiled cycles: 18351 \$MN\_MM\_DRAM\_FILE\_MEM\_SIZE = 2000
- For spindle load meter:  
With Simodrive 611U and default Profibus telegram you have to set bit 10 in display machine data 9719 (read spindle load from drive).  
Otherwise it is necessary to use free Profibus telegram configuration (optional)  
  
With Sinamics Profibus telegram you have to set bit 10 in display machine data 9719 to 0 (read spindle load from drive). In this case the spindle load will be transferred via Profibus telegram 116 and processed in the 840Di sl.

**PLC interface:**

The ShopTurn PLC is omitted. The adaptation of the interface signals is described in the description of functions for ShopTurn provided in chapter 6.

In the OB100, during the FB1 call, the parameter MMCToIF = True (transfer of the MMC signals to the interface...operating types, program influence) must be set. If the parameter is not set to TRUE, no operating mode change commands (on program selection) or program controls (program test, dryrun...) can be implemented via the interface.

The manual tool function (e.g. for multifix holder) can be used under the following conditions:

N22550 TOOL\_CHANGE\_MODE = 0

N22562 TOOL\_CHANGE\_ERROR\_MODE ='H2'

The interface signals in the PLC behave as follows:

- Changing from T0 to a tool from the turret and vice versa activates DB73
- Changing from T0 to a manual tool and vice versa activates DB72 with loading/unloading the manual tool
- Changing from a tool from the turret to a manual tool first activates DB73 with T0 and then DB72 with loading of manual tool
- Changing from a manual tool to a tool from the turret activates DB73 with unloading manual tool (DBX 4.6)

PLC sample modules are available in the tool box under  
\\8x0d\ShopMill\_Turn\ShopTurn\tm\_rev\_xy.awl.

**Installation/upgrade on PCU50.3:**

Requirements:

If you wish to install ShopTurn on the PCU 50.3, the HMI Advanced software (see SINUMERIK 840D sl compatibility list for version) must already be installed on the PCU 50.3. The internal HMI must be deactivated via WINS CP. Call point "Open Terminal" under Commands. You can now run the command sc disable hmi or sc enable hmi in the command line.

In addition, check the version of the cycle support. The cycle support files for the measuring cycles (MCSUPP.ARC) and standard cycles (SCSUPP.ARC) are stored under Archive\Cycle archives.

**Installation/software upgrade with USB on PCU 50.3**

Copy the contents to any directory of the USB hardware (stick; card reader; etc.).

Power up the PCU50 at the desktop.

Power on the PCU50, press key "3" when the message with the PCU Base Software version is displayed (e.g. V08.xx.xx.xx) and enter the password (e.g. SUNRISE).

Connect the USB hardware to the USB front connection of the OP, for example.

After WIN-XP has recognized the hardware, copy the directory contents to D:\INSTALL.

Installing the software:

Power OFF/ON the PCU50. The software is installed automatically when the PCU software is powered up or when SETUP.EXE is called from directory D:\INSTALL.

Call SETUP.EXE during installation to delete the contents of D:\INSTALL prior to PCU50 power OFF in order to avoid duplication of the installation after PCU50 power OFF/ON.

### **Installation/software upgrade on PCU 50.3 via network**

This installation method can be used only if the PCU50 has an existing network link which allows data to be transferred directly to the PCU50 hard disk.

Copy the contents to any directory of a networked PC/PG.

Power up the PCU50 at the desktop.

Power on the PCU50, press key "3" when the message with the PCU Base Software version is displayed (e.g. V08.xx.xx.xx) and enter the password (e.g. SUNRISE).

Then copy all files from the installation package via network to D:\INSTALL of the PCU50.

Installing the software:

Power OFF/ON the PCU50. The software is installed automatically when the PCU software is powered up or when SETUP.EXE is called from directory D:\INSTALL.

Call SETUP.EXE during installation to delete the contents of D:\INSTALL prior to PCU50 power OFF in order to avoid duplication of the installation after PCU50 power OFF/ON.

### **Procedure for NCK update:**

- Save GUD (Global User Data) (NC Active Data => User Data => User Data Complete => Data Out in Archive)
- Create NCK and PLC archives; to do this, switch PLC to stop and back up display machine data
- Load / insert current NCK
- Perform a general reset
- Read in NCK and PLC archives
- Adapt machine data, take note of alarm 4400 if it is displayed!
- Unload / delete definitions
- Cycles and definitions from ShopTurn with HMI on NCU:  
Read in the Define archives from Services\Cycle Archive area standard cycles\defines.arc, sequence cycles\st\_def\_e.arc, measuring cycles\defines.arc. Activate definitions (SMAC.DEF, GUD5.DEF, GUD6.DEF and GUD7.DEF)  
Read in the Cycle archives from Services\Cycle Archive standard cycles\cycles.arc, sequence cycles\st\_cyc\_e.arc, measuring cycles\mcycles.arc.
- Cycles and definitions from ShopTurn with PCU 50.3:  
Read in the Define archive from Services\Archive area ST\_DEF.ARC. Load definitions (GUD7\_JS.DEF, GUD7\_MC.DEF, GUD7\_SC.DEF, GUD7\_ST.DEF, SMAC\_SC.DEF and SMAC\_ST.DEF) and activate definitions SMAC.DEF, GUD5.DEF, GUD6.DEF and GUD7.DEF.  
Read in the cycle archive from Services\Archives\ST\_CYC.ARC and load the cycles to the manufacturer and standard cycles directory if necessary

(Attention: Adapt cycles ST\_CUST.SPF(cyccust\_gr.arc), CYCLE198.SPF and CYCLE199.SPF if necessary after consultation with the machine manufacturer).

- Read in GUD data (Data In => from archive)
- Reset the NCK
- Delete workpiece TEMP

System cycle "Prog\_Event" is utilized by the standard cycles and by ShopTurn. If "Prog\_Event" is also required to implement user functions, it must be ended by means of the M function from machine data N10714 \$MN\_M\_NO\_FCT\_EOP. If you create a cycle with the name CYCPE1US.SPF or CYCPE1MA.SPF, it will be called before the Siemens calls in Prog\_Event. If you create a cycle with the name CYCPE\_US.SPF or CYCPE\_MA.SPF, it will be called after the Siemens calls. These cycles can be stored under User cycles or OEM cycles, as "Prog\_Event" is overwritten in the OEM cycle directory during upgrading.



**Restrictions which apply to ShopTurn:**

- A machine test (segment-specific test according to acceptance protocol) is required for the release of the following functions:
  - Automatic measuring systems for tool measuring
- You can only use a TOA area.
- T=location number exclusively refers to the first turret / tool holder.
- The active location is not displayed with two turrets.
- The Manual Machine option does not support any counterspindle.
- For the manual machine version, a 0 can be entered in the feed field mm/rot or mm/min. The axes will in this case traverse using the data of axis machine data 32020 or 32050.
- This behavior occurs in ShopTurn when 0 is entered for setup feed rate under "Settings".