SIEMENS

Manufacturer's Declaration

Nr. / No. SINUMERIK_840D_sl_668.DCOA0517.40.047

Manufacturer:	SIEMENS Aktiengesellschaft
Address:	SIEMENS Aktiengesellschaft, DF MC Frauenauracher Straße 80 D-91056 Erlangen Germany
Product description:	**SINUMERIK 840D/840DE solution line with SINAMICS S** **System Integrated Safety** **Drive Based Safety (Basic Functions)** **Drive Based Safety (Extended Functions)** (for included hardware and software releases see annex)

The functional safety functions STO, SS1, SS2, SBC, SOS, SLS, SCA, SLP, SSM, SBR, SAM of the above mentioned product fulfil the requirements of SIL2 according to [1] and [4], PLd according to [2] and category 3 according to [2]. The functions STO, SS1 and SS2 correspond to stop category 0, stop category 1 and stop category 2 according to [3], respectively.

Additionally, the I/Os (including brake control), PROFIsafe Master, programmable logic (PLC) and break test are implemented by using integrated safety technology and, therefore, are suitable to be used with safety functions.

The safe break test (SBT) is suitable as diagnostic function according to [2] for a safely controlled brake (e.g. via SBC). By using a single break in a category 2 application or two brakes in a category 3 application with an appropriate test rate, it is possible to reach a performance level up to PLd.

Reference number

[1]	IEC 61508, part 1 to 3 (2010)
[2]	ISO13849 part 1 (2015)
[3]	IEC 60204 (2005)
[4]	IEC 61800-5-2 (2016)

Erlangen, 17-05-22

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1 Software

1.1 NCU 7x0.1, NCU 7x0.2 and NX1x with System Integrated Safety and Drive Based Safety (Basic Functions)

NCU 710.1 NCU 710.2 NCU 720.1 NCU 720.2 NCU 720.2 DP/PN NCU 730.1 NCU 730.2 NCU 730.2 DP/PN NX10 NX15	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 1.3 SP3 HF4	62.13.03	01.03.03	---	---
V 1.4	67.02.00	01.04.03	02.40.33.00	02.40.39.00
V 1.4 HF1	67.03.00	01.04.06	02.40.33.00	02.40.42.00
V 1.4 HF5 V 1.4 HF6 V 1.4 HF7	67.05.00	01.04.06	02.40.43.00	02.40.43.00
V 1.4 SP1 V 1.4 SP1 HF1	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 1.4 SP1 HF3 V 1.4 SP1 HF7 V 1.4 SP1 HF8	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 1.4 SP2 V 1.4 SP2 HF1	67.10.00	01.04.06	02.40.43.00	02.40.49.00
V 1.4 SP3	67.11.00	01.04.06	02.40.43.00	02.40.49.00
V 1.4 SP3 HF1	67.11.00	01.04.06	02.40.43.00	02.40.64.00
V 1.5	72.00.00	01.05.02	02.50.28.00	02.50.37.00
V 1.5 HF1	72.00.00	01.05.03	02.50.39.00	02.50.40.00
V 1.5 HF2	72.04.00	01.05.03	02.50.39.00	02.50.41.00
V 1.5 HF4 V 1.5 HF5	72.04.00	01.05.03	02.50.39.00	02.50.41.00
V 1.5 SP1 V 1.5 SP1 HF1	72.06.00	01.05.07	02.50.39.00	02.50.41.00
V 1.5 SP2 V 1.5 SP2 HF1 V 1.5 SP2 HF2 V 1.5 SP3 V 1.5 SP3 HF1 V 1.5 SP3 HF2 V 1.5 SP3 HF3 V 1.5 SP4 V 1.5 SP4 HF1	72.07.00	01.05.08	02.50.49.00	02.50.49.00
V 1.5 SP4 HF2	72.07.00	01.05.08	02.50.49.00	02.50.56.00
V 2.4	67.02.00	01.04.04	02.40.33.00	02.40.39.00
V 2.4 HF3	67.05.00	01.04.06	02.40.43.00	02.40.43.00

NCU 710.1 NCU 710.2 NCU 720.1 NCU 720.2 NCU 720.2 DP/PN NCU 730.1 NCU 730.2 NCU 730.2 DP/PN NX10 NX15	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 2.4 HF4 V 2.4 HF5 V 2.4 HF7 V 2.4 HF8	67.05.00	01.04.06	02.40.43.00	02.40.43.00
V 2.4 SP1 V 2.4 SP1 HF1 V 2.4 SP1 HF2	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP1 HF3 V 2.4 SP1 HF4	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP1 HF5	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP1 HF6 V 2.4 SP1 HF7 V 2.4 SP1 HF8 V 2.4 SP1 HF9	67.07.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP1 HF11	67.09.03	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP2 V 2.4 SP2 HF1 V 2.4 SP2 HF2	67.10.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP3 V 2.4 SP3 HF1 V 2.4 SP3 HF2	67.11.00	01.04.06	02.40.43.00	02.40.49.00
V 2.4 SP3 HF3	67.11.00	01.04.06	02.40.43.00	02.40.64.00
V 2.5 V 2.5 HF2	72.04.00	01.05.03	02.50.39.00	02.50.41.00
V 2.5 SP1 V 2.5 SP1 HF1	72.06.00	01.05.07	02.50.39.00	02.50.41.00
V 2.5 SP2 V 2.5 SP2 HF1 V 2.5 SP3 V 2.5 SP3 HF2 V 2.5 SP4	72.07.00	01.05.08	02.50.49.00	02.50.49.00
V 2.5 SP3 HF3	72.07.00	01.05.08	02.50.49.00	02.50.56.00
V 2.6	75.03.00	02.06.06	02.60.40.00	02.60.40.00
V 2.6 HF1	75.04.00	02.06.06	02.60.40.00	02.60.40.00
V 2.6 HF2 V 2.6 HF3 V 2.6 HF4 V 2.6 HF5	75.04.00	02.06.08	02.60.40.00	02.60.40.00
V 2.6 HF6	75.04.00	02.06.08	02.60.40.00	02.60.45.03
V 2.6 HF7 V 2.6 HF8 V 2.6 HF9 V 2.6 HF10	75.05.00	02.06.08	02.60.40.00	02.60.45.13

NCU 710.1 NCU 710.2 NCU 720.1 NCU 720.2 NCU 720.2 DP/PN NCU 730.1 NCU 730.2 NCU 730.2 DP/PN NX10 NX15	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 2.6 HF11				
V 2.6 SP1	78.03.00	02.06.17	02.60.40.00	02.60.48.00
V 2.6 SP1 HF1 V 2.6 SP1 HF2	78.05.00	02.06.19	02.60.40.00	02.60.48.00
V 2.6 SP1 HF3 V 2.6 SP1 HF4 V 2.6 SP1 HF5 V 2.6 SP1 HF6 V 2.6 SP1 HF7 V 2.6 SP1 HF8 V 2.6 SP1 HF9 V 2.6 SP1 HF10	78.06.00	02.06.19	02.60.40.00	02.60.51.00
V 2.6 SP1 HF11	78.06.00	02.06.19	02.60.40.00	02.60.58.00
V 2.7 V 2.7 HF1	83.02.00	02.07.10	02.60.40.00	02.60.51.00
V 2.7 SP1 V 2.7 SP1 HF3 V 2.7 SP1 HF5 V 2.7 SP1 HF6	83.03.00	02.07.11	02.60.40.00	02.60.51.00
V 2.7 SP2	83.04.00	02.07.13	02.60.40.00	02.60.51.00
V 2.7 SP2 HF2	83.04.00	02.07.15	02.60.40.00	02.60.51.00
V 2.7 SP2 HF4	83.04.00	02.07.15	02.60.40.00	02.60.57.00
V 2.7 SP3 V 2.7 SP3 HF4	83.05.00	02.07.15	02.60.40.00	02.60.57.00
V 2.7 SP3 HF6 V 2.7 SP3 HF7 V 2.7 SP3 HF8	83.05.00	02.07.15	02.60.40.00	02.60.58.00
V 2.7 SP3 HF10 V 2.7 SP3 HF12 V 2.7 SP3 HF13 V 2.7 SP3 HF14	83.06.00	02.07.15	02.60.40.00	02.60.58.00
V 2.7 SP4 V 2.7 SP4 HF2 V 2.7 SP4 HF3 V 2.7 SP4 HF4 V 2.7 SP4 HF5 V 2.7 SP4 HF6 V 2.7 SP4 HF7 V 2.7 SP4 HF9 V 2.7 SP4 HF99	83.08.00	02.07.15	02.60.40.00	02.60.58.00

1.2 NCU 7x0.3, and NX1x.3 with System Integrated Safety and Drive Based Safety (Basic Functions)

NCU 710.3 DP/PN NCU 720.3 DP/PN NCU 730.3 DP/PN NX10.3 NX15.3	NCU 710.3B DP/PN NCU 720.3B DP/PN NCU 730.3B DP/PN	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 2.7 SP3 V 2.7 SP3 HF4	---	83.05.00	02.07.15	04.40.22.00	04.40.23.04
V 2.7 SP3 HF6 V 2.7 SP3 HF7 V 2.7 SP3 HF8	---	83.05.00	02.07.15	04.40.22.00	04.40.23.35
V 2.7 SP3 HF10 V 2.7 SP3 HF12 V 2.7 SP3 HF13 V 2.7 SP3 HF14	---	83.06.00	02.07.15	04.40.22.00	04.40.23.35
V 2.7 SP4 V 2.7 SP4 HF2 V 2.7 SP4 HF3 V 2.7 SP4 HF4 V 2.7 SP4 HF5 V 2.7 SP4 HF6 V 2.7 SP4 HF7 V 2.7 SP4 HF9 V 2.7 SP4 HF99	---	83.08.00	02.07.15	04.40.22.00	04.40.23.35
V 4.4	---	83.02.00	04.04.07	04.40.22.00	04.40.23.04
V 4.4 SP1 V 4.4 SP1 HF1 V 4.4 SP1 HF2 V 4.4 SP1 HF3 V 4.4 SP1 HF4 V 4.4 SP1 HF6	---	83.03.00	04.04.11	04.40.22.00	04.40.23.04
V 4.4 SP2 V 4.4 SP2 HF2 V 4.4 SP2 HF3	---	83.04.00	04.04.12	04.40.22.00	04.40.23.04
V 4.4 SP3 V 4.4 SP3 HF4	---	83.05.00	04.04.12	04.40.22.00	04.40.23.04
V 4.4 SP3 HF6 V 4.4 SP3 HF7	---	83.05.00	04.04.12	04.40.22.00	04.40.23.35
V 4.4 SP3 HF10 V 4.4 SP3 HF12	---	83.06.00	04.04.12	04.40.22.00	04.40.23.35
V 4.4 SP4 V 4.4 SP4 HF2 V 4.4 SP4 HF3 V 4.4 SP4 HF4 V 4.4 SP4 HF5	---	83.08.00	04.04.12	04.40.22.00	04.40.23.35
V 4.5	---	87.02.00	04.05.06	04.50.30.00	04.50.24.00
V 4.5 SP1 V 4.5 SP1 HF2 V 4.5 SP1 HF3	---	87.03.00	04.05.09	04.50.30.05	04.50.30.05
V 4.5 SP2	---	87.06.00	04.05.14	04.50.30.05	04.50.30.14
V 4.5 SP2 HF4 V 4.5 SP2 HF98	---	87.09.02	04.05.14	04.50.30.05	04.50.30.24

NCU 710.3 DP/PN NCU 720.3 DP/PN NCU 730.3 DP/PN NX10.3 NX15.3	NCU 710.3B DP/PN NCU 720.3B DP/PN NCU 730.3B DP/PN	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 4.5 SP2 HF99	---	87.06.00	04.05.14	04.50.30.05	04.50.30.23
V 4.5 SP3	---	87.10.03	04.05.14	04.50.30.29	04.50.30.30
V 4.5 SP3 HF1 V 4.5 SP3 HF2 V 4.5 SP3 HF5	---	87.10.03	04.05.17	04.50.30.29	04.50.30.30
V 4.5 SP4 V 4.5 SP4 HF1 V 4.5 SP4 HF3 V 4.5 SP4 HF4 V 4.5 SP4 HF7	V 4.5 SP4 V 4.5 SP4 HF1 V 4.5 SP4 HF3 V 4.5 SP4 HF4 V 4.5 SP4 HF7	87.11.00	04.05.18	04.50.30.34	04.50.30.34
V 4.5 SP5 V 4.5 SP5 HF1 V 4.5 SP5 HF2	V 4.5 SP5 V 4.5 SP5 HF1 V 4.5 SP5 HF2	87.12.02	04.05.23	04.50.30.34	04.50.30.41
V 4.5 SP6 V 4.5 SP6 HF3 V 4.5 SP6 HF5 V 4.5 SP6 HF7 V 4.5 SP6 HF8 V 4.5 SP6 HF99	V 4.5 SP6 V 4.5 SP6 HF3 V 4.5 SP6 HF5 V 4.5 SP6 HF7 V 4.5 SP6 HF8 V 4.5 SP6 HF99	87.13.00	04.05.23	04.50.30.46	04.50.30.41
V 4.6	---	94.00.00	04.06.05	04.60.21.06	04.60.20.00
V 4.6 SP1	---	96.02.00	04.06.09	04.60.21.06	04.60.21.13
V 4.7 HF1 V 4.7 HF2	V 4.7 HF1 V 4.7 HF2	99.06.02	04.07.15	04.70.35.07	04.70.29.00
V 4.7 SP1	V 4.7 SP1	99.10.02	04.07.15	04.70.35.18	04.70.35.21
V 4.7 SP1 HF1 V 4.7 SP1 HF3 V 4.7 SP1 HF4	V 4.7 SP1 HF1 V 4.7 SP1 HF3 V 4.7 SP1 HF4	99.10.04	04.07.15	04.70.35.18	04.70.35.21
V 4.7 SP2	V 4.7 SP2	99.15.00	04.07.25	04.70.35.35	04.70.35.37
V 4.7 SP2 HF1	V 4.7 SP2 HF1	99.17.02	04.07.25	04.70.35.42	04.70.35.44
V 4.7 SP2 HF4	V 4.7 SP2 HF4	99.17.07	04.07.25	04.70.35.42	04.70.35.44
V 4.7 SP3 V 4.7 SP3 HF1	V 4.7 SP3 V 4.7 SP3 HF1	99.18.00	04.07.25	04.70.35.51	04.70.35.44
V 4.7 SP3 HF2 V 4.7 SP3 HF3 V 4.7 SP3 HF4	V 4.7 SP3 HF2 V 4.7 SP3 HF3 V 4.7 SP3 HF4	99.18.00	04.07.25	04.70.35.51	04.70.35.62
V 4.7 SP4 V 4.7 SP4 HF1	V 4.7 SP4 V 4.7 SP4 HF1	99.19.00	04.07.25	04.74.35.02	04.70.35.62
V 4.8 SP1	V 4.8 SP1	123.00.00	04.07.25	04.90.23.00	04.90.24.00

1.3 NCU 7x0.3 and NX1x.3 with Drive Based Safety (Extended Functions)

NCU 710.3 DP/PN NCU 720.3 DP/PN NCU 730.3 DP/PN NCU 710.3B DP/PN NCU 720.3B DP/PN NCU 730.3B DP/PN NX10.3 NX15.3	Firmware-Version (Safety-NCK)	Firmware-Version (Safety-PLC)	Firmware-Version SINAMICS (Basic Safety)	Firmware-Version SINAMICS (Extended Safety)
V 4.8 SP1	123.00.00	04.07.25	04.90.23.00	04.90.24.00

2 Hardware

2.1 SINUMERIK NCUs

Description	Order Purchase No. (MLFB)
NCU 710.1 (numerical control unit with PLC 317-2 DP)	6FC5371-0AA00-0AA0 6FC5371-0AA10-0AA0
NCU 710.2 (numerical control unit with PLC 317-2 DP)	6FC5371-0AA10-0AA1 6FC5371-0AA10-0AA2
NCU 710.3 PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5371-0AA30-0AA0 6FC5371-0AA30-0AA1
NCU 710.3B PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5371-0AA30-0AB0
NCU 720.1 (numerical control unit with PLC 317-2 DP)	6FC5372-0AA00-0AA0
NCU 720.2 (numerical control unit with PLC 317-2 DP)	6FC5372-0AA00-0AA1 6FC5372-0AA00-0AA2
NCU 720.2 PN/DP (numerical control unit with PLC 319-3 PN/DP)	6FC5372-0AA01-0AA1 6FC5372-0AA01-0AA2
NCU 720.3 PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5372-0AA30-0AA0 6FC5372-0AA30-0AA1
NCU 720.3B PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5372-0AA30-0AB0
NCU 730.1 (numerical control unit with PLC 317-2 DP)	6FC5373-0AA00-0AA0
NCU 730.2 (numerical control unit with PLC 317-2 DP)	6FC5373-0AA00-0AA1 6FC5373-0AA00-0AA2
NCU 730.2 PN/DP (numerical control unit with PLC 319-3 PN/DP)	6FC5373-0AA01-0AA1 6FC5373-0AA01-0AA2
NCU 730.3 PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5373-0AA30-0AA0 6FC5373-0AA30-0AA1
NCU 730.3B PN/DP (numerical control unit with PLC 317-3 PN/DP)	6FC5373-0AA30-0AB0
NCU 730.3B PN/DP (numerical control unit with PLC 319-3 PN/DP)	6FC5373-0AA31-0AB0

2.2 SINUMERIK Control Extensions

Description	Order Purchase No. (MLFB)
NX10 (numeric control extension)	6SL3040-0NC00-0AA0
NX10.3	6SL3040-1NC00-0AA0
NX15 (numeric control extension)	6SL3040-0NB00-0AA0
NX15.3	6SL3040-1NB00-0AA0

3 Restrictions

The safety function SCA (Safe CAM) is safety approved for NCK (safety version) 67.09.03 and higher.

4 Boundary Conditions

4.1 System Related Hardware

The SINUMERIK 840D/840DE solution line modules named in this manufacturer's declaration SINUMERIK 840D/840DE solution line (17-05-22) at hand shall be used in combination with the dedicated modules listed in the table below. The associated manufacturer's declarations are also listed.

Module Type	NCU 7x0.1 NCU 7x0.2	NCU 7x0.3 NCU 7x0.3B	Manufacturer Declaration
Motor Modules (booksize)	X	X	SINAMICS S120 (booksize)
Motor Modules (booksize) – 2. generation	X	X	SINAMICS S120 (booksize)
Motor Modules (chassis/cabinet)	X	X	SINAMICS S120 (booksize)
Motor Modules (chassis/cabinet) – 2. generation	X	X	SINAMICS S120 (booksize)
SMx (Sensor Modules)	X	X	SINAMICS S120 (booksize)
SMx (Sensor Modules) – 2. generation	X	X	SINAMICS S120 (booksize)

Version 4.4 SP1 HF2 is not approved for Motor Modules (chassis/cabinet) – 2. generation.
Version 4.6 and Version 4.7 is not approved for Motor Modules (chassis/cabinet).

4.2 System Related Software

According to IEC61508-4 (2010) the related engineering system "SINUMERIK 840D sl TIA Portal Toolbox" is classified as T3 off-line support tool. Therefore, all required measures considering T3 off-line support tools as defined in [1] were applied.

Off-Line Support Tool	Version TIA Portal
SINUMERIK 840D sl TIA Portal Toolbox	V13 SP1 V13 SP2
SINUMERIK STEP7 Toolbox	V14 V14 SP1