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Annex 1 of the Report on the Certificate

Z10 05 08 20411 002

Safety-Related Programmable System

SIMATIC S7 Distributed Safety

Manufacturer:

Siemens AG
A & D AS
Gleiwitzer Straße 555
D-90475 Nürnberg

Report No.: 70013560-A1
Revision 1.33 dated 2008-06-26

Testing Body:

TÜV SÜD Automotive GmbH
Electronics Safety
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Accredited Testing Body for Functional Safety





Revision Log

Version	Name	Date	Changes/History
1.0	A. Beer	26.03.2002	Initial
1.1	A. Beer	26.06.2002	The ServicePack 1 includes the French and English user documentation.
1.2	K. Bosch	17.09.2002	CPU 6ES7 315-6FF01-0AB0 added
1.3	A. Beer	06.12.2002	Module added: PM-D F DC24V PROFIsafe
1.4	A. Beer	20.12.2002	Version of optional package S7 Distributed Safety F-CPU's added: CPU 416F-2 and IM 151-7 F-CPU I/O modules added: SM 326, DI 8 x NAMUR and SM 336, AI 6 x 13 Bit Release and order number of I/O modules
1.5	K. Bosch	08.04.2003	Version of Hardware Components
1.6	A. Beer	20.08.2003	Version of optional package S7 Distributed Safety F-CPU added: CPU 317F-2 DP Release number of SM 326, DO 10 x DC24V/2A
1.7	A. Beer	13.10.2003	Version of SM 326, DO 10 x DC24V/2A deleted
1.8	A. Beer	30.04.2004	Optional Package Version of SM 326, DO 10xDC24/2A
1.9	A. Beer	25.05.2004	Version of modules F-DI, F-DO and PM-D F F-DI eco added Version of STEP7
1.10	A. Beer	25.06.2004	Version of module PM-E F pm
1.11	A. Beer	06.07.2004	Module PM-E F pp added
1.12	A. Beer	13.08.2004	CPU 416 (6ES7 416-2FK04-0AB0) and IM 151-7 F-CPU (6ES7 151-7FA01-0AB0) added
1.13	A. Beer	29.10.2004	Version of module PM-E F pp and F-DI eco Version of Optional Package S7 Distributed Safety
1.14	A. Beer	04.05.2005	Version of ET200S-F Module PM-E F pm Version of ET200S-F Module PM-E F pp



Version	Name	Date	Changes/History
1.15	A. Beer	28.07.2005	Module added: ET200S-F-Modul F-DI ET200S-F-Modul F-DO ET200S-F-Modul PM-E F pm ET200S-F-Modul PM-E F pp ET200pro-F 8/16 F-DI DC24V ET200pro-F 4/8 F-DI DC24V / 4 F-DO DC24V/2A
1.16	A. Beer	17.08.2005	Certificate Z2 02 03 20411 009 replaced by Z10 05 08 20411 002 Version V5.4 of optional package S7 Distributed Safety added F-CPU's deleted: <ul style="list-style-type: none"> ○ 6ES7 315-6FF00-0AB0 ○ 6ES7 416-2FK02-0AB0 ○ 6ES7 151-7FA00-0AB0 F-CPU's added: <ul style="list-style-type: none"> ○ CPU 315F-2 PN/DP ○ CPU 317F-2 PN/DP Modules deleted: <ul style="list-style-type: none"> ○ 4/8 F-DI DC24V, 6ES7138-4FA00-0AB0 ○ 4 F-DO DC24V/2A, 6ES7138-4FB00-0AB0 ○ PM-E F DC24V, 6ES7138-4CF00-0AB0 ○ SM 326, DO 10x DC24V/2A, 6ES7326-2BF00-0AB0 Module added: <ul style="list-style-type: none"> ○ PM-D F DC24V
1.17	A. Beer	15.09.2005	Module added: SM 326, DO 8 x DC 24V, 6ES7326-2BF40-0AB0
1.18	A. Beer	11.11.2005	Module added: SM326, DI 24 x DC24V, 6ES7 326-1BK01-0AB0 Release number of Safety protector, 6ES7 195-7KF00-0XA0



Version	Name	Date	Changes/History
1.19	A. Beer	19.01.2006	Release number of SM 336, AI 6 x 13 Bit, 6ES7 336-1HE00-0AB0 SM 326, DO 8 x DC24V/2A PM, 6ES7 326-2BF40-0AB0 ET200eco 4/8 F-DI, 6ES7148-3FA00-0XB0
1.20	A. Beer	31.03.2006	Release number of ET200S-F-Modul PM-E F pm, 6ES7138-4CF02-0AB0
1.21	A. Beer	15.05 .2006	Version V5.4 SP1 of optional package S7 Distributed Safety added
1.22	A. Beer	23.06.2006	Release number of SM 326 DO 10xDC24V/2A, 6ES7326-2BF01-0AB0
1.23	A. Beer	11.08.2006	F-CPU's added: <ul style="list-style-type: none">○ CPU 315F-2 PN/DP (6ES7315-2FH13-0AB0)○ CPU 317F-2 PN/DP (6ES7317-2FK13-0AB0)○ CPU 317F-2 DP (6ES7317-6FF03-0AB0) Module added: <ul style="list-style-type: none">○ ET200S 1F-RO DC24V/5A, AC24..230V/5A (6ES7 138-4FR00-0AA0) Release Number of <ul style="list-style-type: none">○ ET200pro-F 8/16 F-DI DC24V (6ES7 148-4FA00-0AB0)○ ET200pro-F 4/8 F-DI DC24V / 4 F-DO DC24V/2A (6ES7 148-4FC00-0AB0)
1.24	A. Beer	07.09.2006	F-CPU added: <ul style="list-style-type: none">○ CPU 416F-3 PN/DP (6ES7416-3FR05-0AB0)



Version	Name	Date	Changes/History
1.25	A. Beer	15.11.2006	<p>F-CPU added:</p> <ul style="list-style-type: none"> ○ CPU 416F-2 (6ES7 416-2FN05-0AB0) <p>Release Number of</p> <ul style="list-style-type: none"> ○ ET200pro-F 8/16 F-DI DC24V (6ES7 148-4FA00-0AB0) ○ ET200pro-F 4/8 F-DI DC24V / 4 F-DO DC24V/2A (6ES7 148-4FC00-0AB0)
1.26	M. Rau	09.01.2007	<p>Module added:</p> <ul style="list-style-type: none"> • ET200S 4/8 F-DI DC24V (6ES7 138-4FA03-0AB0) <p>Release Number of</p> <ul style="list-style-type: none"> • ET200S 4 F-DO DC24V/2A (6ES7 138-4FB02-0AB0) • ET200S PM-E F pp DC24V (6ES7 138-4CF41-0AB0) • ET200S PM-D F DC24V (3RK1903-3BA01) <p>Version V5.4 SP2 of optional package S7 Distributed Safety added</p>
1.27	M. Rau	27.02.2007	<p>Module added:</p> <ul style="list-style-type: none"> • ET200S 4F-DI/3F-DO DC24V (6ES7 138-4FC00-0AB0) <p>Version V5.4 SP3 of optional package S7 Distributed Safety added</p>
1.28	P. Weiß	10.04.2007	<p>F-CPU added:</p> <ul style="list-style-type: none"> • CPU 319F-3 PN/DP (6ES7 318-3FL00-0AB0)
1.29	M. Rau	16.05.2007	<p>Module added:</p> <ul style="list-style-type: none"> • ET200pro F-Switch (6ES7 148-4FS00-0AB0) <p>Version V5.5 SP2 of S7 ConfigurationPack added</p>
1.30	P. Weiß	06.07.2007	<p>F-CPU added:</p> <ul style="list-style-type: none"> • IM 151-7 F-CPU (6ES7 151-7FA20-0AB0)
1.31	P. Weiß	12.12.2007	<p>Version V5.4 SP4 of optional package S7 Distributed Safety added</p> <p>Version V5.5 SP4 of S7 ConfigurationPack added</p>



Version	Name	Date	Changes/History
1.32	M. Rau	04.04.2008	Module added: SM336, F-AI 6 x 0/4 .. 20 mA HART (6ES7 336-4GE00-0AB0)
1.33	M. Rau	26.06.2008	Version of ET200eco 4/8F-DI 6ES7148-3FA00-0XB0 Remark 7) ET200M SM 326, DI 8 x NAMUR 6ES7 326-1RF00-0AB0



Safety-Certified and Interference-Free Components

1 Hardware Components

The following system components are certified 'safety-related'. This allows the components to be used to process safety critical signals and functions:

Module	Order Number	Release Number	Module Description
CPUs:			
CPU 315F-2 DP	6ES7 315-6FF01-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 317F-2 DP	6ES7 317-6FF00-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 317F-2 DP	6ES7 317-6FF03-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 315F-2 PN/DP	6ES7 315-2FH10-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 315F-2 PN/DP	6ES7 315-2FH13-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 317F-2 PN/DP	6ES7 317-2FJ10-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 317F-2 PN/DP	6ES7 317-2FK13-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 319F-3 PN/DP	6ES7 318-3FL00-0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 416F-2 ⁴⁾	6ES7 416-2FK04-0AB0	02 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.



Module	Order Number	Release Number	Module Description
CPUs:			
CPU 416F-2 ⁴⁾	6ES7 416-2FN05- 0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
CPU 416F-3 PN/DP ⁴⁾	6ES7 416-3FR05- 0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
IM151-7 F-CPU	6ES7 151-7FA01- 0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.
IM151-7 F-CPU	6ES7 151-7FA20- 0AB0	01 or higher	CPU which is suitable for safety-related applications by using a fail-safe-application program.



Module	Order Number	Release Number	Module Description
Signal Modules S7-300:			
SM 326, DI 24 x DC24V	6ES7 326-1BK01- 0AB0	02	24 channel digital input module 24VDC
SM 326, DI 24 x DC24V	6ES7 326-1BK00- 0AB0 ¹⁾	01 to 07	24 channel digital input module 24VDC
SM 326, DI 8 x NAMUR	6ES7 326-1RF00- 0AB0 ^{1),7)}	01 to 06	8 channel NAMUR digital input module for intrinsically-safe sensors
SM 326, DO 10 x DC24V/2A	6ES7 326-2BF01- 0AB0 ¹⁾	01 to 05	10 channel digital output module 24VDC/2A, P-switch
SM 326, DO 8 x DC24V/2A PM	6ES7 326-2BF40- 0AB0	01 ³⁾ , 02	8 channel digital output module 24VDC/2A; P-/M-switch
SM 336, AI 6 x 13 Bit	6ES7 336-1HE00- 0AB0 ¹⁾	01 to 06	6 channel analog input module
SM 336, F-AI 6 x 0/4 .. 20 mA HART	6ES7 336-4GE00- 0AB0	01 / V1.0.1	6 channel analog input module, HART
Safety protector	6ES7 195-7KF00- 0XA0 ¹⁾	03	safety protector protects the fail-safe signal modules from possible overvoltage



Module	Order Number	Release Number	Module Description
Modules ET 200S:			
4/8 F-DI DC24V	6ES7 138-4FA03- 0AB0 ¹⁾	01	4/8 channel digital input module 24VDC
4/8 F-DI DC24V	6ES7 138-4FA02- 0AB0 ¹⁾	01	4/8 channel digital input module 24VDC
4/8 F-DI DC24V	6ES7 138-4FA01- 0AB0 ¹⁾	01	4/8 channel digital input module 24VDC
4 F-DO DC24V/2A	6ES7 138-4FB02- 0AB0 ¹⁾	01 to 02	4 channel digital output module 24VDC/2A; P- / M-switch
4 F-DO DC24V/2A	6ES7 138-4FB01- 0AB0 ¹⁾	01	4 channel digital output module 24VDC/2A; P- / M-switch
1F-RO DC24V/5A, AC24..230V/ 5A ⁵⁾	6ES7 138-4FR00- 0AA0	01	1 channel digital relay output module DC24V/5A, AC24..230V/5A
PM-E F pm DC24V	6ES7 138-4CF02- 0AB0 ¹⁾	01 to 02	power module 24VDC; P- / M-switch
PM-E F pm DC24V	6ES7 138-4CF01- 0AB0 ¹⁾	01 to 02	power module 24VDC; P- / M-switch
PM-E F pp DC24V	6ES7 138-4CF41- 0AB0	01 to 02	power module 24VDC; P- / P-switch
PM-E F pp DC24V	6ES7 138-4CF40- 0AB0	01 to 03	power module 24VDC; P- / P-switch
PM-D F DC24V	3RK1903- 3BA01 ¹⁾	01 to 02	power module 24VDC for failsafe motor starters
PM-D F DC24V	3RK1903- 3BA00 ¹⁾	04	power module 24VDC for failsafe motor starters



Module	Order Number	Release Number	Module Description
Modules ET 200S			
4F-DI/3F-DO	6ES7 138-4FC00-0AB0 ⁶⁾	01	4 channel digital input / 3 channel digital output module 24VDC/2A
Modules ET 200eco:			
4/8 F-DI DC24V	6ES7 148-3FA00-0XB0 ²⁾	01 to 04	4/8 channel digital input module 24VDC
Modules ET 200pro:			
8/16 F-DI DC24V	6ES7 148-4FA00-0AB0 ²⁾	01 to 03	8/16 channel digital input module 24VDC
4/8 F-DI/4 F-DO DC24V/2A	6ES7 148-4FC00-0AB0 ²⁾	01 to 03	4/8 channel digital input 24VDC and 4 channel digital output module 24VDC/2A P- / M-switch (combined)
F-Switch	6ES7 148-4FS00-0AB0 ²⁾	01	2 channel digital input 24VDC and 3 channel digital P- / P-switch module 24VDC (combined).

1) tested in accordance with EN61131-2: 1995

2) EN298: 2003 fulfilled with the exception of permissible environmental temperature -25 to +55 degree centigrade (instead of 0 to +60 degree centigrade)

3) no certification according to EN298:2003, NFPA 79, ENV 1954.

4) the sinusoidal vibrations service conditions does not comply with the increased requirements of IEC 61131 2nd Ed. The requirements of IEC 61131-2:1992 are fulfilled.

5) EN 50178:1997; in difference to all other modules with overvoltage category III the 1 channel digital relay output module DC24V/5A, AC24..230V/5A fulfills the requirements of overvoltage category II.

6) classified SIL 2 in accordance to IEC 61508 and CAT 3 in accordance to EN 954 and no certification according EN 298

7) The requirement of EN 298 2003: fulfilled only with shielded signal cables

Remark: For the I/O modules EN 298, 2003 is fulfilled with external surge protection; see related manuals.

All other components of the SIMATIC S7 Distributed Safety are 'interference-free' and allowed to be used, however, they are not certified for process safety critical signals and functions. Using these components does not interfere with the proper functioning of the safety-related modules.

For details on architectural, configuration and implementation requirements please refer to the Siemens manuals "Safety Engineering in SIMATIC S7", "S7 Distributed Safety, Configuring and



Programming”, “ET 200S Distributed I/O System, Fail-Safe Modules”, “ET 200pro Distributed I/O Device, Fail-Safe Modules”, “ET 200eco Distributed I/O Station, Fail-Safe I/O Modules”, “Automation System S7-300, Fail-Safe Signal Modules”.

2 Safety-Relevant Software Components

S7 Distributed Safety Programming	V5.4 SP4
S7 F ConfigurationPack	V5.5 SP4

The Optional Package S7 Distributed Safety includes the following F application blocks and F system blocks:

Symbolic name	Function in safety program	Signature	Initial value signature
F_SCA_I	F application block	D8CA	2452
F_CTU	F application block	8AC9	2452
F_CTD	F application block	F77D	2452
F_CTUD	F application block	7C8F	2452
F_TP	F application block	669E	980D
F_TON	F application block	6B7E	980D
F_TOF	F application block	14B4	980D
F_ACK_OP	F application block	351F	A150
F_2HAND	F application block	EEB8	6EF7
F_MUTING	F application block	606B	AF14
F_1oo2DI	F application block	6AA7	2C7D
F_2H_EN	F application block	26CD	6EF7
F_MUT_P	F application block	CB71	7D3C
F_ESTOP1	F application block	2E11	AE5E
F_FDBACK	F application block	F521	F965
F_SFDOOR	F application block	86DA	76E6
F_ACK_GL	F application block	8B12	F2DE
F_SENDDP	F application block	F0B9	4E03
F_RCVDP	F application block	42F1	54E4
F_SENDS7	F application block	71D7	8DB7
F_RCVS7	F application block	4D3C	E1A5
F_SHL_W	F application block	4D39	-



Symbolic name	Function in safety program	Signature	Initial value signature
F_SHR_W	F application block	E4E3	-
F_BO_W	F application block	20A5	-
F_W_BO	F application block	BD67	-
F_INT_WR	F application block	A78A	-
F_INT_RD	F application block	BA20	-
F_CTRL_1	F system block	504C	BED9
F_CTRL_2	F system block	40BA	9E40
F_IO_BOI	F system block	FAFA	B79C
F_RTGCO2	F system block	D292	7A4A
F_IO_CGP	F system block	EDA2	DC2F
F_DIAG_N	F system block	99CA	3612
FISCA_I	F system block	A0FB	50E4
FICTU	F system block	2304	A28F
FICTD	F system block	7AC0	A28F
FICTUD	F system block	E51F	E876
FITP	F system block	7E15	3326
FITON	F system block	E1DF	ED43
FITOF	F system block	69AF	3326
FIACK_OP	F system block	BDC3	B593
FI2HAND	F system block	7131	F85A
FIMUTING	F system block	D5F9	B0C4
FI1oo2DI	F system block	C2E2	AEEA
FI2H_EN	F system block	6855	5F72
FIMUT_P	F system block	E8D5	2C45
FIACK_GL	F system block	9FB4	D360
FISHL_W	F system block	146E	8E58
FISHR_W	F system block	AB8F	8E58
FIBO_W	F system block	963B	BED5
FIW_BO	F system block	7A7F	BED5
FIINT_WR	F system block	CFA9	980D
FIINT_RD	F system block	1D3F	980D



3 Non Safety Relevant Software Component

Function	Version
CPU 315F-2 DP (6ES7315-6FF01-0AB0) Firmware	V2.0.0 or higher
CPU 317F-2 DP (6ES7317-6FF00-0AB0) Firmware	V2.1.0 or higher
CPU 317F-2 DP (6ES7317-6FF03-0AB0) Firmware	V2.1.10 or higher
CPU 315F-2 PN/DP (6ES7315-2FH10-0AB0) Firmware	V2.3.3 or higher
CPU 315F-2 PN/DP (6ES7315-2FH13-0AB0) Firmware	V2.3.4 or higher
CPU 317F-2 PN/DP (6ES7317-2FJ10-0AB0) Firmware	V2.3.3 or higher
CPU 317F-2 PN/DP (6ES7317-2FK13-0AB0) Firmware	V2.3.4 or higher
CPU 319F-3 PN/DP (6ES7318-3FL00-0AB0) Firmware	V2.5.2 or higher
CPU 416F-2 (6ES7416-2FK04-0AB0) Firmware	V4.0.1 or higher
CPU 416F-2 (6ES7416-2FN05-0AB0) Firmware	V5.0.1 or higher
CPU 416F-3 PN/DP (6ES7416-3FR05-0AB0) Firmware	V5.0.0 or higher
IM 151-7 F-CPU (6ES7151-7FA01-0AB0) Firmware	V2.1.4 or higher
IM 151-7 F-CPU (6ES7151-7FA20-0AB0) Firmware	V2.6.2 or higher
STEP 7 ¹⁾	V5.3 + Service Pack 3 or higher

¹⁾ Further restrictions specific to modules or versions of the optional package S7 Distributed Safety can be found in the corresponding user documentation.

Munich, 2008-06-26

Marcus Rau
Technical Certifier