Choose certainty.
Add value.

Technical Report for NFPA 79 Listing

Type:

Modular Safety System

3RK3

Manufacturer:

Siemens AG, I IA CD CC TE 5
Werner-von-Siemens Str. 48

D 92220 Amberg

Report No.: SA 73541 T
Revision 1.0 dated 2009-01-12

TÜV SÜD Automotive GmbH
Electronics Safety
Ridler Str. 57

D-80339 Munich

Accredited Testing Body for Functional Safety

Deutscher Akkreditierungs Rat
DAR
DAT-P-217/91-03

This technical report may only be reproduced in the original wording. Use for advertising purposes requires prior written permission. It contains the results of a unique examination of the product submitted for testing and does not represent a general evaluation of current production features.

Revision Log

Rev.	Name	Date	Changes/History
1.0	David Eromosele	2008-10-24	Creation of this report

Table of contents

1 Preface 4
2 Referenced Documents 4
2.1 Basis of review (standards) 4
2.2 Applied Quality management 4
2.3 Documents provided by Siemens AG, I IA CD CC TE 5 5
2.4 Modular Safety System 3RK3 existing Certificates 5
2.5 Documents generated by the testing agency 5
3 Purpose and scope 5
3.1 System description 6
3.2 Modular Safety System 3RK3 identification 7
4 Execution and Results of the Assessment 7
4.1 Results of the assessment 7

List of tables

Table 1: Applied Standards and checklist 4
Table 2: Applied TÜV SÜD Quality Management Guidelines 4
Table 3: Manufacturer's documentation 5
Table 4: TÜV NORD Certificate and reports 5
Table 5: Documents generated by the testing authority 5
Table 6: TÜV NORD CERT GmbH Applied Standards and Directive for Certification 6
Table 7: Modular Safety System 3RK3 identification 7

1 Preface

TÜV SÜD Automotive GmbH, Munich was commissioned by Siemens AG, Amberg to carry out the assessment of its Modular Safety System 3RK3 for the NFPA 79 listing. The commissioning is based on order number 76234759 dated 2008-10-08

The assessment was conducted in accordance to the standard and TÜV SÜD internal checklist listed in chapter 2.1. TÜV SÜD Automotive GmbH quality management guidelines listed in chapter 2.2 were also applied during the assessment.

The scope of assessment of the Modular Safety System 3RK3 is described in chapter 3 with detailed results of the evaluation documented in chapter 4

2 Referenced Documents

2.1 Basis of review (standards)

The review was performed in accordance to the standards in this table.

Table 1: Applied Standards and checklist

Industrial Machinery Standards		
/S1/	NFPA 79 Electrical Standard for Industrial Machinery	2007
/S2/	Checklist of programmable electronic systems for compliance with NFPA 79	2007

2.2 Applied Quality management

Table 2: Applied TÜV SÜD Quality Management Guidelines

Quality Management of Testing Laboratory	
QMH (Revision 3.4.2:7/2008)	TÜV SÜD Automotive Quality Management Handbook – CC Electronics Safety
ISO/IEC 17025:2005	General requirements for the competence of testing and calibration laboratories

2.3 Documents provided by Siemens AG, I IA CD CC TE 5

Table 3: Manufacturer's documentation

Testing Documents		
/B1/	Test Report No. 07103TE-ua (20 pages)	2008-07-23
/B2/	Test report No.: 08002TEL (LOVAG – 20 pages)	2008-01-22
/B3/	LGA Untersuchungsbericht Nr. E 4.357 (16 Pages)	2007-11-12
/B4/	Test Report A&D SE RD 5 / 08-E003139-BM-A01 (39 pages)	2007-12-18
/B5/	MSS 3RK3 System Manual, 07/2008 (298 pages)	2008/07
/B6/	Part B1 Test report No.: 08002TEL (LOVAG – 2 pages)	2008-01-22
/B7/	Isolation MSS 08002TE010-014 (5 pages)	2008-03-13
/B8/	Aufstellung_08_11_06 (1 page)	2008-11-06

2.4 Modular Safety System 3RK3 existing Certificates

Table 4: TÜV NORD Certificate and reports

Report and certificate		Test Report No.	Date
/A1/	EG-Baumusterbeschenigung (2 page)	08 205 334386 000	2008-08-07
/A2/	Zertifikat (2 pages, valid to 2011-08-07)	08 205 334386 000	2008-08-07
/A3/	Technischer Bericht (9 pages)	08 205 334386 000	2008-08-05

2.5 Documents generated by the testing agency

Table 5: Documents generated by the testing authority

Updated Certification Documentation		
/C1/	Technical Report for NFPA Listing (This Report)	2009-01-12
/C2/	Checkliste NFPA79_08_12_18.doc (NFPA Listing for Programmable Safety Controllers)	2008-12-18

3 Purpose and scope

The objective of this assessment is to ascertain, if the Modular Safety System 3RK3 complies with the NFPA 79 requirements for type approval.

Based on the results of the underlying test documentations listed in section 2.3 and the previous test reports and certificate listed in chapter 2.4 from TÜV NORD Cert GmbH. TÜV SÜD Automotive GmbH assessed the Modular Safety System 3RK3 for the NFPA 79 compliance in December 2008 with the results of the assessment documented in /C2/.

3.1 System description

The Modular Safety System 3RK3 is a TÜV NORD CERT GmbH certified product in accordance to the following standards and directives:

Table 6: TÜV NORD CERT GmbH Applied Standards and Directive for Certification

Standards / directives	Description
Machinery Directive 98/37/EC	
EN 61508:2001	Funktionale Sicherheit sicherheitsbezogener elektrischer/elektronischer/programmierbarer elektronischer Systeme
EN ISO 13849-1:2006	Sicherheit von Maschinen - Sicherheitsbezogene Teile von Steuerungen
EN 574:1996	Sicherheit von Maschinen - Zweihandschaltungen - Funktionelle Aspekte; Gestaltungsleitsätze

Depending on the version of the external wiring, applications can be implemented up to SIL3, Category 4 / PL e and Category IIIc requirements of the directives and standards listed in Table 6. The area of application and use of Modular Safety System include:

- The MSS can be implemented in any protective application with more than three safety functions.
- The modular safety relay enables you to interconnect several safety applications with each other. In this way, you can set shutdown ranges, for example, and define other dependencies.
- With suitable safety-related expansion modules, you can adapt the system flexibly to the required safety application.
- The extensive fault and status diagnostics system makes it possible to find faults in the system and to check signals from sensors. This helps reduce plant commissioning times and downtime.
- Diagnostics data are transferred to higher-level bus systems (e.g. PROFIBUS DP) via an optional interface module. This data is then available for further processing in the programmable controller.

3.2 Modular Safety System 3RK3 identification

The tested and certified system type designations are:

- Software V1.00.0102 / MSS Basis
- Software V1.00.0100 / Peripheries.

Table 7: Modular Safety System 3RK3 identification

Device	Erzeugnis stand	MLFB
MSS Basic	E01	3RK3111-*AA10
EM 4/8 F-DI	E01	3RK3211-*AA10
M 2/4 F-DI 1/2 F-RO	E01	3RK3221-*AA10
EM 2/4 F-DI 2 F-DO	E01	3RK3231-*AA10
EM 8 DO (**)		3RK3311-*AA10
DP-Interface (**)		3RK3511-*BA10

The character * represents the values 0 through 2.

0 ➔ no terminal

1 ➔ screw terminals

2 ➔ spring type terminals

4 Execution and Results of the Assessment

Based on /S2/, TÜV SÜD Automotive GmbH assessed the test documents for the Modular Safety System 3RK3. The main input and output documentation and the evaluation of the subtask are described in chapters 4.1 and 4.1.1

4.1 Results of the assessment

The results and completeness of the tests performed and documented by the customer have been verified and compared with the requirements of /S1/. This includes the successful completion of the following test:

- The following tests were implemented in accordance to UL 508 and CSA C22.2 (/B1/)
  - Temperature rise test at 47°C
  - Overvoltage and Undervoltage
  - Dielectric voltage withstand
  - Component failure

(**) Non Safety related device

- LOVAG type test according to IEC 60947-5-1 (/B2/)
  - Dielectric properties
  - Performance under conditional short circuit current
  - Dielectric properties according to IEC 60947-1 (/B7/, /B6/)
- Environmental test according to DIN EN 60068-2 (/B3/) with particular reference to
  - Temperature storage test (warm and cold storage)
  - Changes in temperature test
  - Vibration and Shock test
- EMC measurements according to IEC 60947-5-1 Edition 3:2003 (/B4/) with reference to the following test
  - electro-static discharge (ESD)
  - radiated and conducted RF-Emission
  - fast transients (Bursts)
  - high energy pulses (Surges)
  - RF voltages

4.1.1 Evaluation

Input:	/B1/, /B2/, /B3/, /B4/, /B5/, /B6/, /B7/, /B8/, /S2/
Output:	/C1/, /C2/
Result:	The necessary tests for approval of NFPA 79 compliance have been performed and documented adequately. Please note that the condition of use of the Modular Safety System 3RK3 as described by Siemens AG in the system manual, /B5/, must be observed during installation, commissioning, maintenance and operation. This report loses it's validity on expiration of the certificate /A2/.

Munich, 2009-01-12

David Eromosele
Electronics Safety
Project manager

Jürgen Blum
Electronics Safety
Review