

**Test report on the type approved  
SmartGuard 600 Controller 1752-L24BBB  
regarding the conformity to the extension of standards**

**Report-No.:** 968/EZ 238.01/09

**Date:** 2009-11-12

**Pages:** 3

**Test objects:** SmartGuard 600 Controller  
1752-L24BBB

**Client:** Rockwell Automation Inc.  
1 Allen-Bradley Drive  
Mayfield Heights, OH 44124-6118  
United States of America

**Manufacturer:** OMRON TAKEO Co., Ltd.  
11000 Koaza-Kobaru  
Ohaza-Nakano, Asahi-cho  
843-0002 Takeo-shi, Saga-ken  
Japan

**Order-No./Date:** 5500002727 dated 2009-10-28  
email dated on 2009-09-30

**Test Institute:** TÜV Rheinland Industrie Service GmbH  
Automation, Software and Information Technology  
Competence Center Safeguards and Safety Components  
Am Grauen Stein  
51105 Köln  
Germany

**TÜV-Offer-No./Date:** 968/399/09 dated 2009-09-30

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**Inspectors:** Dipl.-Ing. Gernot Klaes

**Test location:** see Test Institute

The test results are exclusively related to the test samples.

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## 1. Scope

In this test report the results of the inspection of the type approved SmartGuard 600 Controller 1752-L24BBB against the requirements of the standard EN ISO 13849-1:2008 shall be documented.

Furthermore the calculation of the safety related parameters  $PFD_{AV}$  / PFH have been modified according to customer request.

## 2. Standards forming the basis for the requirements

- [S1] EN ISO 13849-1:2008 Safety of machinery - Safety related parts of control systems, part 1: General principles for design
- [S2] IEC 61508 part 1-7: 12/98 - 05/00 Functional safety of electrical/electronic/programmable electronic safety-related systems
- [S3] EN 954-1:1996 Safety of machinery, Safety related parts of control systems, Part 1: General principles of design
- [S4] IEC 61131-2:2007 - Programmable Controllers
- [S5] EN 60204-1:2006 - Safety of machinery - Electrical equipment of machines
- [S6] EN 61000-6-2:2005 Generic Standards; Immunity for industrial environments
- [S7] EN 61000-6-4:2007 Generic standards; Emission standard for industrial environments
- [S8] EN 50178:1997 Electronic equipment for use in power installations
- [S9] NFPA 79:2007 Electrical Standard for Industrial Machinery
- [S10] ANSI/RIA R15.06-1999 American National Standard for Industrial Robots and Robot Systems - Safety Requirements
- [S11] ANSI B11.19-2003 American National Standard for Machine Tools - Performance Criteria for Safeguarding

## 3 Identification of the device under test

No test sample was required.

### 3.1 Previous test report

- [T1] 968/EZ 233.00/06, dated 2006-07-13: Final test report on the type approval of the Safety Logic Controller (SNC Version 1.0)
- [T2] 968/EZ 233.01/06, dated 2006-09-27: Test report on the extension of standards of the type approved Safety Logic Controller (SNC Version 1.0)
- [T3] 968/EZ 233.02/06, dated 2007-06-01: Test report on the modifications of the type approved Safety Logic Controller (SNC Version 2.0)
- [T4] 968/EZ 233.03/07, dated 2007-08-13: Test report on the modifications of the type approved Safety Network Controller (SNC Version 1.0)
- [T5] 968/EZ 233.04/08, dated 2008-10-24: Test report on the type approval Safety Network Controller (SNC Version 1.0) regarding the conformity to the extension of standards
- [T6] 968/EZ 238.00/06, dated 2006-09-25: Test report on the type approval of SmartGuard 600 Controller 1752-L24BBB

## 4 Test activities

### 4.1 Judgement of the conformity with EN ISO 13849-1

The SmartGuard 600 Controller 1752-L24BBB fulfils the requirements of IEC 61508 up to SIL 3, EN 954-1 up to category 4 and the designated architecture as per chapter 6.2.7 in [S1].

#### EN ISO 13849-1 consideration

[S1] chapter 4.6.2 requests that the software design and development process of a SRESW for PL = e shall comply with IEC 61508-3:1998, SIL 3. This requirement is fulfilled.

As per table 3 in [S1], in general it is possible to achieve a PL = e for complex, programmable electronics, provided that the average probability of dangerous failure per hour (PFH) of the components are less than the maximal stated value for PL = e, this is fulfilled. The PFH values of the devices are listed in the user manual.

Since the average probability of dangerous failure per hour and the structural requirements are fulfilled, the requirements of [S1] also are fulfilled.

### 4.2 Safety related parameters $PFD_{AV}$ / PFH

The client has recalculated the safety related parameters based on a proof-test-Interval (PTI) of 20 years.

The  $PFD_{AV}$  and PFH results are summarized in the following table:

Model	PFH 20 years PTI	$PFD_{AV}$ 20 years PTI
1752-L24BBB	$3,9 \times 10^{-10} \text{ h}^{-1}$	$3,4 \times 10^{-5}$

As the results of the review, the calculations carried out by the client are accepted by the Test Institute. They supplement the values defined in the previous test reports.

## 5 Summary

The further results of the type approval stated in the Report-No.: 968/EZ 238.00/06 are still valid. The SmartGuard 600 Controller 1752-L24BBB complies with the requirements of the relevant standards (Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 61508) and can be used in applications up to Cat. 4 / PL e acc. to EN ISO 13849-1 and SIL 3 acc. to IEC 61508.

The instructions of the associated Installation and Operating Manual shall be considered.

Cologne, 2009-11-12  
TIS/ASI/Kst. 968 kg-nie

Report released after review:  
Date: 2009-11-12

The inspector



Dipl.-Ing. Gernot Klaes



Dipl.-Ing. Stephan Häb