



of Functional Safety

The Knowledge Magazine from EBV Elektronik

In conversation with Manuel Ostner | 8

About lifestyle, e-bikes and safety

Ticket to ride | 24

Guidance systems increase rail capacity

Nothing slips through the net | 34

Systems for secure communication

Safely into the grid | 54

Feeding in renewable electricity without risk

Panel of experts | 78

Standards are not a panacea





electronics[®]
mediagroup

**A COMPLEX SERVICES PACKAGE FOR
BUSINESS PROMOTION
AT THE RUSSIAN ELECTRONICS MARKET:
PRINT AND ONLINE MEDIA,
CONFERENCE AND EVENTS ORGANIZATION,
PR AND ADVERTISING SERVICES,
AND MARKETING STUDIES**

www.russianelectronics.ru
Tel.: +7 (495) 741-77-01
E-mail: a.denisov@ecompr.ru



Strict regulations support the market

As the complexity of technical systems increases, so too does the variety of errors that may occur – whether in the automotive, medical, mechanical engineering or energy generation sectors. At the same time, global awareness regarding the use of functional safety systems is growing. After all, this involves the prevention of injury and even death for people working with technology, as well as severe damage to property. Systems for functional safety are thus not only in a position to guarantee a safe working environment, they also increase productivity and the profitability of production processes and facilities. As extensive the application areas for functional safety solutions are, just as varied are the components required: Only with a collaboration of controls, man-machine interfaces, sensors, actuators and communications networks can a system be operated both safely and efficiently.

Safety-conscious thinking ensures good market perspectives for the manufacturers of corresponding solutions. According to a study carried out by market research firm Frost & Sullivan, turnover for machine safety in Europe alone is to increase from 422 million US dollars in 2010 to 565.6 million US dollars in 2015. Internationally, as predicted by the VDC Research Group, machine safety products are set to generate over 1.3 billion US dollars. Of even greater significance is the market potential for functional safety, seen in the processing industry: here, according to VDC, turnover to the amount of 2.5 billion US dollars will be generated by 2015.

Stricter regulations, in particular in Europe and the US, are supporting the strong market growth. However, regulations are driving the market in the emerging nations also, as shown by Brazil for example. Here, there has been a stronger legislative focus on the safety of machines and installations with the result that, according to VDC, turnover for machine safety will increase from 50 million US dollars in 2009 to more than 100 million by 2015.

Regardless of how complex and varied the functional safety regulations on the global market for suppliers and end customers are, they ultimately provide companies with an opportunity to familiarise themselves with the market and quickly offer the appropriate products and infrastructures. EBV lends its support to companies here, in terms of providing both the necessary electronic components and comprehensive information relating to functional safety standards and legislation.



A handwritten signature in blue ink, likely belonging to Slobodan Puljarevic.

Slobodan Puljarevic
President & CEO, EBV Elektronik

A Key to the Russian Electronics Market



Web Projects

Media-KiT publishing house is proactively developing online-services for our readers. Currently we have 6 specialized internet-portals dedicated to electronic components.

On our web site we maintain an electronic archive of technical articles from all different sectors of the industry. The total audience of our site is constantly growing, and has already exceeded 200 000 visits per month

Media-KiT publishing house also performs the following editorial and polygraph works: translation to Russian from English and German languages, design, layout and printing catalogues and brochures.

Among our customers are Agilent Technologies, Arrow Electronics, Avago Technologies, EBV Elektronik, Infineon Technologies, Farnell, Freescale Semiconductor, Ledit, Maxim, Murata.

Media-KiT is the largest independent B2B publishing house in the Russian market of professional electronics.

In 1993 we started to publish our first magazine, which was a section dedicated to electronic components. In 1999 the section has been turned into a separate magazine «Components and Technologies».

Currently Media-KiT publishing house covers the largest professional reader's audience in Russia's electronic industry. Our publishing house annually participates in more than in 30 exhibitions in Russia and other countries of the former Soviet Union.

Components&Technologies magazine is focused on all players of the electronic components' market. It is dedicated to all areas of electronics from component base to modules, circuitry, technological, test and measurement equipment. Target audience — design engineers, production engineers and managers.

First edition — 1999
Frequency — 12 issues per year
Circulation — 6000 copies
www.kit-e.ru

Power Electronics is the only magazine in Russia dedicated to power electronics. The magazine contains information about power semiconductors, drives, converters, power supplies. The target audience is engineers and specialists in application of power electronics devices.

First edition — 2004
Frequency — 6 issues per year
Circulation — 4000 copies
www.power-e.ru

TECHNOLOGIES in Electronic Industry is the magazine about PCB, assembly technique, microelectronics, new technological equipment and consumable materials used in electronic manufacturing. The target audience includes technologists, production engineers and managers of electronic manufacturing companies.

First edition — 2005
Frequency — 8 issues per year
Circulation — 4000 copies
www.tech-e.ru

WIRELESS TECHNOLOGIES magazine is dedicated to wireless M2M solutions: GSM/GPRS modules and standards, the modules of 802.XXX standard group, ISM modules, and accessories for wireless communication equipment.

First edition — 2005
Frequency — 4 issues per year
Circulation — 3000 copies
www.wireless-e.ru

Solid-State Lighting is dedicated to visual optoelectronics. This magazine covers LED components, applications and innovative technologies in the solid state lighting area.

First edition — 2009
Frequency — 6 issues per year
Circulation — 3000 copies
www.led-e.ru

St.Petersburg office
tel. +7 812 438-1538,
fax +7 812 346-0665

Moscow office
tel. +7 495 775-1676

Representative in Germany
+49 151 53 56 24 24

e-mail: compitech@fsmedia.ru

**DEAR READER,**

This edition of “The Quintessence” is all about the subject of “Functional Safety”. An unwieldy term, yet in fact the aim behind it is very simple: no machine, installation or device must present a risk to people or the environment in the event of a fault occurring while it is in operation. Problems that were previously resolved by means of simple mechanical solutions, such as fall-arresting devices on lifts or protective doors on machine tools, today demand significantly more detailed solutions: firstly because technology is becoming ever more complex, and secondly because nowadays, thanks to microprocessor technology, many functions are controlled electronically and by means of software. This is not just a matter of safety systems such as light barriers in industry or ABS in cars – frequently the basic functions of a machine are also relevant to its safe, hazard-free operation. Take, for example, e-mobility where electric cars may be driven by four electric motors positioned immediately on the wheels. Here, functional safety means having to exclude the possibility of a motor stopping suddenly, thereby causing the car to slew. On the subject of e-mobility, when superstars such as Lady Gaga or Orlando Bloom can mount a fast e-bike like the BlackTrail from PG and travel at speeds of 100 km/h, the manufacturer is well advised to have a thought for safety. In our interview, Manuel Ostner, founder of the exclusive PG Bikes, explains how he

is creating not just a high-tech device but a unique lifestyle sensation.

Yet this issue is not just concerned with the safety of electric vehicles. It introduces you to various safety-related systems in a wide range of industries and shows how they ensure that no hazard arises even in the event of a malfunction. Each of these industries has its own standards which determine what is required of such systems and their development process, a great help for designers and system planners, as those involved in our round-table discussion confirm. Yet experts also warn that standards are only a minimum consensus – the development of safety-related systems also demands above all experience and a healthy dose of common sense.

I hope you will enjoy reading this edition and may Functional Safety be with you wherever you are and wherever you travel! As always, I look forward to your feedback or suggestions. You can contact me at bernd.schlemmer@ebv.com.

Best regards

A handwritten signature in black ink that reads "Bernd Schlemmer".

Bernd Schlemmer,
Director Communications, EBV Elektronik

CONTENTS



Manuel Ostner on lifestyle, e-bikes and safety

8



Electronics are an important component of today's aircraft

22

Opening **3**

Market Overview **3**

Strict regulations support the market

Editorial **5**

Safety in all industries

In conversation **8**

With Manuel Ostner

Overview **12**

Functional safety with a system

Standards **15**

The IEC 61508 as a basic standard

Traffic **17**

Increasingly complex systems **18**

Plane, train or automobile

Safety on four wheels **20**

Vehicle electronics supporting the driver

No safety limit in the sky **22**

Computer systems also on board

Ticket to ride **24**

Guidance systems for the trains of tomorrow

Functional safety **26**

Guest editorial Texas Instruments

Industry **29**

Safe machinery **30**

Integrated into automation

Hand in hand **32**

Robot and man coming closer together

Nothing slips through the net **34**

Safe data communication

Class-B certification made easy **36**

Guest editorial NXP

Intelligent safety concept **38**

Guest editorial Infineon

Medical **41**

Systems with a special safety philosophy **42**

Use on patients

Intelligent alternative **44**

Prosthetics and implants

Overcoming barriers in the operating theatre **46**

Operating with robots



Energy 49

Reliable networks 50

Also with regenerative energies

Close to the wind 52

Machinery directive for wind turbines

Safely into the grid 54

Correctly integrating small systems

Buildings 57

Automation on the rise 58

For elevators and doors

“All safe, gentlemen!” 60

Thanks to complex elevator technology

Free entry 62

Sensors ensuring safety of automatic doors

Standards:

Something for everyone 64

Functional safety standards

Company and products 67

We recognise the challenges 68

Interview with Antonio Fernandez, EBV

Product Presentations 70

Solutions from Texas Instruments, STMicroelectronics und Vishay

Trends and visions 77

Standards are not a panacea 78

Experts discuss functional safety

Hardware Authentication 82

Guest editorial Atmel

Good to know 85

Glossary 85

Key terms briefly described

Previous issues 88

Imprint 90

Picture credits 90