

# Safety Warnings for E-IO Safety System

## Berghof Automation



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# 1. Legal Notice

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## 1.2. Version Details

Document History		
Version	Date	Comments
1.00	15.03.18	Initial-Version ERRATA Warning #1 added

### 1.2.1. FSM - Functional Safety Management

According to our FSM procedures, in this document we inform you about potential applicationdependent and safety-relevant problems with CODESYS Safety and our E-IO Safety System.

If necessary, please inform your customers about the problem (unless you can rule out the occurrence in your system).

## 2. Overview

Übersicht							
Warning No.	Date	Comments	Affects	Order number	Modul Release	CODESYS Safety Reference (if available)	fixed?
#1	22.02.18	Unmapped output bits may be set to 1 on a physical output	SafetyPLC	204909000	1.0x	3S Warning #17 SCDS-4551	No

## 3. Safety Warnings

### 3.1. Safety Warning #1

<b>Title:</b>	Unmapped (SAFE)BOOL outputs may go to 1 in output modules with more than 2 BYTE or WORD or DWORD output channels
<b>Category:</b>	physical output
<b>Reference:</b>	SCDS-4551

The following error can occur on your safety controller in operation with safety applications which control single bits of an output module > 1 byte (all field busses, all safety protocols):

An unmapped output bit, i.e. a bit, which is not mapped to a variable of the application, can change to 1 at the physical output.

If, in the machine, a safety relevant actuator is connected to this unmapped output bit, this value change may lead to a sudden hazard.

<b>Details:</b>	The error can only occur
	→ if the image structure of the output module according to the device description contains multiple byte channels, or multiple word or multiple dword channels, and
	→ if only single bits of these channels are mapped to variables of the application and others remain unmapped,
	→ namely in such a way, that the same bit (e.g. #4) is mapped in one channel and unmapped in another channel of the same output module.

At the physical output, this bit (e.g. #4) then always has the same value in both channels.

That is, if the application sets the mapped bit to 1, the unmapped bit goes to 1 at the same time.

<b>Affected:</b>	all versions (CODESYS Safety 1.0, 1.1, 1.2, 1.3, 1.4, 1.4.1)
	→ that means also Version 1.0x of the E-IO Safety PLC (204908000)

<b>Possible workarounds:</b>	→ Don't connect actuators to unmapped output bits.
	→ Or don't use output modules with 2 output channels of the same binary type (no 2 bytes, no 2 words, no 2 dwords).
	→ Or change the device descriptions of output modules to merge multiple byte channels to 1 word or dword channel, or similar.
	→ Or no unmapped output bits.
	→ Or, if a bit of an output channel is unmapped, then its also unmapped in the other output channels of the same output module.

<b>Further steps:</b>	Fix with CODESYS Safety 1.5 (SCDS-4551) in the runtime. Remedy in the field will require a firmware update.
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**Additional  
Informations:**

the cases known to us up to now which are critically affected by the bug are:

- safe drives (e.g. ETG safety drive profile) with multiple control bytes and a safety function supposed to be active continuously:  
If the application engineer decides not to drive this safety function via a variable of the safety application, but to rely on default 0 = active, then, during applicative deactivation of some other safety function, this safety function could be deactivated at the same time because of the bug.

In the following cases, the bug has no effect:

- Channels which are not mapped at all, i.e. no single bit is mapped to a variable: They remain on 0.
- Safety NetVars (The receiver has no access to bits unmapped in the sender; a 3S specific runtime check guarantees that bits are mapped consistently in sender and receiver)
- Exchange variables (The logical exchange devices defined by the Safety Package have only 1 channel)