



# **PLCopen - Technical Committee 5**

## **Safety Software**

### **Technical Specification**

#### **Part 1: Concepts and Function Blocks**

#### **Version 1.0 – Official Release Compliance Statement Only**

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Date: April 20, 2006.

## **Appendix 1. Compliance Procedure and Compliance List**

Listed in this Appendix are the requirements for the compliance statement from the supplier of the safety specification. The compliance statement consists of two main groups:

1. Reduction in programming languages and functionality (see "Appendix 1.2 Reduction in the Development Environment").
2. The definition of a set of function blocks with safety-related functionality (see "Appendix 1.3 Overview of the Function Blocks").

The supplier must fill out the tables for their implementation, according to their product, committing their support to the specification itself.

By submitting these tables to PLCopen, and following approval by PLCopen, the list will be published on the PLCopen website (<http://www.plcopen.org>) as specified in "Appendix 2 The PLCopen Safety Logo and Its Use" below.

In addition to this approval, the supplier is provided with access and usage rights for the PLCopen Safety logo, as described in Appendix 2 The PLCopen Safety Logo and Its Use.

**Appendix 1.1. Supplier Statement**

Supplier name	3S-Smart Software Solutions GmbH
Supplier address	Memminger Straße 151
City	87439 Kempten
Country	Germany
Phone	+49-831-54031-0
Fax	+49-831-54031-50
Website	<a href="http://www.codesys.com">www.codesys.com</a>
Product name	CODESYS Safety
Product version	1.x
Release date	21.10.2012
Certified by	TÜV Rheinland Industrie Service GmbH

I hereby state that the following tables as filled out and submitted correspond to our product and the accompanying user manual, as stated above.

Name of representative: Dr. (MUN) Ulf Schünemann

Date of signature (dd/mm/yyyy): 28/01/2013

Signature:

## Appendix 1.2. Applicable reductions in the Development Environment

Supported User Levels (See Section 4)	Supported	Comments (< 48 Characters)
Basic level	X	
Extended level	X	
System level	X	Limited to OEM

**Table 1: Supported user levels**

Supported Programming Languages	Supported	Comments (< 48 Characters)
Function Block Diagram, FBD	X	
Ladder Diagram, LD	-	

**Table 2: Supported programming languages**

Supported Data Types	Supported	Comments (< 48 Characters)
SAFEBOOL	X	Also: SAFEINT, SAFEDINT, SAFEWORD, SAFETIME
BOOL	X	
INT	X	
DINT	X	
REAL	-	
WORD	X	
TIME	X	
Other ANY_BIT	X	Specify which: BYTE, DWORD (System level and IO-points in Extended level)
Other ANY_INT	-	Specify which
Other ANY_REAL	-	Specify which
ANY_DATE	-	Specify which
STRING	-	Specify which

**Table 3: Supported data types**

Supported Functions and FBs – Basic Level	Supported	Comments (< 48 Words)
AND	X	
OR	X	Operation of only SAFEBOOL permitted - see Ch. 4.4
Type Conversion functions	X	Specify which: implicit SAFEBOOL to BOOL
TON	X	Name: SF_TON (acc. to PLCopen Safety Appendix 0.94)
TOF	X	Name: SF_TOF (acc. to PLCopen Safety Appendix 0.94)
TP	X	Name: SF_TP (acc. to PLCopen Safety Appendix 0.94)
CTU	X	Name: SF_CTU (acc. to PLCopen Safety Appendix 0.94)
CTD	X	Name: SF_CTD (acc. to PLCopen Safety Appendix 0.94)
CTUD	X	Name: SF_CTUD (acc. to PLCopen Safety Appendix 0.94)
Others?	-	Specify which

**Table 4: Supported Functions and Function Blocks at Basic Level**

Supported Functions and FBs – Extended Level	Supported	Comments (< 48 Words)
AND	X	Extendable
OR	X	Extendable
XOR	X	
NOT	X	
ADD	X	Extendable
MUL	X	Extendable
SUB	X	
DIV	X	
GT, GE, EQ, LE, LT, NE	X	Specify which: GT, GE, EQ, LE, LT, NE
Selection functions	X	Specify which: SEL, MUX* * runtime error if selection value out of range
Type conversion functions	X	Specify which: implicit SAFE-XXX to nonsafe-XXX, 'BOOL_TO_INT', 'INT_TO_BOOL', 'BOOL_TO_DINT', 'DINT_TO_BOOL', 'BOOL_TO_TIME', 'TIME_TO_BOOL', 'BOOL_TO_WORD', 'WORD_TO_BOOL', 'INT_TO_DINT', 'DINT_TO_INT', 'INT_TO_TIME', 'TIME_TO_INT', 'INT_TO_WORD', 'WORD_TO_INT', 'DINT_TO_TIME', 'TIME_TO_DINT', 'DINT_TO_WORD', 'WORD_TO_DINT', 'TIME_TO_WORD', 'WORD_TO_TIME', 'BYTE_TO_INT', 'INT_TO_BYTE', 'BYTE_TO_DINT', 'DINT_TO_BYTE', 'BYTE_TO_TIME', 'TIME_TO_BYTE', 'BYTE_TO_WORD', 'WORD_TO_BYTE', 'INT_TO_DWORD', 'DWORD_TO_DINT', 'DINT_TO_DWORD', 'DWORD_TO_TIME', 'TIME_TO_DWORD', 'WORD_TO_DWORD'  * runtime error if source value is not in target type
Time functions	X	Specify which: ADD, MUL, SUB, DIV
TON	X	Name: SF_TON (acc. to PLCopen Safety Appendix 0.94)
TOF	X	Name: SF_TOF (acc. to PLCopen Safety Appendix 0.94)
TP	X	Name: SF_TP (acc. to PLCopen Safety Appendix 0.94)
CTU	X	Name: SF_CTU (acc. to PLCopen Safety Appendix 0.94)
CTD	X	Name: SF_CTD (acc. to PLCopen Safety Appendix 0.94)
CTUD	X	Name: SF_CTUD (acc. to PLCopen Safety Appendix 0.94)
Bistable FBs	X	Specify which: SF_SR, SF_RS (acc. to PLCopen Safety Appendix 0.94)
Edge detection	X	Specify which: SF_R_TRIG, SF_F_TRIG (acc. to PLCopen Safety Appendix 0.94)
Others?	-	Specify which

**Table 5: Supported Functions and Function Blocks at Extended Level**

### Appendix 1.3. Overview of the supported Function Blocks

Function Blocks	Supported	Comments (<= 48 Characters)
SF_Equivalent	X	

SF_Antivalent	X	
SF_ModeSelector	X	
SF_EmergencyStop	X	
SF_ESPE	X	
SF_SafeStop1	-	
SF_SafeStop2	-	
SF_SafetyGuardMonitoring	X	Name: SF_GuardMonitoring (acc. to PLCopen Safety Part 1, V1.0)
SF_SafelyLimitedSpeed	-	
SF_TwoHandControlTypeII	X	
SF_TwoHandControlTypeIII	X	
SF_GuardLocking	X	
SF_TestableSafetySensor	X	
SF_MutingSeq	X	
SF_MutingPar	X	
SF_MutingPar_2Sensors	X	
SF_EnableSwitch	X	
SF_SafetyRequest	X	
SF_OutControl	X	
SF_EDM	X	

**Table 6: Overview of the function blocks**

## **Appendix 2.      The PLCopen Safety Logo and Its Use**

For quick identification of compliant products, PLCopen has developed a logo for the Safety Specification:



**Figure 1: The PLCopen Safety logo**

This logo is owned and trademarked by PLCopen.

In order to use this logo free of charge, the relevant company must meet all of the following requirements:

1. The company must be a voting member of PLCopen;
2. The company must comply with the existing specification, as specified by the PLCopen Technical Committee 5 - Safety, and as published by PLCopen, and of which this statement is a part;
3. This compliance is submitted in writing by the company to PLCopen, clearly stating the applicable software package and the supporting elements of all the specified tables, as specified in this document;
4. The company is aware that this compliance is only a statement of the supporting elements as specified in this document. In particular, the company is aware that this statement does not have any relationship to the implementation itself, nor the fulfillment of any requirements as specified in any safety standard, safety procedure, or development procedure, and does not state anything with regard to the quality of the product itself, nor certification procedures performed by a third party;
5. In the event of non-fulfillment, which must be decided by PLCopen, the company will receive a written statement to this effect from PLCopen. The company will have a period of one month to either adapt their software package in such a way that it is compliant, i.e., by issuing a new compliance statement, or removal of all reference to the specification, including the use of the logo, from all their specifications, be they technical or promotional material;
6. The logo must be used as is - i.e., in its entirety. It may only be altered in size as long as the original scale and color settings are maintained;
7. The logo must be used in the context of PLCopen Safety.