



The manufacturer may use the mark:



Revision 1.1 June 26, 2018
Surveillance Audit Due
September 1, 2021



ANSI Accredited Program
ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004

Certificate / Certificat Zertifikat / 合格証

DAN 1309035 C001

exida hereby confirms that the:

**PLUS+1® Safety Controller Family with
Modular Safety Kernel for PLUS+1® GUIDE**

**Danfoss Power Solutions (US) Company
Ames, IA - USA**

Has been assessed per the relevant requirements of:

**IEC 61508 : 2010 Parts 1-7
IEC 62061:2005+ A1:2012+ A2:2015**

and meets requirements providing a level of integrity to:

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type B Element

SIL 2 @ HFT=0; Route 1_H

**PFH, PFD_{AVG} and Architecture Constraints
must be verified for each application**

Safety Function:

The PLUS+1® Safety Controller Family with Modular Safety Kernel for PLUS+1® GUIDE will provide or maintain a safe state, within the stated safety response time, as programmed by the user application.

Application Restrictions:

The system must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



John C. Yozallinas
Evaluating Assessor

Rudolf P. Chalupa
Certifying Assessor

DAN 1309035 C001

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type B Element

SIL 2 @ HFT=0; Route 1_H

PFH/PFD_{avg} and Architecture Constraints must be verified for each application

PLUS+1® Safety Controller Family with Modular Safety Kernel for PLUS+1® GUIDE
(see report for HW/SW versions)

Systematic Capability:

The Product has met manufacturer design process requirements of Safety Integrity Level (SIL) 2. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element.

IEC 61508 Failure Rates in FIT*

Component	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}	SFF
Common – No External Memory	696	16	744	62	95.9%
Common – With External Memory	2451	16	2556	263	95.0%
DAV/F	0	11	0	22	33.6%
DARC – Current Mode	0	5	11	5	76.2%
DARC – Resistance Mode	0	11	10	11	64.8%
Discrete Output	73	38	28	1	99.6%
PWM Output	143	1	36	10	94.6%

* FIT = 1 failure / 10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/PFD_{avg} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: DAN 13-09-035 R001 V2R1 (or later)

Safety Manual: L1420375, Rev 0301 (or later)



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