STANDARDS UPDATE NOTICE (SUN)
ISSUED: August 17, 2023

STANDARD INFORMATION

Standard: UL 61800-5-2
Standard ID: Adjustable Speed Electrical Power Drive Systems - Part 5-2: Safety Requirements - Functional [UL 61800-5-2:2022 Ed.2]
Previous Standard ID: Adjustable Speed Electrical Power Drive Systems - Part 5-2: Safety Requirements - Functional [UL 61800-5-2:2012 Ed.1+R:15Dec2020]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **October 1, 2024**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

Overview of Changes:

- Addition of requirements for PDS(SR)
- Integrated circuits with on-chip redundancy
- Basic and well-tried safety principles
- New test requirements
- Electromagnetic immunity (EM) requirement for PDS(SR)

Specific details of new/revised requirements are found in table below

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.

STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		Additions to existing requirements are underlined and deletions are shown ~~lined out~~ below.
5	Info	**Management of functional safety**
5.4		**Planning of PDS(SR) functional safety management** A plan shall be generated and updated as necessary throughout the entire development of the PDS(SR). It shall define the activities required to satisfy Clauses 5 to 10, and specify persons and their competence, department(s), or organization(s) responsible for completing these activities. In particular, the plan shall consider or include the following, as appropriate for the complexity of the PDS(SR). a) Generation of the safety requirements specification (see 5.5), including factors such as: – the choice of methods for the avoidance of mistakes during generation of the safety requirements specification (see IEC 61508-2:2010, Annex B); – the consideration of requirements from guidelines and standards for specific target applications of the PDS(SR); b) Generation of the safety system architecture specification (see 5.6), including factors such as: – the personnel responsible for generation and maintenance of the safety system architecture specification; – the choice of methods for the avoidance of mistakes during generation of the safety system architecture specification (see IEC 61508-2:2010, Annex B); – the consideration of requirements from guidelines and standards for specific target applications of the PDS(SR); – the personnel responsible for verification of the safety system architecture specification; – the process for changing the safety system architecture specification after development has started. c) Design and development of the safety sub-function(s) in the PDS(SR), including (where applicable) factors such as: – the personnel responsible for design and development; – the selection of product development and project management methodologies (see IEC 61508-7:2010, B.1.1); e) A validation plan for the safety sub-function(s) comprising the following: – the procedures to be applied to validate that each safety sub-function of the PDS(SR) is correctly implemented, and the pass/fail criteria for accomplishing the tests;

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		– the procedures to be applied to validate that each safety sub-function of the PDS(SR) is of the required safety integrity, and the pass/fail criteria for accomplishing the tests; – the required environment in which the testing is to take place including all necessary tools and equipment (also plan which tools and equipment should be calibrated); – test evaluation procedures (with justifications); – the test procedures and performance criteria to be applied to validate the specified electromagnetic immunity limits; g) Where assessment is required (see IEC 61508-1:2010, Clause 8), a functional safety assessment plan providing all information necessary to facilitate an effective assessment and including: – how the functional safety assessment relates to, and shall be integrated with, other functional safety assessments where appropriate; – the requirement to perform an impact analysis to determine which parts of the assessment are to be repeated in case of a modification (see also IEC 61508-1:2010, 7.16.2) In establishing the scope of each functional safety assessment, it will be necessary to specify the documents, and their revision status, that are to be used as inputs for each assessment activity.
5.5	Info	**Safety requirements specification (SRS) for a PDS(SR)**
5.5.1		**General** A safety requirements specification for a PDS(SR) shall be documented and shall comprise: – written to aid the comprehension by those who are likely to utilise the information at any stage of the PDS(SR) safety lifecycle; – expressed in natural or formal language and/or logic, sequence or cause and effect diagrams that define the necessary safety sub-functions with each safety sub-function being individually defined.
5.5.2		**Safety sub-functions requirements specification** The safety sub-functions requirements specification shall provide comprehensive detailed requirements sufficient for the design and development of the PDS(SR). The safety sub-functions requirements specification shall describe, as appropriate: b) comprehensive detailed requirements sufficient for the design and development of the PDS(SR) including all the normative requirements to be fulfilled; NOTE Requirements like the selected measures of fault avoidance and fault control and the selected measures and techniques for software design and

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		testing etc. can be included in safety sub-functions requirement specification. c) the applicable mode of operation regarding functional safety; d) the manner in which the PDS(SR) is intended to achieve or maintain a safe state for intended applications;
5.5.3		**Safety integrity requirements specification** The safety integrity requirements specification for a PDS(SR) shall contain: e) limiting and constraint conditions for the realisation of PDS(SR) due to the possibility of common cause failures; f) the quality assurance/quality control measures necessary for management of functional safety (see IEC 61508-1:2010, Clause 6).
5.6		***New section added;*** **PDS(SR) safety system architecture specification** The objective of the safety system architecture specification is to specify the architectural decomposition of the PDS(SR) and the requirements for the resulting subsystems and parts of subsystem.
6	Info	**Requirements for design and development of a PDS(SR)**
6.1	Info	**General requirements**
6.1.6		**SIL for multiple safety sub-functions within one PDS(SR)** The safety integrity level of one safety sub-function can be different from the others, and the requirements for design of each safety sub-function are defined as follows. The requirements for hardware and software shall be determined by the safety integrity level of the safety sub-function having the highest safety integrity level unless it can be shown that the implementation of the safety sub-functions of the different safety integrity levels is sufficiently independent.
6.1.7		***New clause added;*** **Integrated circuits with on-chip redundancy** Digital ICs which implement on-chip redundancy with the goal of increasing fault tolerance in a PDS(SR) shall satisfy all of the special requirements for ICs with on-chip redundancy according to IEC 61508-2:2010, Annex E, in case of duplicated circuitry. Alternatively, a justification shall be given that the same level of independence between different channels is achieved by applying a different set of measures.
6.2	Info	**PDS(SR) design requirements**

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6.2.1		***New clause added;*** **Basic and well-tried safety principles** Basic and well-tried safety principles shall be considered where applicable when a category is claimed for the PDS(SR). – For electrical and electro-mechanical PDS(SR), these principles correspond to ISO 13849-2:2012, Table D.1 and Table D.2 – For mechanical parts (e.g. encoders), these principles correspond to ISO 13849-2:2012, Table A.1 and Table A.2
6.2.5	Info	**Requirements for systematic safety integrity of a PDS(SR) and PDS(SR) subsystems**
6.2.5.2	Info	**Requirements for the control of systematic faults**
6.2.5.2.7		***New clause added;*** **PDS(SR) parameterization** Almost all PDS(SR) need configuration parameters which determine the behaviour of safety sub-functions. The software-based parameterization shall be considered as a safety-related aspect of the PDS(SR) design to be described in the software safety requirements specification. Parameterization during act of installing and maintenance shall be carried out using a dedicated parameterization tool provided by the supplier of the PDS(SR). This tool shall have its own identification (name, version, etc.) and shall prevent unauthorized modification, for example, by use of a password. There are no functional safety requirements to be fulfilled by this parameterization tool. A special procedure shall be used for setting the safety-related parameters. This procedure shall include confirmation of input parameters to the PDS(SR) by – retrieval, display and check by operator of the modified parameters and – a verification of the correctness of the parameters in the PDS(SR) by • a configuration test (see 7.2f) or • other suitable means defined by the PDS(SR) manufacturer as well as subsequent documented confirmation of the safety-related parameters, e.g. by a suitably skilled person and by means of an automatic check by a parameterization tool.
6.2.5.2.7DV.1 D2		***New clause added;*** In lieu of a dedicated parameterization tool, protection against unauthorized modification of safety related parameters may be provided by the PDS(SR).
7	Info	**Information for use**

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7.1		***New clause added;*** **General** PDS(SR) manufacturers shall provide information for the users in a safety manual. General requirements of the safety manual are referred to IEC 61508-2:2010, Annex D, and IEC 61508-3:2010, Annex D. This clause describes additional requirements for a PDS(SR).
9		***New section added;*** **Test requirements** Testing of the safety sub-functions of the PDS(SR) shall be planned concurrently with each phase of the development process. See standard for details.
Annex E		***New annex added;*** **Electromagnetic (EM) immunity requirement for PDS(SR)** To show compliance with the design requirements for a PDS(SR) regarding electromagnetic (EM) immunity described in 6.2.6, the immunity requirements provided in the following Table E.1, Table E.2 and Table E.3 shall apply with performance criteria of 9.3.3. See standard for details.