

Global Manufacturing Standards  Programmable Safety Systems	Standard Number w-EL10
	Issue Date: 2-06-06
	Rev: 1

1. PURPOSE AND SCOPE

The aim of this Standard is to establish the principles for the: specification, use and maintenance of Programmable Safety Systems (PSS) that together, create a 'Safe System of Work'.

1.1. Applicability/Scope:

- This Standard applies to Ford Motor Company's manufacturing facilities, worldwide.

1.2. Exceptions

None

1.3. Mandatory and Preferred Items

Mandatory requirements of this Standard and associated appendices are characterized by the use of the word "shall". Departure from these requirements requires a written deviation prior to shipment to a Ford site. Preferred items are characterized by the use of the word "should".

1.4. Objectives

The objectives of this Manufacturing Standard are as follows:

- Specify mandatory requirements for the application of Programmable Safety Systems.
- Through the use of appendices, identify specific forms and Programmable Safety Controllers that meet the intent of this standard.
- Identify a means to control changes to Programmable Safety Systems and detect unauthorized change.
- Specify documentation requirements and approved methods for the certification/re-certification of applications.

2. REFERENCE STANDARDS

Whenever a specific Standard is referenced, it shall be the latest revision, unless otherwise specified.

2.1. Ford Standards and Specifications

- E1 – QSL Qualified Source List. North American Electrical Equipment. (North America only)
- Program Approved Source Lists

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2.2. Industry Standards

2.2.1. Programmable Safety Controllers:

- IEC 61508 - Functional safety of electrical/electronic/programmable electronic safety-related systems.
- ANSI [NFPA 79](#) - Electrical standard for industrial machinery
- ANSI UL508 – Standard for Industrial Control Equipment.
- CSA C22.2 No. 0.8 and No. 14

2.2.2. Programmable Safety Controller Installation

- IEC 62061 - Safety of machinery, Functional safety of safety-related electrical, electronic and programmable electronic control systems.
- IEC 60204 - Safety of machinery – Electrical equipment for machines.
- ANSI [NFPA 79](#) - Electrical standard for industrial machinery

2.2.3. Risk Assessment.

- ISO 14121 Safety of machinery - Principles of risk assessment.
- ISO 13849-1 – (Note: equivalent to EN954-1:1997) Safety-related parts of control systems -- Part 1: General principles for design [Note: Used to define safety categories].

Note: The following tools should be used to assist in the development of individual machine risk assessment.

- IEC 62061 Safety of machinery, Functional safety of safety-related electrical, electronic and programmable electronic control systems.
- ANSI RIA R15.06 – Industrial robots and robot systems – safety requirements.
- ANSI B11.TR3 – Risk assessment and risk reduction – A guide to estimate, evaluate and reduce risks associated with machine tools.

2.3. Testing and Certification

- 2.3.1. Programmable Safety Controllers shall be CE Marked () to meet IEC61508 and have NRTL certification to NFPA79 and UL508.

3. CONFORMANCE

3.1. Material and Components

- 3.1.1. All materials and components supplied to this Global Manufacturing Standard shall be equivalent in all respects to material upon which approval was originally granted. Any deviations from this Standard, without written notice and subsequent review and re-approval by the Ford Global Manufacturing Standards - Electrical Technical Committee, will be sufficient cause for removal from the Ford Global Manufacturing Standards - Electrical Qualifying Source List (E1-QSL).
- 3.1.2. All products submitted for evaluation shall be "off-the-shelf" catalog types manufactured with normal production procedures and quality control. Prototypes will not be considered.
- 3.1.3. The Programmable Safety Controller (PSC) supplier shall provide a written statement of their procedures should a safety recall or safety notice be required.

3.2. Data Sheets and Appendices

- 3.2.1. Suppliers shall submit a Programmable Safety Standard appendix numbered with this Standard. Suppliers shall also submit relevant Data Sheets and copies of test Agency certificates and associated letters and documentation which cite the actual standards their products were tested to. The Vice President (or equivalent) of Engineering or a higher officer of the Supplier's (Manufacturer's) company shall sign the original copy of the appendix.
- 3.2.2. Approvals shall be made based on conformance to this Standard as certified by the above Data Sheet, the required Agency approvals, as well as laboratory and performance tests and documented Shop Trials. All documentation is subject to the review of Ford Global Manufacturing Standards - Electrical Technical Committee.
- 3.2.3. The following appendices identify mandatory forms for use when applying Programmable Safety Systems:
- Appendix 1 – PSS Design and Installation Assessment
 - Appendix 2 – PSS Permit to Work

3.3. Approved PSS Controller Appendices

- 3.3.1. The Programmable Safety Controllers listed below conform to the requirements of this standard.
- Appendix P1 – Pilz PNOZmulti
 - Appendix R1 – Rockwell Automation Allen Bradley GuardLogix Integrated Safety
 - Appendix S1 - Siemens SINUMERIK Safety Integrated® CNC system.

4. DEFINITIONS

- 4.1. **Application Code** – Software that is designed and written for a specific machine or equipment task.
- 4.2. **Certified Design** – The approved hardware and software design referenced in the *Declaration of Certification*.
- 4.3. **Checksum** – A unique value that is automatically generated by the Programmable Safety Controller when the application is compiled. Any change to the application program will cause the generation of a new value.
- 4.4. **Declaration of Certification** - A written declaration that a *Programmable Safety System* application has been tested and complies with stated criteria.
- 4.5. **OEM** - Original Equipment Manufacturer. A machine tool or equipment supplier.
- 4.6. **Permit to Work** – A documented procedure designed to maintain a 'safe system of work'.
- 4.7. **Program Approved Source Lists** - A list of parts approved for use by the requisitioning authority.
- 4.8. **Programmable Safety Controller** - A programmable or configurable software and firmware-based system that meets the requirements of current standards by guaranteeing safety through redundancy, diversity, and self-monitoring.
- 4.9. **Programmable Safety System (PSS)** - A machine/equipment safety system that utilizes a *Programmable Safety Controller*.
- 4.10. **Programming Software** – A software tool used to write *Application Code*.
- 4.11. **Qualified Person** - A person that has successfully completed all three levels of training specified in Section 5.3 of this standard.
- 4.12. **Responsible Person** – A person empowered by the Ford management to make decisions and instruct *Qualified Persons* in work related to a specific task, and having the necessary knowledge and experience for that purpose.
- 4.13. **Technical Guideline** –A document issued by the Programmable Safety Controller manufacturer to supplement their user manual.
- 4.14. **Temporary Change** –An interim change to the *Certified Design*, implemented for a period of time necessary to resume production safely until the *Certified Design* or permanent change can be implemented.