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ANSI Technical Report for Machines –

Safety Control Systems for Machine Tools

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Foreword

Recognizing the need for a guidance document on the subject matter, the ANSI B11 Accredited Standards Committee for Machine Safety formed a subcommittee consisting of professionals that are involved in manufacturing, safety, design, integration and controls to develop a technical report giving guidance in understanding and implementing safety control functions when applied to machines covered by the ANSI B11 series of machine safety standards.

The intent is to illustrate safety control circuit design concepts to help mitigate the risks identified by a risk assessment. The following example circuits, explanations, and minimum fault exclusions are for educational purposes and do not contain complete information on electrical, fluid power, and mechanical design requirements. Substitutions, additions, or changes to the circuits, components, safety modules, or safeguarding devices should be thoroughly researched and examined as to the extent of the impact on the integrity, reliability, and the level of performance of the safety functions. The designer should refer to relevant standards, regulations, and codes to address all installation and safety requirements.

The B11.TR6 Subcommittee began with current industrial circuit applications and provided examples of common solutions in use at the time of creating this document; these are not intended to limit innovation or the advancement of technology.

Industry users expressed the desire that example circuits be depicted in a NEMA format. To provide clarity and enhance understanding the committee created symbols for safety components that previously did not exist. These new symbols distinguish safety rated components from their non-safety rated counterparts such as emergency stops and forced guided relays. This document also identifies the relationship between ANSI B11.TR3 risk level (now included within ANSI B11.0) and that of the Categories of ISO 13489.

The Circuit Analysis Table for each circuit diagram provides important guidance information on the performance of safety-related functions, identification and analysis of failures, and safety-related performance levels for categories B through 4 as referenced in section 4.13.

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