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ANSI Technical Report for Machines – Safety Control Systems for Machine Tools

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TABLE OF CONTENTS	PAGE
Introduction and Overview of the ANSI B11 Series.....	13
1 Scope	15
2 References	15
3 Definitions.....	16
4 General Design Considerations for Mechanical, Fluid Power and Electrical Technologies.....	21
4.1 ANSI B11.TR6 Circuit Analysis Tables	21
4.2 Practical Use of TR6.....	22
4.2.1 General.....	22
4.2.2 Applying TR6 to a Sample Application.....	22
4.3 Reset Function of the Safety Circuit.....	24
4.4 Start Function.....	24
4.5 Testing & Verification of the Safety Function	24
4.5.1 Category 2 Periodic Test.....	24
4.6 Fault Consideration.....	24
4.6.1 Fault Analysis	25
4.6.2 Fault Exclusion	25
4.7 Response Time.....	25
4.8 Mechanical Considerations (general)	25
4.9 Fluid Power (Pneumatics & Hydraulics)	25
4.9.1 General Considerations.....	25
4.9.2 Basic Methodology for Safety Interfacing.....	25
4.9.3 Pressure Vessels and Accumulators	26
4.9.4 Stored Energy (Trapped Pressure)	26
4.9.5 Reapplication of Pressure	26
4.9.6 Hoses and Fittings.....	27
4.9.7 Fluid Power Valve Crossover Considerations.....	28
4.9.8 Single Channel Fluid Power Device.....	28

4.9.9	Single Channel Fluid Power Device with Monitoring.....	28
4.9.10	Dual channel fluid power	29
4.9.11	Dual Channel fluid power with Monitoring	29
4.9.12	Dual Channel Cross Monitoring Valve	29
4.9.13	Response Time Considerations	29
4.9.14	Fault Reset Function	29
4.9.15	Position Fault.....	29
4.9.16	Diminished Performance Fault.....	29
4.9.17	Failure Modes to be Considered	29
4.9.18	Non-Safety Devices.....	30
4.10	Pneumatics.....	30
4.10.1	Basic Pneumatic System Considerations	30
4.10.2	Safety Shut-Off and Exhaust Valve.....	30
4.10.3	Filtration.....	31
4.10.4	Regulator	31
4.10.5	Lubrication	31
4.10.6	Air Valve Mufflers	32
4.10.7	Environmental Influences	32
4.11	Hydraulics.....	32
4.11.1	Basic Hydraulic System Considerations	32
4.11.2	General.....	32
4.11.3	Accumulators.....	33
4.11.4	Fluid Management.....	33
4.11.5	Filtration.....	34
4.11.6	Relief/Pressure Reducing Valve.....	36
4.12	Electrical Interfacing Considerations (General).....	36
4.12.1	Basic Methodology of Safety Interfacing.....	36
4.12.2	Protective Stop Circuits	36
4.12.2.1	Single-Channel Control.....	36
4.12.2.2	Dual-Channel Control	37
4.12.3	Safety Interface Module (SIM).....	37
4.12.4	Interfacing the Protective (Safety) Stop	38
4.12.4.1	Positive Logic	38
4.12.4.2	PES/PLC Interfacing.....	38
4.12.5	Electro-Mechanical Contact Considerations	39
4.12.6	Failure Modes.....	39
4.12.7	Power Supplies.....	39
4.12.8	Environmental Influences	39
4.13	Safety-Related Performance.....	40
5	Input Devices (safeguarding devices and complementary equipment).....	42

5.1	Emergency Stop Devices.....	42
5.1.1	Lowest Risk Reduction (Category 1).....	43
5.1.1.1	Single Channel E-Stop Using a Control Relay (Category 1).....	43
5.1.2	Low / Intermediate Risk Reduction (Category 2)	44
5.1.2.1	Dual Channel E-Stop Using Redundant Control Relays (Category 2)	44
5.1.3	Intermediate / High Risk Reduction (Category 3).....	45
5.1.3.1	Dual Channel E-Stop Using FGR Relays and Cross Monitoring (Category 3)	45
5.1.3.2	Multiple Dual Channel E-Stop with a Safety Relay Interface Module (Category 3)	46
5.1.4	Highest risk reduction (Category 4).....	47
5.1.4.1	Single Button Dual Channel E-Stop with a SIM (Category 4)	47
5.1.4.2	Single Button Dual Channel E-Stop* w/ Self Monitoring and a SIM (Category 4).....	48
5.2	Contact Interlocking.....	49
5.2.1	Description of Positive-Opening Interlock Switches.....	49
5.2.2	Type 1 and Type 2 Considerations	50
5.2.2.1	Failure Modes.....	50
5.2.2.1.1	Type 1	50
5.2.2.1.2	Type 2	50
5.2.2.2	Categories.....	50
5.2.3	General Considerations.....	50
5.2.3.1	Physical installation	50
5.2.3.2	Electrical interface	50
5.2.3.2.1	PES/PLC Control System Monitoring.....	51
5.2.3.2.2	Monitoring Series Connected Positive-Opening Interlocking Switches.....	51
5.2.4	Basic Circuit (Category B)	52
5.2.4.1	Basic Interlocked Guard Monitoring Circuit (Category B)	52
5.2.5	Lowest Risk Reduction (Category 1).....	53
5.2.5.1	Interlocked Guard Monitoring Circuit – Single Channel (Category 1).....	53
5.2.6	Low / Intermediate Risk Reduction (Category 2)	54
5.2.6.1	Series Connection of Interlocks to a SIM (Category 2).....	54
5.2.6.2	Interlocked Guard Monitoring – Single Channel w/ a SIM and PES (Category 2)	55
5.2.7	Intermediate / High Risk Reduction (Category 3).....	56
5.2.7.1	Single Interlock to a SIM (Category 3)	56
5.2.7.2	Series Connection of Interlocks to a SIM (Category 3).....	57
5.2.8	Highest Risk Reduction (Category 4).....	58
5.2.8.1	Interlocked Guard Monitoring – Dual Channel w/ Relay/Contactor and Reset Button (Category 4)	58
5.2.8.2	Interlocked Guard Monitoring – Dual Channel w/ a SIM (Category 4)	59
5.3	Guard Interlocking with Non-Contact Switches (without a Locking Function).....	60
5.3.1	Description of Non-Contact Interlock Switches	60
5.3.2	General Considerations.....	60
5.3.3	Inductive Switches.....	60
5.3.4	Optical Switches	60
5.3.5	Magnetic Switches	60
5.3.6	Transponder Switches.....	61
5.3.7	Basic Risk Reduction (Category B).....	61
5.3.7.1	Non-Contact Interlocked Guard Monitoring using Standard Retro-Reflective Photo Sensor (Category B)	61
5.3.7.2	Non-Contact Interlocked Guard Monitoring using Standard Magnetic Sensor (Category B)	62
5.3.8	Intermediate / High Risk Reduction (Category 3).....	63

5.3.8.1	Non-Contact Interlocked Guard Monitoring Circuit (Category 3).....	63
5.3.8.2	Interlocked Guard Monitoring – Dual Channel with a SIM (Category 3).....	64
5.3.9	Highest Risk Reduction (Category 4)	65
5.3.9.1	Interlocked Guard Monitoring – Dual Channel with a SIM (Category 4).....	65
5.3.9.2	Interlocked Guard Monitoring – Dual Channel with a SIM (Category 4).....	66
5.3.9.3	Interlocked Guard Monitoring – Dual Channel with a SIM (Category 4).....	67
5.3.9.4	Interlocked Guard Monitoring – Dual Channel with a SIM (Category 4).....	68
5.4	Guardlocking Interlocks	69
5.4.1	General Considerations.....	69
5.4.2	Low / Intermediate Risk Reduction (Category 2)	69
5.4.2.1	Power to Release, Inline Guardlocking Interlock (Category 2).....	69
5.4.3	Intermediate / High Risk Reduction (Category 3).....	70
5.4.3.1	Power to Release, Dual Axis Guardlocking Interlock (Category 3).....	70
5.4.4	Highest Risk Reduction (Category 4)	71
5.4.4.1	Power to Release, Inline Guardlocking Interlock (Category 4).....	71
5.4.4.2	Power to Release, Dual Axis Interlock Connected to a SIM (Category 4).....	72
5.4.4.3	Power to Release, Dual Axis Interlock Connected to a SIM (Category 4).....	73
5.4.4.4	Power to Release, Dual Axis Interlock Connected to a SIM (Category 4).....	74
5.5	Optical Presence Sensing Devices	75
5.5.1	General Considerations.....	75
5.5.1.1	Light Curtains	75
5.5.1.2	Single/Multiple Beam Devices (Point or Grid Devices)	76
5.5.1.3	Scanners	76
5.5.2	Lowest Risk Reduction (Category 1).....	77
5.5.2.1	IEC 61496 Type 2 Presence Sensing Device with Control Relay (Category 1).....	77
5.5.3	Low / Intermediate Risk Reduction (Category 2)	78
5.5.3.1	IEC 61496 Type 2 Presence Sensing Device with Force-guided Relay (Category 2)	78
5.5.3.2	IEC 61496 Type 2 Presence Sensing Device with Force-guided Relay (Category 2)	79
5.5.4	Intermediate / High Risk Reduction (Category 3).....	80
5.5.4.1	IEC 61496 Type 3 Presence Sensing Device with Safety Interface Module (Category 3).....	80
5.5.5	Highest Risk Reduction (Category 4)	81
5.5.5.1	IEC 61496 Type 4 Presence Sensing Device with OSSD (Category 4)	81
5.5.5.2	IEC 61496 Type 4 Presence Sensing Device with Safety Interface Module (Category 4).....	82
5.6	Mats / Edges	83
5.6.1	General considerations	83
5.6.2	Low / Intermediate Risk Reduction (Category 2)	83
5.6.2.1	Single Safety Mat Using a Safety Interface Module (Category 2).....	83
5.6.3	Intermediate / High Risk Reduction (Category 3).....	84
5.6.3.1	Multiple Safety Mats Using a Safety Interface Module (Category 3)	84
5.7	Two-Hand Control	85
5.7.1	General Considerations.....	85
5.7.1.1	Minimum functional requirements for a Two-hand Control as required by NFPA 79 and IEC 60204-1 (Type III):	85
5.7.1.2	Physical Installation and Electrical Interface Considerations:	85
5.7.1.3	Two-Hand Control Safety Interface Modules.....	86
5.7.2	Lowest Risk Reduction Two Hand Control (Type IIIa Category 1)	86
5.7.2.1	Two Hand Control (Type IIIa Category 1).....	86
5.7.2.2	Low / Intermediate Risk Reduction Two-Hand Control (Type IIIa Category 1)	87
5.7.3	Intermediate / High Risk Reduction Two-Hand Control (Type IIIb Category 3)	88

5.7.3.1	Two Hand Control (Type IIIb Category 3).....	88
5.7.4	Intermediate / High Risk Reduction Two-Hand Control (Type IIIb Category 3)	89
5.7.4.1	Two-Hand Control (Type IIIb Category 3)	89
5.7.5	Highest Risk Reduction Two-Hand Control (Type IIIc Category 4).....	90
5.8	Zero (Stand Still) Speed Detection	91
5.8.1	General Considerations.....	91
5.8.2	Lowest Risk Reduction (Category 1).....	92
5.8.2.1	Single Proximity Sensing (Category 1).....	92
5.8.3	Intermediate / High Risk Reduction (Category 3).....	93
5.8.3.1	Dual Proximity Sensors to Timers and Force-guided Relay Monitoring (Category 3).....	93
5.8.3.2	Dual Proximity Sensors to Timers and Force-guided Relay Monitored by a SIM (Category 3).....	94
5.8.3.3	Dual Proximity Sensors to Dual Frequency Counters Monitored by a SIM (Category 3).....	95
5.8.3.4	Dual Proximity Sensors Plus Zero Speed or Stand Still SIM (Category 3 or 4).....	96
5.8.3.5	Encoder Speed Monitoring (Category 3).....	97
5.8.3.6	Motor Drive Back EMF Detection (Category 3 or 4)	98
5.9	Enabling Devices.....	99
5.9.1	General Considerations.....	99
5.9.2	Intermediate / High Risk Reduction (Category 3).....	101
5.9.3	Intermediate / High Risk Reduction (Category 3).....	102
5.9.3.1	Enabling device with overspeed (Category 3)	102
5.9.3.2	Enabling device with manual/auto switch (Category 3).....	103
5.9.3.3	Enabling device with manual mute enable (Category 3).....	104
5.9.4	Intermediate / High Risk Reduction (Category 4).....	105
6	Power Control Devices Interface (MPCE)	106
6.1	General Considerations	106
6.2	Relays and Contactors.....	107
6.2.1	Lowest Risk Reduction (Category 1).....	107
6.2.2	Low / Intermediate Risk Reduction (Category 2)	108
6.2.3	Intermediate / High Risk Reduction (Category 3).....	109
6.2.4	Highest Risk Reduction (Category 4).....	110
6.3	Variable Frequency Drives (VFD).....	111
6.3.1	Power Drive Systems - General Considerations.....	111
6.3.2	Lowest Risk Reduction (Category 1).....	114
6.3.2.1	Single Channel Interlock Stop Category 0 of an AC Motor using Standard Rated AC Drive	114
6.3.2.2	Single Channel Interlock Stop Category 1 of an AC Motor using Standard Rated AC Drive	115
6.3.3	Intermediate / High Risk Reduction (Category 3).....	116
6.3.3.1	Stop Category 0 of an AC Motor using Safety Rated AC Drive (Category 3)	116
6.3.3.2	Stop Category 1 (Controlled) Stop of an AC Motor using Safety Rated AC Drive	117
6.3.4	Highest Risk Reduction (Category 4)	118
6.3.4.1	Dual Channel Interlock Stop Category 0 (Coast to Stop) of an AC Motor using Standard Rated AC Drive with Checking (Category 4)	118
6.4	Pneumatic Systems	119
6.4.1	General Considerations.....	119

6.4.1.1	Pneumatic Component Selection Process	120
6.4.1.2	Air Preparation (Contamination Control)	122
6.4.1.3	Non-Lubricated (Preferred)	122
6.4.1.4	Lubricated (Not Recommended)	122
6.4.1.5	Example Supply Circuit.....	123
6.4.2	Exhaust (Blocking, Dump) Valve.....	124
6.4.2.1	Basic Risk Reduction (Category B)	124
6.4.2.1.1	Spring Centered Three Position Open Center (Category B).....	124
6.4.2.1.2	Lowest Risk Reduction (Category 1).....	125
6.4.2.2	Low / Intermediate Risk Reduction (Category 2)	126
6.4.2.2.1	Single Monitored Directional Valve (Category 2).....	126
6.4.2.2.2	Spring Centered Three Position Open Center w/ Actuator Monitoring (Category 2)	127
6.4.2.3	Intermediate / High Risk Reduction (Category 3)	128
6.4.2.3.1	Series Dump Safety Valve with Spring Centered Three Position Open Center (Category 3)	128
6.4.2.3.2	Series Monitoring Circuit (Category 3)	129
6.4.2.4	Highest Risk Reduction Monitoring Circuit (Category 4).....	130
6.4.2.4.1	Dual Shift Time Monitored Valves (Category 4)	130
6.4.2.4.2	Safety Rated Valve – Manual Valve Reset (Category 4)	131
6.4.2.4.3	Safety Rated Valve – Automatic Valve Reset (Category 4)	132
6.4.3	Directional (Motion) Valve Selection	133
6.4.3.1	Category B and 1.....	133
6.4.3.1.1	Single Solenoid – Two Position – Spring Offset (Category B and 1)	133
6.4.3.1.2	Double Solenoid – Two Position – Detented (Category B and 1)	134
6.4.3.1.3	3 Position – Spring Centered – Open Centered (Category B and 1)	135
6.4.3.1.4	3 Position – Spring Centered – Close or Blocked Center (Category B and 1)	136
6.4.3.2	Low / Intermediate Risk Reduction (Category 2)	137
6.4.3.2.1	2 Position Spring Offset – Monitored Spool Position (Category 2).....	137
6.4.3.3	Intermediate / High Risk Reduction (Category 3 and 4).....	138
6.4.3.3.1	Dual – 2 Position Spring Offset – Monitored Spool Position(s) (Category 3 and 4).....	138
6.4.4	Pilot Operated Check Valves	139
6.4.4.1	Basic / Lowest Risk Reduction (Category B and 1)	139
6.4.4.1.1	Pilot Operated Check Valve (Category B and 1)	139
6.4.4.2	Low / Intermediate Risk Reduction (Category 2)	140
6.4.4.2.1	Pilot Operated Check Valve (Category 2)	140
6.4.4.3	Intermediate / High Risk Reduction (Category 3)	141
6.4.4.3.1	Pilot Operated Check (Category 3).....	141
6.4.4.3.2	Pilot Operated Check with Spring Centered Three Position Open Center (Category 3).....	142
6.4.4.4	Highest Risk Reduction (Category 4)	143
6.4.4.4.1	Pilot Operated Check (Category 4).....	143
6.4.5	Rod Locks and Brakes	144
6.4.6	Flow Controls.....	145
6.4.6.1	Meter-IN – Controls the Fluid Flow Going into the Cylinder.....	146
6.4.6.2	Meter-OUT – Controls the Fluid Flow Coming Out of the Cylinder.	147
6.4.6.3	Meter-IN Flow Control Example	148
6.4.6.4	Meter-OUT Flow Control Example	149
6.4.7	Pneumatic Air Logic Control Circuits.....	150
6.4.7.1	E-Stop	150
6.4.7.1.1	Lowest Risk Reduction (Category 1).....	150
6.4.7.2	Two hand control	151
6.4.7.2.1	Lowest Risk Reduction (Category 1).....	151
6.4.7.2.2	Highest Risk Reduction (Category 4)	152
6.4.7.3	Velocity Fuse.....	153
6.5	Hydraulic Systems	154
6.5.1	General considerations	154
6.5.1.1	Hydraulic Component Selection Process	155
6.5.1.2	Fluid Preparation (Contamination Control).....	157

6.5.2	Dump (Blocking) Valve	157
6.5.2.1	Basic Risk Reduction (Category B)	157
6.5.2.1.1	Spring Centered Three Position Exhaust Center (Category B).....	157
6.5.2.1.2	Spring Centered Three Position Exhaust Center w/ Actuator monitoring (Category 1)	158
6.5.2.2	Low / Intermediate Risk Reduction (Category 2)	159
6.5.2.2.1	Monitored Two Way Valve (Category 2)	159
6.5.2.2.2	Spring Centered Three Position Exhaust Center w/ Control Circuit Functional Monitoring (Category 2)	160
6.5.2.3	Intermediate / High Risk Reduction (Category 3)	161
6.5.2.3.1	Series Monitored Blocking Valve with Circuit Spring Centered Three Position Exhaust Center (Category 3)	161
6.5.2.4	Highest Risk Reduction (Category 4)	162
6.5.2.4.1	Series Monitoring Circuit (Category 4)	162
6.5.3	Directional (Motion) Valve Selection	163
6.5.3.1	Basic / Lowest Risk Reduction (Category B and 1)	163
6.5.3.1.1	2 Position - Spring Offset (Category B and 1)	163
6.5.3.1.2	2 Position – Detented (Category B and 1).....	164
6.5.3.1.3	3 Position – Spring Centered – Open (Float) Centered (Category B and 1)	165
6.5.3.1.4	3 Position – Spring Centered – Closed or Blocked Center (Category B and 1)	166
6.5.3.2	Low / Intermediate Risk Reduction (Category 2)	167
6.5.3.2.1	2 Position Spring Offset – Monitored Spool Position (Category 2).....	167
6.5.4	Pilot Operated Check Valves	168
6.5.4.1	Basic / Lowest Risk Reduction (Category B and 1)	168
6.5.4.1.1	Pilot Operated Check – Example 1 of 2 (Category B and 1).....	168
6.5.4.2	Pilot Operated Check – Basic / Lowest Risk Reduction; Example 2 of 2 (Category B and 1).....	169
6.5.4.3	Low / Intermediate Risk Reduction (Category 2)	170
6.5.4.3.1	Pilot Operated Check – Low / Intermediate Risk Reduction (Category 2).....	170
6.5.4.4	Pilot Operated Check – Intermediate / High Risk Reduction (Category 3)	171
6.5.4.4.1	Intermediate / High Risk Reduction (Category 3)	171
6.5.4.4.2	Monitored Pilot Operated Check with Spring Centered Three Position Exhaust Center (Category 3)	172
6.5.4.5	Highest Risk Reduction (Category 4)	173
6.5.4.5.1	Pilot Operated Check (Category 4)	173
6.5.5	Counter Balance Valve	174
6.5.6	Rod Locks and Brakes	175
6.5.7	Flow Controls.....	176
6.5.8	Velocity Fuse	177
ANNEX A – Analysis of circuit considerations		178
ANNEX L – Safety-Related Performance Levels		183
ANNEX M - External Device Monitoring by the Safety-Related Function		188
ANNEX S – Symbols		190
ANNEX V – Valves		195

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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