

ISO 19085-3:2021-11 (E)

Woodworking machines - Safety - Part 3: Numerically controlled (NC/CNC) boring and routing machines

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	2
3	Terms and definitions	3
4	Safety requirements and measures for controls	6
4.1	Safety and reliability of control systems	6
4.2	Control devices	6
4.2.1	General	7
4.2.2	Hand-held control sets	7
4.3	Start	7
4.3.1	Direct start	7
4.3.2	Start via control power-on	7
4.4	Safe stops	8
4.4.1	General	8
4.4.2	Normal stop	8
4.4.3	Operational stop	8
4.4.4	Emergency stop	8
4.5	Braking function of tools	8
4.6	Mode selection	8
4.6.1	General	8
4.6.2	Machine setting mode [MODE 2]	8
4.6.3	Clamping device manual positioning mode [MODE 3]	9
4.6.4	Boring units positioning mode [MODE 4]	9
4.7	Tool speed changing	9
4.7.1	Speed changing by shifting the belts on the pulleys	9
4.7.2	Speed changing by incremental speed change motor	9
4.7.3	Infinitely variable speed by frequency inverter	9
4.8	Failure of any power supply	10
4.9	Manual reset control	10
4.10	Standstill detection and monitoring	10
4.11	Machine moving parts speed monitoring	10
4.12	Time delay	10
4.13	Tele-service	10
5	Safety requirements and measures for protection against mechanical hazards	10
5.1	Stability	10
5.2	Risk of break-up during operation	10
5.3	Tool and tool fixing design	11
5.3.1	General	11
5.3.2	Spindle locking	11
5.3.3	Circular saw blade fixing device	11
5.3.4	Flange dimension for circular saw blades	11
5.4	Braking	11
5.4.1	Braking of tools	11
5.4.2	Maximum run-down time	11

5.4.3	Brake release	11
5.5	Safeguards	11
5.5.1	Fixed guards	11
5.5.2	Interlocking moveable guards	12
5.5.3	Hold-to-run control	12
5.5.4	Two-hand control	12
5.5.5	Electro-sensitive protective equipment (ESPE)	12
5.5.6	Pressure-sensitive protective equipment (PSPE)	13
5.5.7	Enabling control	13
5.6	Prevention of access to hazardous moving parts	13
5.6.1	General	13
5.6.2	Safeguarding of all machine sides except the loading/unloading zone	13
5.6.3	Safeguarding of the loading/unloading zones	14
5.6.4	Measures against access to the rear of the machine from un/loading zone	24
5.6.5	Minimum clearances at the loading/unloading zone	27
5.7	Impact hazard	27
5.8	Clamping devices	27
5.9	Measures against ejection	28
5.9.1	General	28
5.9.2	Guards materials and characteristics	30
5.9.3	Curtains	31
5.10	Workpiece support and guides	32
6	Safety requirements and measures for protection against other hazards	32
6.1	Fire	32
6.2	Noise	32
6.2.1	Noise reduction at the design stage	32
6.2.2	Noise emission measurement and declaration	32
6.3	Emission of chips and dust	32
6.4	Electricity	32
6.5	Ergonomics and handling	32
6.6	Lighting	33
6.7	Pneumatics	33
6.8	Hydraulics	33
6.9	Electromagnetic compatibility	33
6.10	Laser	33
6.11	Static electricity	33
6.12	Errors of fitting	33
6.13	Isolation	33
6.14	Maintenance	33
6.15	Relevant but not significant hazards	33
7	Information for use	33
7.1	Warning devices	33
7.2	Marking	34
7.2.1	General	34
7.2.2	Additional markings	34
7.3	Instruction handbook	34
7.3.1	General	34
7.3.2	Additional information	34
Annex A (informative)	List of significant hazards	36
Annex B (informative)	Performance levels required	38
Annex C (normative)	Stability test	40
Annex D (normative)	Test for braking function	41
Annex E (normative)	Impact test for guards	42

Annex F (normative) Noise test code43
Annex G (normative) Dynamic test for pressure-sensitive bumpers, edges, trip bars, trip plates48
Annex H (informative) Examples of safeguarding concepts for different machine designs 56
Annex I (normative) Impact test for curtains 74
Annex J (normative) Wear test for curtains 79
Bibliography83