

ISO 230-10:2022-03 (E)

Test code for machine tools - Part 10: Determination of the measuring performance of probing systems of numerically controlled machine tools

Contents	Page
Foreword.....	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
3.1 General terms.....	2
3.2 Terms relating to the probing system.....	2
3.3 Terms relating to probing performance.....	7
3.4 Terms relating to scanning probes.....	8
4 Symbols.....	9
5 Preliminary remarks.....	12
5.1 Influences on the measurement performance of the probing system.....	12
5.2 Measurement units.....	12
5.3 Reference to ISO 230-1.....	13
5.4 Recommended instrumentation and test equipment.....	13
5.5 Machine conditions prior to testing.....	13
5.6 Testing sequence.....	13
5.7 Tests to be performed.....	13
5.8 Sources of test uncertainty.....	13
5.9 Reporting of test results.....	14
6 Thermal influences.....	15
6.1 General.....	15
6.2 Environmental temperature variation error (ETVE) test.....	15
6.3 Other thermal distortion tests.....	15
7 Probing of workpiece.....	16
7.1 Touch trigger probes.....	16
7.1.1 General.....	16
7.1.2 Probing repeatability.....	17
7.1.3 Stylus tip offset test.....	18
7.1.4 Probing-tool location repeatability test.....	19
7.1.5 2D probing error test.....	20
7.1.6 3D probing error test.....	21
7.1.7 Workpiece position and orientation tests.....	23
7.1.8 Combined workpiece machining and location test.....	29
7.1.9 Time delay variation tests.....	30
7.1.10 Feature size measurement performance tests.....	35
7.2 Scanning probes.....	37
7.2.1 General.....	37
7.2.2 Filtering parameters.....	37
7.2.3 Scanning 2D performance test.....	37
7.2.4 Scanning 3D performance test.....	39
7.3 Bore gauge.....	42
7.3.1 General.....	42
7.3.2 Characteristics of bore gauge systems.....	42
7.3.3 Preliminary remarks.....	45
7.3.4 Determination of measurement repeatability of the system.....	46

8	Probing of tools	46
8.1	Touch trigger probes	46
8.1.1	General	46
8.1.2	Tool-setting system qualification	47
8.1.3	Tool-setting repeatability	47
8.2	Non-contacting laser light barrier tool measuring system	50
8.2.1	General	50
8.2.2	Typical functions of a laser light barrier system	51
8.2.3	Differences between laser light barrier systems and contacting tool measuring systems	51
8.2.4	Laser light barrier tool measuring system	51
8.2.5	Factors influencing the uncertainty of tool dimensional measurement	54
8.2.6	Preliminary remarks	54
8.2.7	Verification of detection tasks	54
8.2.8	Verification of measurement tasks	59
8.2.9	Reports of test results	66
	Bibliography	68