

ISO 13856-2:2013-04 (E)

Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Requirements for design and testing	7
4.1 Effective sensing surface	7
4.2 Actuating force for testing	9
4.3 Pre-travel	10
4.4 Working travel	10
4.5 Overtravel	10
4.6 Force	10
travel relationships	10
4.7 Minimum operating speed	12
4.8 Number of operations	12
4.9 Sensor output	13
4.10 Response of output signal switching device to actuating force	13
4.11 Reset function	13
4.12 Environmental conditions	14
4.13 Power supply variations	15
4.14 Electrical equipment	15
4.15 Hydraulic equipment	16
4.16 Pneumatic equipment	16
4.17 Enclosure	16
4.18 Additional coverings for sensors	17
4.19 Access	17
4.21 Adjustments	18
4.22 Sensor fixing and mechanical strength	18
4.23 Recovery after deformation	18
4.24 Connections	19
4.25 Sharp corners, sharp edges and rough surfaces	19
4.26 Mechanical features	19
4.27 Inhibition and blocking	19
5 Marking	19
6 Information for selection and use	20
6.1 General	20
6.2 Essential data for the selection of suitable pressure-sensitive edge or pressure-sensitive bar	20
6.3 Information for use	21
7 Verification of requirements	23

7.1	General	23
7.2	Test samples	24
7.3	Test pieces	24
7.4	Test No. 1 -- Safety-related data for selection, installation, commissioning, operation and maintenance of suitable pressure-sensitive edges or pressure-sensitive bars	25
7.5	Test No. 2 -- Mounting orientations of sensors	25
7.6	Test No. 3 -- Actuating force	26
7.7	Test No. 4 -- Force	
	travel relationship(s)	32
7.8	Test No. 5 -- Number of operations	32
7.9	Test No. 6 -- Output state of sensor and output signal switching device	33
7.10	Test No. 7 -- Response of output signal switching device to actuating force, reset and state of power supply	33
7.11	Test No. 8 -- Environmental conditions	33
7.12	Test No. 9 -- Power supply variation	35
7.13	Test No. 10 -- Electrical, hydraulic and pneumatic equipment	36
7.14	Test No. 11 -- Enclosure	36
7.15	Test No. 12 -- Additional coverings for sensors	36
7.16	Test No. 13 -- Access	36
7.18	Test No. 15 -- Adjustments	37
7.19	Test No. 16 -- Sensor fixing and mechanical strength	37
7.20	Test No. 17 -- Recovery after deformation	37
7.21	Test No. 18 -- Connections	37
7.22	Test No. 19 -- Sharp corners, sharp edges and rough surfaces	37
7.23	Test No. 20 -- Mechanical features	37
7.24	Test No. 21 -- Inhibition and blocking	38
7.25	Test No. 22 -- Marking	38
7.26	Test No. 23 -- Information for selection and use	38
	Annex A (normative) Timing diagrams for pressure-sensitive edges/bars with/without reset	39
	Annex B (informative) Operating speed, force and travel -- Explanatory remarks and recommendations	43
	Annex C (informative) Device selection guidance for machinery manufacturer/user	46
	Annex D (informative) Design guidance	48
	Annex E (informative) Application guidance	51
	Annex F (informative) Guidance on commissioning and testing after installation	52
	Bibliography	55