Specifications for safety testing

Insofar as they apply to the installation/machine supplied, performance
of the following tests is mandatory:

1. Initial electrical testing in accordance with VDE 0113-1 (DIN EN ISO 60204)
and VDE 0100-600
* A detailed list of the measurements to be taken is given in the annex.
1. Initial inspection and initial testing of electro-sensitive protective equipment in accordance with DIN EN 62046 / VDE 0113-211 / Provision on Operating Safety (BetrSichV)
* Stopping performance is to be measured in accordance with DIN EN ISO 13855.
1. Checking of ESD capability in accordance with DIN EN ISO 61340-5-1
* The discharge resistances of setting-down surfaces and the field strengths
of individual insulators are to be measured
1. Testing of the closing force of power-operated guards in accordance with
DIN EN ISO 14120
* The actual closing force is to be measured.

All measurements are to be taken by a person qualified to perform the corresponding test.

Use is to be made of measuring instruments that comply with the applicable standards.

All tests are to be documented with the corresponding measured values and submitted to ebm-papst on acceptance of the installation/machine.

If the installation/machine is fully or partially disassembled for transportation, renewed testing (item 1) must be performed at the assembly location.

Annex to item 1

The measurement protocol to be supplied must list all the measurements performed (measurement points), as well as the reference point for each measurement.

The following measurements are to be performed:

1. Low-resistance measurement (protective earth resistance, equipotential bonding)
in accordance with VDE 0113-1/18.2.2

Test current: min.10 A

1. Insulation resistance measurement in accordance with VDE 0113-1/18.3

Measurements are to be taken on all the conductors of the main circuit.

1. Voltage measurement (HV) in accordance with VDE 0113-1/18.4

Measurements are to be taken on all the conductors of the main circuit.

Assemblies and devices not designed to withstand this test and overvoltage protectors that would probably be triggered during measurement were disconnected before the test.
Assemblies and devices subjected to voltage testing on the basis of the applicable product standards can be disconnected during the test.

1. Leakage current measurement

Measurement method: Measurement of current difference between phase and neutral conductors.

True RMS measurement.

In the case of measured values ≥10 mA TRMS, a connection is to be provided for additional equipotential bonding on or in the switch cabinet.

1. Ground fault loop impedance and system impedance measurement

in accordance with VDE 0100-600

Measurements are to be taken on all protected current paths of the main circuit. At the connection furthest away in each case.

The reference value of the connection point during the measurement is also to be documented.

1. Residual voltage measurement in accordance with VDE 0113-1/6.2.4

If a hazardous residual voltage still remains after the corresponding decay time, this is to be clearly marked on the switch cabinet.

1. RCD measurement in accordance with VDE 0100-600

Measurements are to be taken with the corresponding tripping currents depending on the type of RCD.

The ebm-papst Mulfingen internal test log is appended
to this document. It can be used as a specimen log.

Usage is not obligatory!

 **Test log for the safety testing of the electrical equipment of machines**

Log number: (Installation number\_date)

|  |
| --- |
| **Details of test object** |
| **Machine:** |  | **Year of manufacture:** |  |
| **Manufacturer:** |  | **Installation number:** |  |
| **Place of testing:** |  | **Inventory number:** |  |
| **Type of testing:** | 🞎 Initial test🞎 Repeat test🞎 Testing following modification or repair🞎 Only partial testing required | **Order number:** |  |
|  |
| **General remarks:** |

**Tests carried out:**

**Yes No Not applicable**

🞎 🞎 🞎 Initial electrical testing in accordance with VDE 0113 Annex 1

🞎 🞎 🞎 Initial inspection and testing of

electro-sensitive protective equipment Annex 2

🞎 🞎 🞎 Testing of ESD capability Annex 3

🞎 🞎 🞎 Testing of closing force of automatically closing guards Annex 4

🞎 🞎 🞎 Completeness of documentation Annex 5

**Annex 1 Initial electrical testing and repeat testing**

**References to laws and standards:** Provision on Operating Safety (BetrSichV), § 5 DGUV regulation 3

 🞎 VDE 0113-1 / DIN EN 60204-1 / IEC 204-1 🞎 VDE 0100-600

 🞎 VDE 0701-0702

🞎 Initial test 🞎 Repeat test

|  |
| --- |
| **Technical specifications** |
| Nominal voltage V: |  | **Remarks:** |
| Nominal current A: |  |
| Rated output VA: |  |
| Back-up fuse A: |  |

This test log confirms the proper performance of all tests prescribed within the scope of the quoted standards on acceptance of the above-mentioned electrical machine / installation.

Testing was performed by a qualified person meeting the requirements as per DIN VDE 0105 Part 1/5.75, item 3.2.1.

The machine/installation tested meets the requirements of DIN VDE 0113/EN 60204-1/IEC 204-1
in every respect.

**OK Not OK Not applicable**

 1.1 Visual inspection

🞎 🞎 🞎 1.1.1 General design features

🞎 🞎 🞎 1.1.2 Electrical equipment

🞎 🞎 🞎 1.1.3 Machine/installation

 1.2 Measurements

🞎 🞎 🞎 1.2.1 Low-resistance measurement (protective earth resistance, equipotential bonding)

🞎 🞎 🞎 1.2.2 Ground fault loop impedance/system impedance measuring

🞎 🞎 🞎 1.2.3 Insulation resistance measuring

🞎 🞎 🞎 1.2.4 Voltage measuring (HV)

🞎 🞎 🞎 1.2.5 Residual voltage measuring

🞎 🞎 🞎 1.2.6 Leakage current measuring

🞎 🞎 🞎 1.2.7 RCD measuring

🞎 🞎 🞎 1.3 Testing of function and functional safety

Name

Date

Signature

Place

Name

Date

Signature

Place

**Measuring instruments used:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.:** | **1** | **2** | **3** | **4** |
| **Manufacturer:** |  |  |  |  |
| **Type:** |  |  |  |  |
| **Serial no.:** | 🞎 🞎  | 🞎 🞎  | 🞎 🞎  |  |
| **Last calibration:** |  |  |  |  |

**Information on place of testing/measurements:**

|  |  |
| --- | --- |
| Connection location: |  |
| System configuration: |  |
| Sub-distribution: |  |
| Connection point designation: |  |

**Reference measurements:**

 Measuring instrument used:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Impedance** | **Short-circuit current** |
| **Fault impedance measurement** | L1 – PE | mΩ | A |
| L2 – PE | mΩ | A |
| L3 – PE | mΩ | A |
| **Systemimpedance****measurement** | L1 - L2 | mΩ | A |
| L2 - L3 | mΩ | A |
| L1 - L3 | mΩ | A |
| L1 – N | mΩ | A |
| L2 – N | mΩ | A |
| L3 – N | mΩ | A |

Comments:

**Visual inspection**

* + 1. **General design features**

**OK Not OK Not Remarks
 applicable**

🞎 🞎 🞎 🞎 Name plate affixed

🞎 🞎 🞎 🞎 Labeling of control elements and emergency stop in local language

🞎 🞎 🞎 🞎 Attachment/accessibility of control element

🞎 🞎 🞎 🞎 Attachment/accessibility of main switch and emergency stop button

🞎 🞎 🞎 🞎 Accessibility of electrical equipment

🞎 🞎 🞎 🞎 Cleanliness, general condition

🞎 🞎 🞎 🞎 Labeling of pneumatic components

🞎 🞎 🞎 🞎 Pneumatic diagram in document pouch

Comments:

* + 1. **Electrical equipment (switch cabinet, panel, terminal box)**

Bemerkungen:

**OK Not OK Not Remarks
 applicable**

🞎 🞎 🞎 🞎 Equipment marked

🞎 🞎 🞎 🞎 Equipment installation location marked

🞎 🞎 🞎 🞎 Equipment installed as per manufacturer's specifications

🞎 🞎 🞎 🞎 Logical arrangement of equipment

🞎 🞎 🞎 🞎 Terminal strips labeled

🞎 🞎 🞎 🞎 Terminals labeled

🞎 🞎 🞎 🞎 Wires labeled at connection point

🞎 🞎 🞎 🞎 Warning notes / signs affixed (in local language)

🞎 🞎 🞎 🞎 Plug-in lines labeled

🞎 🞎 🞎 🞎 Line dimensioning

🞎 🞎 🞎 🞎 Wire colors (in accordance with internal standard)

🞎 🞎 🞎 🞎 Marking of non-disconnected circuits

🞎 🞎 🞎 🞎 Spatial separation of different voltage levels

🞎 🞎 🞎 🞎 Marking of protective earth connections

🞎 🞎 🞎 🞎 Electrically conductive parts grounded

🞎 🞎 🞎 🞎 Additional grounding of electric drives

🞎 🞎 🞎 🞎 Protection against direct contact

🞎 🞎 🞎 🞎 Extra-low voltage SELV / PELV

🞎 🞎 🞎 🞎 Selectivity of overcurrent protectors

🞎 🞎 🞎 🞎 Dimensioning of switch cabinet cooling

🞎 🞎 🞎 🞎 Additional equipotential bonding provided and marked

Comments:

* + 1. **Machine / installation electrical equipment**

**OK Not OK Not Remarks
 applicable**

🞎 🞎 🞎 🞎 Equipment marked

🞎 🞎 🞎 🞎 Equipment fitted as per manufacturer's specifications

🞎 🞎 🞎 🞎 Cables / sheathed cables marked

🞎 🞎 🞎 🞎 Warning notes / signs affixed (in local language)

🞎 🞎 🞎 🞎 Line dimensioning

🞎 🞎 🞎 🞎 Selection of lines and method of laying

🞎 🞎 🞎 🞎 Marking of protective earth terminals

🞎 🞎 🞎 🞎 Equipotential bonding (item sections and doors) fitted

🞎 🞎 🞎 🞎 Electrically conductive parts grounded

🞎 🞎 🞎 🞎 Protection against direct contact

🞎 🞎 🞎 🞎 Plug-in connection secured against self-opening

🞎 🞎 🞎 🞎 Equipotential bonding strip fitted and labeled

Comments:

* 1. **Measuring**
		1. **Low-resistance measuring (protective earth resistance,
		equipotential bonding) in accordance with VDE 0113-1/18.2.2**

 Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

 Test current: 🞎 10A AC 🞎 ≥200mA AC 🞎 ≥200mA DC 🞎

Test duration: 🞎 5 sec. 🞎

 mΩ

 Measuring instrument offset:

The specified limit value corresponds to values such as length, cross-section and material of the relevant protective earth. The test duration and the limit value for the permissible protective earth resistance are listed for the individual measurement points.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of measurements performed:** |  |  |  |
| **Measurement reference point:** |  |  |  |
| **No.** | **Measurement point** | **Specified limit value****in mΩ** | **Resistance measured value****in mΩ** | **Assessment** |
| **OK** | **Not OK** |
| 1 |  |  |  |  |  |
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| --- | --- | --- | --- | --- |
| **No.** | **Measurement point** | **Specified limit value****in mΩ** | **Resistance measured value****in mΩ** | **Assessment** |
| **OK** | **Not OK** |
| 22 |  |  |  |  |  |
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* + 1. **Ground fault loop impedance/system impedance measurement
		VDE 0113-1/18.2.3**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

The connection point and its reference values are listed on Page 2 of the log.

|  |
| --- |
| **Calculations:** |
| **\*1** | **Tripping current** | **Ia=K x IN** |
| **\*2** | **Max. impedance** | **2/3 UL-PE / Ia****2/3 UL-L(N) / Ia** |
| **\*4** | **Machine impedance** | **\*2 - \*3 = \*4** |

Measurement values have been measured at the farthest point of the respective protection device. With integrated **RCD,** ground fault loop impedance may be omitted.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Number of measurements performed:** | **\*1** | **\*2** |  | **\*3** | **\*4** |  |
| **No** | **Measurement****Point/terminal/circuit** | **Protective****Device****Type** | **Nominal Current** | **K-****Factor** | **Tripping current in A** | **max. Impedance****in mΩ** | **Measured value****In mΩ****ZSCH / ZI** | **Reference measurement** **See****p.2** | **Machine****impedance** | **Assessment** |
|  **OK** | **Not****OK** |
| **Designation** | **Pt.****1** | **Pt.2** |
| 1 |  |  |  |  |  |  |  |  |  |  |   |  |  |
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Comments:

* + 1. **Insulation resistance measurement in accordance with 0113-1/18.3**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

Test voltage: 🞎 500V DC 🞎 250V DC 🞎

The phase conductors of the supply line/supply terminals and the neutral conductor were connected together
for the measurement. All main circuit switching devices were actuated.

Further measurements are listed in the measured value table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of measurements performed:** |  |  |  |  |
| **No.** | **Connection / terminal / circuit** | **Specified limit value****in MΩ** | **Resistance measured value in MΩ** | **Assessment** |
| **Designation** | **Connection** | **OK** | **NotOK** |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
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Comments:

* + 1. **Voltage measurement (HV) in accordance with VDE 0113-1/18.4**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

Test voltage: 🞎 1000V AC 🞎

Test duration: 1 second

Assemblies and devices not designed to withstand this test and overvoltage protectors that would probably be triggered during measurement were disconnected before the test.
Assemblies and devices subjected to voltage testing on the basis of the applicable product standards can be disconnected during the test.

The phase conductors of the supply line/supply terminals and the neutral conductor were connected together for the measurement. All main circuit switching devices were actuated.

Further measurements are listed in the measured value table.

|  |  |
| --- | --- |
| **Number of measurements performed:** |  |
| **No.** | **Connection / terminal / circuit** | **Measured valuein mA** | **Assessment** |
| **Designation** | **Connection** | **OK** | **Not OK** |
| 1 |  |  |  |  |  |
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Comments:

* + 1. **Residual voltage measurements in accordance with VDE 0113-1/18.5 (6.2.4)**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

Safe isolation of the machine/installation from the supply following shut-off/disconnection of the supply was measured and the time taken for the voltage to decay to a value of less than 60 V was determined.

With permanently installed machines or systems, residual voltage measuring can be omitted if protection against accidental contact as per IP20 is complied with.

Limit values: 🞎 1 sec 🞎 5 sec

1 second 🡪 Plug-in cable, measurement taken at terminals of cable

5 seconds 🡪 Residual voltage in closed housing, corresponding

measurement point was recorded in measured value table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of measurements performed:** |  |  |  |
| **No.** | **Measurement point / terminal / circuit** | **Measured value****Time until U < 60 V****in s** | **Residual voltage****after 1 s/5 s****in V** | **Assessment** |
| **OK** | **Not OK** |
| **Designation** | **Pt. 1** | **Designation** | **Pt. 2** |
| 1 |  |  |  |  |  |  |  |  |
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Comments:

* + 1. **Leakage current measurement**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

Measurement method: Measurement of current difference between phase and neutral conductors.

True RMS measurement.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of measurements performed:** |  |  |  |
| **No.** | **Measurement point / circuit / equipment** | **Measured value****in mA** | **Assessment** |
| **OK** | **Not OK** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
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* Highest measured value >3.5 mA

A warning notice is required.

* Highest measured value ≥ 10 mA,

additional equipotential bonding required.

A warning notice is required.

* Highest measured value ≥ 10 mA and cross section of the protective earth ≥ 10mm²
	+ - * + Additional equipotential bonding **not required** with **permanently installed** supply line**.**

A warning notice is required!

* + - * + Additional equipotential bonding **required** with **plug-in** supply line**.**

A warning notice is required!

Comments:

* + 1. **RCD measurement**

Measuring instrument used: 🞎 1 🞎 2 🞎 3 🞎 4

Test current: 1) AC ramp (0.3 – 1.3 x I∆N) 4) DC ramp (0.3 – 1.3 x I∆N)

 2) 1 x I∆N AC 5) 1 x I∆N DC

 3) 5 x I∆N AC

Note on measurements to be performed: RCD Type A: Test current 1) - 3)
RCD Type B: Test current 1) - 5)

|  |  |  |
| --- | --- | --- |
| **Number of measurements performed:** |  |  |
| **No.** | **Equip. ID** | **Type** | **Nominal current**IN in A | **Nominal fault current** I∆N in mA | **Test current****1) - 6)** | **Measured value**Ia in mA | **Measured value**ta in ms | **Measured value**RE in Ω | **Measured value**UB in V | **Assessment** |
| **OK** | **Not OK** |
| 1 |  |  |  |  |  |  |  |  |  |  |  |
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Comments:

* 1. **Testing of functional safety**

**OK Not OK Not Remarks
 applicable**

🞎 🞎 🞎 🞎 Emergency stop function 🡪 Shut-off

🞎 🞎 🞎 🞎 Emergency stop function of main switch (if red-yellow)

🞎 🞎 🞎 🞎 Acknowledgment required after emergency stop

🞎 🞎 🞎 🞎 All fixed protective devices fitted

🞎 🞎 🞎 🞎 All removable protective devices monitored

🞎 🞎 🞎 🞎 No start-up with open guard/protective device

🞎 🞎 🞎 🞎 Electrical interlocking of guards/protective device

🞎 🞎 🞎 🞎 Two-hand control fitted as per normative regulations

🞎 🞎 🞎 🞎 Interruption of electro-sensitive protective equipment stops movement

🞎 🞎 🞎 🞎 Main circuit voltages tested

🞎 🞎 🞎 🞎 Rotating field tested

🞎 🞎 🞎 🞎 Control circuit voltages tested (SELV/PELV)

🞎 🞎 🞎 🞎

🞎 🞎 🞎 🞎

🞎 🞎 🞎 🞎

🞎 🞎 🞎 🞎

Comments:

**Annex 2 Initial inspection and testing of electro-sensitive
 protective equipment**

Initial inspection and testing of electro-sensitive protective equipment
in accordance with DIN EN 62046 / VDE 0113-211 / DIN EN ISO 13855 /
Provision on Operating Safety (BetrSichV)

🞎 Initial inspection and testing successful 🞎 Initial inspection and testing not successful

The test only relates to proper functioning, fitting and incorporation of the electro-sensitive protective equipment into the control system. It is not a substitute for machine safety testing. Modifications to the electro-sensitive protective equipment or the machine/installation render this initial inspection and test invalid. The initial inspection and test must then be repeated.

Comments:

Table of contents:

[2.1. Details of the installation 21](#_Toc47023442)

[2.2. Details of the control system 21](#_Toc47023443)

[2.3. Assessment of protective device and hazard spot(s) 22](#_Toc47023444)

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Name

Date

Signature

Place

Name

Date

Signature

Place

|  |
| --- |
| Details of the installation |
| **Machine:** |  | **Installation number:** |  |
| **Manufacturer:** |  | **Inventory number:** |  |
| **Cost center:** |  | **Comments:** |
| **Site:** |  |
| **Performance level PL:** |  a |  b |  c |  d |  e |  |
| The performance level (PL) of the downstream peripheral equipment corresponds at least to the performance level (PL) of the installation as a whole. |
| 🞎Yes | 🞎No |

|  |
| --- |
| Details of the control system |
| **Type of control:** |  Programmable |  Conventional | **Manufacturer:** |  |
| **Programmer:** |  | **Type:** |  |
| **Mode of operation:** | Protective mode | Single break | Double-break |
| With parts monitoring | Manual Start | Other |
| **Restart interlock:** | OK | Not OK | Not applicable |
| **External device monitoring:** | OK | Not OK | Not applicable |
| **Equipment ID:** |  |
| **Performance level PL:** |  a |  b |  c |  d |  e |

##  Assessment of protective device and hazard spot(s)

|  |
| --- |
| Details and checking of the protective device |
| **Type of protective device:** |  |
| **Manufacturer:** |  |
| **Type:** |  |
| **Serial number:** |  |
| **Performance level:** |  a |  b |  c |  d |  e |
| **Response time:** |  |
| **Detection capability:** |  |
| **Equipment ID:** |  |
| **Range:** |  |
| **Installation position:** |  horizontal |  vertical |  diagonal |
| **Deflection mirror provided:** |  Yes |  No |
| **Does the protective device have a safety-relevant function?** |  Yes |  No |
| **Cascading:** |  OK |  Not OK |  Not applicable |
| **Muting:** |  OK |  Not OK |  Not applicable |
| **Blanking:** |  OK |  Not OK |  Not applicable |
| **Restart interlock (internal):** |  OK |  Not OK |  Not applicable |
| **External device monitoring (internal):** |  OK |  Not OK |  Not applicable |
| **Protective device attached as per manufacturer's specifications:** |  OK |  Not OK |  Not applicable |
| **Protective device electrically wired as per manufacturer's specifications:** |  OK |  Not OK |  Not applicable |
| **Protective device checked for damage:** |  OK |  Not OK |  Not applicable  |
| **No reflecting surfaces near and around the protective field:** |  OK |  Not OK |  Not applicable |
| **Protective device effective in all modes of operation:** |  OK |  Not OK |  Not applicable |
| **Further safety measures taken with disconnectable protective device:** |  OK |  Not OK |  Not applicable |
| **Test finger adapted to detection capability (incl. instructions) fitted as per manufacturer's specifications:** |  OK |  Not OK |  Not applicable |
| **Connection diagram of installation/machine provided:** |  OK |  Not OK |  Not applicable |
| **Protective device wired as per circuit diagram provided:** |  OK |  Not OK |  Not applicable |
| **Technical documentation of protective device provided:** |  OK |  Not OK |  Not applicable |

**Protective device used as:**

🞎 Protective field for orthogonal approach
🞎 Protective field for parallel approach
🞎 Presence-sensing device
🞎 Access control

## Structure and assessment of hazard spots:

 

Fig 2: Use as protective field for parallel approach and presence sensing

Fig 1: Use as protective field for orthogonal approach and access control

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Dimensionin mm |  |
| A | Length of protective field ( A1 – A2 ) |  |  Not applicable |
| A1 | Top edge of protective field |  |  Not applicable |
| A2 | Bottom edge of protective field |  |  Not applicable |
| B1 | Bottom edge of danger zone |  |  Not applicable |
| B2 | Top edge of danger zone |  |  Not applicable |
| B3 | Height of hazardous point above floor |  |  Not applicable |
| E | Distance between protective field and machine body |  |  Not applicable |
| Sist | Protective field distance from hazardous point |  |  Not applicable |
| C1 | Protective field distance on reaching over |  |  Not applicable |
| C2 | Protective field distance on reaching under |  |  Not applicable |
| H | Height of protective field above floor |  |  Not applicable |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | Not possible to step behind protective field (dimension E 75 mm) or additional action taken to safeguard the area |  OK | Not OK |  Not applic. |
| 2 | Not possible to reach over protective field Dimension C1 from DIN EN ISO 13855 Table 1 |  OK | Not OK |  Not applic. |
| 3 | Not possible to reach over protective field Dimension C1 from DIN EN ISO 13855 Table 1 |  OK | Not OK |  Not applic. |
| 4 | Not possible to reach around protective field |  OK | Not OK |  Not applic. |
| 5 | Fixed guard |  OK | Not OK |  Not applic. |
| 6 | Guards with interlock correspond to the performance level (PL) of the machine as a whole |  OK | Not OK |  Not applic. |
| 6.1 | Hazardous movement is stopped after opening a protective device |  OK | Not OK |  Not applic. |
| 6.2 | Restart interlock active after closing the protective device |  OK | Not OK |  Not applic. |
| 7 | Height of danger zone above floor  750 mm or additional access protection provided |  OK | Not OK |  Not applic. |
| 8 | Accessible danger zone: Bottom edge of protective field (dimension B1)  200 mm |  OK | Not OK |  Not applic. |
| 9 | Accessible danger zone: Top edge of protective field (dimension B2)  900 mm |  OK | Not OK |  Not applic. |
| 10 | Resetting of restart interlock not possible from danger zone |  OK | Not OK |  Not applic. |
| 11 | Entire hazardous point visible from place of resetting restart interlock |  OK | Not OK |  Not applic. |

When “cycle operation” mode is possible, the following items must be checked:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 12 | Work area height  600 mm or work area depth  1000 mm |  OK | Not OK |  Not applic. |
| 13 | Item 1 must be assessed as being OK |  OK | Not OK |  Not applic. |
| 14 | Item 7 must be assessed as being OK |  OK | Not OK |  Not applic. |
| 15 | Detection capability of protective device  30 mm |  OK | Not OK |  Not applic. |

The following items must be checked in the case of a protective field for parallel approach:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 16 | Height of protective field above floor (dimension H)  200 mm |  OK | Not OK |  Not applic. |
| 17 | Height of protective field above floor (dimension H)  1000 mm |  OK | Not OK |  Not applic. |
| 18 | Further safety measures taken to protect against crawling underneath (dimension H between 200 mm and 1000 mm) |  OK | Not OK |  Not applic. |

## Stopping performance measurement protocol

|  |  |
| --- | --- |
| Manufacturer: |  |
| Type: |  |
| Serial no.: |  |
| Last calibration: |  |

 Measuring instrument used:

**Actuator:**

|  |  |  |
| --- | --- | --- |
| 🞎 Wire draw encoder | 🞎 Friction wheel | 🞎 Light barrier |
| 🞎 Relay box | 🞎 Not applicable |  |

**Measurement direction:**

|  |  |  |
| --- | --- | --- |
| 🞎 Retraction | 🞎 Extension | 🞎 Other |
| 🞎 Counter-clockwise | 🞎 Clockwise | 🞎 Not applicable |

**Protective device:**

|  |
| --- |
| 🞎 Two-hand/door interlock |
| 🞎 Light curtain for orthogonal approach |
| 🞎 Light curtain for parallel approach |
| 🞎 Multi-beam electro-sensitive protective equipment (access control/3D camera system) |
| 🞎 Scanner/electro-sensitive protective equipment access protection/pressure-sensitive mat |
| 🞎 Press brake |

**Tool no. fitted (Designation / WZ.(tool) no.):**

|  |  |  |
| --- | --- | --- |
| SPM Point | in mm |  |
| Maximum speed | in mm/s |  |
| Stopping distance | in mm |  |
| Stopping time | in ms |  |
| Minimum safety distance SMIN | in mm |  |

**Measured Values:**

**The actual protective field distance SIST from the hazardous point is mm.**

**The minimum safety distance determined at least corresponds to the actual protective field distance.**

|  |  |
| --- | --- |
| **Yes** | **No** |
| 🞎 | 🞎 |

**Annex 3 Checking of ESD capability**

Checking of ESD capability in accordance with DIN EN 61340-5-1
as well as internal guidelines

|  |
| --- |
| **Details of test object** |
| **Machine:** |  | **Tester** ➀**:** |  |
| **Manufacturer:** |  | **ESD officer** ➁**:** |  |
| **Installation number:** |  | **Year of manufacture:** |  |
| **Test date / period:** | **from:** |  | **to:**  |  |

* Initial test following completion 🞎 Repeat test

## Definition of dissipation method:

* Charge dissipation takes place via protective grounding of the machine.
* Charge dissipation takes place via a defined equipotential bonding point.

## Visual inspection:

 OK Not OK Not applicable

1. All setting-down surfaces made of ESD-capable material 🞎 🞎 🞎
2. All surfaces likely to be used for setting-down designed to be ESD-capable 🞎 🞎 🞎
3. All electrically conductive, grounded surfaces covered with dissipative mats 🞎 🞎 🞎
4. All transparent cover panels made of dissipative plastic 🞎 🞎 🞎
5. ESD-capable rollers/feet fitted 🞎 🞎 🞎
6. Grounding point with connection notice provided 🞎 🞎 🞎
7. Low-resistance connection point for wrist-strap provided (pushbutton) 🞎 🞎 🞎
8. All permanently mounted tools (e.g. screwdrivers) grounded 🞎 🞎 🞎
9. All insulators fitted at an adequate distance 🞎 🞎 🞎
10. Dissipative components marked (rests, cover panels) 🞎 🞎 🞎

Comments:

**Overall test result: 🞎 OK 🞎 Not OK**

➀

Signature

Date

Place

➁

Signature

Date

Place

## Measurement of discharge resistances:

Measuring instrument used:

|  |  |
| --- | --- |
| Manufacturer: |  |
| Type: |  |
| Serial no.: |  |
| Last calibration: |  |

Test voltage: 100 V DC

Limit value: > 1 kΩ und < 1GΩ

 Ambient conditions: Temperature: ˚C Relative humidity: %

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of measurement performed:** |  |  |  |
| **Measurement reference point:** |  |  |  |
| **No.** | **Measurement point** | **Measured value** | **Assessment**  |
| **OK** | **Not OK** |
| 1 |  |  |  |  |
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Comments:

## Measuring field strength of insulators:

 Measuring instrument used:

|  |  |
| --- | --- |
| Manufacturer: |  |
| Type: |  |
| Serial no.: |  |
| Last calibration: |  |

Before the start of measurement, equipotential bonding (protective earth) was connected to the connection socket of the measuring instrument

Limit value: 50V for every cm from ESD-sensitive component/unit

|  |  |  |  |
| --- | --- | --- | --- |
|  **Number of measurement performed:** |  |  |  |
| **No.** | **Measurement point** | **Distance from componentin cm** | **Measured valuein V** | **Assessment**  |
| **OK** | **Not OK** |
| 1 |  |  |  |  |  |
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Comments:

**Annex 4 Power-operated guards**

Testing of power-operated guards in accordance with
DIN EN ISO 14120 / DIN EN 12453

|  |
| --- |
| **Details of test object** |
| **Machine:** |  | **Year of manufacture:** |  |
| **Manufacturer:** |  | **Installation number:** |  |
| **Place of testing:** |  | **Inventory number:** |  |
| **General comments:** | **Order number:** |  |

* 1. **Visual inspection:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **OK** | **Not OK** | **Not applicable** | **Remark** |  |
| [ ]  | [ ]  | [ ]  | [ ]  | No dangerous crushing points |
| [ ]  | [ ]  | [ ]  | [ ]  | Adjusters (pressure regulator etc.) secured against manipulation |

Comments:

* 1. **Measuring closing force:**

[ ]  Protective device does **not** open automatically upon contact with a person or object.

|  |  |
| --- | --- |
| Manufacturer: |  |
| Type: |  |
| Serial no.: |  |
| Last calibration: |  |

Measuring instrument used:

Measured closing force (in Newton): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N

**Assessment:**

Maximum closing force as per DIN EN ISO 14120 may **not** exceed 75N.

[ ]  Protective device opens automatically upon contact with a person or an object.

|  |  |
| --- | --- |
| Manufacturer: |  |
| Type: |  |
| Serial no.: |  |
| Last calibration: |  |

Measuring instrument used:

Measured closing force (in Newton): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N

|  |  |
| --- | --- |
| Measured existing closing force remains in force:  | [ ]  longer |
| [ ]  less than 0.75 seconds |
| Closing force goes down to <25N in 5 seconds: | [ ]  Yes |
| [ ]  No |

**Assessment:**

Maximum closing force as per DIN EN ISO 12453 (see table)

This maximum value as defined in table may only persist for max. 0.75s (= Td).

After Td has elapsed, no force <150N is permitted.

This force must go down to <25N after no longer than 5 seconds.



Comments:

* 1. **Functional test with purely pneumatic systems:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **OK** | **Not OK** | **Not applicable** | **Comment** |  |
| [ ]  | [ ]  | [ ]  | [ ]  | Testing dual-channel nature of system/device |

Comments:

**Overall test results:** [ ]  OK [ ]  Not OK

Name (Constructor)

Date

Signature

Place

Name (Tester)

Date

Signature

Place

**Annex 5 Documentation**

**OK Not Not Not
OK available applicable**

🞎 🞎 🞎 🞎 Description of machine/installation

🞎 🞎 🞎 🞎 Information on installation and assembly

🞎 🞎 🞎 🞎 Operating instructions

🞎 🞎 🞎 🞎 Servicing and maintenance plan

🞎 🞎 🞎 🞎 Connection diagram

🞎 🞎 🞎 🞎 Control programs (PC)

🞎 🞎 🞎 🞎 Setting instructions for equipment used

🞎 🞎 🞎 🞎 Settings for equipment used

🞎 🞎 🞎 🞎 Parts list/spare parts list

🞎 🞎 🞎 🞎 CE Declaration of Conformity

🞎 🞎 🞎 🞎 Test log: Initial electrical testing in accordance with VDE 0113-1

🞎 🞎 🞎 🞎 Test log: Initial inspection and testing of electro-sensitive protective

equipment in accordance with Provision on Operating Safety (BetrSichV)

🞎 🞎 🞎 🞎 Test log: Stopping performance measurement

🞎 🞎 🞎 🞎 Test log: ESD suitability

🞎 🞎 🞎 🞎 Test log: Force measurement - Protective devices

🞎 🞎 🞎 🞎 Description of procedure in the case of faults/repair

🞎 🞎 🞎 🞎 Information on transportation

🞎 🞎 🞎 🞎 Information on disposal

🞎 🞎 🞎 🞎 Documentation in electronic form

Comments: