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Requirements for electronic components and PCB assembly

Further source and attached files:

File	Description	Sheet/Connections
1		
2		
3		

The list of the document versions

Version	Description	Prepared by	Validated by	Approved by
160412	Introduction of the document	Ing. Žilinec	Ing. Žilinec	Ing. Michalec
160801	Change Name of the document	Ing. Žilinec	Ing. Žilinec	Ing. Michalec
201111	Change Name of the document, added chapter 4.4	Ing. Žilinec	Ing. Žilinec	Ing. Michalec
211005	Add descriptions of gerber files	Ing. Papán	Ing. Žilinec	Ing. Michalec
211029	Add layers Top/Bottom Coating	Ing. Papán	Ing. Žilinec	Ing. Michalec
220412	Changing the method of assembling foil capacitors	Ing. Papán	Ing. Žilinec	Ing. Michalec
221122	Addition of the requirement for assembling through-hole components. Chapter 4.5	Ing. Žilinec	Ing. Žilinec	Ing. Michalec

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1 Determination of the document

The document specifies the requirements for contractors and subcontractors, technical operations and production stages as required by HMM.

The document follows and refers to the following documents:

Number	Version	Name
[1]		
[2]		
[3]		
[4]		

The document is intended for:

- workers of the manufacturer as a basis for the preparation of materials for production
workers of the supplying companies

2 Specification changes to the document

Version 160412

Introduction of the document

Version 160801

Change Name of the document to General requirements ...

Version 201111

- Change Name of the document to Requirements for...
- Added chapter 4.4 Depanelization assembled PCB

Version 211005

- Add chapter – descriptions of gerber files

Version 211029

- Add layers Top/Bottom Coating

Version 220412

Addition of subchapter - Special requirements for assembling electronic components

- Changing the method of assembling foil capacitors

Version 221122

- Addition of the requirement for assembling through-hole components. Chapter 4.5
- Addition of the requirements resulting from EN 50155:2022. Chapter 4.1

3 Used abbreviations and terminology

PCB	Printed circuit board
FR4	Specification of materials and fireproof class (flame retardant cat. 4)
SMT	Surface mount technology
SMD	Surface mount device
BOM	Bill of materials
ppm	One millionth of the number (parts per million)
274X	Gerber data format
PBA	Printed board assembling

4 Requirements for electronic components and PCB assembly

4.1 A necessary condition for PCB assembly

1. Use only lead-technology
2. Based on the requirement of EN 50155:2022 on electronic assembly (PBA), the electronic embedding must be at least in accordance with class 2 of IPC-A-610G.

4.2 Supplied documents and data for assembling modules

1. Document "Scheme (ASSEMBLY)" for the corresponding module, in which all necessary documents such as bills of materials for different modifications of the module, as well as assembly plans of the individual modification are contained
2. Gerber documents in the form of 274-x for manufacturing of the assembly stencil if the module is populated with SMD components
3. The relevant files "pick & place" for SMT placement machine

4.3 Required parameters of the supplied electronic components

BOM in the documentation "Scheme" under "Amount" specifies the quantity of component used for the assembling modification, concurrently the given number is part of the material delivery for assembling.

If the specified number is "0", we assume the supply of the component by the supplier along with the PCB assembling.

Specifically, the amount requested is set out in column "Note" in brackets "()" before the part numbers of individual components.

4.3.1 For SMD resistors we require

1. Tolerance 1%.
2. Temperature range -50 °C to 105 °C
3. Operating voltage 150V
4. Thermal coefficient of $\pm 100\text{ppm} / ^\circ\text{C}$
5. Power rating SMD 0805 125mW @70°C
6. Power rating SMD 1206 250mW @70°C
7. Expiration period max 5 years from dispatching

4.3.2 For SMD ceramic capacitors we require

1. Tolerance 10%.
2. Working voltage for capacity < 1uF 50V
3. Working voltage for capacity > 1uF 16V
4. Temperature range -50 °C to 105 °C
5. Preferred thermal coefficient for capacity < 1nF NPO(COG)
6. Preferred thermal coefficient for capacity > 1nF NPO(COG)
7. Expiration period max 5 years from dispatching

4.3.3 For SMD semiconductor components we require

Further specification in the column "Name" applies and generally the following applies

1. Min temperature range -40°C ÷ 85°C
2. Preferred temperature range -40°C ÷ 105°C
3. Version automotive / industrial
4. Expiration period max 5 years from dispatching

4.4 Depanelization assembled PCB

In the case of assembly of panelized PCBs multiplied as multimotives on one panel, we require to deliver the individual assembled PCBs separated and cleaned from the remains of the panel mounting bridges. The width of the cutter used for peripheral milling of individual PCBs is 2 mm.

4.5 Special requirements for assembling electronic components

1. Do not assembly foil capacitors (marked with the code **CFxxxxxxx**) with in-line wave, but manually with maximum heating time 4s
2. Through-hole components have to be mounted with minimum height of overhang above the PCB. For example, tap disc HV capacitors, connectors, resistors, etc. The requirement applies to all through-hole components, unless another mounting method is indicated in the relevant documentation.

5 Description of the layers of gerber files

File extensions	Layer name	Explanation of the gerber file
.GTL	Top Layer	Top layer
.GLP	Top Paste Mask	Top SMT stencil
.GM6	Top Coating	Top removable mask when mounted with in-line wave
.GM8	Top Assembly	Top assembly – outline of components
.GM21	Top Designator	Top designators of components
.GM23	Top Value	Top values of components
.GBL	Bottom Layer	Bottom layer
.GBP	Bottom Paste Mask	Bottom SMT stencil
.GM7	Bottom Coating	Bottom removable mask when mounted with in-line wave
.GM9	Bottom Assembly	Bottom assembly – outline of components
.GM22	Bottom Designator	Bottom designators of components
.GM24	Bottom Value	Bottom values of components
.GM1	Dimensions	Outline of PCB