Claims

1. Separating device~~Device~~ for selective separating electronic components from a frame with electronic components, the said selective separating is combined with a separation process, comprising;

- at least two press parts which are displaceable relative to each other;
- drive means for moving the press parts towards and away from each other;
- a guide for guiding frames between the press parts;
- a plurality of punches installed in a first press part, which punches are connecting to individual punch controls;
- a plurality of openings in a second press part, opposite to the individually controlled operative punches in the first press part; and
- an intelligent control system connecting to the individual punch controls;~~.~~

characterised in that

the separated electronic components are sorted based on multiple different selection criteria; and the said separated electronic components received at various locations are differentiated on a quality level, wherein the successive selection of different sets of electronic components for separation is an effective way to separate the electronic components based on multiple sources of quality level information.

2. Separating device according to claim 1, **characterised in that** the punches are individually moveable between an operative position and an inoperative position.

3. Separating device according to claim 2, **characterised in that** the individual punch controls are cylinders.

4. Separating device according to any of the preceding claims, **characterised in that** the separating device comprises a drive for moving the frames along the guide between the press parts and the intelligent control system connects to the frame drive.

5. Separating device according to any of the preceding claims, **characterised in that** the openings in the second press part connect to at least one collecting bin for receiving punched out electronic components.

6. Separating device according to claim 5, **characterised in that** the separating device comprises plural collecting bins, which collecting bins are displaceable by a collecting bin drive and the intelligent control system connects to the collecting bin drive.

7. Separating device according to claims 4 and 6, **characterised in that** the intelligent control system is configured to control the individual punch controls and the frame drive to perform multiple successive punching operations, wherein the frame drive retains the frame in the same position along the frame guide and the collecting bin drive exchanges collection bins between said subsequent punching operations.

8. Separating device according to any of the preceding claim, **characterised in that** the intelligent control system is configured to control the individual punch controls and the frame drive based on information on component quality level obtained from previous operations performed on the frame with electronic components.

9. Separating device according to claim 7 and 8, **characterised in that** the intelligent control system is configured to use the quality level information obtained during one operation performed on the frame with electronic components to set the individual punch controls during a first punching operation and to use the quality level information obtained during another operation performed on the frame with electronic components to set the individual punch controls during a successive punching operation.

10. Separating device according to any of the preceding claims, **characterised in that** the punches in the first press part are installed in a line, which line of punches is oriented perpendicular to the frame guide.

11. Separating device according to claim 10, **characterised in that** the punches in the first press part are installed in plural lines, which lines of punches are oriented perpendicular to the frame guide.

12. System for in-line selective separating electronic components from a frame with electronic components, comprising at least one separating device according to any of the preceding claims, and at least a loader and/or off-loader for frames with electronic components.

13. System for in-line selective separating electronic components according to claim 12, **characterised in that** the system also comprises at least one inspection unit for individual inspection of the electronic components in a frame.

14. System for in-line selective separating electronic components according to claim 12 or 13, **characterised in that** the system also comprises a processing unit acting on the frame with electronic components.

15. System for in-line selective separating electronic components according to claim 14, **characterised in that** the processing unit is a forming unit or a trimming unit for manipulating electronic components connected to a frame, which processing unit is positioned upstream from the separating device.

16. System for in-line selective separating electronic components according to claim 14, **characterised in that** the processing unit is a forming unit or a trimming unit for manipulating electronic components connected to a frame, which processing unit is positioned downstream from the separating device.

17. Method for selective separating electronic components from a frame with electronic components with a separating device according to any of the claims 1 – 8, comprising the processing steps:
A) opening the press parts by moving the press parts away from each other;
B) feeding a frame with electronic components over a controlled distance forwards between the moved apart press parts;

C) selective activating those punches of the plurality of punches that correspond to the positions of a first set of electronic components that during a next processing step have to be separated from the frame; and

D) moving the press parts towards each other such that the activated punches on the corresponding locations separate the electronic components from the frame;~~.~~ characterised in that

the separated electronic components received at various locations are differentiated on a quality level.

18. Method according to claim 17, **characterised in that** the separated electronic components are received at a controlled location and the intelligent control system registers which separated electronic components are received at which location.

~~19. Method according to claim 18, **characterised in that** the separated electronic components received at various locations are differentiated on a quality level.~~

~~20~~19. Method according to any of the claims 17 - ~~19~~18, **characterised in that** step D) is followed up by re-executing steps A), C) and D) while the frame is retained in the same position between the press parts, wherein during the re-execution of step C), those punches of the plurality of punches are selectively activated that correspond to the positions of a second set of electronic components that during a next processing step have to be separated from the frame.

~~21~~20. Method according to claim ~~20~~19, **characterised in that** the selective activation of the punches during the first execution of step C) is based on quality level information obtained during a first operation previously performed on the frame with electronic components and that the selective activation of the punches during the re-execution of step C) is based on quality level information obtained during a second operation previously performed on the frame with electronic components.

~~22~~21. Method according to any of the claims 17 - ~~21~~20, **characterised in that** the length of the forward movement of the frame during processing step B) is

dependent on the number of punches and the number and orientation of electronic components in the frame.

~~23~~22. Method according to any of the claims 17 - ~~22~~21, **characterised in that** the selective separation of the electronic components from a frame is in-line coupled with at least one other operation performed onto the frame of electronic components.

~~24~~23. Method according to claim ~~23~~22, **characterised in that** the selective separation of the electronic components from a frame is preceded by a forming or trimming operation for manipulating the electronic components connected to the frame, wherein the outcome of the forming or trimming operation determines which electronic components are separated from the frame during the selective separation.

~~25~~24. Method according to claim ~~23~~22, **characterised in that** the selective separation of the electronic components from a frame is followed up by a forming or trimming operation for manipulating the electronic components connected to the frame.