

TITLE OF INVENTION: INTERMEDIARY DEVICE FOR ELECTRONIC PART
HANDLER

CROSS-REFERENCE TO RELATED APPLICATION

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This application claims the benefit of Korean Patent Application No. 10-2021-0069330 filed on May 28, 2021, which is hereby incorporated by reference herein in its entirety.

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BACKGROUND

1. Technical Field

The present invention relates to an intermediary device that handles an electronic part between hands in an electronic
15 part handler.

2. Description of the Related Art

Electronic parts are manufactured through various processes, are tested, and are then shipped. In this case, an
20 electronic part handler (hereinafter abbreviated as the "handler") for handling electronic parts is employed in various operation processes. In particular, in order to test and classify manufactured electronic parts, a handler needs to be employed.

25 Meanwhile, handlers are being proposed and manufactured in

new structures in response to the development of a new electronic part or a required process, and various subsequent developments are being made for stabilization.

Recently, the popularization of solid-state drives (SSDs),
5 which are large-sized electronic parts each equipped with various electronic devices, is increasing more and more.

When the initial demand for SSDs was low and thus only a small number of SSDs were manufactured, SSDs were handled manually. In particular, in a test process, SSDs were
10 electrically connected to a tester and then disconnected from the tester manually. However, as the demand surged, manual support for tests became difficult.

However, since the thickness, structure, and weight of SSDs are different from those of conventional electronic parts, a
15 conventional handler could not be applied without change. Accordingly, the applicant of the present invention previously proposed handlers suitable for the support of the testing of large-sized electronic parts such as SSDs in Korean Patent Application Publication Nos. 10-2019-0050483 and 10-2019-
20 0061291.

Meanwhile, the conventional handlers are designed to handle only electronic parts having the same dimensions, or require the replacement of various components when the dimensions of electronic parts to be handled change. As a result, multiple
25 handlers required to handle electronic parts having various

dimensions are required, resulting in the wastage of the construction cost and space, or the operating time is decreased due to the replacement of components.

In addition, since electronic parts such as SSDs have
5 considerably different dimensions depending on finished products to which SSDs will be applied, they are being manufactured by a small-quantity batch production system. In view of this situation, the applicant of the present application proposed a versatile handler (hereinafter referred to as the “the invention
10 of the preceding application”) in Korean Patent Application No. 10-2020-0073725, which is currently unpublished.

An adapter is applied to the handler according to the invention of the preceding application. The adapter serves as a carrier that is used to feed an electronic part to a tester.
15 Accordingly, a single handler may handle multiple types of electronic parts having different sizes only by replacing the adapter.

In spite of the above technology, when reductions in the construction cost and space are taken into consideration, there
20 is still the demand for a handler that can handle as many types of electronic parts having various dimensions as possible.

SUMMARY

25 The present invention has been conceived in pursuit of a

technology that has an improvement over the invention of the preceding application and can handle electronic parts having more various dimensions than the invention of the preceding application.

5 According to a first aspect of the present invention, there is provided an intermediary device for an electronic part handler, the intermediary device including: a mounter configured to detachably mount one of different types of adapters (an electronic part can be detachably mounted on the adapter)
10 thereon; and a reciprocator configured to reciprocate the mounter between a first operation area and a second operation area, the first and second operation areas are divided into different areas to prevent interference between a first operation and a second operation; wherein the mounter
15 selectively and detachably mounts a first adapter for seating a first type of electronic part thereon and a second adapter for seating a second type of electronic part thereon; wherein the first adapter is fixedly mounted on the mounter to prevent itself from moving together with the first type of electronic part; and
20 wherein the second adapter is detachably mounted on the mounter to allow itself to move together with the second type of electronic part.

 The intermediary device may further include a posture converter configured to convert the posture of an electronic
25 part, seated on the first or second adapter mounted on the

mounter, from a laid position to an erected position or from an erected position to a laid position by rotating the mounter.

The planar area of the first type of electronic part may be wider than that of the second type of electronic part.

5 The mounter may include: a mounting plate configured such that the first or second adapter is mountable thereon; a pair of gripping levers configured to grip the electronic part seated on the first adapter mounted on the mounting plate or the second adapter; and a drive source configured to allow the pair of
10 gripping levers to automatically and selectively grip and release an electronic part seated on the first adapter or the second adapter by narrowing or widening the gap between the pair of gripping levers.

 The drive source may be provided to be coupled to the
15 mounting plate, and may be located on the surface of the mounting plate opposite to the mounting surface of the mounting plate on which the first or second adapter is mounted.

 The intermediary device may further include an opener configured to selectively allow an electronic part to be seated
20 on the second adapter and to be drawn out from the second adapter by opening the second adapter mounted on the mounting plate.

 The opener may include a pressing lever configured to open the second adapter by pressing the opening lever of the second adapter, and a pressing source configured to allow the pressing
25 lever to press or release the opening lever by selectively moving

the pressing lever forward and backward; and the pressing lever may be rotatably coupled to the pressing source.

The first adapter may be configured such that a predetermined portion of the seating surface thereof on which
5 the first type of electronic part is seated has a width narrower than that of the first type of electronic part.

According to a second aspect of the present invention, there is provided an intermediary device for an electronic part handler, the intermediary device including: a mounter configured
10 to detachably mount one of different types of adapters (an electronic part can be detachably mounted on the adapter) thereon; and a posture converter configured to convert the posture of an electronic part, seated on a first or second adapter mounted on the mounter, from a laid position to an
15 erected position or from an erected position to a laid position by rotating the mounter; wherein the mounter selectively and detachably mounts the first adapter for seating a first type of electronic part thereon and the second adapter for seating a second type of electronic part thereon; wherein the first
20 adapter is fixedly mounted on the mounter to prevent itself from moving together with the first type of electronic part; and wherein the second adapter is detachably mounted on the mounter to allow itself to move together with the second type of electronic part.

25 The planar area of the first type of electronic part may

be wider than that of the second type of electronic part.

The mounter may include: a mounting plate configured such that the first or second adapter is mountable thereon; a pair of gripping levers configured to grip the electronic part seated
5 on the first adapter mounted on the mounting plate or the second adapter; and a drive source configured to allow the pair of gripping levers to automatically and selectively grip and release an electronic part seated on the first or second adapter by narrowing or widening the gap between the pair of gripping
10 levers.

The drive source may be provided to be coupled to the mounting plate, and may be located on the surface of the mounting plate opposite to the mounting surface of the mounting plate on which the first or second adapter is mounted.

15 The intermediary device may further include an opener configured to selectively allow an electronic part to be seated on the second adapter and to be drawn out from the second adapter by opening the second adapter mounted on the mounting plate.

The opener may include a pressing lever configured to open
20 the second adapter by pressing the opening lever of the second adapter, and a pressing source configured to allow the pressing lever to press or release the opening lever by selectively moving the pressing lever forward and backward; and the pressing lever may be rotatably coupled to the pressing source.

25 The first adapter may be configured such that a

predetermined portion of the seating surface thereof on which the first type of electronic part is seated has a width narrower than that of the first type of electronic part.

5

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features, and advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the
10 accompanying drawings, in which:

FIG. 1 is a reference diagram illustrating a structure for the electrical connection between an electronic part and a tester;

FIG. 2 is a conceptual structure diagram of an electronic
15 part handler according to an embodiment of the present invention;

FIG. 3 is a schematic perspective view of the handler of FIG. 2;

FIG. 4 is a reference diagram illustrating the flow of an
20 electronic part that is formed in a connection part;

FIG. 5 is a top perspective view of a first adapter that is applicable to the handler of FIG. 2;

FIG. 6 is a bottom perspective view of the first adapter of FIG. 5;

25 FIG. 7 is a plan view of a second adapter that is applicable

to the handler of FIG. 2;

FIG. 8 is a conceptual diagram of an intermediary device for an electronic part handler applied to the handler of FIG. 2;

5 FIG. 9 is a partial excerpt view of the intermediary device of FIG. 8;

FIGS. 10 and 11 are excerpt views of a mounter applied to the intermediary device of FIG. 8;

10 FIGS. 12 and 13 are excerpt views illustrating a pair of gripping levers and a drive source applied to the mounter of FIG. 10;

FIG. 14 is an excerpt view of an opener applied to the intermediary device of FIG. 8;

15 FIG. 15 shows an example in which the first adapter is coupled to a mounting plate;

FIG. 16 shows an example in which the second adapter is coupled to the mounting plate;

FIG. 17 is a reference diagram comparing the widths of the first adapter and a first type of electronic part; and

20 FIG. 18 illustrates the various shapes of SSDs, which are one type of electronic parts.

DETAILED DESCRIPTION

25 Embodiments of the present invention will be described in

detail below with reference to the accompanying drawings. For brevity of description, descriptions of redundant or substantially identical configurations will be omitted or abridged as much as possible.

5 **<Description of the Electrical Connection between an Electronic Part and a Tester>**

A handler to which an intermediary device for an electronic part handler (hereinafter abbreviated as the "intermediary device") according to the present invention is applied is more
10 suitable for a case where the contact terminal-side portion of an electronic part is inserted into a test slit of a tester like that of a solid-state drive (SSD).

For example, as shown in FIG. 1, a tester TESTER is provided with test slits S and the terminal (T)-side portion of an
15 electronic part ED is inserted into a corresponding one of the test slits S, so that the electronic part ED and the tester TESTER are electrically connected to each other. In this case, the test slits S may be elongated in the vertical direction, as shown in FIG. 1, or may be elongated in the lateral direction.

20 **<Schematic Description of the Large-level Configuration of a Handler>**

FIG. 2 is a schematic plan view of a handler HR according to the present invention, and FIG. 3 is a schematic perspective view of the handler HR of FIG. 2.

25 The handler HR according to the present embodiment includes

a connection part CP, a stacker part SP, and a transfer device TA.

The connection part CP draws out an electronic part ED to be tested from a customer tray CT and feeds it to a tester
5 TESTER, or collects a tested electronic part ED from a tester TESTER and loads it onto a customer tray CT. An intermediary device according to the present invention is provided in the connection part CP.

The stacker part SP stores customer trays, carried into
10 the handler HR, to feed a customer tray CT loaded with electronic parts ED to be tested to the connection part CP, or collects a customer tray CT loaded with tested electronic parts ED from the connection part CP and stores it before being drawn out from the handler. Furthermore, the stacker part SP feeds a stored
15 customer tray CT, loaded with electronic parts ED to be tested, to the transfer device TA, or collects a customer tray CP, loaded with tested electronic parts ED, from the transfer device TA.

The transfer device TA transfers a customer tray CT between the connection part CP and the stacker part SP. In other words,
20 a customer tray CT loaded with electronic parts ED to be tested is transferred from the stacker part SP to the connection part CP by the transfer device TA, and a customer tray CT loaded with tested electronic parts ED is transferred from the connection part CP to the stacker part SP by the transfer device TA.

25 In the above-described handler HR, an electronic part ED

to be tested is moved from the stacker part SP to the connection part CP by the transfer device TA in the state of being loaded on a customer tray CT. Furthermore, in the connection part CP, an electronic part ED to be tested is moved from a customer tray
5 CT to the intermediary device 100 by a moving hand MH, and is fed from the intermediary device 100 to a tester TESTER by a test hand TH. Thereafter, a tested electronic part is moved to the stacker part SP through the reverse process of the above-described process.

10 In this case, the moving hand MH has a structure configured to grip an electronic part ED by a vacuum suction method, and the test hand TH has a structure configured to grip an electronic part ED by a both ends pressing method.

15 **<Summary of the Flow of an Electronic Part in the Connection Part related to an Adapter>**

As described in detail in the preceding application, the flow of an electronic part ED that is formed when an adapter AD is applied is summarized with reference to the conceptual diagram of FIG. 4.

20 In the state in which an adapter AD is mounted on the intermediary device 100, the moving hand MH draws out an electronic part ED from a customer tray CT and seats it on the adapter AD in a first operation area WA1. In this case, the intermediary device 100 opens the adapter AD so that the moving
25 hand MH can seat the electronic part ED on the adapter AD.

When the first operation of seating the electronic part ED on the adapter AD is completed, the intermediary device 100 moves the adapter AD from the first operation area WA1 to a second operation area WA2. In this case, the first operation
5 area WA1 is located behind the second operation area WA2.

When the movement of the adapter AD to the second operation area WA2 is completed, the intermediary device 100 rotates the adapter AD so that the posture of the electronic part ED seated on the adapter AD is converted from a laid position to an erected
10 position. Then, the test hand TH grips the adapter AD, moves the adapter AD, and then electrically connects the electronic part ED, seated on the adapter AD, to a tester TESTER. Thereafter, when the electronic part ED has been tested, the tested electronic part ED is moved to a customer tray CT through
15 the reverse operations of the above-described operations.

Meanwhile, according to the present invention, an adapter AD of a type different from that of the above adapter AD is additionally implemented. In the following, the adapter AD previously proposed in the preceding application is referred to
20 as a "second adapter," and the adapter AD newly proposed through the present invention is distinctively referred to as a "first adapter."

As described above, the second adapter is gripped by the test hand TH for the purpose of testing the electronic part ED,
25 is moved out of the intermediary device 100, and is then returned

to the intermediary device 100 again.

However, since the first adapter is intended to seat an electronic part ED having relatively large dimensions, it is difficult to implement the first adapter so that it can be gripped by the test hand TH. Accordingly, the first adapter is provided to be fixedly coupled to the intermediary device 100, and only the electronic part ED is gripped by the test hand TH, is moved out of the intermediary device 100, and is then returned to the intermediary device 100 again.

10 **<Description of the First Adapter>**

FIG. 5 is a top perspective view of the first adapter AD1, and FIG. 6 is a bottom perspective view of the first adapter AD1.

Inclined surfaces TF that guide the front and rear ends of the electronic part ED so that the electronic part ED can be appropriately seated on the first adapter AD1 are formed on the front and rear end portions of the first adapter AD1.

In addition, through holes PH, an avoidance window AW, and fixation holes FH are formed in the first adapter AD1, and a location fixation depression FG is formed in the back side of the first adapter AD1. They will be described later in related parts.

Since the first adapter AD1 is fixedly coupled to the intermediary device 100, it may not be moved together with the electronic part ED by the test hand TH.

<Summary of the Second Adapter>

FIG. 7 is a plan view of the second adapter AD2, which is configured such that an opening lever FL may be pressed by an opener (not shown) or the pressing of the opening lever FL may be released by the opener, as in the preceding Korean Patent Application No. 10-2021-0017446 (hereinafter referred to as the "preceding application") of the applicant of the present application. When the opening lever FL is pressed, the gap between the pair of gripping rails GR1 and GR2 is widened and thus the second adapter AD2 is opened, so that the electronic part ED can be seated on the second adapter AD2 or the electronic part ED seated on the second adapter AD2 may be drawn out. In addition, when the pressing of the opening lever FL is released, the gap between the pair of gripping rails GR1 and GR2 is narrowed and thus the second adapter AD2 is closed, in which case the electronic part ED seated on the second adapter AD2 is fixed.

Since the other components and operating structure of the above-described second adapter AD2 have been described in detail in the preceding application, descriptions thereof will be omitted herein.

The second adapter AD2 is detachably coupled to the intermediary device 100, and is thus moved together with the electronic part ED by the test hand TH.

Additional descriptions of the first adapter AD1 and the

second adapter AD2 described above will be given in the parts related to the intermediary device 100 to be described later.

<Brief Description of the Purpose and Configuration of the Intermediary Device>

5 The intermediary device 100 handles an electronic part ED between the moving hand MH and the test hand TH that are responsible for the process of feeding an electronic part ED seated on a customer tray CT to a tester TESTER or collecting a tested electronic part ED from a tester TESTER to a customer
10 tray CT.

 In general, a large electronic part ED having a wide and flat shape such as an SSD is fed to the handler HR in the state of being loaded onto a customer tray CT in a laid position. Accordingly, in order to draw out the electronic part ED from
15 the customer tray CT, it is appropriate to employ a scheme of gripping an electronic part ED by a vacuum suction method. In contrast, in order to forcibly insert an electronic part ED into a test slit S of a tester TESTER, the scheme of gripping an electronic part ED by a vacuum suction method is inappropriate,
20 and a scheme of gripping an electronic part ED by pressing both ends of the electronic part ED is appropriate. The reason for this is that in the case of employing the scheme of gripping an electronic part ED by pressing both ends of the electronic part ED, a structure capable of appropriately guiding an electronic
25 part ED moving for insertion may be easily taken.

Accordingly, as in the preceding related applications, the handler HR needs to be provided with two types of gripping mechanisms for gripping an electronic part ED. One type of gripping mechanism is the moving hand MH capable of gripping an electronic part ED by a vacuum suction method, and the other type of gripping mechanism is the test hand TH capable of gripping an electronic part ED by a both ends pressing method.

The moving hand MH is used to draw out an electronic part ED from a customer tray CT or to load an electronic part ED into a customer tray CT. In contrast, the test hand TH is used to insert an electronic part ED into the test slit S of a tester TESTER or to collect an electronic part ED from a test slit S.

Meanwhile, when the operation areas of the moving hand MH and the test hand TH overlap each other, it is difficult to design control to prevent interference between the moving hand MH and the test hand TH, and also the operation rate of the moving hand MH and the test hand TH is lowered. Accordingly, it is preferable to divide an overall operation area into their respective operation areas WA1 and WA2, as described above. In addition, when a test slit S is elongated in the vertical direction, it is necessary to change the posture of the electronic part ED from a laid position to an erected position. Therefore, the intermediary device 100 is required as in the present invention.

In other words, the intermediary device 100 according to

the present invention is provided for the following reasons:

First, it is necessary to appropriately handle an electronic part ED between the moving hand MH having a vacuum suction structure and the test hand TH having a both ends
5 pressing structure.

Second, in an intermediary process, it is necessary to change the posture of an electronic part ED from a laid position to an erected position or from an erected position to a laid position.

10 Third, it is necessary to prevent the overlapping of the operation areas WA1 and WA2 of the moving hand MH and the test hand TH.

Fourth, it is necessary for the handler HR to handle electronic parts having various dimensions.

15 To this end, the intermediary device 100 includes a mounter 110, a reciprocator 120, a posture converter 130, and an opener 140, as shown in the conceptual diagram of FIG. 8 and the partial excerpt view of FIG. 9 from which the reciprocator 120 is omitted.

20 The mounter 110 is provided to mount the first adapter AD1 or the second adapter AD2 described above. The mounter 110 will be described later under a separate section title.

The reciprocator 120 reciprocates the mounter 110 between the first operation area WA1 in which the moving hand MH operates
25 and the second operation area WA2 in which the test hand TH

operates. Accordingly, the first operation area WA1 and the second operation area WA2 may be divided without overlapping each other, and operation interference between the moving hand MH and the test hand TH may be prevented.

5 The posture converter 130 rotates the first adapter AD1 or the second adapter AD2 mounted on the mounter 110 by rotating the mounter 110, and thus rotates an electronic part ED seated on the first adapter AD1 or the second adapter AD2, thereby changing the posture of the electronic part ED. For reference,
10 in a process in which an electronic part ED is fed to a tester TESTER, the posture of the electronic part ED is converted from a laid position to an erected position, and in a process in which an electronic part ED is collected to a customer tray CT, the posture of the electronic part ED is converted from an
15 erected position to a laid position.

 The opener 140 opens the second adapter AD2 so that an electronic part ED can be seated on the second adapter AD2 or an electronic part ED seated on the second adapter AD2 can be drawn out. The opener 140 will be described later under a
20 separate section title.

 For reference, since the posture converter 130 and the opener 140 need to be reciprocated together with the mounter 110, they are coupled to the mounter 110 in an operable structure and moved together with the mounter 110.

25 <Description of the Mounter>

As shown in the excerpt views of FIGS. 10 and 11, the mounter 110 includes a mounting plate 111, coupling bolts 112a to 112d, location setting pins 113a to 113f, a first detection sensor 114, a second detection sensor 115, a pair of gripping
5 levers 116a and 116b, and a drive source 117.

The mounting plate 111 is provided to mount the first adapter AD1 or the second adapter AD2 through surface contact. In other words, the bottom surface of the first adapter AD1 or the second adapter AD2 comes into surface contact with the top
10 surface of the mounting plate 111 so that the first adapter AD1 or the second adapter AD2 is laid over the mounting plate 111. A location fixation protrusion FP configured to be inserted into the location fixation depression FG of the first adapter AD1 and to fix the mounting plate 111 is formed to protrude upward from
15 the mounting plate 111. In addition, a stopper ST is formed on the mounting plate 111 to prevent the detachably mounted second adapter AD2 from being moved.

The coupling bolts 112a to 112d are provided as coupling members for fixing and coupling the first adapter AD1 to the
20 mounting plate 111 by a manual operation. In other words, the coupling bolts 112a to 112d are configured to pass through the fixation holes FH of the first adapter AD1 in the vertically downward direction and to be fastened to the mounting plate 111. Accordingly, since the first adapter AD1 is firmly fixed to the
25 mounting plate 111, the movement of the first adapter AD1

together with a first type of electronic part ED is fundamentally prevented. It is obvious that since it is sufficient if the coupling bolts 112a to 112d serve as coupling members, the coupling members do not need to be limited to bolts such as the
5 coupling bolts 112a to 112d in this embodiment.

The location setting pins 113a to 113f serve to appropriately set the horizontal locations of the first adapter AD1 and the second adapter AD2, and also serve to, when the gripping of an electronic part ED by the second adapter AD2 is
10 released during the operation of the second adapter AD2, support the electronic part ED so that the vertical location of the electronic part ED can be appropriately set, as described in the preceding application. At least some of these location setting pins 113a to 113f may be provided to be shorter and thicker than
15 the others. By providing the location setting pins 113a to 113f in this way, the through holes PH through which the location setting pins 113a to 113f can pass are formed in the first adapter AD1 and the second adapter AD2 at corresponding locations.

20 The first detection sensor 114 is provided to detect whether an electronic part ED is seated on the first adapter A2 or the second adapter AD2. To this end, the first detection sensor 114 is formed to be exposed upward through the avoidance window AW of the first adapter AD1.

25 The second detection sensor 115 is provided to detect

whether the first adapter AD1 or the second adapter AD2 is mounted on the mounting plate 111.

Although the above first detection sensor 114 or second detection sensor 115 is provided as an optical sensor as an example, any sensor employing any type of detection method may be preferably applied as long as it is a means for detection.

The pair of gripping levers 116a and 116b and the drive source 117 will be described with reference to the excerpt views of FIGS. 12 and 13.

10 The pair of gripping levers 116a and 116b grip or release the first type of electronic part ED seated on the first adapter AD1 or the second adapter AD2 in such a manner that the gap therebetween is selectively narrowed and widened.

The drive source 117 provides a driving force that narrows or widens the gap between the pair of gripping levers 116a and 116b so that the pair of gripping levers 116a and 116b automatically grip or release the first type of electronic part ED or the second adapter AD2. In this embodiment, the driving force generated by the drive source is not directly supplied to the pair of gripping levers 116a and 116b, but is transmitted by a guide rail 'a,' a pair of rotation links 'b,' and an advance/retreat member 'c.'

The guide rail 'a' guides the gripping levers 116a and 116b through their movement when the gripping levers 116a and 116b move in the left and right direction. To this end, the gripping

levers 116a and 116b are rail-coupled to the guide rail 'a.'

First sides of the pair of rotation links 'b' are rotatably coupled to the gripping levers 116a and 116b, and the remaining sides thereof are rotatably coupled to the advance/retract member 'c.' Accordingly, the rotation links b are rotated by the forward or backward movement of the advance/retreat member 'c,' and the gripping levers 116a and 116b are pushed or pulled in the left and right directions by the rotation links b.

The advance/retreat member 'c' is selectively moved forward and backward by the driving force of the drive source 117.

For reference, although the driving force of the drive source 117 provided as a cylinder is transmitted to the pair of gripping levers 116a and 116b through the advance/retreat member 'c,' etc. in the present embodiment, any structure may be preferably applied as long as it can change the gap between the pair of gripping levers 116a and 116b.

Meanwhile, the pair of gripping levers 116a and 116b need to selectively grip and release an electronic part ED or the second adapter AD2 in a state in which the electronic part ED is in a laid position, and also need to selectively grip and release an electronic part ED or the second adapter AD2 even in a state in which the electronic part ED is in an erected position. Accordingly, the gripping levers 116a and 116b and the drive source 117 need to be rotated together with the mounting plate 111 by the posture converter 130. To this end,

in the present embodiment, the gripping levers 116a and 116b and the drive source 117 are operatively coupled to the mounting plate 111. In this case, as shown in FIG. 11, the drive source 117 is located on the rear surface of the mounting plate 111, which is opposite to the surface of the mounting plate 111 on which the first adapter AD1 or the second adapter AD2 is mounted, so that it does not interfere with the mounting of the first adapter AD1 or the second adapter AD2 while appropriately supplying a driving force to the pair of gripping levers 116a and 116b.

<Description of the Opener>

As shown in the excerpt view of FIG. 14, the opener 140 includes a pressing lever 141, a pressing source 142, and a spring 143.

The pressing lever 141 opens the second adapter AD2 by pressing the opening lever FL of the second adapter AD2.

The pressing source 142 selectively moves the pressing lever 141 forward and backward so that the pressing lever 141 can press or release the opening lever FL of the second adapter AD2. Although a cylinder is applied as the pressing source 142 in the present embodiment, the pressing source 142 is not necessarily limited to a cylinder.

The spring 143 is provided as an elastic member for applying an elastic force to the pressing lever 141 in a direction that releases pressing when a pressing force is not

supplied from the pressing source 142.

Meanwhile, it needs to be noted that the mounter 110 is rotated by the posture converter 130. Accordingly, in order to open the second adapter AD2 on the mounter 110, it may be first contemplated that the opener 140 is coupled to the mounter 110. However, due to the operation structure of the mounter 110 itself, it is considerably difficult to couple the opener 140 to the mounter 110. Therefore, in the present embodiment, by employing a structure in which the pressing lever 141 is rotatably coupled to the pressing source 142, when the mounter 110 is rotated by the posture converter 130, the pressing lever 141 is allowed to be also rotated.

FIG. 15 shows an example in which the first adapter AD1 is coupled to the mounting plate 111, and FIG. 16 shows an example in which the second adapter AD2 is coupled to the mounting plate 111.

It is again emphasized that the first adapter AD1 is fixedly mounted on the mounting plate 111 using coupling members such as the coupling bolts 112a to 112d. Accordingly, when the first adapter AD1 is applied, the handler HR enters a state capable of handling the first type of electronic part ED having the maximum width that can be gripped by the pair of gripping levers 116a and 116b, and the test hand TH directly grips the first type of electronic part ED.

In addition, when the second adapter AD2 is automatically

and detachably mounted on the mounting plate 111 as in the preceding application, the test hand TH grips the second adapter AD2. In this case, the handler HR enters a state capable of handling a second type of electronic parts ED having various
5 dimensions according to the type of second adapter AD2.

It is obvious that since the second type of electronic part ED is gripped by the test hand TH in the state of being seated on the second adapter AD2, the planar area of the first type of electronic part ED is wider than that of the second type of
10 electronic part ED.

Meanwhile, in order for the test hand TH to grip the electronic part ED seated on the first adapter AD1, it is necessary to prevent the first adapter AD1 from being gripped together or to prevent interference. Accordingly, as shown in
15 FIG. 17, at least a predetermined portion (the front end portion in this embodiment) of the seating surface of the first adapter AD1 needs to be designed to have a width $W2$ significantly narrower than the width $W1$ of the first type of electronic part ED, and the test hand TH grips the first type of electronic part
20 ED in the corresponding predetermined portion. In the present embodiment, the width $W3$ of the seating surface of the first adapter is narrower than the width $W1$ of the electronic part ED in the remaining portions other than the predetermined portion. The reason for this is that the remaining portion is an area in
25 which the electronic part ED is gripped by the gripping levers

116a and 116b. It is obvious that in order to handle the large electronic part ED having a wide width, the width W2 of the predetermined portion needs to be narrower than the width W3 of the remaining portion.

5 **<Notes - Examples of Electronic parts>**

Electronic parts ED may have various dimensions. FIG. 18 shows the various shapes of SSDs, which are one type of electronic parts. In other words, the sizes of SSDs may be various depending on the functionality or dimensions of finished
10 products to which the SSDs will be applied. Therefore, SSDs having a relatively large size are mounted on the first adapter AD1, and various types of SSDs having a relatively small size are mounted on the second adapter AD2. More specifically, for example, a case where the first adapter AD1 is applied is
15 intended to seat relatively large SSDs such as U.2 SSDs, and a case where the second adapter AD2 is applied is intended to seat relatively small SSDs such as M.2 SSDs.

It is obvious that since N.2 SSDs have various dimensions, the second adapter AD2 may include second adapters having
20 various dimensions while having the same structure.

According to the present invention, there are the following effects:

First, the present invention may reduce the construction cost and space because it may handle more electronic parts having
25 various dimensions than the invention of the preceding

application by using a single handler.

Second, an electronic part having a size excessive for connection to a tester may be electrically connected to a tester via an adapter as in the invention of the preceding application,
5 so that the versatility of the present invention is increased accordingly.

While the specific description of the present invention has been given in conjunction with the embodiments described with reference to the accompanying drawings above, the
10 aforementioned embodiments are merely examples of the present invention. Therefore, it should be understood that the present invention is not limited only to the above embodiments, and the true scope of the present invention should be defined based on the attached claims and the range of equivalents thereto.

WHAT IS CLAIMED IS:

1. An intermediary device for an electronic part handler,
the intermediary device comprising:

5 a mounter configured to detachably mount one of different
types of adapters thereon, wherein an electronic part can be
detachably mounted on the adapter; and

 a reciprocator configured to reciprocate the mounter
between a first operation area and a second operation area,
10 wherein the first and second operation areas are divided into
different areas to prevent interference between a first
operation and a second operation;

 wherein the mounter selectively and detachably mounts a
first adapter for seating a first type of electronic part thereon
15 and a second adapter for seating a second type of electronic
part thereon;

 wherein the first adapter is fixedly mounted on the mounter
to prevent itself from moving together with the first type of
electronic part; and

20 wherein the second adapter is detachably mounted on the
mounter to allow itself to move together with the second type
of electronic part.

2. The intermediary device of claim 1, further comprising
25 a posture converter configured to convert a posture of an

electronic part, seated on the first or second adapter mounted on the mounter, from a laid position to an erected position or from an erected position to a laid position by rotating the mounter.

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3. An intermediary device for an electronic part handler, the intermediary device comprising:

a mounter configured to detachably mount one of different types of adapters thereon, wherein an electronic part can be
10 detachably mounted on the adapter; and

a posture converter configured to convert a posture of an electronic part, seated on a first or second adapter mounted on the mounter, from a laid position to an erected position or from an erected position to a laid position by rotating the mounter;

15 wherein the mounter selectively and detachably mounts the first adapter for seating a first type of electronic part thereon and the second adapter for seating a second type of electronic part thereon;

wherein the first adapter is fixedly mounted on the mounter
20 to prevent itself from moving together with the first type of electronic part; and

wherein the second adapter is detachably mounted on the mounter to allow itself to move together with the second type of electronic part.

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4. The intermediary device of claim 1 or 3, wherein a planar area of the first type of electronic part is wider than that of the second type of electronic part.

5 5. The intermediary device of claim 1 or 3, wherein the mounter comprises:

a mounting plate configured such that the first or second adapter is mountable thereon;

a pair of gripping levers configured to grip the electronic
10 part seated on the first adapter mounted on the mounting plate or the second adapter; and

a drive source configured to allow the pair of gripping levers to automatically and selectively grip and release an electronic part seated on the first adapter or the second adapter
15 by narrowing or widening a gap between the pair of gripping levers.

6. The intermediary device of claim 5, wherein the drive source is provided to be coupled to the mounting plate, and is
20 located on a surface of the mounting plate opposite to a mounting surface of the mounting plate on which the first or second adapter is mounted.

7. The intermediary device of claim 5, further comprising
25 an opener configured to selectively allow an electronic part to

be seated on the second adapter and to be drawn out from the second adapter by opening the second adapter mounted on the mounting plate.

5 8. The intermediary device of claim 7, wherein the opener comprises:

 a pressing lever configured to open the second adapter by pressing an opening lever of the second adapter; and

 a pressing source configured to allow the pressing lever
10 to press or release the opening lever by selectively moving the pressing lever forward and backward;

 wherein the pressing lever is rotatably coupled to the pressing source.

15 9. The intermediary device of claim 1 or 3, wherein the first adapter is configured such that a predetermined portion of a seating surface thereof on which the first type of electronic part is seated has a width narrower than that of the first type of electronic part.

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