WHAT IS CLAIMED IS:

1. A substrate processing apparatus, comprising:

a first processing module including a first process container in which at least one substrate is processed and a substrate loading port installed at a front side of the first processing module;

a first utility system including a first supply system configured to supply a first processing gas into the first process container, a surface of the first utility system is connected or arranged close to a rear surface of the first processing module; and

a first vacuum-exhauster arranged behind the first processing module and configured to exhaust an inside of the first process container,

wherein the first vacuum-exhauster includes:

a first booster pump with a first intake port formed forward at a position substantially facing a first exhaust port installed backward at a rear side of the first process container;

a first exhaust pipe configured to substantially linearly bring the first exhaust port into fluid communication with the first intake port and including a first pressure regulator, a first gate valve, and a first bellows installed at a flow path in series; and

an outer side surface configured such that the outer side surface does not protrude more outward than an outer side surface of the first utility system.

2. The substrate processing apparatus of Claim 1, wherein the first vacuum-exhauster is arranged close to a rear surface of the first utility system, and the first vacuum-exhauster has an installation area of less than 500×500 mm^2.

3. The substrate processing apparatus of Claim 2, further comprising:

a second processing module arranged close to a side surface of the first processing module and including a second process container in which the at least one substrate is

processed;

a second utility system including a second supply system configured to supply a second processing gas into the second process container, a surface of the second utility system is connected or arranged close to a rear surface of the second processing module; and

a second vacuum-exhauster arranged behind the second processing module such that an outer surface of the second vacuum-exhauster does not protrude more outward than an outer side surface of the second utility system, and configured to exhaust an inside of the second process container,

wherein the at least one substrate includes a plurality of substrates, the first process container is configured to accommodate the plurality of substrates arranged in multiple stages on a first substrate holder and thermally treat the substrates, and the second process container is configured to accommodate the plurality of substrates arranged in multiple stages on a second substrate holder and thermally treat the substrates,

wherein a first maintenance port configured to be capable of allowing the first process container or the first substrate holder to be taken out of the substrate processing apparatus is formed on the rear surface of the first processing module at a position below or above the first exhaust port,

wherein a second maintenance port configured to be capable of allowing the second process container or the second substrate holder to be taken out of the substrate processing apparatus is formed at the rear surface of the second processing module at a position below or above a second exhaust port installed at a rear side of the second process container, and,

wherein a maintenance area, which is formed by being sequentially surrounded by the first vacuum-exhauster, the first utility system, the first processing module, the second processing module, the second utility system, and the second vacuum-exhauster, is configured to have a width and a height large enough to unload at least one selected from the group of the first process container, the first substrate holder, the second process container, and the second substrate holder taken out via the first maintenance port and the second maintenance port respectively.

4. The substrate processing apparatus of Claim 3, wherein the second vacuum-exhauster includes a second booster pump, the second vacuum-exhauster is arranged close to a rear surface of the second utility system, and the second vacuum-exhauster includes a second intake port formed at a position substantially facing the second exhaust port, and further comprising:

a second exhaust pipe configured to substantially linearly bring the second exhaust port into fluid communication with the second intake port and including a second pressure regulator, a second gate valve, and a second bellows installed at a flow path in series,

wherein the first booster pump and the second booster pump have a rotating shaft respectively extending in the vertical direction, and

wherein the first vacuum-exhauster includes a first gantry configured to match a height of the first intake port with the first exhaust port, and the second vacuum-exhauster includes a second gantry configured to match a height of the second intake port with the second exhaust port.

5. The substrate processing apparatus of Claim 4, wherein the first pressure regulator, the first gate valve, the second pressure regulator, and the second gate valve are configured to be openable at flow path cross-sectional areas equal to or larger than cross-sectional areas of the first exhaust pipe and the second exhaust pipe respectively.

6. A method of manufacturing a semiconductor device, the method comprising:

providing, to a first process container in which a substrate is processed, the substrate to be loaded into the first process container via a first loading port installed at a front side of the first process container, the first process container being included in a first processing module;

supplying a first processing gas into the first process container from a first supply system included in a first utility system, a surface of the first utility system being connected or arranged close to a rear side of the first processing module;

exhausting an inside of the first process container by a first vacuum-exhauster

arranged behind the first processing module,

wherein the first vacuum-exhauster includes:

a first booster pump with a first intake port formed forward at a position substantially facing a first exhaust port installed backward at a rear side of the first process container;

a first exhaust pipe configured to substantially linearly bring the first exhaust port into fluid communication with the first intake port and including a first pressure regulator, a first gate valve, and a first bellows installed at a flow path in series; and

an outer side surface configured such that the outer side surface does not protrude more outward than an outer side surface of the first utility system.