What is claimed is:

1. A multi-refrigeration-cycle apparatus for cooling a semiconductor-device manufacturing equipment, comprising:

a first refrigeration cycle having a first refrigerant for performing heat exchange with a cooling medium for cooling the semiconductor-device manufacturing equipment, the first refrigerant circulating in the first refrigeration cycle; and

a second refrigeration cycle having a second refrigerant for performing heat exchange with the first refrigerant, the second refrigerant circulating in the second refrigeration cycle,

wherein at least a part of the first refrigeration cycle is arranged in a clean room where the semiconductor-device manufacturing equipment is installed, and

the second refrigeration cycle is arranged in a sub-fab.

2. The multi-refrigeration-cycle apparatus according to claim 1, wherein the entire first refrigeration cycle is arranged in the clean room.

3. The multi-refrigeration-cycle apparatus according to claim 1, wherein the first refrigeration cycle includes:

a first evaporator configured to perform heat exchange between the cooling medium and the first refrigerant to generate the first refrigerant in a gas phase;

a first compressor configured to compress the first refrigerant in the gas phase;

a first condenser configured to condense the compressed first refrigerant in the gas phase to generate the first refrigerant in a liquid phase; and

a first expansion mechanism located between the first condenser and the first evaporator and configured to reduce pressure and temperature of the first refrigerant,

the first evaporator and the first expansion mechanism are arranged in the clean room, and the first compressor and the first condenser are arranged in the sub-fab.

4. The multi-refrigeration-cycle apparatus according to claim 1, further comprising an intermediate-medium circulation line configured to circulate an intermediate medium between the first refrigeration cycle and the second refrigeration cycle, the intermediate-medium circulation line extending between the first refrigeration cycle and the second refrigeration cycle.

5. The multi-refrigeration-cycle apparatus according to claim 4, further comprising a buffer tank coupled to the intermediate-medium circulation line.

6. The multi-refrigeration-cycle apparatus according to claim 4, wherein the intermediate medium is brine (antifreeze).

7. The multi-refrigeration-cycle apparatus according to claim 1, further comprising a cascade condenser configured to perform heat exchange between the first refrigerant and the second refrigerant.

8. The multi-refrigeration-cycle apparatus according to claim 1, wherein the first refrigeration cycle includes:

a first evaporator configured to perform heat exchange between the cooling medium and the first refrigerant to generate the first refrigerant in a gas phase;

a first compressor configured to compress the first refrigerant in the gas phase;

a first condenser configured to condense the compressed first refrigerant in the gas phase to generate the first refrigerant in a liquid phase; and

a heat exchanger disposed between the first compressor and the first condenser and configured to cool the compressed first refrigerant in the gas phase.