CLAIMS

1. A matching network device, coupled between an RF generator and a plasma processing device, comprising:

an impedance matching module, coupled between the RF generator and the plasma processing device;

a control module, coupled to the impedance matching module and having a default mode, wherein the default mode indicates a matching impedance conversion of the impedance matching module according to an impedance range of the plasma processing device; and

a detection module, coupled among the control module, the RF generator and the plasma processing device;

wherein the detection module detects the impedance of the RF generator and the impedance of the plasma processing device, so as to output a detection signal to the control module, and the control module adjusts the default mode according to the detection signal, so that the impedance matching module transmits an RF energy outputted by the RF generator to the plasma processing device.

2. The matching network device according to claim 1, wherein the impedance matching module comprises a first variable capacitance unit, a second variable capacitance unit and an inductance unit.

3. The matching network device according to claim 2, wherein the first terminal of the first variable capacitance unit is coupled to the RF generator and the inductance unit, the first terminal of the second variable capacitance unit is coupled to the plasma processing device and the inductance unit, and the second terminal of the first variable capacitance unit and

the second terminal of the second variable capacitance unit are coupled to a ground terminal.

4. The matching network device according to claim 2 ~~or 3~~, wherein the first terminal of the first variable capacitance unit is coupled to the RF generator and the first terminal of the second variable capacitance unit, the second terminal of the second variable capacitance unit is coupled to the inductance unit, the inductance unit is coupled to the plasma processing device, and the second terminal of the first variable capacitance unit is coupled to a ground terminal.

5. The matching network device according to ~~any of the preceding~~ claim~~s~~ 2 ~~to 4~~, wherein the first terminal of the first variable capacitance unit is coupled to the RF generator, the second terminal of the first variable capacitance unit is coupled to the inductance unit, the first terminal of the second variable capacitance unit is coupled to the inductance unit and the plasma processing device, and the second terminal of the second variable capacitance unit is coupled to a ground terminal.

6. The matching network device according to ~~any of the preceding~~ claim~~s~~ 2 ~~to 5~~, wherein the first variable capacitance unit has several capacitors and several switches, and the second variable capacitance unit has several capacitors and several switches, wherein the control module adjusts the default mode according to the detection signal, and the default mode indicates the operation of the switches of the first variable capacitance unit, and/or the operation of the switches of the second variable capacitance unit.

7. The matching network device according to ~~any of the preceding~~ claim~~s~~ 2~~ to 6~~, wherein the default mode indicates a series or a parallel state of the capacitors of the first variable capacitance unit, and/or a series or a parallel state of the capacitors of the second variable capacitance unit.

8. A matching network system, comprising:

an RF generator, for outputting an RF energy according to a default frequency;

a plasma processing device, for receiving the RF energy to perform a wafer production process; and

a matching network device, coupled between the RF generator and the plasma processing device, the matching network device comprising:

an impedance matching module, coupled between the RF generator and the plasma processing device;

a control module, coupled to the impedance matching module and having a default mode, wherein the default mode indicates a matching impedance conversion of the impedance matching module according to an impedance range of the plasma processing device; and

a detection module, coupled among the control module, the RF generator and the plasma processing device;

wherein the detection module detects the impedance of the RF generator and the impedance of the plasma processing device, so as to output a detection signal to the control module, and the control module adjusts the default mode according to the detection signal, so that the impedance matching module transmits an RF energy outputted by the RF generator to the plasma processing device.

9. The matching network system according to claim 8, wherein the impedance matching module comprises a first variable capacitance unit, a second variable capacitance unit and an inductance unit.

10. The matching network system according to claim 9, wherein the first variable capacitance unit has several capacitors and several switches, and the second variable capacitance unit has several capacitors and several switches, wherein the control module adjusts the default mode according to the detection signal, and the default mode indicates the operation of the switches of the first variable capacitance unit, and/or the operation of the switches of the second variable capacitance unit, so that the capacitors of the first variable capacitance unit form a series or a parallel state, and/or the capacitors of the second variable capacitance unit form a series or a parallel state.