CLAIMS

1. A small combined construction equipment for soft foundation treatment, comprising several membrane outlets for pumping gas and water arranged on a soft soil foundation covering membrane, characterized in that: the construction equipment is provided with a combined gas-water pumping device engaged to the membrane outlets, the combined gas-water pumping device at least comprises one gas-water separation tank and one water ring vacuum pump which are mounted nearby on the soft soil foundation covering membrane in the vicinity of the membrane outlets, the membrane outlets are respectively connected with interfaces arranged around the gas-water separation tank, and a set of a check valve and a cut-off valve are arranged on each interface pipeline; and the gas-water separation tank is internally equipped with one submersible pump, a drain outlet of the submersible pump is arranged outside the gas-water separation tank, one gas pumping port is arranged at an upper part of the gas-water separation tank, and the gas pumping port is connected with a gas suction port of the water ring vacuum pump via a pipeline.

2. The small combined construction equipment for soft foundation treatment according to claim 1, characterized in that: one floating cut-off valve is arranged at the gas pumping port at the upper part of the gas-water separation tank, and the gas pumping port at the upper part of

the gas-water separation tank is connected with the gas suction port of the water ring vacuum pump by an automatic air pressure distributor; one check valve is arranged on a connecting pipeline between the gas suction port of the water ring vacuum pump and the automatic air pressure distributor; the automatic air pressure distributor comprises a pressure control valve and an atmospheric jet pump which are connected in parallel, and the pressure control valve and the atmospheric jet pump are controlled by the pressure in the gas-water separation tank; when a negative pressure value in the gas-water separation tank is greater than a set negative pressure value, the pressure control valve is in an opened state, the atmospheric jet pump is in a closed state, the pressure of the gas-water separation tank is in a low vacuum state, and then the gas-water separation tank is vacuumized by the opened pressure control valve; and when a negative pressure value in the gas-water separation tank reaches a set negative pressure value, the pressure control valve is closed, the atmospheric jet pump is opened, and the gas-water separation tank continues to be vacuumized by the atmospheric jet pump such that the pressure in the gas-water separation tank reaches a high vacuum state.

3. The small combined construction equipment for soft foundation treatment according to claim 1 or 2, characterized in that: the water ring vacuum pump is a submersible water ring vacuum pump arranged in a water tank; and one water tank is arranged beside the gas-water

separation tank, the submersible water ring vacuum pump is arranged in the water tank, and the drain outlet of the submersible pump is connected with the water tank by a drainage pipeline and a check valve.

4. The small combined construction equipment for soft foundation treatment according to claim 2, characterized in that: the pressure control valve and the atmospheric jet pump are solenoid-operated opening and closing valves, the gas-water separation tank is provided with a negative pressure sensor, and a control signal outputted by the negative pressure sensor is connected with the pressure control valve and the atmospheric jet pump by a control system.

5. The small combined construction equipment for soft foundation treatment according to claim 2, characterized in that: the pressure control valve is an air pressure membrane box I, a gas pumping port of the air pressure membrane box I and a gas pumping port of the atmospheric jet pump are connected in parallel and then connected with the gas suction port of the water ring vacuum pump by a gas pumping pipeline, a gas suction port of the air pressure membrane box I and a gas suction port of the atmospheric jet pump are connected in parallel and then connected with the gas pumping port of the gas-water separation tank by a gas suction pipeline, an air inlet pipeline of the atmospheric jet pump is connected with the gas pumping pipeline by an air pressure membrane box II, the air inlet pipeline of the atmospheric jet pump is connected with

an air outlet of the air pressure membrane box II, and the air outlet of the air pressure membrane box II is communicated with an outer cavity of a diaphragm of the air pressure membrane box I via a branch.

6. The small combined construction equipment for soft foundation treatment according to claim 2, characterized in that: the low vacuum state refers to a negative pressure value of 0 to -0.09 Mpa in the gas-water separation tank.

7. The small combined construction equipment for soft foundation treatment according to claim 2, characterized in that: the high vacuum state refers to a negative pressure value of -0.09 to -0.096 Mpa in the gas-water separation tank.

8. The small combined construction equipment for soft foundation treatment according to claim 3, characterized in that: the submersible water ring vacuum pump consists of a supporting seat, a submersible motor, a sealed oil chamber and a water ring vacuum pump head, the sealed oil chamber has two layers of oil cavities, each of which is internally provided with a set of mechanical seals, the water ring pump head is internally provided with a set of mechanical seals, and the three sets of mechanical seals together ensure the sealing performance in the driving of a pump shaft.