Claims

1. A gate valve used in a semiconductor apparatus, comprising:

a valve box, which has a channel for connecting a vacuum pipeline in the semiconductor apparatus;

an actuator, which has a connecting flange for connecting the valve box;

a fixing device, which is set on the connecting flange and configured to detachably connect the actuator to the valve box, wherein a detachment direction of the fixing device faces the actuator; and

a jackscrew, wherein the jackscrew is set on an edge side of the connecting flange, facing the actuator and passing through the connecting flange to contact the valve box, and separates the actuator from the calve box by rotation.

2. The gate valve according to claim 1, further comprising a sealing valve plate, wherein an edge of the sealing valve plate is set with a sealing ring, the sealing valve plate is connected to the actuator, and the actuator is operable to drive the sealing valve plate into the valve box to close the channel, or to drive the sealing valve plate out of the valve box to open the channel.

3. The gate valve according to claim 1, wherein the jackscrew comprises a pair of jackscrews that are symmetrically arranged on the edge side.

4. The gate valve according to claim 1, wherein the fixing device comprises a plurality of fixing screws set on the edge side of the connecting flange.

5. The gate valve according to claim 1, wherein the fixing device comprises a clamp.

6. The gate valve according to claim 5, wherein the clamp comprises a first clamp portion and a second clamp portion that are generally semi-annular, a first end

of the first clamp portion is locked and fixed with a first end of the second clamp portion through a first locking screw, and a second end of the first clamp portion is locked and fixed with a second end of the second clamp portion through a second locking screw.

7. The gate valve according to claim 6, wherein a first groove is provided on an edge of a portion adjacent to the connecting flange on the valve box, and a second groove corresponding to the first groove is provided on an edge of the connecting flange, a middle part of the first clamp portion, between the first end and the second end of the first clamp portion, is arranged in the first groove, and a middle part of the second clamp portion, between the first end and the second end of the second clamp portion, is arranged in the second groove.

8. The gate valve according to claim 6, wherein the detachment directions of the first locking screw and the second locking screw face the actuator.

9. The gate valve according to claim 5, wherein the clamp comprises two clamps that are symmetrically arranged on the connecting flange.

10. The gate valve according to claim 1, further comprising a positioning pin, wherein the positioning pin is set on the edge side of the connecting flange, and passes through the connecting flange to be inserted into a positioning hole on the valve box.

11. A method for maintaining the gate valve according to claim 1, wherein the gate valve is installed on the vacuum pipeline in a semiconductor apparatus, and the method comprises:

detaching the fixing device on the connecting flange from an actuator side;

separating the actuator from the valve box by rotating the jackscrew set on the connecting flange and facing an edge side of the actuator;

maintaining a connection between the valve box and the vacuum pipeline, while removing the actuator for maintenance; and

returning the jackscrew after completing the maintenance.

12. The method according to claim 11, wherein the step of removing the actuator comprises: removing a sealing valve plate connected to the actuator, wherein an edge of the sealing valve plate is set with a sealing ring.

13. The method according to claim 11, further comprising:

aligning the actuator with the valve box, and connecting the actuator to the valve box via the fixing device, after completing the maintenance.

14. The method according to claim 11, wherein the fixing device comprises a plurality of fixing screws set on the edge side of the connecting flange.

15. The method according to claim 11, wherein the fixing device comprises a clamp.

16. The method according to claim 15, wherein the clamp comprises a first clamp portion and a second clamp portion that are generally semi-annular, a first groove is provided on an edge of a portion adjacent to the connecting flange on the valve box, and a second groove corresponding to the first groove is provided on an edge of the connecting flange, a middle part of the first clamp portion, between a first end and a second end of the first clamp portion, is arranged in the first groove, and a middle part of the second clamp portion, between a first end and a second end of the second clamp portion, is arranged in the second groove,

the step of detaching the fixing device on the connecting flange comprises: loosening a first locking screw that locks and fixes the first end of the first clamp portion with the first end of the second clamp portion, and loosening a second locking screw that locks and fixes the second end of the first clamp portion with the second end of the second clamp portion.

17. The method according to claim 15, wherein the clamp comprises two clamps

that are symmetrically arranged on the connecting flange.

18. The method according to claim 11, wherein the step of rotating the jackscrew comprises: synchronously rotating a pair of jackscrews symmetrically arranged on the edge side of the connecting flange.

19. The method according to claim 13, wherein a positioning pin is used to align the actuator with the valve box, and the positioning pin is set on the edge side of the connecting flange.