CLAIMS

1. A drive device, comprising:

an articulated structure, comprising a fixed end and a movable end articulatedly connected to the fixed end, wherein the fixed end is configured to be connected to a vehicle body of a vehicle, and the movable end is configured to be connected to a door assembly of the vehicle;

a transmission structure, provided at the movable end and comprising a connecting rod and a rocker arm, wherein one end of the connecting rod is rotatably connected to the rocker arm, and the other end of the connecting rod is rotatably connected to the fixed end; and

a drive structure, provided at the movable end and comprising an actuator and a drive shaft, wherein the drive shaft is fixedly connected to an end of the rocker arm away from the connecting rod, and the actuator drives the drive shaft to rotate the rocker arm about an axis of the drive shaft, wherein the axis of the drive shaft and a pivot axis of the articulated structure are arranged in different planes,

wherein the drive device further comprises a first fixing plate for fixing the drive structure, and the first fixing plate is directly connected to the movable end of the articulated structure.

2. The drive device according to claim 1, wherein the drive structure comprises:

a driving gear connected to the actuator; and

a driven gear meshing with the driving gear and fixedly connected to the drive shaft, wherein the driving gear has a diameter smaller than that of the driven gear.

3. The drive device according to claim 2, wherein the driven gear comprises a first driven gear and a second driven gear, the first driven gear meshing with the driving gear and the second driven gear, respectively, and the second driven gear being fixedly connected to the drive shaft, wherein the first driven gear has a diameter larger than that of the driving gear and smaller than that of the second driven gear.

4. The drive device according to claim 3, wherein the first driven gear comprises a first sub-gear and a second sub-gear, wherein the first sub-gear is fixedly connected to the second sub-gear, and the first sub-gear has a diameter larger than that of the second sub-gear; and the first sub-gear meshes with the driving gear, and the second sub-gear meshes with the second driven gear.

5. The drive device according to claim 1, further comprising:

a sealing sleeve disposed around a portion of the connecting rod, wherein one end of the sealing sleeve is fixedly connected to the connecting rod, and the other end of the sealing sleeve extends to the movable end.

6. The drive device according to claim 1, wherein an end of the connecting rod close to the rocker arm comprises a first socket, and an end of the rocker arm close to the connecting rod comprises a first ball, the first ball being rotatably disposed in the first socket; and/or

an end of the connecting rod close to the fixed end comprises a second socket, and the fixed end comprises a second ball, the second ball being rotatably disposed in the second socket.

7. The drive device according to claim 1, further comprising:

a torque sensor configured to detect a torque of the actuator.

8. A vehicle, comprising the drive device according to any one of claims 1 to 7.

9. The vehicle according to claim 8, further comprising:

the vehicle body and a lower tailgate, wherein the movable end of the articulated structure of the drive device is fixedly connected to the lower tailgate, and the fixed end of the articulated structure is fixedly connected to the vehicle body.

10. The vehicle according to claim 9, further comprising:

a locking structure comprising a vehicle body locking member and a lower tailgate locking member cooperating with the vehicle body locking member; and

a locking sensor configured to detect a locking state between the vehicle body locking member and the lower tailgate locking member.

11. A method of controlling a drive device, applied to the vehicle according to any one of claims 8 to 10, the method comprising:

acquiring a state of the drive device; and

controlling an operation mode of the actuator, wherein the operation mode comprises: a forward rotation mode, in which the movable end is pivoted away from the fixed end; a reverse rotation mode, in which the movable end is pivoted close to the fixed end; and a stop mode, in which a relative position between the movable end and the fixed end is maintained.

12. The method according to claim 11, wherein acquiring the state of the drive device comprises:

acquiring a torque of the actuator; and

controlling the operation mode of the actuator comprises:

activating the stop mode in response to the torque of the actuator being greater than a preset value.

13. The method according to claim 12, further comprising:

before acquiring the state of the drive device,

acquiring an initial operation mode of the actuator,

wherein the method further comprises:

after activating the stop mode,

determining whether the initial operation mode is the forward rotation mode or the reverse rotation mode;

activating the reverse rotation mode in response to the initial operation mode being the forward rotation mode; and/or

activating the forward rotation mode in response to the initial operation mode being the reverse rotation mode.

14. The method according to claim 11, wherein acquiring the state of the drive device comprises:

acquiring an angle between the fixed end and the movable end; and

controlling the operation mode of the actuator comprises:

activating the stop mode in response to the angle reaching a preset angle value.