



KTM SERIES POWDER DISCHARGE SYSTEM (PDS) BALL VALVES

OPERATING AND SAFETY INSTRUCTION

Before installation these instructions must be read fully and understood

1 SCOPE OF APPLICATION

This instruction manual applies to the PDS ball valve.

2 HANDLING SUMMARY

2.1 Piping summary

In order to keep using the valve in good condition for long, carry out piping in accordance with the following procedure.

- a. Before installing the delivered product, collate whether it meets specified operational conditions (e.g. temperature, pressure, fluid property, environment, piping standard).
- b. Check each section of the valve for components such as bolts, and nuts. Make sure there is no loosening of each section caused by transportational vibration, etc. If a loose section is found, tighten it as required.
- c. Since both flanges of the valve are covered with dustproof seals, peel them off.
- d. Before installing the valve, carry out adequate flashing of pipe lines (inside of pipe line) to remove foreign matters. Installing and operating the valve to open and close leaving welding or cut chips unremoved inside pipes may threaten to cause damage to the ball and seat of the valve.
- e. The valve can be mounted to a horizontal or vertical pipe, or can be installed in any direction such as turning it sideways, except that the mounting attitude of the valve may be limited for maintenance or automatic operation.
- f. When fastening flange bolts, alternately fasten each pair of those opposite to each other toward the center of the flange by applying uniform strength with care for uneven fastening. Uneven fastening of flange bolts causes pipe stress, thereby damaging the flange, or inducing an excessive operating torque.

2.2 Checkup and maintenance

To make the valve perform its intrinsic function to the utmost end without fail, carry out periodic checkup and maintenance of it as required.

a. *Valve seat*

The valve seat is made of stainless steel deposited of stellite. In case unusually excessive leakage occurs from the valve seat disassemble the valve to check for leakage from the surface of seat and ball. Since a scratch or flaw on the surface of ball or seat may cause excessive leakage from the valve seat, it is necessary to replace the seat or ball as required. (Since the allowance for leakage from the valve seat is prescribed by the ANSI/FC170-2bCLASS 5, the KTM employs the allowance as standard.)

In addition, when reassembling the valve, replace the gasket with a new one.

b. *Mating face between the body and the body cap*

The mating face between the valve body and the body cap uses a gasket. Make sure there is no leakage from the mating face. In case slight leakage occurs from the mating face, retighten bolts and nuts for the body cap. In case even slight leakage still continues, disassemble the valve, check the gasket to make sure of the presence or absence of abnormality, and replace the gasket as required.

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c. *Gland seal*

The seal for the gland uses a packing made of reinforced PTFE or Graphite. Since the gland is the sliding section of the stem, execute periodic checkup on the gland to make sure there is no leakage from the gland seal. In case even slight leakage occurs from the gland seal, retighten gland bolts uniformly to make sure the leakage has been stopped. In case the leakage still continues, disassemble the valve to check for the packing, make sure of the presence or absence of abnormality, and replace the packing as required.

d. *Mating face between the valve body and the lower cover*

The mating face between the valve body and the lower cover uses a gasket. Make sure there is no leakage from the mating face. In case even slight leakage occurs from the mating face, retighten bolts and nuts for the mating face. In case the leakage still continues, disassemble the valve, check for the gasket to make sure of the presence or absence of abnormality, and replace the gasket as required.

2.3 Cautions for disassembly and assembly of the valve

For the valve structure, see the drawing of delivery.

When disassembling and assembling the valve, be careful for the following matters.

- a. Since fluid (gas or liquid) pressure may be left as it is inside the cavity of the valve body, discharge the pressure by open the drain plug, or open or close the valve to discharge the pressure from the cavity. After making sure there is no pressure inside the cavity any longer, disassemble the valve.
- b. If fluid for use in the valve is physically harmful, or strongly inflammable, clean the valve and pipes adequately so that no fluid remains inside the cavity of the valve body. After making sure there remains no fluid used inside, disassemble the valve. In this case, too, it is effective to repeat opening and closing the valve a number of times before disassembling and assembling the valve.
- c. Handle the spherical surface of the ball and each seal with care not to dent or flaw them.
- d. In order to protect the spherical surface of the ball and the seat from being dented or flaw, fully close the valve before disassembling or assembling it.
- e. When assembling the valve, replace all the gaskets, stem bearing and thrust bearing with new ones.

2.4 Disassembly

The following provides a procedure for disassembling the valve required for maintenance and checkup, or troubleshooting of the valve.

1. Removal of the actuator (pneumatic torque cylinder).

See drawing AE0106-7437

- a. Shut off operational pneumatic pressure and operational electric power supply, and remove the pneumatic piping and electric wiring from the actuator.
- b. Remove all of the attachments that may threaten to be damaged by the disassembly.
- c. Mark both yoke (2) and valve (1) with tally.
- d. Unfasten Hex Socket Head Bolt (7) from connector and remove connector (3) from the valve stem.
- e. Unfasten anchor nuts to remove both actuator (4) and yoke (2) together from valve (1).

2. Disassembly of the valve.

See drawing HE0106-7477

- a. Remove key (41) from stem (4), unfasten nut (32) to remove gland flange (31) from the valve. Next, unfasten nut (37) to remove EXT. bonnet (13) from the valve. (Then, removing the gland packing from the valve makes the removal work easy.)
- b. Extract stem (4) from valve body (1) (Since there is a female threaded hole on the top of stem (4), screwing an eyebolt, or the like in the hole makes the extraction easy. Moreover, the use of a jig as shown in Figure 1 makes the extraction easier.)
- c. Unfasten nut (39) to remove lower cover (14) and shim (44). Next, extract lower stem (5) from valve body (1). (Since there is a female threaded hole on the under surface of lower stem (5), screwing an eyebolt, or the like in the hole makes the extraction easy. Moreover, the use of a jig as shown in Figure 1 makes the extraction easier.)
- d. Unfasten nut (35) to remove body cap (2) from valve body (1). After that, ball (3) from valve body (1) with care not to scratch or flaw the spherical surface of the ball.
- e. Remove seat (6), O-ring (9), spring holder (7) and spring (8) from the valve body. Then, be careful for spring (8) set in the back of spring holder (7) not to be lost.
- f. Also, disassemble seat (6) attached to body cap (2) in the same manner as the procedure described in step (e) above.

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2.5 Assembly

The following is a procedure for reassembling the valve which was once disassembled for maintenance and check up, or troubleshooting.

1. Assembly of the valve.

See drawing HE0106-7477 and HE0106-7467

a. Check up of the valve for every component.

Wipe away or clean fouling from every component of the valve. After removing dust, fouling, etc., make sure there is neither scratch nor flaw on components. Since broken pieces of packing are apt to adhere to gasket attachment surfaces of the valve body and body cap, remove the broken pieces with care not to scratch or flaw the metallic contact surfaces.

b. Insert powder proof (11), (12), spring holder (7), spring (8), and O-ring (9) together in valve body (1). Then, using grease or the like to plaster spring (8) to spring holder (7) makes the work easy. Next, insert seat (6) with powder proof (10).

c. Fix seat (6) to body cap (2) in the same manner as the procedure described in step (b) above.

d. Press fit lower stem bearing (20) in the ball (3).

e. Insert thrust washer (22) V ring (powder proof) (25) in valve

f. Insert stem bearings (18) and (19) in valve body (1).

g. Insert ball (3) in valve body (1) keeping the ball in the closed state and making the stem hole of ball (3) having a keyway coincide with the stem hole of body (1).

h. Attach key (40) and thrust bearing (23) and (47) to stem (3), and push key (40) and thrust bearing (24), (47) into the stem hole of ball (3) by about 1cm deep through body (1). Then, avoid pushing them into the utmost end of the stem hole.

i. Attach gasket (15) to body (1), incorporate body cap (2) in body (1), and fasten the body cap with studs (34) and nuts (35). Then fasten them diagonally.

j. Push stem (4) into the stem hole of ball (3) while lightly hitting the head of stem (4) around using a plastic hammer or the like until stem (4) touches body (1).

k. Insert lower stem (5) with O-ring (27) and backup ring (28) in ball (3) through body (1), and push it into the ball using a plastic hammer or the like until it touches body (1).

l. Attach gasket (16) to the gland section of body (1), and fix EXT. bonnet (13) with O-ring (26) to the gland section using studs (36) and nuts (37). Then, fasten nuts (37) diagonally. Next, insert gland packing (30) lantern ring (29) and gland flange (31) in this order in the gland section, and fasten them using gland bolts (32) and nuts (33).

m. Attach gasket (17) to body (1), attach shim (44) to lower cover (14), and fasten them using studs (38) and nuts (39). Then, fasten nuts (39) diagonally.

n. Turn stem (4) to make sure ball (3) can smoothly move. (In case the ball cannot smoothly move, readjust it in accordance with the procedure for disassembly and assembly.)

2. Mounting the actuator (pneumatic torque cylinder).

See drawing AE0106-7437

a. Incorporate both actuator (4) and yoke (2) together in the main body of valve (1), make the tallies marked when they were disassembled coincide with each other, and fasten them with bolts/nuts.

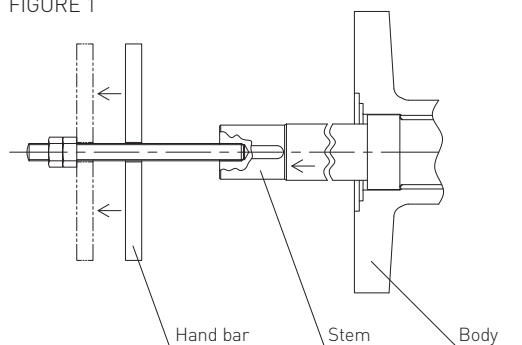
b. Attach the key and connector (3) to the valve stem.

c. Fasten Hex Socket Head Bolt (7).

d. Attach to the actuator the attachments, pneumatic piping, and electric wirings which were all removed when disassembling the driving section.

3. The procedure for assembling the actuator has now been completed.

FIGURE 1



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2.6 Test and inspection

After assembling the valve, execute air tightness test, seat leakage test, and valve action test to make sure they are all normal. In addition, execute those tests taking the matters as listed in the following table as a rule of thumb.

Item	Content	Criteria
Tightness test	1. Test pressure: Compressed air or nitrogen gas which is 1.1 times the operational pressure. 2. Test duration: 10min	1. No leakage is allowed from the gasket seal, gland, and other sections.
Seat leakage test	1. Test pressure: ANSI/FCI 70-2 Class 5 2. Test duration: 1min	1. ANSI/FCI 70-2 Class 5 0.076cc/min/inch/ $\Delta P < \text{Mpa}$ (Liq)
Working test	1. Fill the pneumatic torque cylinder with compressed air having an operational pressure of 0.35 Mpa	1. Visually make sure the valve can act normally.

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