



KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

Please read through this manual completely before operating the valves



V-port valves are usable for control of slurry including solids or fiber materials and high viscosity fluid etc.

Please use the valves according to warnings and cautions described in this document. Failure to do so could result in an accident due to wrong storage, installation, operation, maintenance and disassembling and/or serious damage.

Please keep this manual in a handy place for immediate reference; be sure to provide it to purchaser, contractor, piping designer, user, operator or maintenance technician.

SECTION 1 - SAFETY PRECAUTIONS

Precautions for using KTM valves safely are highlighted with the following two warning signs to indicate the level of danger posed. Please read the postscript carefully to ensure safety and prevent any damage before starting to use the product.

SECTION 2 - SPECIFICATIONS

The safety of the valves and conformity with your equipment should be checked by the design engineer or those who determine the specification based on the Technical Data Sheet or other technical data.

Upon arrival, the applicable conditions (temperature, pressure, fluid-characteristics, environmental conditions, mounting gauge etc.) should be first checked to make sure they are correct.

For the standard specifications refer to the Technical Data Sheet VCTDS-00010.

SECTION 3 - RANGE OF APPLICATION

WARNING

Do not use valves beyond specifications or limits indicated in the Technical Data Sheet.

If valves are used under the following conditions, ensure to take safety measures into consideration and consult us.

1. *Applications to electrolyte solutions (sea water, salt water, halide salt solutions, and chloride/halogen ion solutions).*
2. *Application to beverage and food.*

CAUTION

1. *These models may be used indoors or outdoors. If however used in an environment exposed to gas, an appropriate type and material should be selected to prevent corrosion or rusting. (Details on the component materials are provided in the Technical Data Sheets).*
2. *Valves for specific applications using oxygen and hydrogen peroxide require special washing and treatment to prevent accidents. Please indicate such applications since custom-made valves should be used.*

KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

SECTION 4 - STORAGE AND PRESERVATION BEFORE INSTALLATION

The storage of the valves should be in accordance with the following criteria:

1. Storage warehouse should be clean and dry.
2. Do not remove the bore protection cover until installation to avoid rust and contamination with foreign substances.
3. Periodical checks have to be carried out in the storage area to verify that the above mentioned conditions are maintained.

CAUTION

1. Do not place consignment package directly on the ground.
2. Do not expose consignment packages to train/wind or directly to the sun.
3. Storage in an open area for a limited period can be considered only if the valves have appropriate packing (packed in cases covered with vinyl sheets protecting from rain, wind, dust etc).
4. Store in a dry and well ventilated condition.
5. If storage is anticipated for an extended period, the desiccant bags (if supplied) should be changed every six months.

SECTION 5 - TRANSPORTATION

WARNING

1. When handling valves, the correct equipment and accessories (slings, fasteners, hooks etc.) must be sized and selected, taking into consideration the individual and/or overall valves weight indicated in the packing list and/or delivery note. Ensure that the wires do not touch or wind around accessories and tubing.
2. Lifting and handling must be done only by qualified personnel. Improper hoisting can cause valve deformation or damage from dropping the valve.
3. Do not lift the valve by using lifting points or lugs located on the actuator, as these lifting points/lugs are for the actuator only.
4. Do not lift the valve by its hand-lever as these levers are not designed to take the load of the whole valve. Doing so may cause the lever to brake off or be disconnected from the valve, resulting in possible valve damage or a person's injury.
5. Avoid lifting over people's heads, equipment or anything else, that can possibly be damaged or cause of injury in the event that the lifted load falls off the handling equipment.
6. All local safety regulations must be observed and complied with at all times.

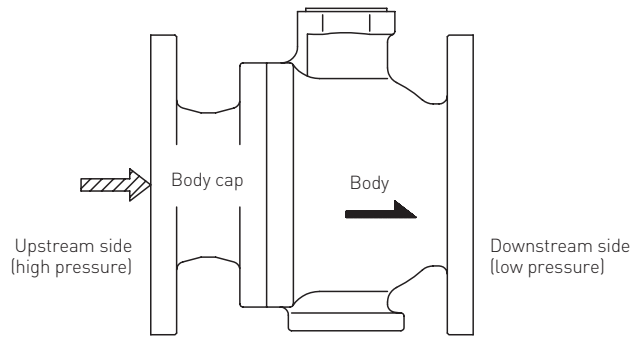


FIGURE 1 - FLOW TYPE

SECTION 6 - INSTALLATION

The following instructions will make for a satisfactory and long life service of the valve.

1. Remove the valve from the shipping package (box or pallet) carefully to avoid any damage to the valve and actuator (plus accessories where applicable).
2. Confirm that the materials of construction listed on the valve nameplates are appropriate for the intended service and are according to specifications. When in doubt, contact KTM or your local Emerson facility.
3. Fasteners like bolts and nuts at each connecting portion on the valve should be checked and retightened in case they were loosened due to shock during transportation. Refer to Table 3 for tightening torque. When tightening nuts, use a closed wrench for safety.
4. Before installation, the protection cover on the bore must be removed.
5. Manually operated valves, may be installed on pipes at any angle, horizontally, vertically or any other direction. It is however recommended to consider facilitating maintenance and operation of the valve.
6. Maintenance space must be provided.
7. V-port valves are designed as unidirectional flow type. The arrow on the body helps to identify the upstream side (high pressure) and downstream side (low pressure). Install the valve with the body cap positioning to the primary side (high pressure side during valve closed) in normal applications.

KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

CAUTION

1. Ensure that there are no solid objects such as pieces of wood, plastic or packing materials within the valve or on the valve seat. It is recommended to flush pipes before installing the valve. If this is not possible, the installed valve must be in its open position before flushing takes place.
2. Unless otherwise recommended by KTM, the valves should be installed with the ball in open position to ensure that the seat rings are not damaged during installing.
3. Use appropriate gaskets which comply with standards or specifications.
4. Tighten the flange bolts with a closed wrench, using a "crisscross" pattern that alternately tightens the bolts located 180 degrees apart. Unequal partial tightening places stress on lined pipes which may damage the flange or produce excessive operation torque (see Fig. 2).
5. Failure to fabricate pipes without excessive stress will result in leakage, poor operation or failure of the valves.
6. When conducting a pressure test of the pipe system, the valves should be in a partially open position. Testing at closed position will impose too much load and will cause leakage from seats. Check for any leakage from the joint flange and gland portion during the pressure test. After conducting the pressure test, return to fully close/open position at once.
7. If the piping system is pressurized with water for testing, and if the piping system has been shut down for a long time after testing, the following measures should be taken:
 - Use corrosion inhibitor with water to pressurize the piping system.
 - After testing, the piping system should be depressurized and the test water completely drained.
 - Ensure that the corrosion inhibitor does not leave a residue within the system as the particulates may damage the valve sealing surfaces.

SECTION 7 - OPERATION

V-port valves can be operated by installing the following devices:

- 1) Throttle lever
- 2) Gear operator
- 3) Torque cylinder
- 4) Electric actuator

7.1 Manual operation

Valve adjustment is performed through lever handle/gear operation. Turning the stem clockwise shuts the valve. Check the operation of the valve by stroking it to "fully open" and "fully closed".

Either the hand lever or the direction of the parallel flats on the top of the stem indicates the open or close position (Fig.3). For gear operated valves, the position is indicated by the arrow-indicator (Fig. 4).

WARNING

1. Operate the valve taking up a stable posture, after checking that the specified handle is fastened by bolts/nuts or snap-ring/set screw. Also, when operating the valve with a spare handle, please make sure that the handle is reliably inserted into the stem's end. Insufficient insertion and forced operation of the handle may result in damage or injury if the handle slips out.
2. Excessive handle operation may break the lever, injure the operator, and/or deform the stopper or the stem, which may also result in seat leakage.

7.2 Gear operated valve adjustment

If the gear-operated mechanism indicator does not correctly indicate whether the valve is completely open or shut, adjust the opening with the adjustment screw.

7.3 Torque cylinders

For operations and pneumatic piping of AGN, AW, AWN and AK actuators, refer to the corresponding Installation and Operation Manuals.

7.4 Electric actuator

For operations and wiring of electric actuator, refer to the installation and maintenance instructions of the electric actuator attached to the valve.

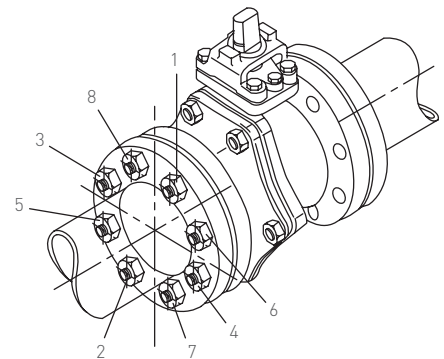


FIGURE 2 - TIGHTENING OF BOLTS

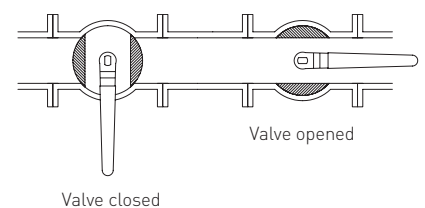


FIGURE 3 - THROTTLE LEVER

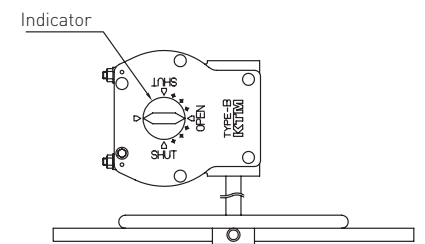


FIGURE 4 - GEAR OPERATOR

KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

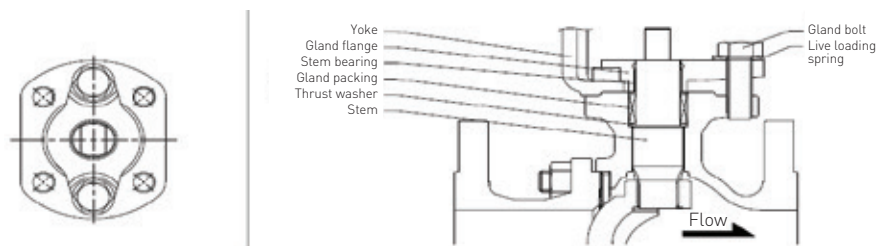


FIGURE 5 - VA11, VA12 DN65 ~ DN100 [NPS 2½ ~ NPS 4]
VA21, VA22 DN80 ~ DN125 [NPS 3 ~ NPS 5]

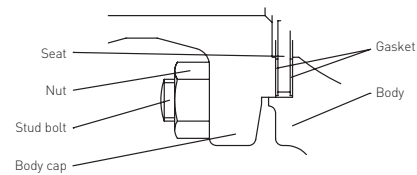


FIGURE 7 - BODY SEALING STRUCTURES

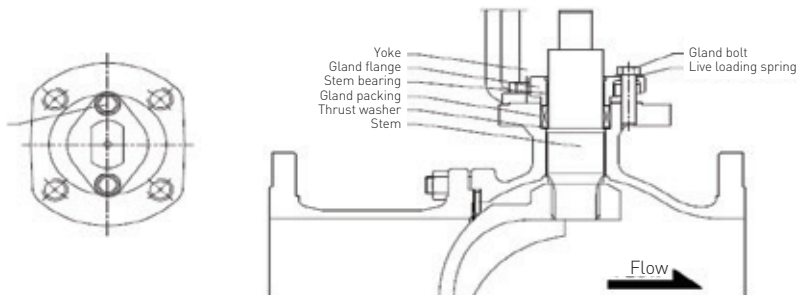


FIGURE 6 - VA11, VA12 DN125 ~ DN250 [NPS 5 ~ NPS 10]
VA21, VA22 DN150 ~ DN300 [NPS 6 ~ NPS 12]

SECTION 8 - MAINTENANCE

The following instructions will contribute to a long life service.

Periodical checks and maintenance are required to keep valves in good working condition. Parts to be checked periodically and maintenance items are shown in below Fig. 5 to 7.

CAUTION

If leakage is observed through the gland packing, tighten the gland bolts slowly and evenly until the leakage stops. This must be accomplished without affecting the torque.

Do not over-tighten the packing gland bolts, since this will increase the torque required to operate the valve.

This procedure should be performed every 3000 operation cycles or every six months of service. When the gland packing is expected to be loosened due to the heat cycle, retighten the screws every two months of service or every 1000 operational cycles. Since the tightening strength affects valve operating torque, the tightening torque should be within the range defined in Table 3.

CAUTION

The sealing portion between body and body cap is provided with a gasket. In case of slight leakage, the fastening bolts should be moderately tightened. Refer to Table 3 for the tightening torque. If the leakage does not stop, the gasket should be replaced.

SECTION 9 - TROUBLESHOOTING

Trouble examples	Causes	Measures
Unsmooth operation	<ol style="list-style-type: none"> 1. Jamming due to solids or slurry in the fluid. 2. Disc is corroded by fluid. 3. Fluid sticks to disc and seats. 4. Unusual pressure rise exceeding seat rating limit when shutting the valve. 	<ol style="list-style-type: none"> 1. Clean the inside of the valve. If necessary, replace parts (disc, seats, stem bearing, thrust bearing). 2. Replace with disc made of corrosion resistant material or replace with facehardened disk. 3. Clean the inside of the valve. If necessary, replace disc or seats. 4. Take measures to prevent abnormal pressure rise in pipe and replace seats.
Outside leakage	<ol style="list-style-type: none"> 1. Sealing performance of gasket and gland packing decreases gradually when operation frequency is high or the high temperature fluid flows. 2. Sealing performance of gasket and gland packing decreases when shutting the valve during abnormal pressure rise in the piping. 	<ol style="list-style-type: none"> 1. The fastening nuts or bolts at gasket and gland packing are required to be lightly tightened, or gasket and gland packing replaced. 2. Take measures to prevent pressure rise and replace seats, gaskets and gland packing.
Seat leakage	<ol style="list-style-type: none"> 1. Disc and seats are damaged by solids and slurry in the fluid. 2. Fluid sticks to disc and seats. 3. Disc is corroded by fluid. 4. Unusual pressure rise exceeding seat rating limit when shutting the valve. 	<ol style="list-style-type: none"> 1. Clean the inside of the valve. If necessary, replace disc or seats. In case of laminated seat, change to thick seat, and disc is changed to stellited disk, too 2. Clean the inside of the valve. If necessary, replace disc or seats. 3. Replace with disc made of corrosion resistant material or replace with facehardened disk. 4. Take measures to prevent abnormal pressure rise and replace seats.

KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

SECTION 10 - VALVE DISASSEMBLY

Assemble/disassemble the valves in a clean, well-lit and well ventilated place.

Refer to below construction drawing for disassembly. The numbers of parts vary slightly depending on the valve size, but the basic structures are identical.

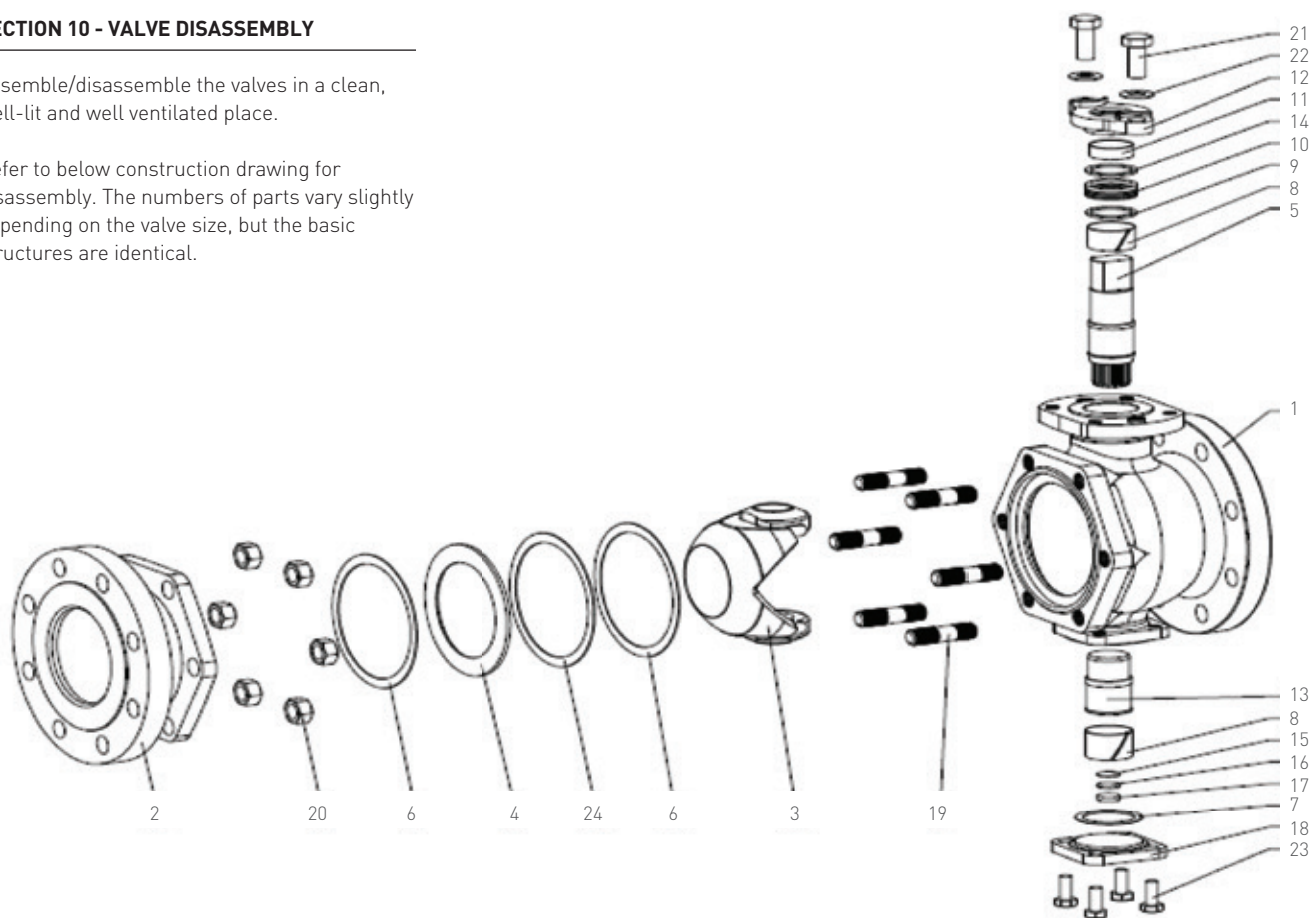


FIGURE 8 - PARTS CONSTRUCTION FOR V-PORT
(NOMINAL DIAMETER: DN 100 [NPS 4])

PARTS LIST

No.	Part Name
1	Body
2	Body Cap
3	Disc
4	Seat
5	Shaft
6	Gasket
7	Gasket
8	Shaft Bearing
9	Thrust Washer
10	Gland Packing
11	Gland
12	Gland Flange
13	Lower Shaft
14	Shaft Bearing
15	Thrust Bearing
16	Shim
17	Pivot
18	Lower Cover
19	Stud
20	Nut
21	Bolt
22	Live Loaded Washer
23	Bolt
24	Shim

WARNING

Maintenance of the valves must be performed only by qualified personnel.

Never operate/disassemble the valves before checking the safety. The valve is extremely heavy; ensure a stable position to prevent it from falling down when assembling/disassembling.

For a safe disassembly, following instructions must be carried out:

- 1. Fully open the valve when installing on the piping, and make sure there is no pressure in the pipeline. Failure to do so may result in injury, explosion or fire by the remaining pressure.*
- 2. Before disassembling the valve, make sure that it has been decontaminated of any harmful gasses or fluids, and disassembly is done at a well ventilated place and within a safe temperature range for maintenance.*
- 3. Pressure of flammable gas and other dangerous fluids must be checked only at well ventilated places outdoors, far away from any fire source.*

KTM V-PORT CONTROL BALL VALVES

INSTALLATION AND OPERATION MANUAL

1. Cautions when disassembling

- Small parts such as shim [16] and pivot [17] are used around the lower stem. Be careful not to lose those small parts.
- Disc surface is important for sealing function. Care should be taken when handling the disc not to damage it.

2. Cautions when assembling

- Clean spherical surface of disc, metal surfaces where gaskets settle, and metal surface where gland packing contact with by using a waste cloth etc. (contamination with dust can cause leakage)
- For setting the bearing [14] on the stem, temporary bonding with cyanoacrylate instantaneous adhesive may be helpful for easy working. (Not required for lower stem.)
- The number of shims [16] has been adjusted beforehand. Insert the correct number of shims when reassembling.
- For adjusting the laminated seat, which has a self-centering function, put it on the disc in closed state, and assemble them as they are. In case of a thick seat, adjust the seat so that the seat settles uniformly on the spherical surface of the closed positioned disc and then assemble them.
- There are gaskets in three kinds of thicknesses; 0.8 mm [0.03 in], 0.4 mm [0.02 in] and 0.2 mm [0.01 in] are prepared for the seat portion. Each product has been adjusted in the factory with proper selection of one of them. Measure the thickness when disassembling and select the gasket with the same thickness for reassembling.
- Stem and disc are assembled by spline coupling. Be sure that the alignment in reassembling is same as that when disassembling. [Special models with key coupling will be available.]

TABLE 1. SEAT LEAKAGES

Seat type	Leakage ratings
Laminated seat	1.5 ml/min/inch (inch represents nominal diameter of seat)
Thick seat	Not more than 0.5% of C _v rating

TABLE 2. SPARE PARTS

No.	Parts	Number of items per model
(4)	Gasket(0.2t, 0.4t, 0.8t)	1~4 (Thickness option)
(5)	Seat	1
(6)	Gasket	1 (Order with thickness)
(10)	Bearing	1
(13)	Gland packing	1 set
(19)	Bearing	1
(20)	Thrust bearing	1
(23)	Gasket	1

- Please do not disassemble the valve in case you return it to us for repair.
- Spare parts for V-port valve Table 2 shows the list of consumable parts that need to be replaced when disassembling and reassembling. For the materials used please refer to each drawing attached to the delivered products.

SECTION 11 - WARRANTY

The warranty period is one year from the date of installation by the first use of the goods, or eighteen (18) months from the date of shipment to the first user, whichever occurs first.

CAUTION

(Sending the valves back to us and requesting repair)

- Since some fluid may remain inside the valve, be sure to purge fluids completely by keeping the valve half-open when removing the valve from the piping or sending them back to us.
- Please return the valve without disassembling.

TABLE 3. TIGHTENING TORQUE

Full bore [VA11/VA12]	Reduced bore [VA21/VA22]	Gland bolt [Nm] [lb-in]		Mating flange bolt				Lower cover bolt [Nm] [lb-in]	
				VA11 VA21 [Nm]	VA11 VA21 [lb-in]	VA12 VA22 [Nm]	VA12 VA22 [lb-in]		
DN25 [NPS 1]	DN40 [NPS 1½]	3	27	42.5~63.5	376.2~562	42.5~63.5	376.2~562	25~37	221~327
DN40 [NPS 1½]	DN50 [NPS 2]	4	35	42.5~63.5	376.2~562	42.5~63.5	376.2~562	42.5~63.5	376.2~562
DN50 [NPS 2]	DN65 [NPS 2½]	4	35	42.5~63.5	376.2~562	42.5~63.5	376.2~562	42.5~63.5	376.2~562
DN65 [NPS 2½]	DN80 [NPS 3]	7	62	42.5~63.5	376.2~562	102~152	903~1345	25~37	221~327
DN80 [NPS 3]	DN100 [NPS 4]	7	62	42.5~63.5	376.2~562	102~152	903~1345	25~37	221~327
DN100 [NPS 4]	DN125 [NPS 5]	7	62	102~152	903~1345	102~152	903~1345	25~37	221~327
DN125 [NPS 5]	DN150 [NPS 6]	10	89	102~152	903~1345	200~297	1770~2629	42.5~63.5	376.2~562
DN150 [NPS 6]	DN200 [NPS 8]	10	89	102~152	903~1345	200~297	1770~2629	42.5~63.5	376.2~562
DN200 [NPS 8]	DN250 [NPS 10]	14	124	200~297	1770~2629	340~510	3009~4514	102~152	903~1345