

Contents

1. SCOPE	2
2. INSTALLATION	2
3. VALVE OPERATION	3
4. DISASSEMBLY	4
5. ASSEMBLY	4
6. REPAIR KITS	4
7. BILL OF MATERIALS	5

1. SCOPE

1.1. CAUTION

- 1.1.1. For your safety, read this manual before installation or service.
- 1.1.2. Before installing or servicing, please ensure the line pressure has been relieved and any hazardous fluids have been drained or purged from the system.
- 1.1.3. Ensure that all Lockout and Tagout procedures for the system have been properly implemented.

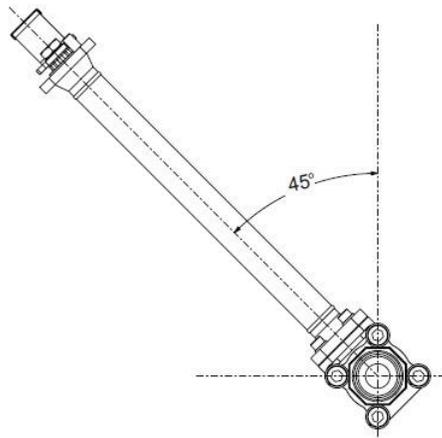
1.2. USE

- 1.2.1. Maximum results and long life of valves can be maintained under normal working conditions and according to pressure/ temperature ratings and corrosion data chart.

2. INSTALLATION

2.1. GENERAL INFORMATION FOR INSTALLATION

- 2.1.1. When installing the cryogenic valve, the gradient for the extended bonnet can not be greater than 45 degrees as the following illustration. This is to avoid flooding at the top of the gland packing which can cause valve failure.



- 2.1.2. As the cryogenic valve is unidirectional, it is required to make sure the direction of the arrow mark on the body match the flow of the pipeline when installing the valve. The vented hole of the ball will be upstream when the valve is closed.



2.2. INSTALLATION OF THREADED VALVES

2.2.1. Use conventional sealant, such as hemp core, Teflon, etc. on threads. Apply wrench only on the hexagon of the valve ends. Tightening by using the valve body or lever can seriously damage the valve. In some applications, screwed valves are back welded on site. These valves must be treated as per instructions for the weld end valves before back welding.

2.3. INSTALATION OF WELDED ENDS

2.3.1. Tack weld the valve on the pipe in four points on both end caps.

2.3.2. With the valve in the open position, (lever to be parallel to the axis of the pipe), remove all the body bolts except one. Loosen the nut on the remaining bolt. Swing the body outside the pipe. Finish welding both end caps on the pipe.

2.3.3. When cooled down, clean both end caps and body surface.

2.3.4. Swing the body back in position and replace the body bolts. Tighten all nuts slightly. This operation is very important to keep the body and end caps perfectly parallel, thus preventing distortion of end caps. Tighten body bolts evenly (see section 5.5) Make sure that the maximum tightening torque is observed. Check proper operation of the valve.

3. VALVE OPERATION

3.1. MANUAL

3.1.1. HANDLE

3.1.1.1. To OPEN the valve, turn the handle counterclockwise until the handle is parallel with the pipeline and the handle has contacted the handle stop.

3.1.1.2. To CLOSE the valve, turn the handle clockwise until the handle is perpendicular with the pipeline and the handle has contacted the handle stop.

3.1.1.3. A handle lock is incorporated into the handle. To use, slide the lock into the mounting pad, in the full open or full closed position. Insert an appropriate size lock or hasp into the handle. If it can be performed safely, try to turn the handle to ensure the valve has been locked properly.

3.1.2. GEAR

3.1.2.1. To OPEN the valve, turn the handle wheel counterclockwise. The indicator will be pointing to the open position and stop rotating when fully open. The flow can be adjusted by stopping the indicator anywhere between open and close.

3.1.2.2. To CLOSE the valve, turn the handle wheel clockwise. The indicator will be pointing to the close position and stop rotating when fully closed. The flow can be adjusted by stopping the indicator anywhere between open and close.

3.1.3. AUTOMATED

3.1.3.1. A-T Controls Cryogenic High Performance Three-Piece Full Port or Regular Port Ball Valves can be mounted with quarter-turn actuators. Valves with actuators shall be checked for proper valve stem alignment. Angular or linear misalignment may result in high operational torque and unnecessary wear on the valve stem. See the actuator IOM for information on operating the actuator.

4. DISASSEMBLY

- 4.1. Remove actuator or gear if equipped.
- 4.2. Care should be taken to not damage the surface finish of the valve components.
- 4.3. Remove the end caps (2) from the body (1) by removing the body bolts (17) and bolt nuts (18).
- 4.4. Remove the seats (4) and body gasket (5) from both sides of the body (1). Once removed, with the valve in the fully closed position, the ball (3) should slide freely out of the body (1).
- 4.5. If equipped, remove the handle nut (27), and handle stop assembly (15).
- 4.6. While holding the stem (10) stationary, remove the packing nut (13). Once removed, the locking saddle (12), Belleville washers (19), and packing bushing (11) should be free to remove.
- 4.7. Remove the extended bonnet (26) and stem (10) through the top of the valve.
- 4.8. Remove the packing set (9) and thrust washer (8).
- 4.9. Inspect all components for damage and, if necessary, clean or replace.

5. ASSEMBLY

- 5.1. Care should be taken to not damage the surface finish of the valve components.
- 5.2. Install extended bonnet (26). Place thrust washer (8) on the stem (10) and install stem (10) by going through the extended bonnet (26). Insert the packing set (9) over stem (10).
- 5.3. Install packing gland (9), Belleville washers (19), locking saddle (12), and packing nut (13). While holding the stem (10), tighten the packing nut (13) to the torque listed in the Fastener Torque Chart below. Tighten further if needed in order to be able to place the locking saddle (12) over the packing nut (13).
- 5.4. Ensure the stem (10) is in the closed position with the body tang parallel with the flow of the valve. Insert a seat (4) and body gasket (5) in one side of the body (1). Carefully slide the ball (3) into the body (1) making sure the vent hole of the ball (1) is upstream of the valve. Insert the other seat (4) and other body gasket (5).
- 5.5. Assembly ends (2) onto body (1). Insert all body bolts (17) and nuts (18) into the valve and tighten to finger tight, making sure that the ends (2) are flat against the body (1). Tighten all body bolts (17) from the nut (18) to the final torque in a star pattern. Check each body bolt (17) torque and tighten if needed a final time. It is acceptable for the torque to relax slightly over time due to relaxation of the polymer components, but the valve will still seal properly. If leakage is detected, repeat the steps for tightening the body bolts (17).
- 5.6. If required, assemble the handle stop (15), handle (14), and the handle nut (27).

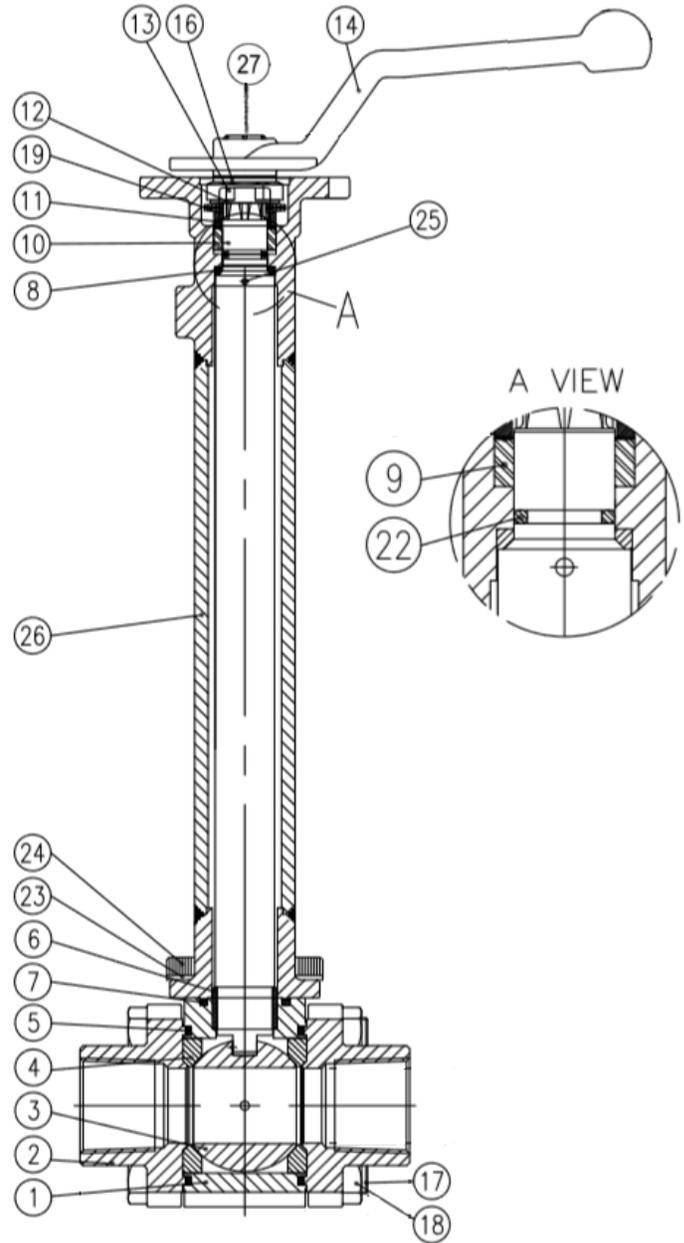
VALVE SIZE	MAX STEM NUT TORQUE (in-lbs)	MAX BODY BOLT TORQUE (in-lbs)	MAX BONNET SCREW TORQUE (in-lbs)
1/4"	78	96	61
3/8"	78	96	61
1/2"	87	113	61
3/4"	87	139	61
1"	104	183	87
1-1/4"	104	208	87
1-1/2"	148	347	104
2"	148	382	104

6. REPAIR KITS

Repair kits are available to replace all soft goods. See Bill of Materials for components that are included in the repair kits.

7. BILL OF MATERIALS

NO.	PART NAME	QTY	REPAIR KITS
1	BODY	1	
2	END CAP	2	
3	BALL	1	
4	SEAT	2	X
5	BODY GASKET	2	X
6	STEM BEARING	1	X
7	JOINT GASKET	1	X
8	THRUST WASHER	1	X
9	GLAND PACKING	1	X
9.1	GLAND PACKING	1	
10	STEM	1	
11	GLAND BUSHING	1	
12	LOCKING SADDLE	1	
13	STEM NUT	1	
14	HANDLE	1	
15	STOP BOLT	1	
16	STEM WASHER	1	
17	BODY BOLT	4	
18	BOD BOLT NUT	4	
19	BELLEVILLE WASHER	2	
20	HANDLE SCREW	1	
21	HADNLE SCREW NUT	1	
22	O-RING	1	X
23	SCREW WASHER	4	
24	SCREW	4	
25	ANTI-STATIC DEVICE	2	
26	EXTENDED BONNET	1	
27	HANDLE NUT	1	



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