

**Operating & Maintenance Manual
For Steam Conditioning Valve**



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1.0 Introduction

General

This instruction manual included installation, operation and maintenance information for Steam Conditioning Valves. Please refer to separate manuals for instructions covering controllers and positioners.

This operating manual covers the areas of installation, commissioning, maintenance, storage, packaging and transport.

Personnel qualification

Transport, installation, commissioning, maintenance or repair must only be performed by trained or instructed personnel.

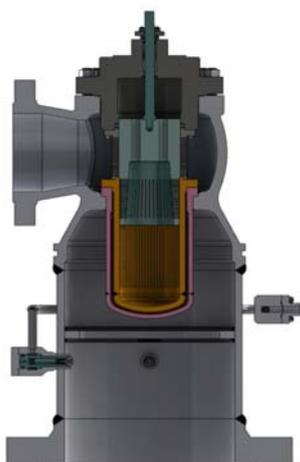
Safety Information

Danger, Warning, Caution symbols, where necessary, to alert you to safety related or other important information. In order to ensure successful and safe operation of our valves the entire operation manual must have been read through and understood prior to installation and commissioning,

2.0 Product description

Description

This Steam Conditioning Valves are custom designed to fit customer's difficult applications. Specially the valves are designed for horizontal application in steam pipe line.



Inner parts of valve are linked with each other not to damaged a cage, a plug, a seat ring when pull those back from the body for maintenance.

Balance cage control trim is used with the steam flowing down through the characterized ports in the cage. The pressure drop occurs at the flow area of the cage's port with the port's contour characterizing flow as linear or equal percent.

Valves are equipped standard with spring diaphragm pneumatic actuators, either reverse acting or direct acting type. Both actuator types are available in a range of sizes and with a selection of springs to suit the operating conditions.

Valve identification

A nameplate is fixed to the side of actuator yoke. The nameplate lists the serial number, model number as well as other information such as size, rating, materials, Cv, stroke.,etc.

When ordering replacement of parts, please refer to the serial and model numbers on the nameplate.

3.0 Safety Instruction

Product safety

The valves comply with the state of the art and the recognized rules of technical safety, but dangers can still arise. Operate the valves only in perfect condition taking into account the entire operating manual.



Warning:

Use of material-incompatible media, exceeding the limit values of medium pressure and temperature and mechanical additional loads such as caused by connected pipelines can result in failure of the valve material and bursting of the valve.

Product specific dangers

1. Use of a medium unsuitable for the valve

The valve materials are compatible only with steam. Please contact the manufacturer when used for media requiring or excluding certain media.



Danger !

When using unintended media, the materials included in the valve may be attacked or could even be combusted explosively with fatal consequences. For the reason, only use media for which the valve has been approved.

2. Exceeding the permissible pressure with risk of bursting

A cause for such exceeding could be for instance so-called closing hammer or cavitation. Closing hammer are pressure peaks, which occur when a pipe is closed by means of a valve.



Warning:

Maximum allowable pressures for the valve body and actuator and the maximum allowable pressure at the maximum temperature for the valve are shown on the nameplate mounted on the actuator.

3. Leakage of dangerous substances

Dangerous substances can leak for instance from relief bores or when disassembling the valve.



Warning:

Collect and dispose of dangerous media (for instance leakages from relief bores or traces of medium remaining during the disassembly of the valve) so that persons and the environment are not endangered. Observe the legal regulations.

Emergency information

In the event of fires, use only such extinguishing agents as are suitable for the extinguishing of corresponding electrical systems. Ensure that the extinguishing agent does not result in a dangerous reaction together with possibly leaking medium.

4.0 Installation and commissioning



Danger

Before disassembly, all pressures in this device must be relieved. Failure to relieve pressures may result in personal injury or device damage.

Before installing the valve, inspect it for any shipment damage and for any foreign material that may have collected during crating and shipment. Remove flange protectors from body end connections.

Piping Cleanliness

Blow out all pipelines to remove pipe scale, chips, welding slag, and other foreign materials. Gasket surfaces should also be free of any foreign materials.

Flow Direction

Install the valve so that flow in the direction indicated by the flow direction arrow located the tag plate pinned to the body.

Install valve using good piping practice. For flanged bodies, use a suitable gasket between the body and pipeline flanges.

Connect instrument air to actuator or positioner connection. Refer to the nameplate for the maximum instrument air pressure.

Existing protection and guards have been reinstalled or enabled.

Heat Insulation

Where piping is insulated, do not insulate the valve above the valve bonnet flange.

Isolation Bypass Valve

For in-line inspection, maintenance and removal of the valve without service interruption, provide a manually operated shutoff valve on each side of the control valve and a manually operated throttling valve in the bypass line.

5.0 Valve Disassembly

Removing the actuator

1. Supply the instrument air to the actuator for lifting up the 25% position of valve open to avoid injury or damaging valve parts from disassembly of actuator from bonnet.



Warning:

Actuator shall be pre-loaded with tension from springs, To remove the actuator from valve be sure that positioner signal and air supply shall be connected prior to remove the actuator. If do not, could result injury or damaging of valve.

2. Remove the lock bolts from the actuator clamp and remove the clamp from valve stem.
3. Remove the lock nuts from the yoke.
4. Move the actuator sideward from bonnet using by slings or chains.

Removing the internal parts



Caution:

Prior to disassembly, vent the process pressure and isolate the valve if necessary.

1. Remove the nuts(10) from the bonnet flange studs(9).
2. Pull the bonnet and internal parts assembly sideward from valve body(1) using by slings or chains.
Keep tighten the packing flange nuts not to move the plug assembly during this operation.
3. Place the bottom of assembly down on the plain surface.
4. Remove the cage bolts(6) to separate between the bonnet(2) and the cage(7).
5. Remove the packing flange nuts and then packing flange(18), packing follower(17).
6. Lift up the bonnet and remove from plug-stem assembly. Check the exposed part of the valve body stem(5) to confirm it is clean enough for ease of removal of the bonnet.
7. Remove the cage(7) from the plug assembly by pulling upward.
8. Seat ring bolts(11) be loosened using the same sequence as shown on the table 1, bolts torque sequence. Remove all seat bolts(11) from seat ring(3), then pull it sideward from valve body.
9. Remove seat gasket and bonnet gasket.

Caution:

Use care to avoid damaging gasket sealing surfaces. The surface finish of the valve stem is critical for making a good packing seal. The seating surfaces of the valve plug and seat ring are critical for tight shutoff. Assume all of these parts are in good condition when disassembling the valve and protect them accordingly.

6.0 Maintenance

- Isolate the valve from the process.
- shut off all control and supply lines to the actuator.
- Release the process pressure.
- Vent the actuator loading pressure.

Valve parts are subject to normal wear and must be inspected and replaced as necessary, with the frequency of inspection and maintenance depending upon the severity of service conditions. All maintenance operations may be performed while the valve body remains in line as long as the line is not in service and/or is isolated from active process by block valves.

Guiding Surfaces

Guiding surfaces of the cage, plug, stem must be checked. If there is only slight wear indications, then use a light abrasive to smooth out guiding surfaces. Parts with greater damage or wear on the guiding surfaces must be replaced.

- If the stem has been removed, examine the stem for pitting, scratches, or other damage in the packing box area. If any damage cannot be removed by polishing the stem, replace the stem.

Seating Surfaces

- Visually inspect the valve plug and seat for signs of erosion, pitting, scratches and damage from corrosion.
- Fit the plug and the seat together. While looking into the bottom of the seat, hold the trim set against a bright light. If any light can be seen between the plug and seat contact surfaces, this is an indication of poor seat condition.
- Determine the magnitude of any wear or corrosion damage. Many times the plug and seat contact surfaces can be fully restored by relapping. Replace any parts that cannot be fully restored by relapping. After the restoration of trims, wash plug and seat in solvent to remove all lapping compound and wipe the parts dry.

Gasket Seating Surfaces

Gasket seating surfaces must be free of dents, scratches, and corrosion.

Seal Ring and Gaskets

Spiral-wound gasket must always be replaced after disassembly. Seal ring, back-up rings can be reused if they are free of scratches, erosion, corrosion, or other damage.

Replacement of Packing

Packing box maintenance is one of the principle chores of routine servicing. Tightness of the packing is maintained by packing compression. Compression is achieved by evenly tightening the packing flange nuts against the packing flange. Care must be taken not to over tighten as this could prevent smooth operation of the valve. If all compression is used up and the valve leaks, new packing is required.

- Remove the nuts retaining the packing flange and lift the packing flange and packing follower from bonnet. Pull out the old packing with a hook or packing removal tool.

Note: be careful to avoid scratching the packing box wall or stem. If the stem has been removed, the packing may be pushed out using a rod inserted through the hole in the bottom of the bonnet.

- Clean the packing box and all metal parts.
- Insert the new packing and associated parts in the following sequence :
 1. Lower guide bush (Carbon)
 2. Spacer
 3. Upper guide bush (Carbon)

4. Graphite packing

7.0 Valve Reassembly

Caution:

If the packing is to be reused and was not removed from the bonnet, use care when installing the stem in the bonnet to avoid damaging the packing with the valve stem threads.

1. Clean all gasket surfaces, including the body, bonnet, and guide.
2. A light coat of lubricant, such as light oil/ silicon grease, may be used on the soft seals to aid ease of assembly.
3. Install the new seat gasket into the seat cavity in the body.
4. Install the seat ring into the body's seat cavity and tighten the seat bolts evenly.
5. Assemble the cage and the bonnet with cage bolts. Before this operation, seal-ring shall be inserted into the bonnet's bottom groove. Backup ring installed on top of the cage as well as bottom of the bonnet.
6. Install the bonnet assembly over the plug-stem push it down carefully.
7. Tighten the packing flange nuts not to separate between the bonnet assembly and plug-stem during move these assembly.
8. Grease the bonnet gasket surface and install the bonnet gasket.
9. Push the bonnet assembly sideward into the body by using of sling or chain carefully.
10. Tighten the stud nuts to the recommended torques given in table 1.
11. Mount the actuator on the bonnet and connect actuator stem to the valve stem.

8.0 Nozzle Maintenance

Disassembly of spray nozzles

1. Unscrew all nuts/bolts (42) and remove nozzle cover(32).
2. Loosen and remove packings(40), nozzle holder(33),and gasket(39) by mounting one of the screws in the center hole of the nozzle holder and pull it out.(see also fig.1)
3. The nozzle(34) is locked by means of spot welding between holder and nozzle. Remove the welding points using by applicable grinding tool. Unscrew the nozzle from the holder.
4. Check the nozzle for obstruction caused by dirt particles. Clean if required. Make sure the water channels in the nozzle tip are open. Check the condition of the spring as well. If the seat surface is damaged or the spring is worn . Replace the complete new nozzle.

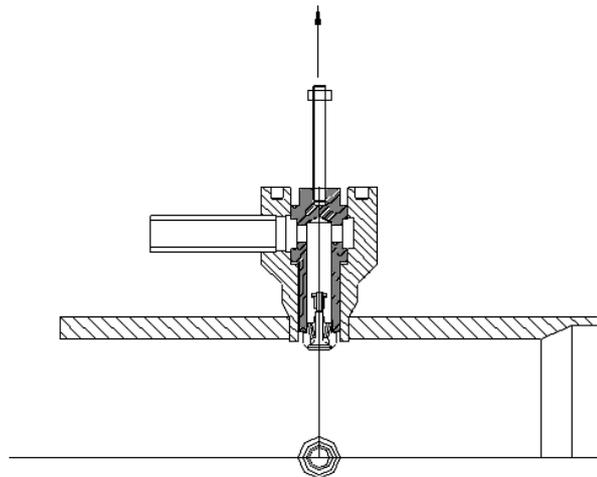


FIG.1 Removing the Nozzle Holder

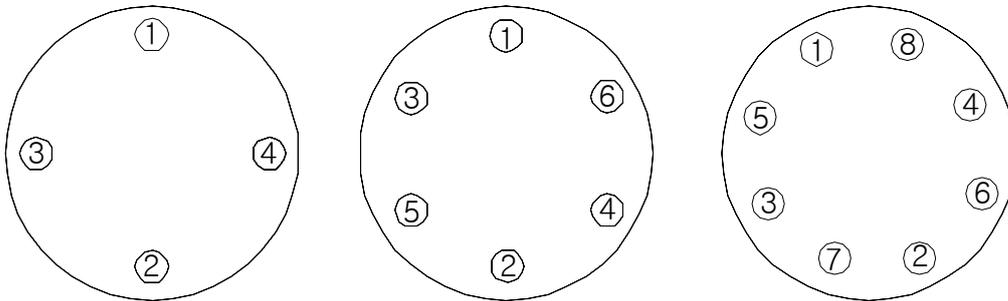
Reassembly of Spray nozzles

1. Clean all parts and inspect them carefully. No defective components must be reused.
If necessary, recondition, repair or replace.
2. Polish nozzle holder (33) and guiding areas inside the nozzle body.
3. Assemble the nozzle (34) with the nozzle holder (33) and tighten it firmly.
4. Put a NEW gasket(39) on nozzle holder(33) and insert into nozzle body(31). **ALWAYS USE NEW GASEKT FOR REASSEMBLY!**
Make sure that the old gasket is completely removed. **TAKE CARE ! NEW GASKET MUST NOT BE DAMAGED DURING INSERTION !**
5. Slide carefully NEW packing(40) into the nozzle body(31). **PACKING MUST NOT BE DAMAGED DURING INSERTION !**
6. Install nozzle cover(32) and bolts/nuts (41/42).

9.0 Replacement parts

If replacement parts are required, please contact the supplier/manufacturer.

Table 1. Studs Torque



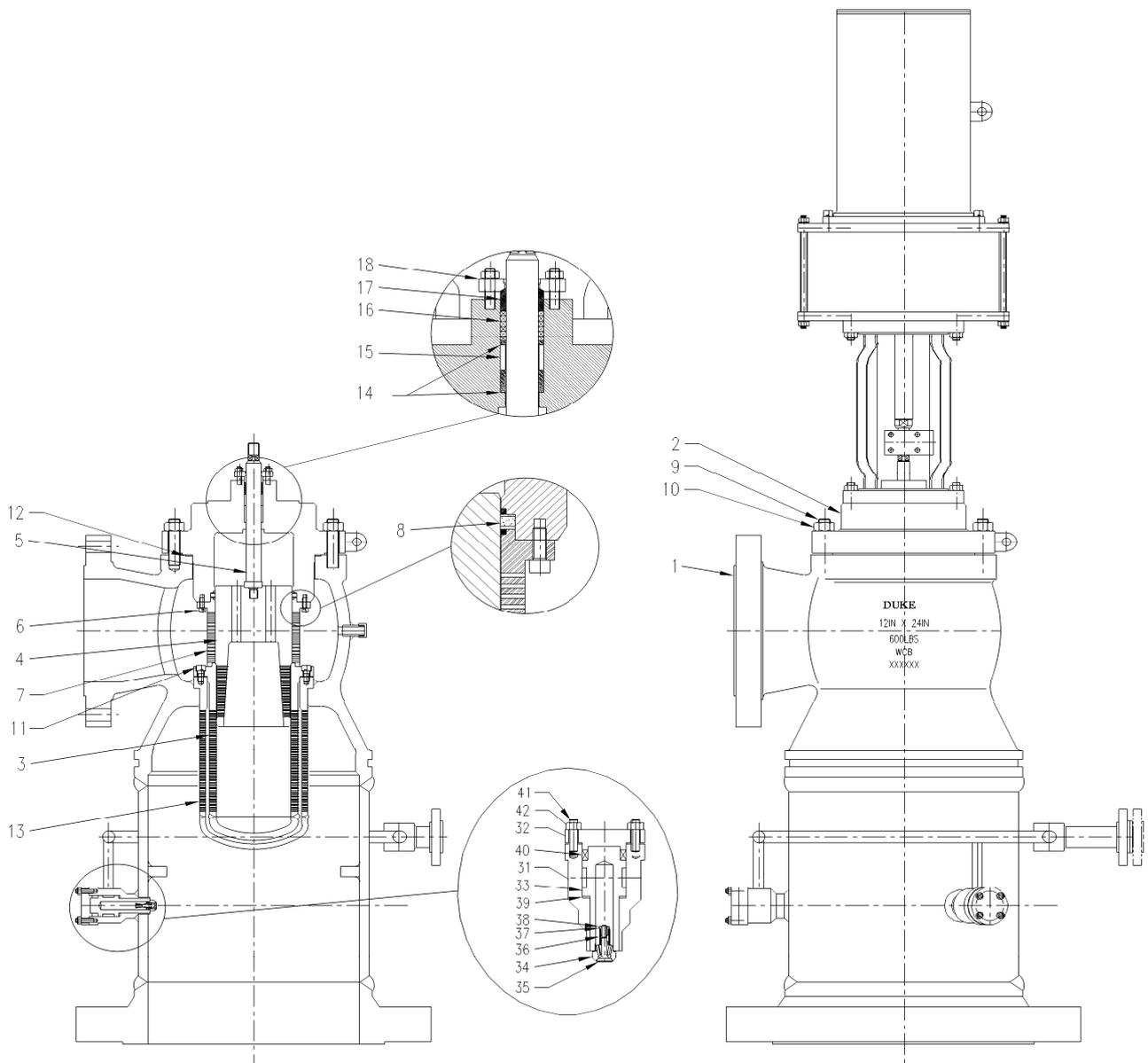
ANSI Class	Valve Size (NPS) ft/lb.												
	3/4	1	1.5	2	2.5	3	4	6	8	10	12	14	16
150~600	84	115	197	113	146	200	320	490	710	1000	1000	1223	1542
900~1500	93	148	351	228	327	449	694	867	1301	-	-	-	-
2500	93	148	385	266	358	496	734	1832	1648	-	-	-	-

Tables are based on the use of bolts with a yield strength of 100,000 psi.

Table.2 Trouble Diagnosis

TROUBLE	SYMPTOM POSSIBLE CAUSE	CORRECTIVE ACTION
Valve will not cycle when instrument air is applied to the actuator.	<ol style="list-style-type: none"> 1. Broken valve stem. 2. Diaphragm ruptured or torn. 3. Diaphragm plate connection at top may be loose. 4. Actuator vent plugged 	<ol style="list-style-type: none"> 1. Replace stem. 2. Remove upper diaphragm housing. Inspect the diaphragm and replace if necessary. 3. Remove upper diaphragm housing. Inspect the plate-to-stem connection and tighten if loose. 4. Clean out vent fitting.
Excessive trim leakage with valve closed	<ol style="list-style-type: none"> 1. Insufficient shut-off force from actuator 2. Foreign object interfering with plug-to-seat contact. 3. Plug and seat contact surfaces may be worn or damaged. 	<ol style="list-style-type: none"> 1. For reverse actuator - increase actuator size. For direct actuator - increase supply pressure to diaphragm. 2. Remove actuator and bonnet from body. Inspect trim and remove foreign objects if present. 3. Inspect critical surfaces of plug and seat. For minor wear or damage, lap seating surfaces. If severely worn or damaged, replace plug and seat.
Fluid leakage from top of bonnet.	<ol style="list-style-type: none"> 1. Stem packing is worn or loose. 	<ol style="list-style-type: none"> 1. For non-adjustable packing: remove and replace packing. 2. For adjustable packing: tighten adjusting nuts or add extra packing rings.
Fluid leakage from body/bonnet joint.	<ol style="list-style-type: none"> 1. Some or all bonnet studs may be loose. 2. Body/bonnet gasket may be worn or damaged. 	<ol style="list-style-type: none"> 1. Check studs and nuts, tighten if necessary. 2. Inspect gasket, replace if necessary.
Instrument air leaks from outer edge of diaphragm cases.	<ol style="list-style-type: none"> 1. Hex bolts securing upper and lower cases may be loose. 	<ol style="list-style-type: none"> 1. Inspect hex bolts, tighten as necessary.
Instrument air leaks from actuator vent connection located in upper case of reverse actuator or lower case of direct actuator.	<ol style="list-style-type: none"> 1. Diaphragm may be torn or ruptured, allowing air to leak through. 	<ol style="list-style-type: none"> 1. Disassemble upper case and lower case and inspect diaphragm. Replace if damaged.
Valve stem movement is sticky or jerky.	<ol style="list-style-type: none"> 1. Valve stem or actuator stem may be bent or misaligned. 	<ol style="list-style-type: none"> 1. Disassemble valve and/or actuator to inspect stem. Replace if bent or otherwise damaged.

Fig.2 Steam Conditioning Valve Description



VALVE BODY PARTS								
NO	PART NAME	Q'TY	NO	PART NAME	Q'TY	NO	PART NAME	Q'TY
1	BODY	1	9	BONNET STUD	16	17	PACKING FOLLOWER	1
2	BONNET	1	10	BONNET NUT	16	18	PACKING FLANGE	1
3	SEAT-DIFFUSER	1	11	SEAT BOLT	16	19	STEM COUPLING	1
4	CAGE PLUG	1	12	BONNET GASKET	1			
5	BODY STEM	1	13	OUTLET DIFFUSER	1			
6	CAGE BOLT	16	14	STEM GUIDE	1			
7	CAGE	1	15	PACKING SPACER	1			
8	BALANCE SEAL	1 SET	16	PACKING	1 SET			

NOZZLE PARTS								
31	NOZZLE BODY	1	37	SPRING SEAT	1			
32	NOZZLE COVER	1	38	LOCK NUT	1			
33	HOLDER	1	39	GASKET	1			
34	NOZZLE	1	40	PACKING	1			
35	NOZZLE DISC	1	41	STUD BOLT	4			
36	SPRING	1	42	NUT	4			