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3500 Series Valve Instruction and Maintenance Manual

Caution: Prior to performing any repairs or maintenance on the valve assembly, isolate the valve and vent the process pressure. Shut off or disconnect the supply airline and the pneumatic or electric signal lines.

When ordering parts, be sure to provide the Valve Serial Number and Model Number to Ensure the correct parts are supplied.

J Flow Controls Model Numbering

Actuator	Series	Trim Type	Characteristic	Body Material[1]
Spring Diaphragm	**3500** Mixing	**1** Metal Seat	**1** Linear	**0** A30 LF2
870 Air-to-Close	**3501** Diverting	**2** Soft Seat	**2** Equal Percentage	**2** WCB/A105
880 Air-to-Open				**3** 316
Spring Cylinder				**A** 304
660 Air-to-Open				**AL** 304L
670 Air-to-Close				**3L** 316L
680 Double Acting				

Packing	Body Gasket	End Connection	Size
T Teflon	**S** Standard 400°F	**S** Socket Weld	3/4" - 8"
G Graphite	**H** High Temp 750°F	**BW** Butt Weld	
LE Low Emission	**ST** Super Temp 1049°F	**F1** 150	
		F3 300	
		F6 600	

Installation

Before installing the valve in the line, clean piping and valve of all foreign material such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to insure leak-proof joints.

To allow for in-line inspection, maintenance or removal of the valve without service interruption, provide a manually operated stop valve on each side of the Series 3500 valve with a manually operated throttling valve mounted in the by-pass line

The valve must be installed so that the controlled substance will flow through the valve in the direction indicated by the flow arrow located on the body. For heat-insulated installation, *do not insulate the valve bonnet.* Take necessary protective measures relate to personal safety.
Piping to Actuator

The actuators are designed to accept 3/8" FNPT air supply piping. Use 1/4" OD tubing (4 x 6 mm) or equivalent for all air lines. If the **supply** air line exceeds 25 feet in length (7 meters), or if the valve is equipped with volume boosters, then 3/8" tubing (6 x 8 mm) is preferred. AII connections must be free of leaks.

Caution: Do not exceed supply pressure indicated on serial plate located on the yoke of the actuator.

NOTE: Model 870/ 880 not to exceed 50 PSIG

Model 660/ 670 / 680 not to exceed 100 PSIG

Unpacking

Use care when unpacking the valve to prevent damage to the accessories and component parts. Should any problems arise, contact J Flow Controls or Authorized Representative or After Sales Department.

Storage

When storing the valves, make sure to keep protective covers in place to prevent damage to the valve surfaces. It is highly recommended that valves be stored indoors in a clean and dry environment until it is ready for use.

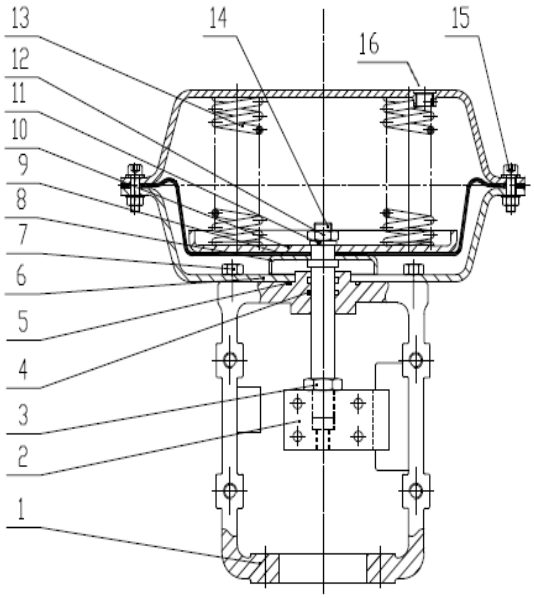
Removal of 880 Actuator

Fail Closed Units (880 models), air supply must be at or around 50% of travel. This will ensure the plug is off the seating area prior to removal to avoid damage to the seat and plug.

1). Supply actuator with enough air to move the coupling block to approximately 50% of travel.
2). Remove Coupling Block (# 2) and Coupling Block Nut (#3), then remove air supply.
3). Remove actuator from valve by removing the 4 mounting bolts (Not Shown)
4). Use the Lifting eyes (if provided) to remove the actuator.

Actuator Assembly
Models May Vary

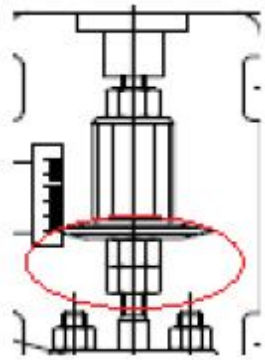
No.	Part
1	Yoke Bracket
2	Coupler
3	Coupler Nut
4	O-ring
5	O-ring
6	Lower Diaph Case
7	Bolt
8	Travel Limiter
9	Diaphragm
10	Spring Tray
11	Spring Washer
12	Nut
13	Spring
14	Stem / Push Rod
15	Bolt
16	Upper Diaph Case



Removal of 870 Actuator

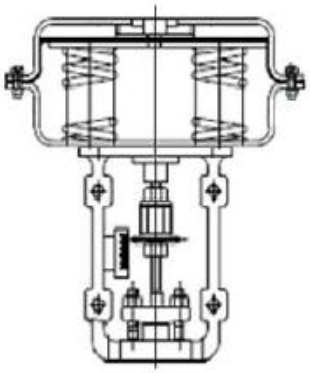
Fail Open Units (870 models)

1). Disconnect Air Supply to the actuator.
2). Check actuator position to ensure the plug is off the seat.
3). Loosen the Lock Nuts above and below Coupler Block or Coupling Nut
4). Remove Coupling Block (# 2) and Coupling Block Nut (#3).
5). Remove actuator from valve by removing the 4 mounting bolts (Not Shown)
6). If a Coupling Nut is used, the actuator must be unthreaded from the valve stem. Use the 2 each jam nuts below the Coupler nut together, then unthread the valve stem away from the actuator nut.

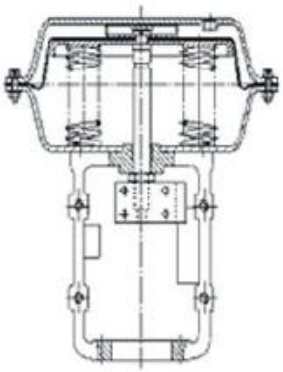


7). Remove the actuator from the valve.

Typical 870 Actuator Assemblies



Old Style 870
(Coupler Nut)



Currrent 870
(Coupling Block)

General Information 880 and 870 Actuators

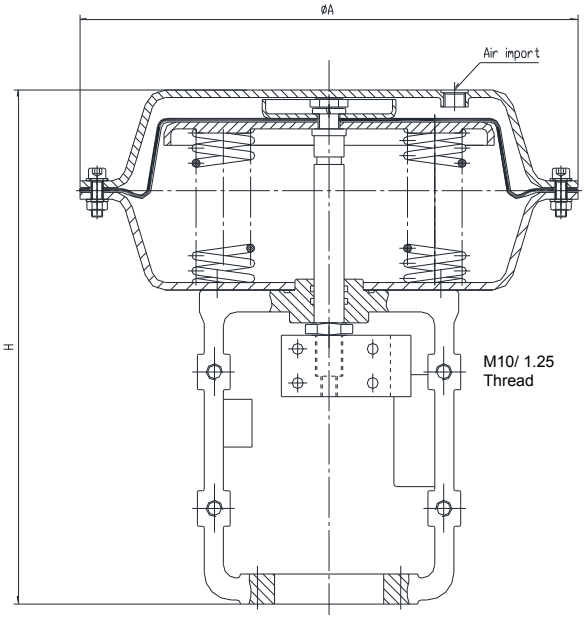


Figure 1
870 Air to Close Assembly

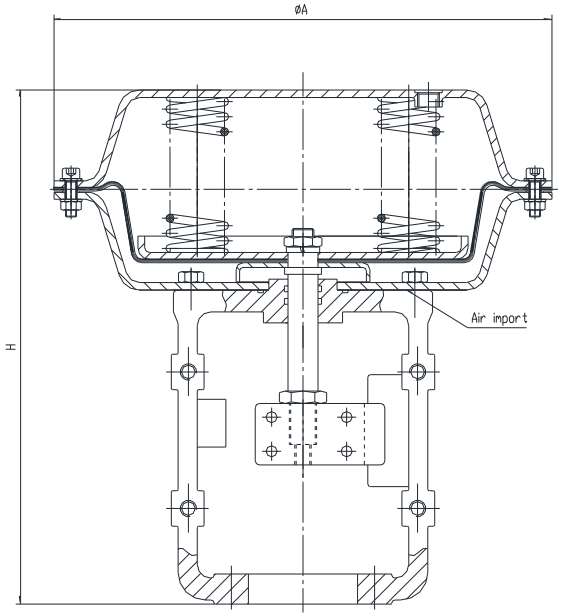


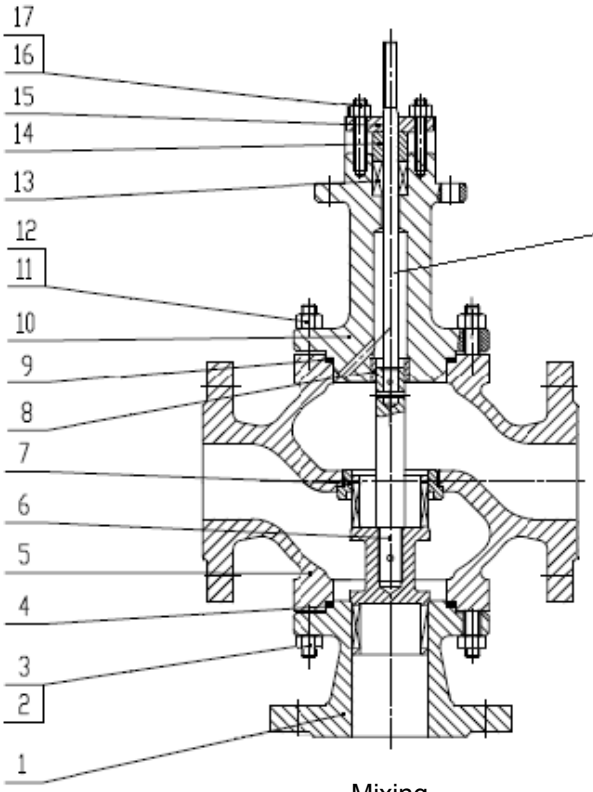
Figure 2
880 Series: Air to Open Assembly

- **Temperature: 14-140F**
- **Max Air supply 50 PSIG**
- **Medium: Clean compressed air**

Model Size	Diaphragm Effective Area (Sq. In)	Travel(mm)	H	ΦA	Spring Range PSIG	Standard Air Supply Pressure PSIG	Output Thrust(N)	
							Spring Restoration Thrust	Standard Air Supply Thrust
25	54	10mm 16mm	420	290	3-15	20	157	314
					6-30	35	314	
					11-35	40	629	
29	54	25mm	460	290	3-15	20	157	314
					6-30	35	314	
					11-35	40	629	
37	86	40mm	460	362	3-15	20	251	503
					6-30	35	503	
					11-35	40	1007	
48	139	60mm	550	454	3-15	20	404	809
					6-30	35	809	
					11-35	40	1618	
55	217	100mm	760	560	3-15	20	629	1258
					6-30	35	1258	
					11-35	40	2517	

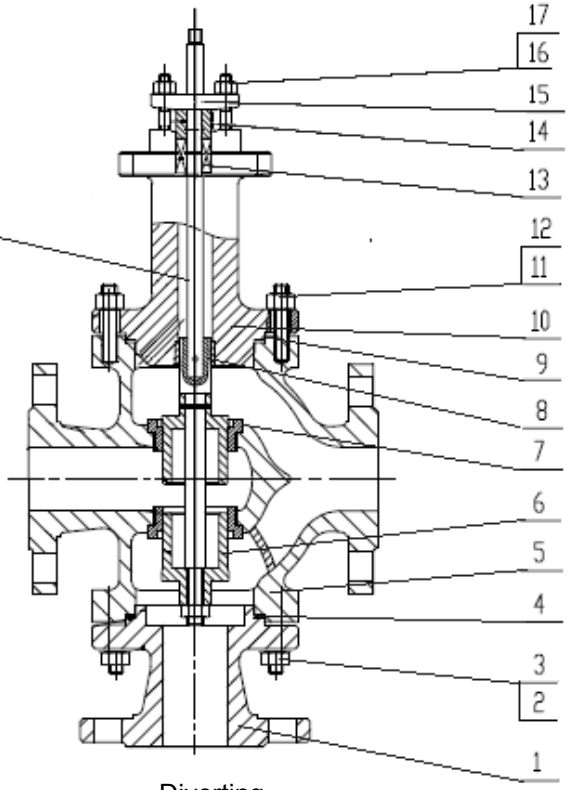
3500 Series Valve Disassembly

3500 Series Sub-Assembly



Mixing

3501 Series Sub-Assembly



Diverting

18	Stem	SS316
17	Nut	2H
16	Bolt	B7
15	Glanol Flange	WCB
14	Glanol	A105
13	Packing	PTFE
12	Nut	2H
11	Bolt	B7
10	Bonnet	WCB
9	Gasket	SS304+Graphite
8	Bushing	SS316
7	Seat	SS316+STL
6	Plug	SS316
5	Body	WCB
4	Gasket	SS304+Graphite
3	Nut	2H
2	Bolt	B7
1	Bottom Flange	WCB
No.	Part Name	Material

Models May Vary

Caution: Prior to performing any repairs or maintenance on the valve, isolate the valve and vent the process pressure. Shut off the supply airline and the pneumatic or electric signal line.

Disassembly

Reference Page 6.

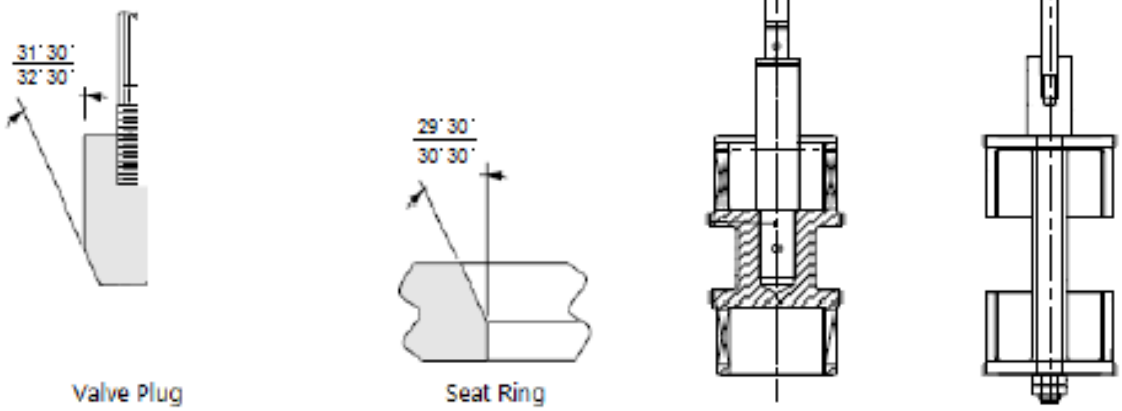
1). Loosen Packing Gland Nuts (#17)
2). Remove Stem Nuts (Not Shown)
3). Loosen and Remove Body Nuts (#12)
4). Remove Bonnet evenly from body (#10) *Note* Stem / plug assembly will remove from bottom side of bonnet.
5). Loosen and remove bottom flange nuts (# 3)
6). Remove Bottom Flange evenly (#1) from the main body
7). Remove Stem and Plug assembly (#18, #6) from the body (or Lower half of plug in 3501 series)
8). Remove seat rings (#7)
9). Threaded Trim Style, use Seat Ring Tool (Not Provided) to unthread the seat from the body (#5). 10).
10). Remove the Packing Stud Nuts (#17) and inspect
11). Remove the Packing Gland (#11) and inspect
12). Remove the Packing (#10)
13). Remove Body Gaskets (#4 & 9)

Inspect and Clean the Body & Bonnet and Bottom Flange for any signs of wear.
Inspect the valve trim for wear and replace if needed.

Trim Machining

If the Valve Trim looks to be repairable, the following can be applied to the valve trim:

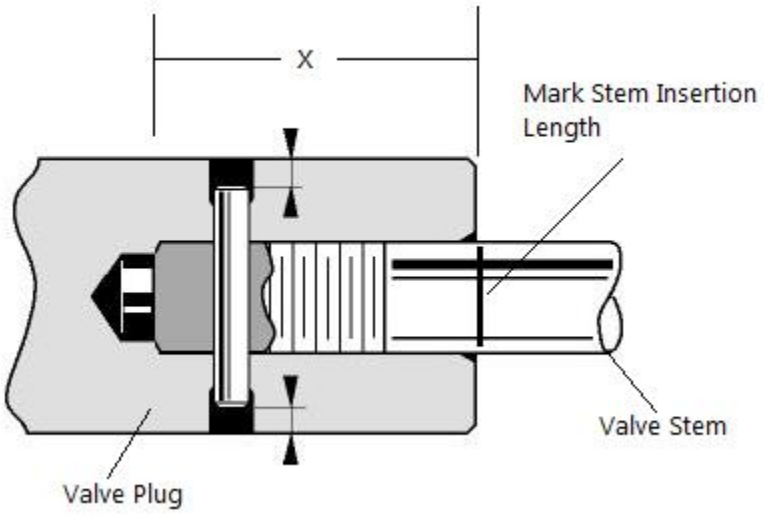
Plug Angle 31 - 32 Degrees
Seat Angle 29 - 30 Degrees



Reference only

Plug Replacement and Pinning

If it is necessary to replace the plug, then the plug stem must be replaced at the same time. The original pin hole in an existing stem will not provide the necessary fit, and might seriously impair the strength of the assembly.



Note: If pinning is being performed, care must be taken not to damage the seating surface or plug guide. Always use a soft metal or plastic vice jaws to hold the plug guide area

1). Hold the plug (with vise jaw assembly) in a vise
2). Lock two stem nuts against each other on the end of the new plug stem (#18), and screw the stem ***solidly*** into the plug using a wrench on the upper nut. When properly assembled, the reference mark (see above) should be flush with the end of the plug guide.
3). Drill new pin hole and Insert Replacement Pin.

3500 Series Mixing Valve Reassembly

Clean and Inspect the gasket mating surfaces around the body and seating areas, this will ensure a good sealing surface is achieved and prevent undesired leaks.

Reference Page 6.

1). Threaded Seat Ring- Install seat ring (#7 or #1) - Apply a small amount of sealant to the seat ring threads and sealing shoulder.

Apply a Sealant sparingly that is compatible with the process and Tighten seat ring. Do not over-tighten as this could distort the seat ring and not seal properly.

2). Carefully install plug (#6) and stem assembly in through the bottom side of body
3). Install Lower Body Gasket (#4) & Bottom Flange (#1). Note* Use Caution to not let the plug and seating areas make contact until Lower Flange is tightened.
4). Tighten Bottom Flange Nuts (#3) Tighten evenly. See Torque chart on page 14.
5). Install main body bonnet gasket (#9).
6). Carefully install the the Bonnet assembly (#10) over the valve stem.
7). Install Body bolts and nuts (#11, 12. Tighten evenly. See Torque Chart on Page 14.
8). Install packing (#13) into bonnet (#10) and lantern rings (if equipped).
9). Install packing gland (#14) and packing flange (#15).
10). Install Packing flange nuts (do not tighten at this time).
11). Install Actuator (See below).

3501 Series Diverting Valve Reassembly

Reference Page 6.

1). Install threaded seat ring (#7 or #1) - Apply a small amount of sealant to the seat ring threads and shoulder

2). Carefully install top half of plug and stem down through the top of the body (#6).
3). Install lower half of plug assembly through the bottom side of body. Note* Use caution when tightening assembly on seating areas.
4). Install Lower Body Gasket (#4) & Bottom Flange (#1). Note* Use Caution to not let the plug and seating areas make contact until Lower Flange is tightened.
5). Tighten Bottom Flange Nuts (#3) Tighten evenly. See Torque chart on page 14.
6). Install main body bonnet gasket (#9).
7). Carefully install the the Bonnet assembly (#10) over the valve stem.
8). Install Body bolts and nuts (#11, 12. Tighten evenly. See Torque Chart on Page 14.
9). Install packing (#13) into bonnet (#10) and lantern rings (if equipped).
10). Install packing gland (#14) and packing flange (#15).
11). Install Packing flange nuts (do not tighten at this time).
12). Install Actuator (See below).

Actuator Installation

Fail Closed Actuators (880 Models),

Note: Air supply must be at or around 50% of travel. This will ensure the plug is off the seating area prior to installation to avoid damage to the seat and plug.

1). Supply actuator with enough air to move the travel to approximately 50% of travel.
2). Use the Lifting eyes (if provided) to install the actuator.
3). Install actuator and tighten the 4 mounting bolts (Not Shown)
4). Place a flat wrench between the actuator stem and the valve stem. Driving the valve stem down into the seat. Apply enough air to actuator to remove the wrench. Then remove air.
5). Take air supply and apply until the actuator stem is fully up. Then reduce the air down the amount of travel the actuator has. Example-1" Scale, reduce air supply and move the actuator stem down 1". A tape measure can be used to ensure correct travel length is reached.
6). Connect the Coupling Block (# 2) and Coupling Block Nut (#3), then remove air supply.
7). Tighten packing flange bolts evenly.
8). Test valve & Actuator together to ensure proper function.

Fail Open Actuators (870 Models)

1). Install the actuator, then tighten 4 Mounting bolts that connect the actuator to the bonnet.

2). Place a flat wrench between the actuator stem and the valve stem. Driving the valve stem down into the seat. Remove air from actuator.

3). Slowly apply air to the actuator, to move the stem down the stroke length of the scale. (Example. 1" Scale, bring stem down out of actuator 1") Stop applying air once the scale travel has been reached.

4). Install Coupling Block (# 2) **

5). If a Coupler Nut is used, the valve stem should have 2 jam nuts. Move the jam nuts to the lower part of the threads on the valve stem. They need to be jammed together so it can be threaded into the Coupling Nut.

6). Thread the Valve stem into the Coupling nut until it stops. Then loosen the jams nuts and relocate them against the Coupler nut, then tighten them. Adjust Scale if required.

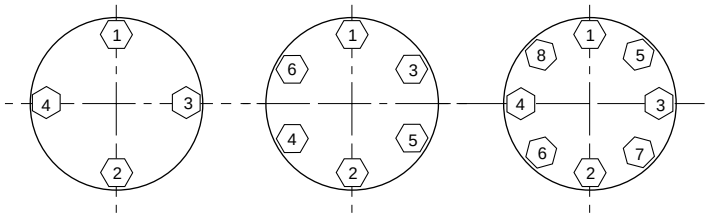
7). Tighten packing flange bolts evenly.

8). Test valve & Actuator together to ensure proper function.

Assembly Torque Chart

Tightening torques for connection of body and bonnet / lower flange

Valve size		Thread of stud bolt Body/bonnet	No. of bolts	Tightening torque for body nut in Nm
DN	NPS			
15 to 25	½ to 1	M10/⅜" – 16 UNC	4	30
32 to 50	1½ to 2	M12/½" – 13 UNC	4 / 6	50
65 to 80	2½ to 3	M16/⅝" – 11 UNC	6	80
100	4	M20/¾" –10 UNC	6	100
125	5	M16	8	120
150	6	M20/1" – 8 UNC	8	160
200	8	M27/1" – 8 UNC	8	180



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