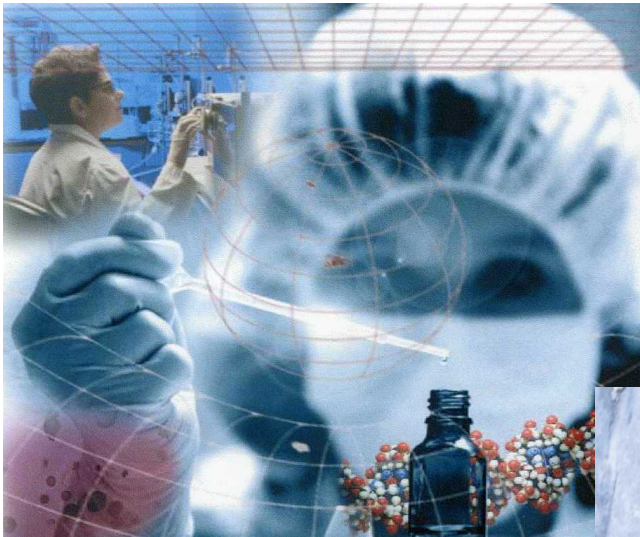




# VALVES, ACTUATORS AND CONTROL SYSTEMS

## Diaphragm Valve Maintenance Instructions

Prepared November, 8<sup>th</sup>, 2006 for:



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## **PROCESS DIAPHRAGM INSTALLATION**

### **Threaded Types – Image 1**

Screw the diaphragm clockwise into the adapter manually so that the diaphragm boss fits closely in the recess of the compressor.

When resistance is felt turn the diaphragm anti-clockwise until the bolt holes are in correct alignment with the bolt of the actuator.

Do not over tighten the diaphragm into the compressor as this causes the spindle to keep traveling into the compressor, but the boss has run out of travel distance. This is turn does not allow the center of the diaphragm to compress onto the center of the weir and may allow the valve to leak and/or may cause premature failure.

### **Push Fit Types (601, 602, 605) – Image 2**

Place the fastening spigot of the diaphragm in an inclined position at the hole of the compressor.

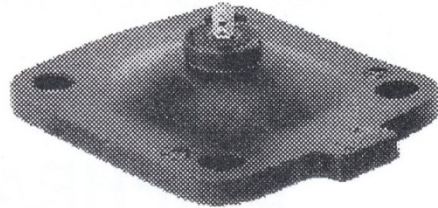
Push and twist slightly and the spigot will pop into place in the compressor.

Do a visual check that the spigot is sitting clean in the compressor.

Images on next page:

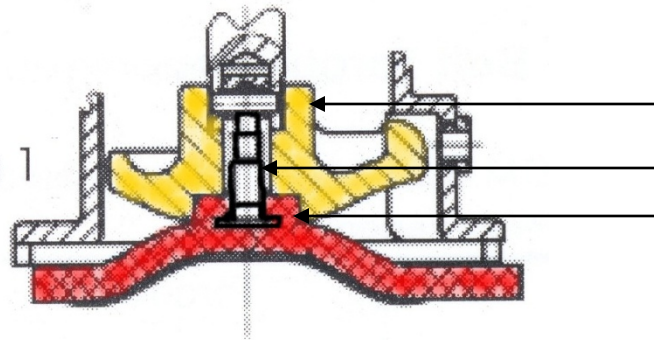


# VALVES, ACTUATORS AND CONTROL SYSTEMS



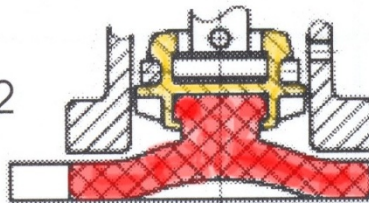
If you over tighten the diaphragm into the compressor. The spindle continues into the compressor, diaphragm boss has no where to travel.

Drawing 1



Compressor  
Spindle  
Diaphragm Boss

Drawing 2



This in turn can cause the spindle to separate from the diaphragm, stiffen the center of the diaphragm causing leakage and/or premature failure



# VALVES, ACTUATORS AND CONTROL SYSTEMS

## Torque Procedure

It is important to tighten the screws in a cross pattern order to avoid one-sided deformity of the diaphragm.

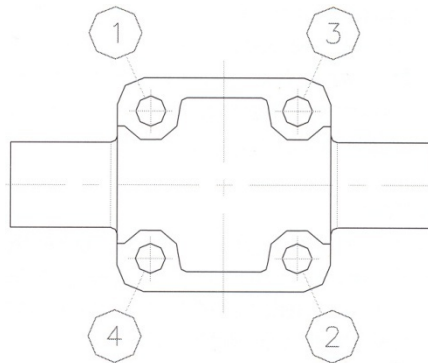
It is very important not to tighten one side all or most of the way down.

Tighten each screw a little bit at a time drawing the bonnet down towards the body in a level manner. Attainment of the maximum values guide is recommended.

In the event there is insufficient space for the utilization of a torque wrench. The actual compression of the diaphragm should range between 15-20% of its original thickness. Diaphragm compression greater than this will result in reduced life or/and failure.

When torturing the bonnet down by optical sight lines, snug the screws so that bonnet flange is parallel with the body flange. Tighten each screw a little at a time in an axis pattern till 15% - 20% compression of original thickness achieved. Keep watch along the sight lines that one corner is not pulling down farther than the rest.

Always, ensure that the diaphragm is in the open position when tightening down the bonnet.

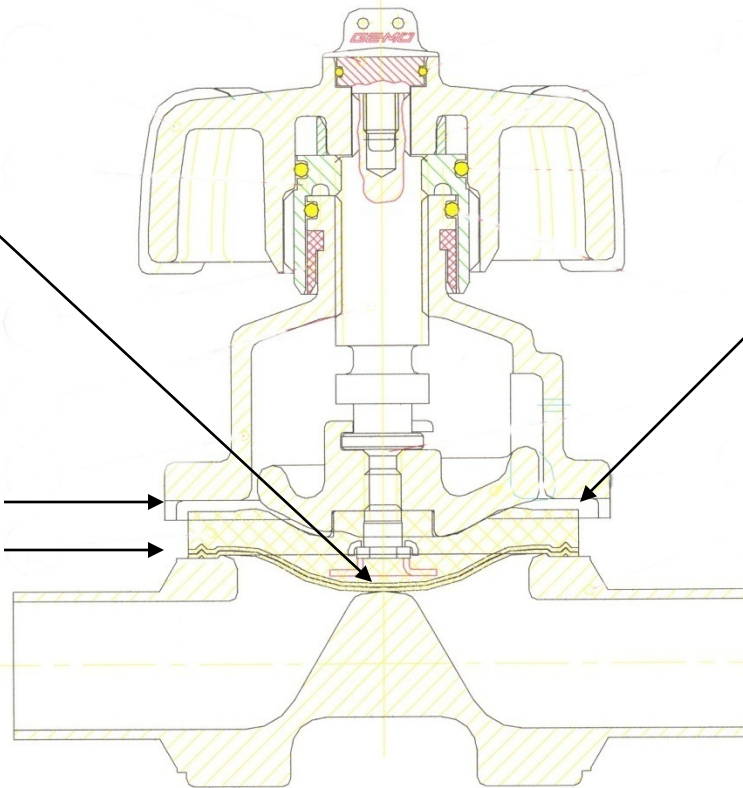




VALVES, ACTUATORS  
AND CONTROL SYSTEMS

Installing bonnet with diaphragm in the close position causes the diaphragm to impact into the weir, crushing the center portion of the diaphragm face.

Bonnet Flange Sightline  
Body Flange Sightline



If this corner were tightened too far, when the opposite corner tightened down so that the bonnet and body flanges are parallel, this corner of the diaphragm could be crushed.

Over-tightening one corner causes the body to twist out of profile. This could cause the valve to leak and/or damage the diaphragm.

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Subject to change without  
notice.



## DIAPHRAGM VALVES

### Bolt Torque Recommendations: Valve Body/Actuator

1. EPDM elastomer and laminated TEFLON diaphragms  
(One Piece design)

Size	Torque Min.		Torque Max		Bolt Size
	NM	Inch Lbs.	NM	Inch Lbs.	
1/4" - 1/2" *	.5	4.4	.6	5.3	M 4
3/8" - 3/4" **	3.0	27	4.0	35	M 5
1/2" - 1"	6.5	58	8.0	72	M 8
1 1/4" - 1 1/2"	12.0	107	14.0	125	M 10
2"	17.0	152	19.0	169	M 12
2 1/2" - 3"	50.0	445	60.0	534	M 16
4"	40.0	356	50.0	445	M 12
5"	50.0	445	60.0	534	M 16
6"	50.0	445	60.0	534	M 16

2. TWO-PIECE TEFLON Diaphragms with EPDM elastomer backing

Size	Torque Min.		Torque Max		Bolt Size
	NM	Inch Lbs.	NM	Inch Lbs.	
3/8" - 3/4" **	3.5	30	4.5	40	M 5
1/2" - 1"	13.0	115	16.0	140	M 8
1 1/4" - 1 1/2"	24.0	215	28.0	250	M 10
2"	34.0	300	38.0	340	M 12
2 1/2" - 3"	100.0	890	120.0	1070	M 16
4"	80.0	700	100.0	900	M 12
5"	100.0	890	120.0	1070	M 16
6"	100.0	890	120.0	1070	M 16

**Note:** It is important to tighten the screws in the order of cross pattern to avoid one-sided deformity of the diaphragm. Attainment of the above maximum values is recommended. The above table should be considered an assembly guide.

The values are recommendations. The actual compression of the diaphragm should range between 15-20% of its original thickness. Any compression greater than this will result in reduced diaphragm life or failure.

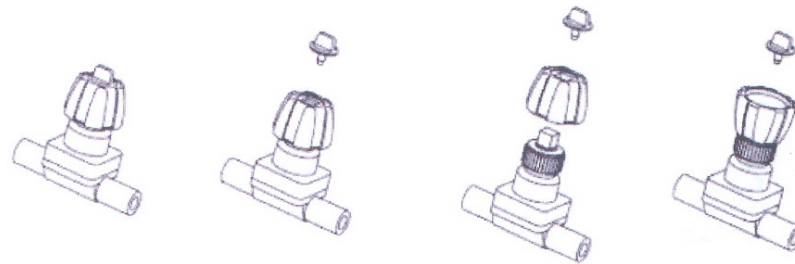
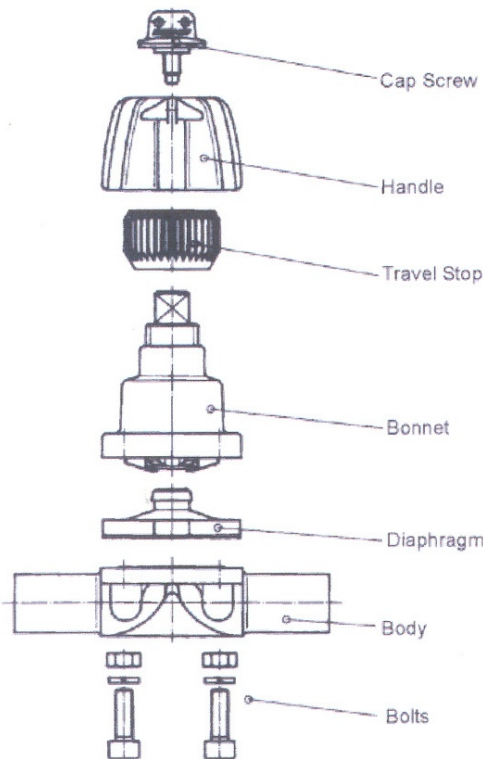
Torque spec.

\* 601, 602, 603, 605, 618, 640, 641

\*\* 610, 611, 612, 613, 615, 617, 618, 625, 640  
600, 620, 640, 647, 667, 671, 672, 673, 675  
677, 687, 688, 690, 695, 698

## Setting the Travel Stop Type 601, 612, 673

The travel stop limits the closing force acting on the diaphragm, and is also used to set the minimum flow volume.



### Procedure

- Remove the cap screw from the handle
- Take off the handle, turn it upside down and mount it to the square end of the spindle
- Turn the handle clockwise until the valve closes or
- Turn the handle clockwise until the desired flow volume is set
- Tighten the travel stop clockwise until it locks tight against the bonnet
- Pull the handle off the spindle, turn it right side up and mount it back onto the spindle / bonnet assembly.