

# KHR Series Regulators Maintenance Instructions

Swagelok®

## Kit Contents



Seat retainer



Seat



Poppet



Poppet spring



Poppet damper



Outer body seal



Inner body seal



Upper piston seal



Piston seal backup ring



Main piston seal



Piston vent seal



Self-vent seat



Self-vent poppet



Self-vent poppet spring



Self-vent seat retainer



Inlet Filter



Lubricant  
MS-LT-WL8

## Symbols














Discard



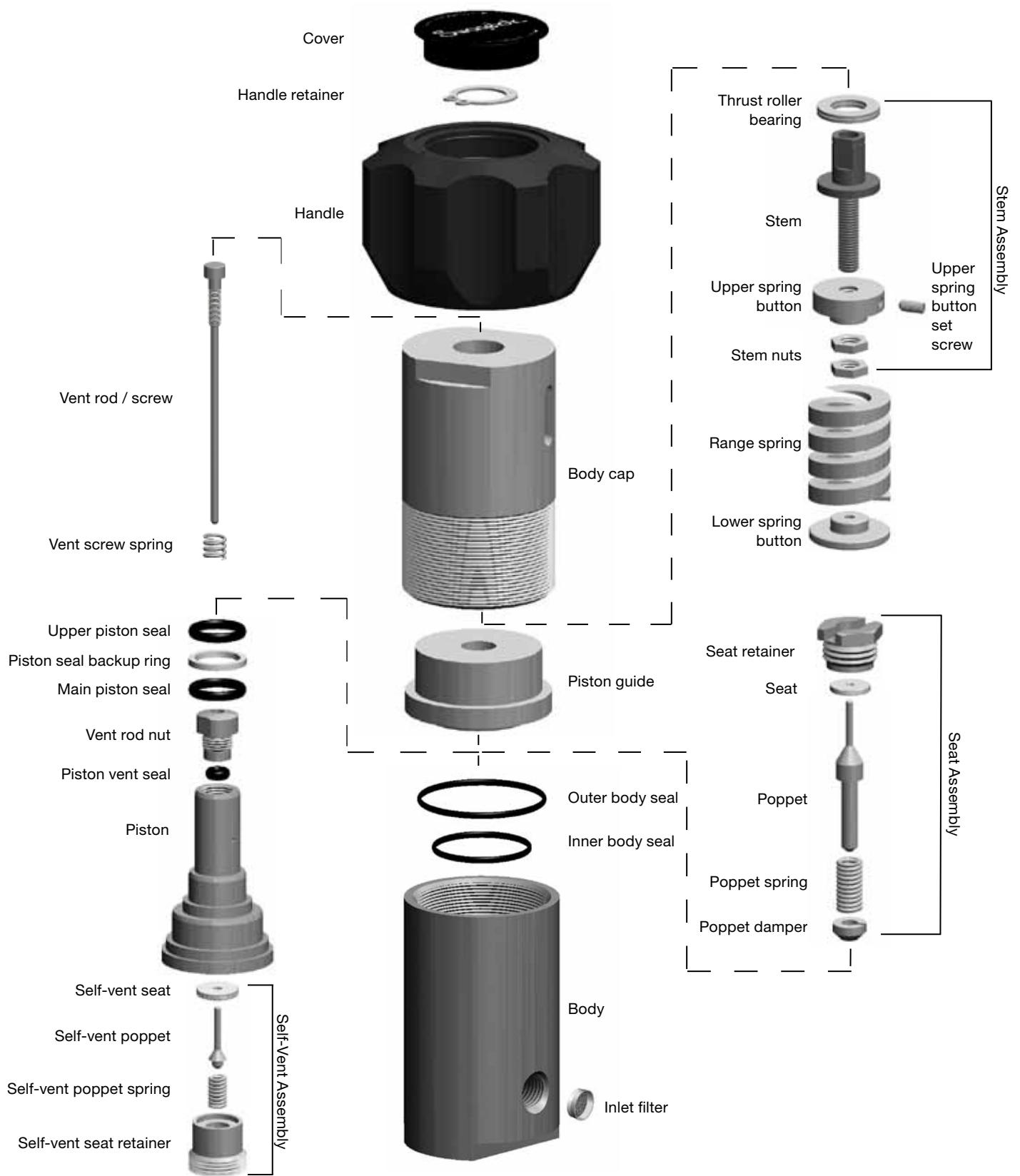
Lightly lubricate

## Tools Required

Tool	Size	Component
Vise 	-	Body
Socket 	5/8 in. or 16 mm	Seat retainer
Crow's foot 	1 5/8 in. or 41 mm	Body cap
	3/4 in. or 19 mm	Vent assembly retainer nut
Open-ended wrench 	1 5/8 in. or 41 mm	Body cap
	3/4 in. or 19 mm	Vent assembly retainer nut
Torque wrench 	Capable of 129 ft·lb (175 N·m, 17.9 m·kg)	Seat retainer, Body cap, Vent assembly retainer nut
Hex key 	1/8 in. or 3 mm	Vent screw, Upper spring button set screw
Needle-nose pliers 	-	Knob handle retainer
<b>Swagelok Tools Available</b>		
Vent retainer tool 	-	Self-vent seat retainer
Piston assembly bar 	-	Piston
Filter insertion tool 	-	Inlet filter
Filter pick tool 	-	Inlet filter

NOTE: See *Pressure Regulators*, MS-02-230, for tool ordering information.

# Exploded View



**⚠ WARNING**

**Before removing a regulator from the system for service, you must**

- depressurize system
- purge the system to remove any residual system media left in the regulator.

**Disassembly**

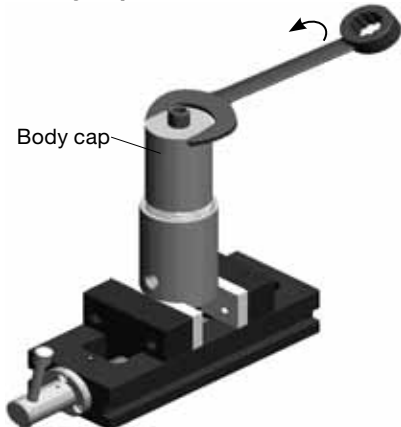
1. Place the regulator in a vise.
2. Turn the **handle** counterclockwise until it stops. Remove the **cover**, the **handle retainer** and then pull the **handle** from the body.  
Note: Use needle-nose pliers to remove the handle retainer.



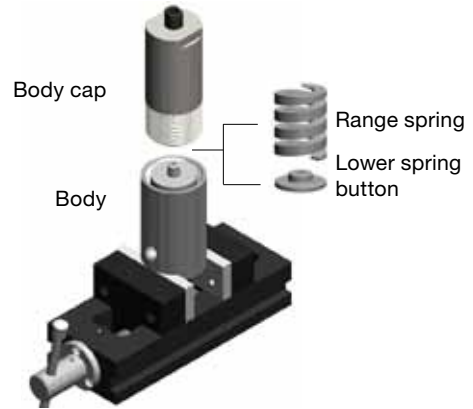
3. Remove the vent screw / rod and vent screw spring from the **stem**, and set aside for later use.



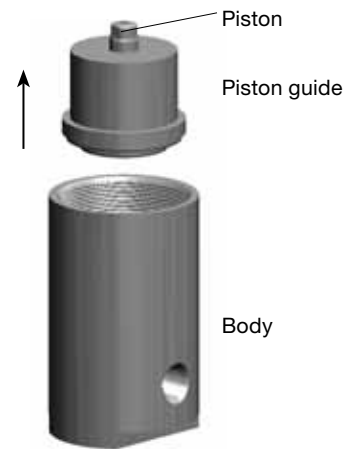
4. Loosen the **body cap**.



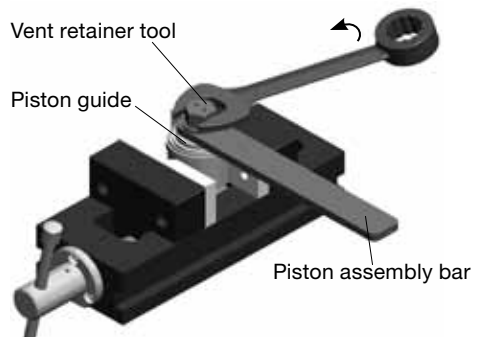
5. Remove the **body cap** from the **body**.  
Note: The **range spring** and the **lower spring button** may fall from the body cap. Set aside for later use.



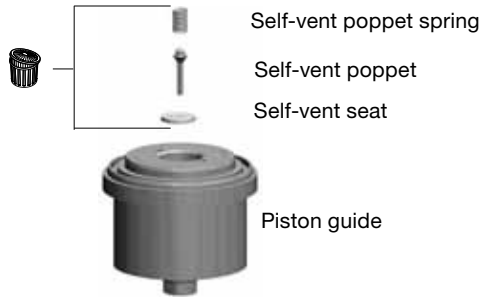
6. Remove the **piston guide** from the **body** by pinching the **piston top** with your fingers and gently rocking it.



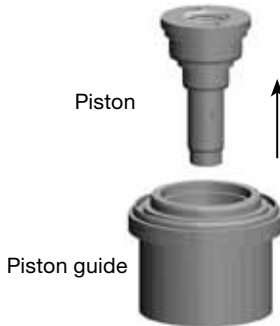
7. Lightly grip the **piston guide** in the vise and remove the self-vent seat retainer from the **piston guide** using the **piston assembly bar** and the **vent retainer tool**. The piston assembly bar must be held still.



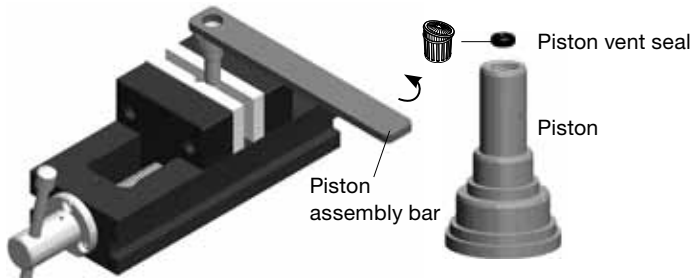
8. Remove the **self-vent poppet spring**, the **self-vent poppet** and the **self-vent seat** from the **piston guide**.



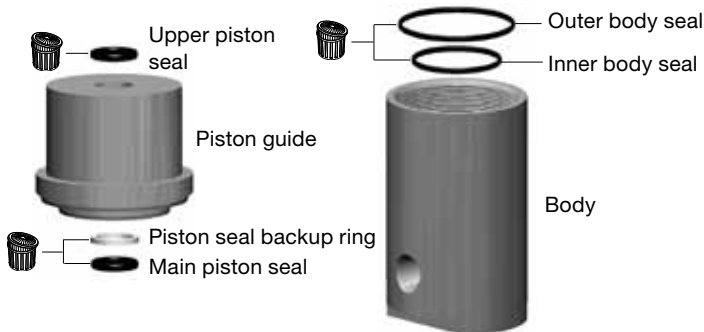
9. Push the **piston** out of the **piston guide**.



10. Grip the vent rod nut in the vise, and loosen and remove the nut by using the **piston assembly bar**. Set aside the nut for later use. Remove the **piston vent seal** from the **piston**.



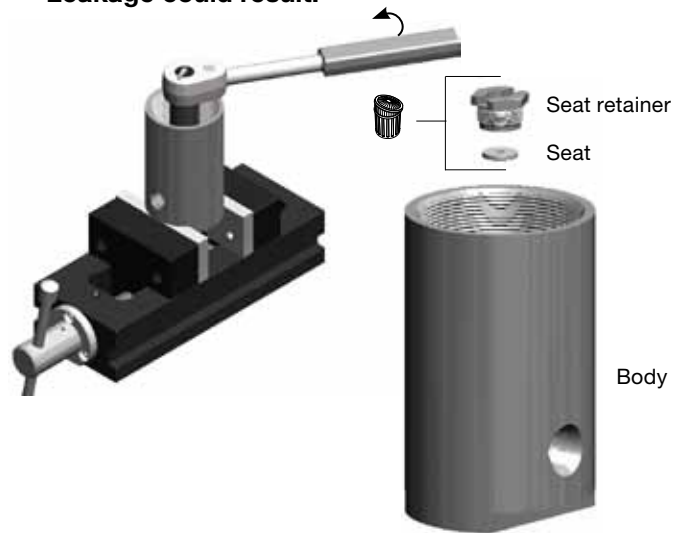
11. Remove the **upper piston seal** from the top of the **piston guide**, and the **main piston seal** and the **piston seal backup ring** through the bottom of the piston guide. Remove the **outer body seal** and the **inner body seal** from the **body**.



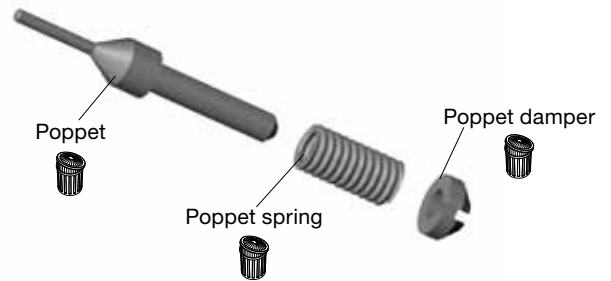
12. Loosen and remove the **seat retainer**. Discard the seat and seat retainer.

**NOTICE**

**Be careful not to scratch the inside of the body. Leakage could result.**



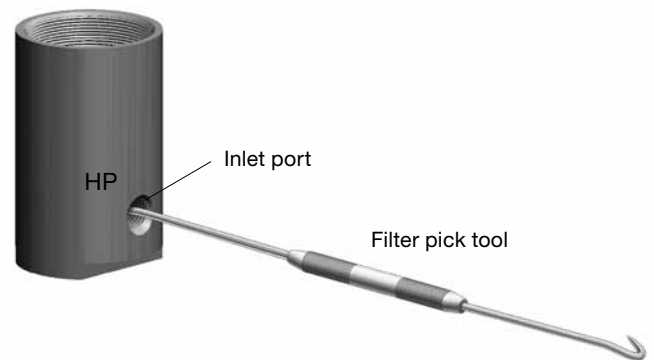
13. Invert the body and remove the **poppet**, the **poppet spring**, and the **poppet damper**.



14. Remove the **inlet filter** using the **filter pick tool** or similar tool, and remove the **filter** from the **inlet port** (marked 'HP') of the body.

**NOTICE**

**Be careful not to scratch the sides of the inlet port. Leakage could result.**



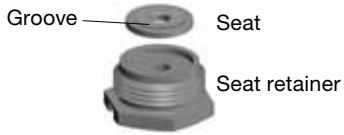
Discard inlet filter

## Reassembly

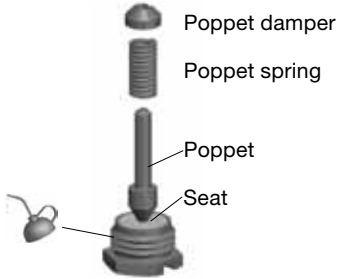
### NOTICE

Ensure all parts and tools are free of debris or damage.

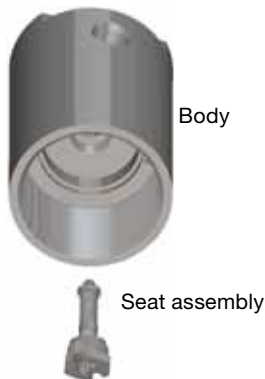
15. Insert the **seat** into the **seat retainer** with the groove facing away from the seat retainer.



16. Place the **poppet** through the **seat**. Then place the **poppet spring** and the **poppet damper** onto the exposed end of the poppet.



17. Invert the **body** and thread the **seat assembly** into the body finger-tight.



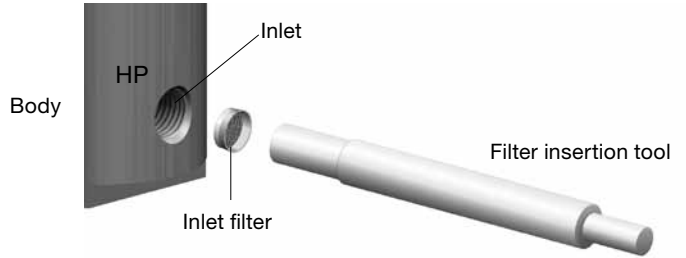
18. Tighten the **seat assembly** to:  
 for non-metallic seat: 13 ft·lb (17.5 N·m, 1.8 m·kg)  
 for metallic seat: 26 ft·lb (35.0 N·m, 3.7 m·kg)



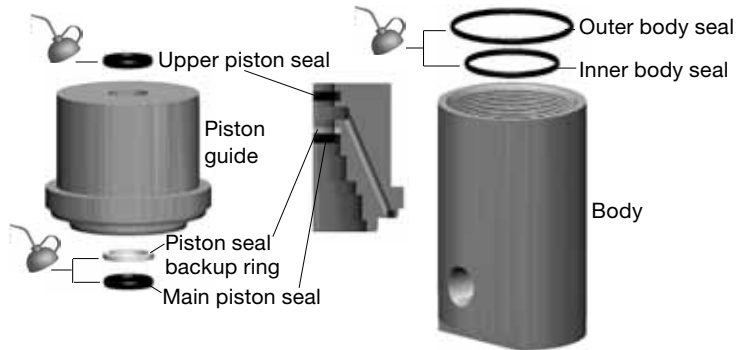
19. Insert the **inlet filter** using the **filter insertion tool** into the **inlet** (marked 'HP') of the **body**.

### NOTICE

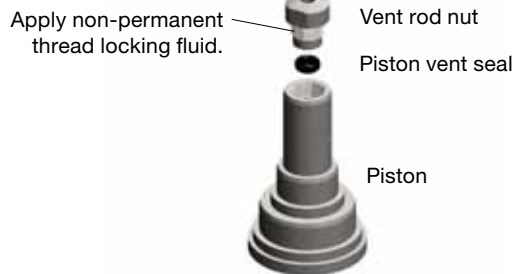
Do not insert with sharp tools. Damage to filter could result.



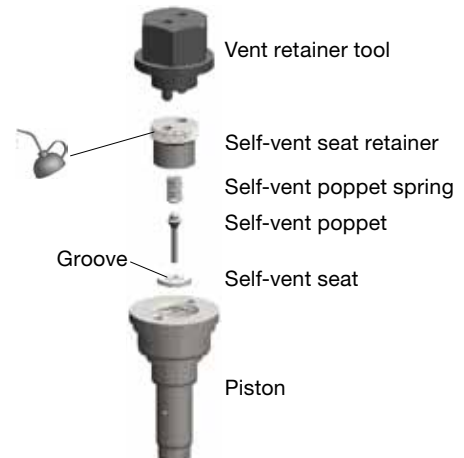
20. Insert the **upper piston seal** into the groove in the top of the **piston guide**. Insert the **piston seal backup ring**, followed by the **main piston seal** through the bottom of the piston guide. Insert the **outer body seal** and **inner body seal** into the **body**.



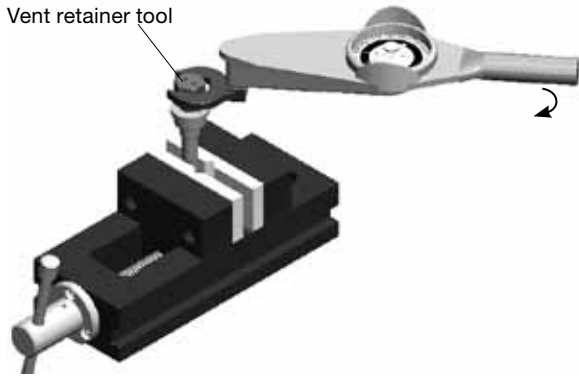
21. Insert the **piston vent seal** and thread the **vent rod nut** into the **piston**.



22. Invert the **piston** and insert the **self-vent seat** with the groove facing away from the piston. Then insert the **self-vent poppet** and the **self-vent poppet spring** into the piston. Finger-tighten the **self-vent seat retainer** into the piston using the **vent retainer tool**.



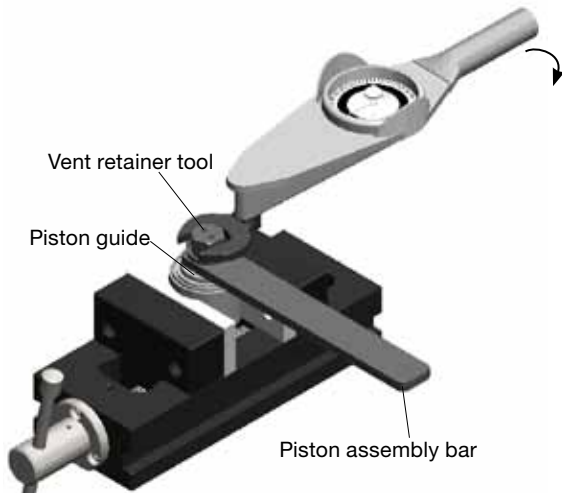
23. Grip the vent rod nut in the vise and tighten to 3.5 ft·lb (5 N·m, 0.5 m·kg).



24. Lightly grip the **piston guide** in the vise and insert the **piston assembly** into the piston guide. Then tighten the **self-vent seat retainer** to 7 ft·lb (10 N·m, 1.0 m·kg) using the **piston assembly bar** and **vent retainer tool**.

**NOTICE**

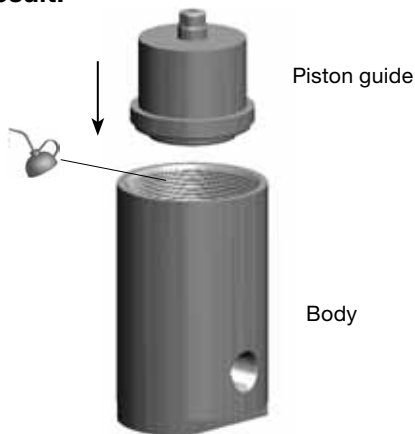
**Do not force the piston assembly into the piston guide. Damage to the seals could result.**



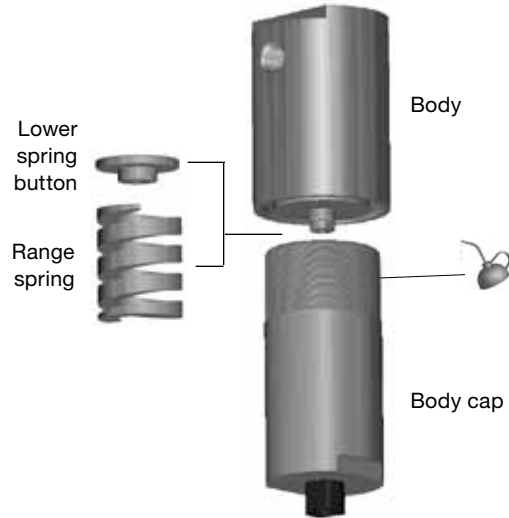
25. Insert the **piston guide** into the **body**. Lightly press down on the piston guide until it is fully seated.

**NOTICE**

**Do not pinch the body seals. Damage could result.**



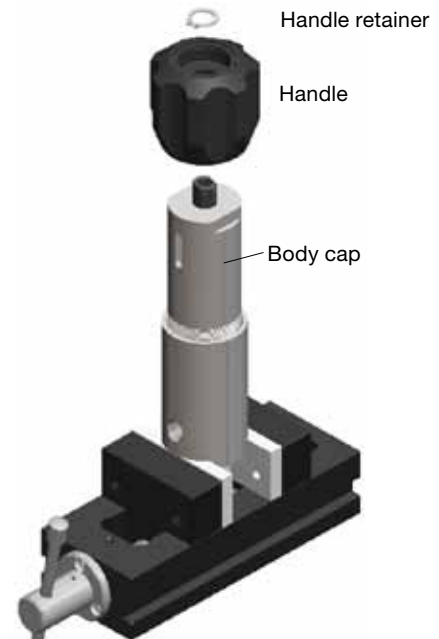
26. Place the **range spring** and the **lower spring button** into the **body cap**. Thread the body cap finger-tight into the **body** in the inverted position.



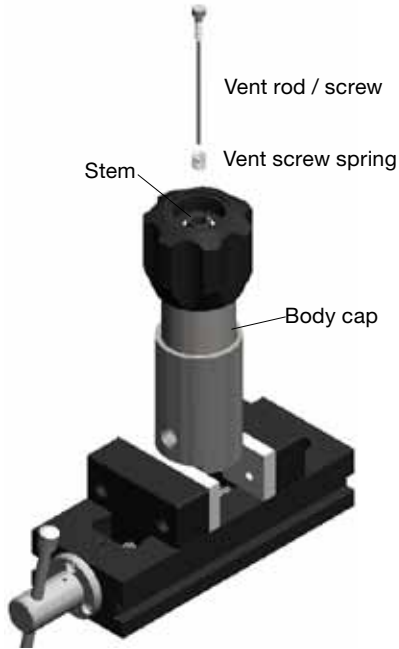
27. Tighten the **body cap** to 129 ft·lb (175 N·m, 17.8 m·kg).



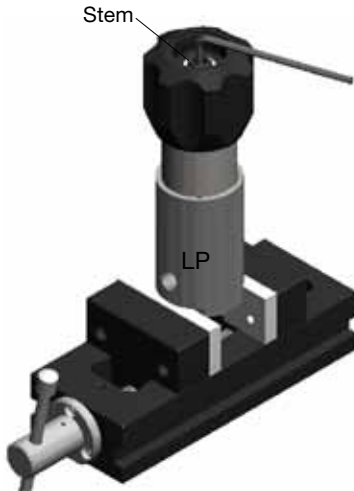
28. Place the **handle** and the **handle retainer** on the **body cap**.



29. Insert the **vent screw spring** into the **stem**. Thread the **vent rod / screw** three or four turns onto the stem. Do not fully tighten.



30. Test regulator for proper operation.  
31. Apply 50 to 100 psig (3.4 to 6.8 bar) to the LP port, tighten the vent screw until leakage is heard, and then loosen by one-half turn.



32. Place the **cover** on the **handle**



For additional information, see [www.swagelok.com](http://www.swagelok.com).