Firehawk® Second Stage Regulator

MAINTENANCE AND REPAIR

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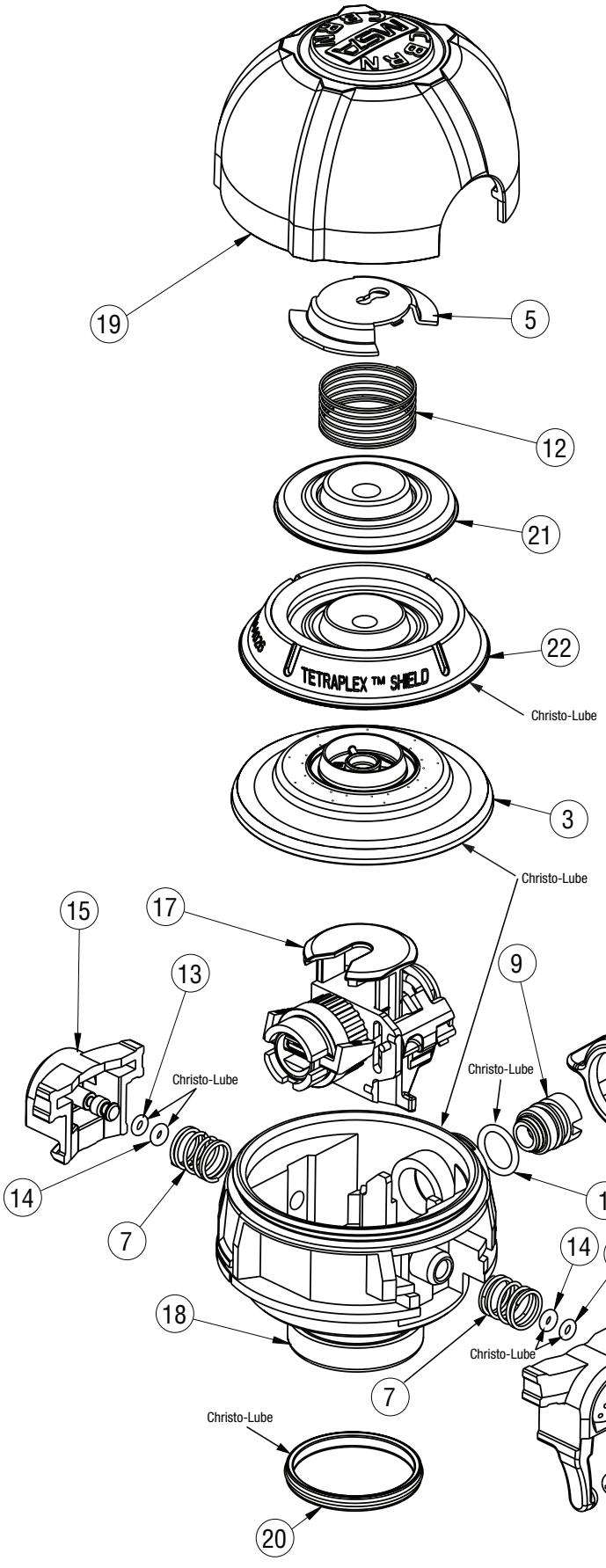
MSA The Safety Company

MINE SAFETY APPLIANCES COMPANY
CRANBERRY TWP., PENNSYLVANIA, U.S.A. 16066

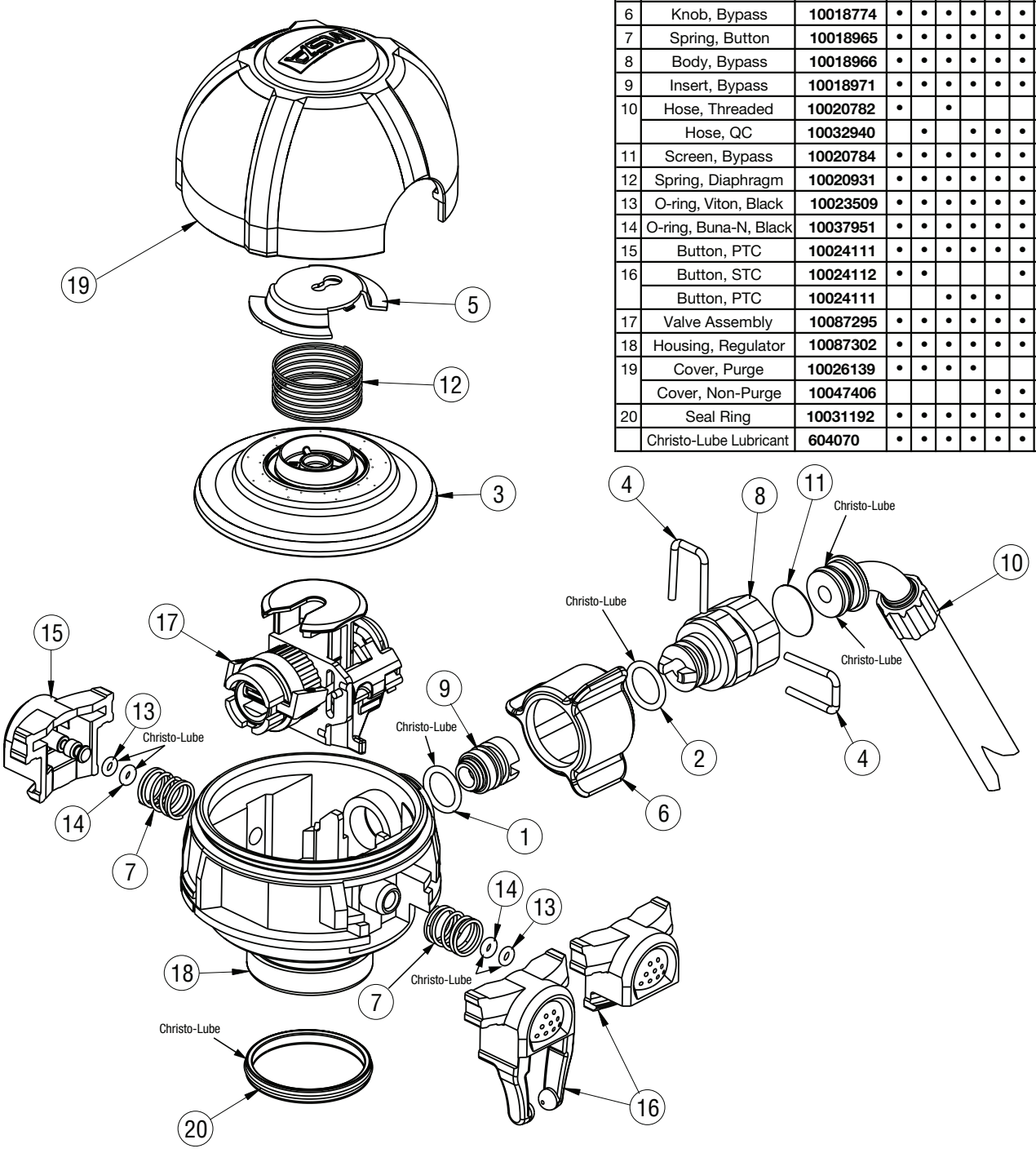
Firehawk CBRN Mask Mounted Regulator



	Component		Regulator Assembly							
			10043892	10043893	10043894	10043895	10047529	10047600	10047601	10047602
1	O-ring, Silicone, Re	**697453**	•	•	•	•	•	•	•	•
2	O-ring, Fluro., Blue	**634669**	•	•	•	•	•	•	•	•
3	Diaphragm, CBRN	**10039172**	•	•	•	•	•	•	•	•
4	U-Clip	**10018547**	•	•	•	•	•	•	•	•
5	Retainer, Spring (purge cover only)	**10018622**	•	•	•	•				
6	Knob, Bypass	**10018774**	•	•	•	•	•	•	•	•
7	Spring, Button	**10018965**	•	•	•	•	•	•	•	•
8	Body, Bypass	**10018966**	•	•	•	•	•	•	•	•
9	Insert, Bypass	**10018971**	•	•	•	•	•	•	•	•
10	Hose, Threaded	**10036171**	•		•				•	•
	Hose, QC	**10046484**		•		•	•	•		
11	Screen, Bypass	**10020784**	•	•	•	•	•	•	•	•
12	Spring, Diaphragm	**10092041**	•	•	•	•	•	•	•	•
13	O-ring, Viton, Black	**10023509**	•	•	•	•	•	•	•	•
14	O-ring, Buna-N, Black	**10037951**	•	•	•	•	•	•	•	•
15	Button, PTC	**10047238**	•	•	•	•	•	•	•	•
16	Button, STC	**10047331**	•	•				•		•
	Button, PTC	**10047238**			•	•	•		•	
17	Valve Assembly	**10087295**	•	•	•	•	•	•	•	•
18	Housing, Regulator	**10087301**	•	•	•	•	•	•	•	•
19	Cover, Purge	**10047441**	•	•	•	•				
	Cover, Non-Purge	**10047664**					•	•	•	•
20	Seal Ring	**10031192**	•	•	•	•	•	•	•	•
21	Cap, Spring	**10047528**	•	•	•	•	•	•	•	•
22	Shield, CBRN	**10044026**	•	•	•	•	•	•	•	•
	Christo-Lube Lubricant	**604070**	•	•	•	•	•	•	•	•

Firehawk Mask Mounted Regulator

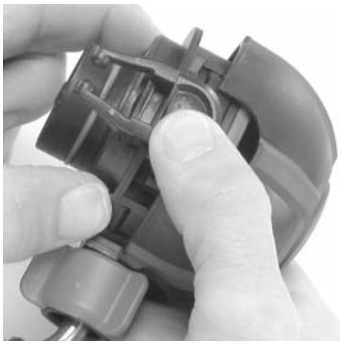
	Component		Regulator Assembly							
			10023684	10023685	10033112	10033113	10047534	10047535	10047536	10047537
1	O-ring, Silicone, Red	**697453**	•	•	•	•	•	•	•	•
2	O-ring, Fluro., Blue	**634669**	•	•	•	•	•	•	•	•
3	Diaphragm, Silicone	**10018540**	•	•	•	•	•	•	•	•
4	U-Clip	**10018547**	•	•	•	•	•	•	•	•
5	Retainer, Spring (purge cover only)	**10018622**	•	•	•	•				
6	Knob, Bypass	**10018774**	•	•	•	•	•	•	•	•
7	Spring, Button	**10018965**	•	•	•	•	•	•	•	•
8	Body, Bypass	**10018966**	•	•	•	•	•	•	•	•
9	Insert, Bypass	**10018971**	•	•	•	•	•	•	•	•
10	Hose, Threaded	**10020782**	•		•				•	•
	Hose, QC	**10032940**		•		•	•	•		
11	Screen, Bypass	**10020784**	•	•	•	•	•	•	•	•
12	Spring, Diaphragm	**10020931**	•	•	•	•	•	•	•	•
13	O-ring, Viton, Black	**10023509**	•	•	•	•	•	•	•	•
14	O-ring, Buna-N, Black	**10037951**	•	•	•	•	•	•	•	•
15	Button, PTC	**10024111**	•	•	•	•	•	•	•	•
16	Button, STC	**10024112**	•	•				•		•
	Button, PTC	**10024111**			•	•	•		•	
17	Valve Assembly	**10087295**	•	•	•	•	•	•	•	•
18	Housing, Regulator	**10087302**	•	•	•	•	•	•	•	•
19	Cover, Purge	**10026139**	•	•	•	•				
	Cover, Non-Purge	**10047406**					•	•	•	•
20	Seal Ring	**10031192**	•	•	•	•	•	•	•	•
	Christo-Lube Lubricant	**604070**	•	•	•	•	•	•	•	•



FIREHAWK SECOND STAGE REGULATOR DISASSEMBLY

REMOVING THE REGULATOR COVER, SPRING, AND SPRING RETAINER

1. Press and hold the housing buttons IN. Also, press the regulator housing retaining latches IN.



2. Pull firmly on the regulator cover to remove the cover, spring, and spring retainer from the regulator housing.

Note: Do not stretch the spring.

REMOVING THE SPRING AND SPRING RETAINER

1. Push the outside center (rubber) regulator cover IN.

Note: Do not pull the spring to remove the spring retainer.

2. Lift up on the spring retainer to remove it from the regulator cover.

REMOVING THE SPRING FROM THE SPRING RETAINER

1. Twist the spring clockwise to remove it from the spring retainer.

Note: Do not stretch the spring.

REMOVING THE DIAPHRAGM

1. Roll the diaphragm edges out of the regulator housing groove.
2. Slide the diaphragm away from the red bypass handwheel and slide the diaphragm off the valve fork.

REMOVING CBRN SHIELD

⚠ CAUTION

Care should be taken when handling the CBRN shield. Handle the shield by the plastic ring when removing or installing. The CBRN shield must be replaced according to the apparatus overhaul schedule requirements in the Flow Test section P/N 10051109.

1. Hold the shield by the outer plastic ring when removing or installing. Lift the CBRN shield Assembly and spring cap off the diaphragm assembly.

2. Lift the spring cap off the CBRN Shield Assembly.

3. Check the CBRN shield to ensure the shield is not damaged. Inspect the shield for damage by holding up to a light and checking the film surface for holes prior to installing.

DISASSEMBLING THE REGULATOR HOUSING O-RING

1. Remove the o-ring from regulator housing outlet. Be careful not to scratch the o-ring groove.

FIREHAWK SECOND STAGE REGULATOR DISASSEMBLY

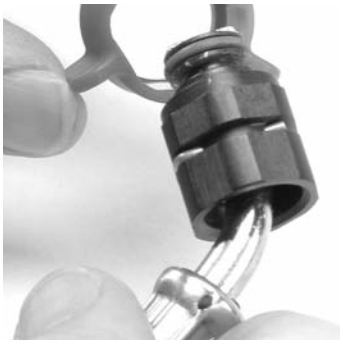
DISASSEMBLING THE BYPASS AND HOSE W/SWIVEL

1. Remove the regulator cover, spring, and spring retainer.

Note: DO NOT REMOVE THE DIAPHRAGM (option)

2. Use a small, flat-blade screwdriver to remove the u-clip from the regulator housing.

3. Remove the bypass and hose assembly from the regulator housing.



4. Remove the red bypass handwheel. Slide the handwheel back off the bypass body to reveal the u-clip in the bypass body.

5. Using a screwdriver, remove the u-clip from the bypass body.

6. Remove the hose assembly by pulling the hose out of the bypass body.

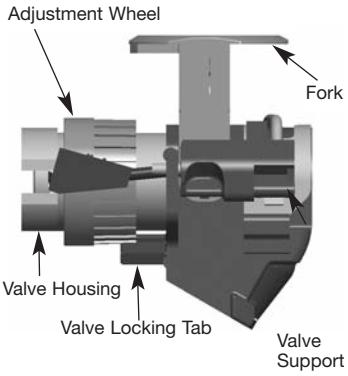
7. Remove the hose assembly o-ring. Be careful not to scratch the o-ring groove.

8. Inspect the second groove of the hose swivel. If dirty, all dirt and foreign matter must be removed before reassembling the bypass body.

9. Inspect the screen inside the bypass body. If dirty, all dirt and foreign matter must be removed before reusing the screen. If the screen is damaged, replace it as follows:

   a. Insert a small screwdriver into the small hole side of the bypass body and push the screen out the large hole side of the bypass body.

INSPECTION OF THE VALVE FORK FOR PROPER HEIGHT

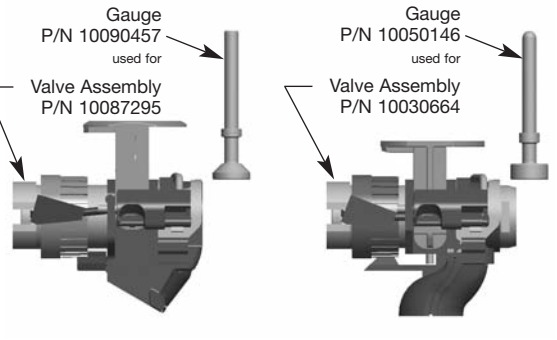


1. Press the top of the valve fork to ensure the valve fork assembly moves up and down freely.

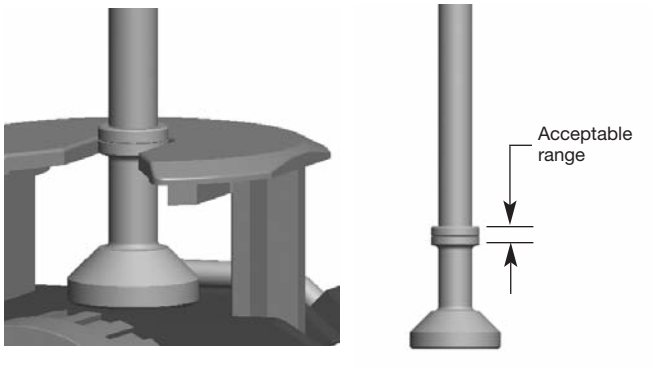
2. Use the height gauge to verify the fork height setting.

FIREHAWK SECOND STAGE REGULATOR REASSEMBLY

Note: There are two different valve assemblies used in Firehawk regulators. The correct gauge must be used for the valve assembly part number being inspected. Use the picture below to identify the correct gauge for the valve part number being inspected.



3. Center the gauge between the center gap of the valve fork. The valve assembly must be held vertical and the fork must be not be prevented from moving freely.

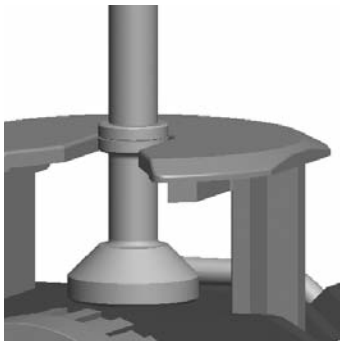


4. The top of the valve fork must be within the acceptable range of the gauge. If the top of the valve fork is above the top edge of the acceptable range or if the top of the valve fork is below the bottom edge of the acceptable range the valve must be adjusted. Refer to the next section for the proper adjustment procedures.

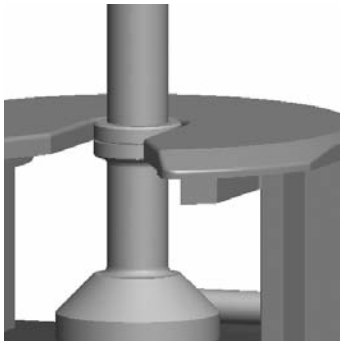
ADJUSTING VALVE FORK HEIGHT FOR PROPER PERFORMANCE

Normally the valve fork will not require adjustment and the valve should not be adjusted as long as it is within the acceptable range. If the valve fork is above or below the acceptable range the valve must be adjusted to correct the height of the fork. Depressurize and remove the valve assembly from the regulator housing. Follow one of the following procedures to correct the height of the fork.

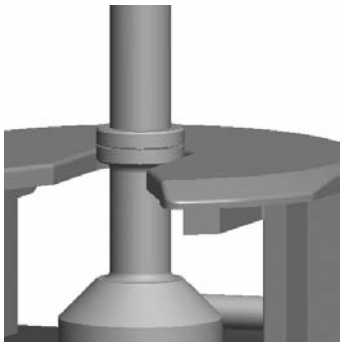
Nominal height – Top of fork level with center of acceptable range.



Maximum height – Top of fork level with top edge of acceptable range.

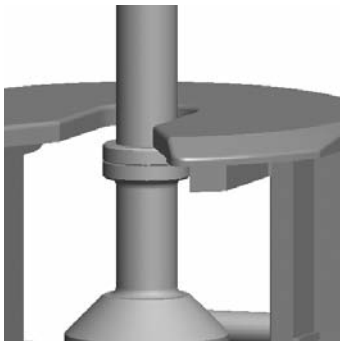


Minimum height – Top of fork level with bottom edge of acceptable range.



ADJUSTMENT FOR VALVE FORK ABOVE THE MAXIMUM RANGE

Above maximum height – Top of fork above top edge of acceptable range.

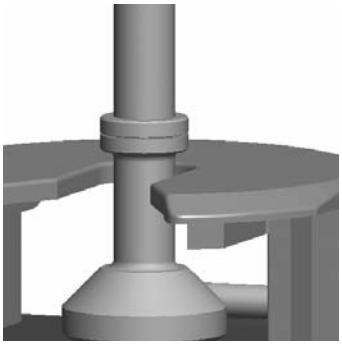


1. Slide the cylindrical valve housing slightly away from the valve support. This will free the adjustment wheel and allow it to rotate. The adjustment wheel cannot

be turned unless the ribs on the wheel are free from engaging the locking tab.
2. Turn the adjustment wheel clockwise to lower the fork.
3. Slide the cylindrical valve housing back into place making sure that the valve lever and fork are not binding. The fork should move easily up and down when pushed.

ADJUSTMENT FOR VALVE FORK BELOW THE MINIMUM RANGE

Below minimum height – Top of fork is below bottom edge of acceptable range.



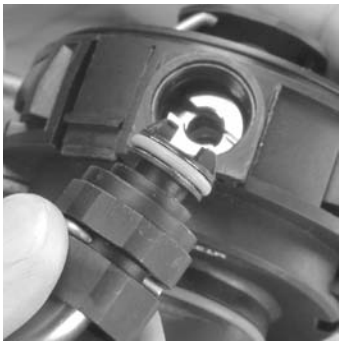
1. Slide the cylindrical valve housing slightly away from the valve support. This will free the adjustment wheel and allow it to rotate. The adjustment wheel cannot be turned unless the ribs on the wheel are free from engaging the locking tab.
2. Turn the adjustment wheel counter-clockwise to raise the fork.
3. Slide the cylindrical valve housing back into place making sure that the valve lever and fork are not binding. The fork should move easily up and down when pushed.

DISASSEMBLING THE VALVE ASSEMBLY

1. Remove the regulator cover, spring, and spring retainer.
2. Remove the diaphragm.
3. Remove the u-clip from the regulator housing.

Note: Use the bypass body as a tool to remove the bypass insert.

4. Insert the bypass body into the regulator housing bypass port.



5. Turn the valve counter-clockwise to unthread the bypass insert from the valve.

6. Turn the regulator housing until the bypass insert drops out of the regulator housing.

7. To remove the valve, turn the regulator housing upside down, or lift the valve out of the regulator housing.

8. Replace all o-rings on the bypass insert and bypass body.

DISASSEMBLING THE REGULATOR HOUSING QC BUTTON AND SLIDE BUTTON

1. Remove the old o-rings. Be careful not to damage the o-ring seal area.

2. Pull firmly on the buttons to remove them from the regulator housing. Be careful not to lose the spring.

FIREHAWK SECOND STAGE REGULATOR REASSEMBLY

REASSEMBLING THE DIAPHRAGM

1. Slide the diaphragm knob into the valve fork slot, then slide the diaphragm toward the red bypass handwheel.

2. Roll the diaphragm edges over the regulator housing groove.

Removing Spring from Spring Retainer

1. Twist spring (clockwise) out of spring retainer.

Note: Do not stretch the spring

Removing Diaphragm Assembly

1. Roll diaphragm edges out of regulator housing groove.
2. Slide diaphragm away from red bypass handwheel and slide the diaphragm off the valve fork.

Reassembly Diaphragm Assembly

1. **For only CBRN approved Firehawk,** apply a skim coat of Christo-Lube to the top rim of the regulator housing.

2. **For both CBRN and Non-CBRN Firehawk,** slide the diaphragm's knob into the valve fork's slot toward the red bypass handwheel.

3. **For both CBRN and Non-CBRN Firehawk,** roll the diaphragm edges into the regulator housing groove.

Reassembly Regulator Cover

1. Insert spring into spring retainer by attaching last coil of spring over the retainer's hooks.
2. Push spring retainer over the center stem of regulator cover.
3. Double check proper engagement by lifting on spring retainer. Ensure that the retainer is engaged.
4. Push regulator cover, spring, and spring retainer onto regulator housing.

⚠ WARNING

Double check proper engagement by pulling on regulator cover to ensure that the regulator cover is securely attached to the regulator housing. Failure to follow this warning can result in serious personal injury or death.

Note: The following Section is for CBRN approved Firehawk regulators only.

Installing CBRN Shield

1. Push the shut off buttons in for OFF position. While installing the Shield, the valve fork must be in the UP position.
2. Apply a thin coating of Christo-Lube to the bottom of the Shield Assembly.
3. Place the CBRN shield over the diaphragm assembly.

4. Using finger, tap slightly on the top of CBRN shield to remove trapped air.

5. Replace spring cap.

INSTALLATION

Installing Spring into the New Solid Regulator Cover

Note: The new solid regulator cover does not use a spring retainer.

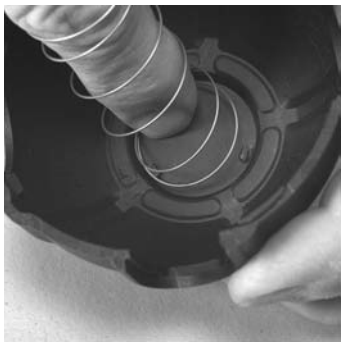
1. Insert old spring into solid cover

a. Sliding spring over finger, insert spring and finger into the inside of solid cover.

FIREHAWK SECOND STAGE REGULATOR REASSEMBLY

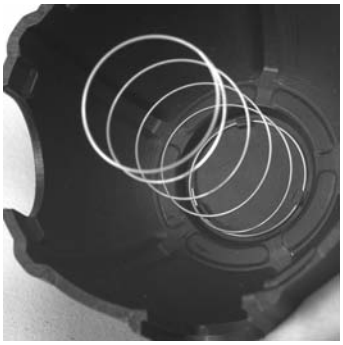
2. Attach last coil of spring over the cover's hooks

a. Holding the spring centered in the solid cover with finger, insert thumb of other hand down along the inside of cover to the bottom of spring.



b. Slip the last coil of spring over each of the three (3) molded hooks at the bottom of cover.

c. Ensure that the last coil of the spring is engaged over each of the three (3) molded hooks.



⚠ WARNING

Double check proper engagement of solid cover spring by lifting on spring to ensure that the spring is securely attached to the regulator cover. Do not stretch the spring. Failure to follow this warning can result in serious personal injury or death.

3. Push regulator cover and spring onto regulator housing.

⚠ WARNING

Double check proper engagement by lifting on regulator cover to ensure that the regulator cover is securely attached to the regulator housing. Failure to follow this warning can result in serious personal injury or death.

REASSEMBLING THE REGULATOR COVER

1. To install the spring in the retainer, press the spring's last coil over the retainer hooks.
2. Push the spring retainer over the regulator cover center stem.
3. Lift the spring retainer to check that the spring and retainer are engaged properly.
4. Push the regulator cover, spring, and spring retainer on the regulator housing.

⚠ CAUTION

Pull on the regulator cover to be sure the regulator cover and regulator housing are secure.

REASSEMBLING THE REGULATOR HOUSING O-RING

1. Apply a light film of Christo-Lube lubricant to the new o-ring.
2. Roll the new o-ring over the end of the regulator housing outlet and seat it into the o-ring groove. If the o-ring is not seated, it can cause an air leak.

REASSEMBLING THE BYPASS AND HOSE ASSEMBLY

1. Apply a light film of Christo-Lube to all o-rings.
2. Roll a new o-ring into the first groove of the bypass body.
3. Insert the new screen (if removed). Insert screen into the large hole (hose swivel) side of the bypass body. Be careful not to damage the screen. Make sure the screen is flat inside the body.

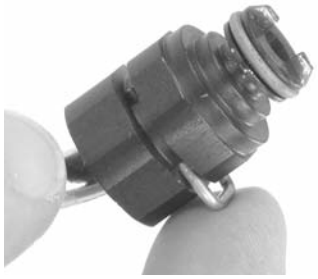
4. Roll a new O-ring into the first groove of the hose swivel.

5. Apply a thin film of Christo-Lube lubricant (P/N 604070) into the second groove of the hose swivel.

6. Insert the swivel into the bypass body.

FIREHAWK SECOND STAGE REGULATOR REASSEMBLY

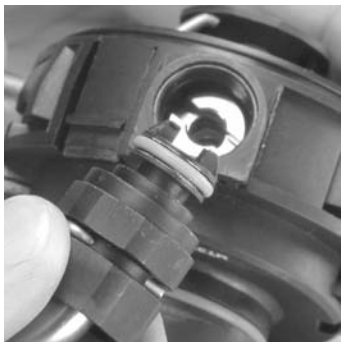
7. Slide the u-clip through the bypass body. The u-clip should slide through the bypass body freely.



8. Slide the red bypass handwheel over the bypass body. The handwheel hex lines up with the handwheel.

9. Ensure that the hose with swivel moves freely.

10. Insert the bypass body and hose assembly into the regulator housing so that the bypass body tabs are lined up with the slots in the bypass insert.



11. Slide the u-clip through the regulator housing. The u-clip should slide through the regulator housing freely.

REASSEMBLING THE VALVE ASSEMBLY

1. Insert the valve into the regulator housing -- valve fork slot facing up and away from the bypass port.
2. Push the valve into the regulator housing.

3. Insert the bypass insert into the bypass port -- slot facing out.

4. Use the bypass body to thread the bypass insert into the valve. Hand-tighten only.

Note: If the bypass insert does not thread into valve assembly easily, the valve assembly is not aligned in the regulator housing properly. Ensure that the valve assembly is fully seated in the regulator housing.

5. Insert the hose assembly and bypass body into the regulator housing.

6. Insert the u-clip into the regulator housing.

7. Replace the diaphragm.
8. Replace the spring, and regulator cover.
9. Thread the second stage hose to the first stage intermediate pressure hose. Torque to 125 +/- 5 in. lbs.
10. Check the valve assembly calibration. (See Inspection for Valve Fork section.)
11. Flow test the air mask.

REASSEMBLING THE REGULATOR HOUSING QC BUTTON AND SLIDE BUTTONS

1. Apply a light film of Christo-Lube to the new o-rings.
2. Install new o-rings on the button's post.

Note: With the red bypass handwheel facing you and the cap facing up, the slide button is to the left and the housing button is to the right.

FIREHAWK SECOND STAGE REGULATOR REASSEMBLY

3. Install the spring. Align the buttons.
4. Push firmly on the buttons. Install the post o-ring on the inside of the regulator housing.
5. Double-check proper engagement by pulling on the buttons to ensure that they are securely attached to the regulator.