

Firehawk[®] Responder[®] Second Stage Regulator

MAINTENANCE AND REPAIR

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**MINE SAFETY APPLIANCES COMPANY
PITTSBURGH, PENNSYLVANIA, U.S.A. 15230**

FIREHAWK RESPONDER SECOND STAGE REGULATOR

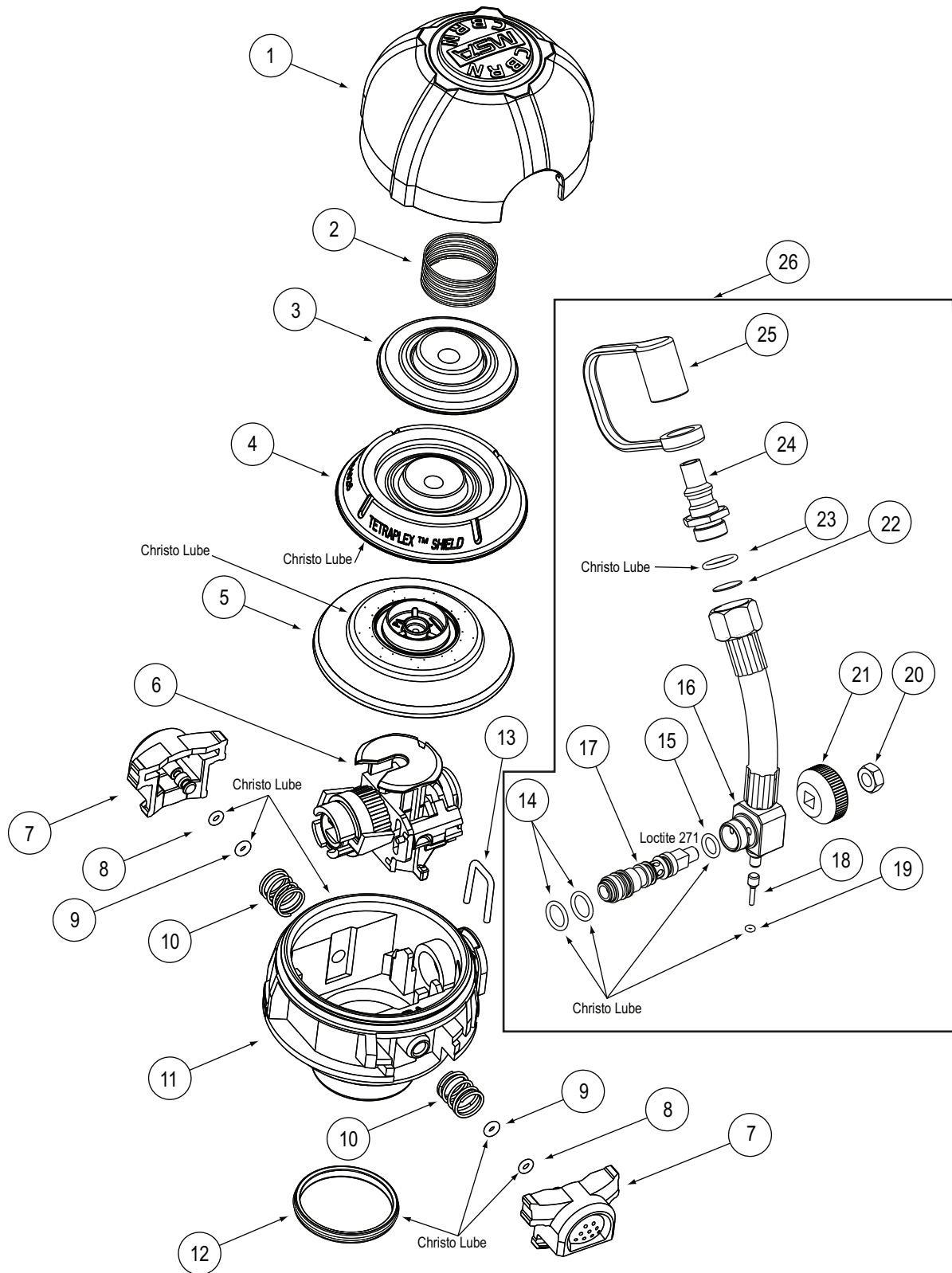
Replacement Kits and Overhaul Kit

P/N	Description	
Firehawk Responder Second Stage Regulator Replacement Kits		
10082527	Firehawk Responder Regulator	
10093810	10087295	Valve Assembly
	10087301	Housing Assembly
	10092041	Diaphragm Spring
	10037951	O-ring (2)
	10023509	O-ring (2)
10087295	10087295	Valve Assembly
10093809	10087301	Housing Assembly
	10037951	O-ring (2)
	10023509	O-ring (2)
10091435	10047528	Spring Cap
	10044026	CBRN Shield
10093946	10082481	Bypass Knob
10093950	10082486	Nut (Pack of 5)
10094014	10082489	Bypass Assembly
10093948	10082484	Bypass Insert Assembly
10093947	10082482	Bypass Stem (Pack of 5)
10018547	10018547	U-Clip
10093949	10082485	Bypass Screen (Pack of 5)
10091436	10031192	Regulator Outlet O-Ring (Pack of 10)
10091439	10018965	Spring, Button (Pack of 10)
10094012	10082487	O-Ring (Pack of 10)
10094013	10082488	O-Ring (Pack of 10)
10091461	634669	O-Ring (Pack of 10)
Height Gauge Kit		
10090457	10090457	Height Gauge for P/N 10087295
Firehawk Responder Second Stage Regulator Overhaul Kit		
10097667	10092041	Diaphragm Spring
	10047528	Spring Cap
	10044026	CBRN Shield
	10039172	CBRN Diaphragm
	10023509	O-Ring (2 Required)
	10037951	O-Ring (2 Required)
	10031192	Seal Ring
	10082487	O-Ring (2 Required)
	697453	O-Ring
	10082488	Bypass Stem O-Ring
	10082485	Bypass Screen
	632736	O-Ring

Parts List

Item	P/N	Description
1	10047664	Cover
2	10092041	Diaphragm Spring
3	10047528	Spring Cap
4	10044026	Tetraplex CBRN Shield
5	10039172	CBRN Diaphragm
6	10087295	Valve Assembly
7	10047238	Button (2 Required)
8	10023509	O-Ring (2 Required)
9	10037951	O-Ring (2 Required)
10	10018965	Spring, Button (2 Required)
11	10087301	Housing Assembly
12	10031192	Seal Ring
13	10018547	U-Clip
14	10082487	O-Ring (2 Required)
15	697453	O-Ring
16	10111834	Bypass Housing
17	10082484	Bypass Insert
18	10082842	Bypass Stem
19	10082488	Bypass Stem O-Ring
20	10082486	Bypass Nut
21	10082481	Bypass Knob
22	10082485	Bypass Screen
23	632736	O-Ring
24	637945	Nipple
25	813035	Dust Cover
	604070	Christo-Lube Lubricant
26	10082489	Bypass Assembly

FIREHAWK RESPONDER SECOND STAGE REGULATOR



FIREHAWK RESPONDER SECOND STAGE REGULATOR

Table of Contents

Disassembly	4	Adjustment of Valve Fork if Above the Maximum	8
Regulator Cover and Spring	4	Adjustment of Valve Fork if Below the Minimum	8
Diaphragm	4	Reassembly	9
Bypass Assembly	5	Seal Ring.....	9
Bypass Screen.....	6	Regulator Housing and Buttons	9
Valve Assembly.....	6	Valve Assembly.....	9
Regulator Housing Buttons	6	Bypass Screen.....	10
Seal Ring.....	7	Bypass Assembly	10
Inspection of the Valve Fork for Proper Height	7	Diaphragm	12
Acceptable Valve Fork Heights	8	Regulator Cover.....	12
Adjusting Valve Fork Height for Proper Performance	8		

DISASSEMBLY

Removing the Regulator Cover and Spring

1. Remove the regulator cover.

- a. Press and hold the release buttons while pressing the regulator housing retaining latches.



- b. Allow the cover to drop into your palm.



- c. Remove the spring from the regulator cover.



Note: Do not stretch the spring.

Removing the Diaphragm

1. Remove the CBRN Shield.

⚠ CAUTION

Handle the CBRN shield by the rim only.

- a. Lift the CBRN shield assembly and spring cap off of the diaphragm assembly.



- b. Lift the spring cap off of the CBRN shield assembly.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

2. Roll the edge of the diaphragm off the lip of the regulator housing.



3. Slide the diaphragm away from the bypass to disengage it from the valve fork.



Disassembling the Bypass Assembly

1. Remove the regulator cover and spring. (See **Removing the Regulator Cover and Spring** for instructions.)

2. Remove the U-clip.



3. Unscrew the bypass assembly and pull the bypass assembly and housing from the valve housing.



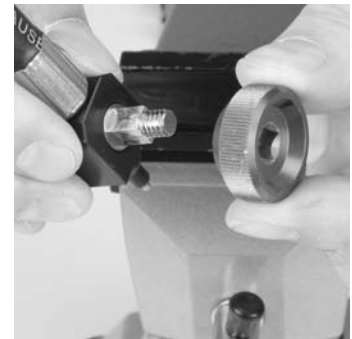
4. Secure the bypass knob in a vise.

Note: Use rubber pads or electrical tape on the vise to protect the bypass knob.

- a. Use a 7/16" socket to unscrew the nut.



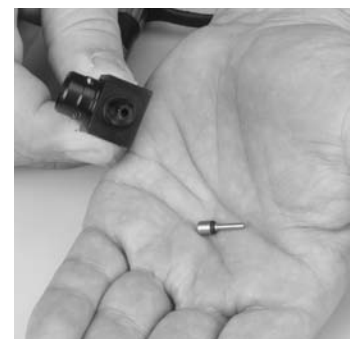
5. Remove the bypass knob.



6. Gently pull the bypass assembly from the bypass housing.

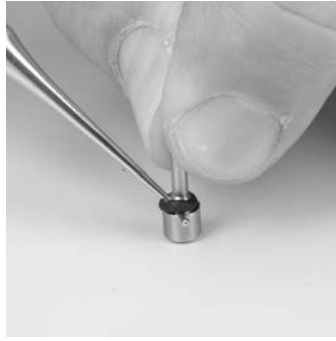


7. Turn the bypass manifold upside down and allow the bypass stem to fall out.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

- Use the o-ring removal tool to remove the o-ring. Be careful not to scratch the bypass stem. Discard the o-ring.



- Use the o-ring removal tool to remove the bypass insert assembly o-rings. Be careful not to scratch the o-ring grooves. Discard the o-rings.

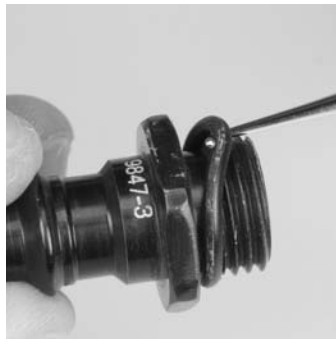


Removing the Bypass Screen

- Use two **3/4"** **wrenches** to hold the hose union and unscrew the nipple.

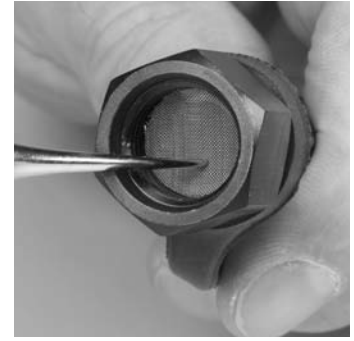


- Use the o-ring removal tool to remove the o-ring.



Note: Be careful not to scratch the o-ring groove. Discard the o-ring.

- Remove the old screen and discard.

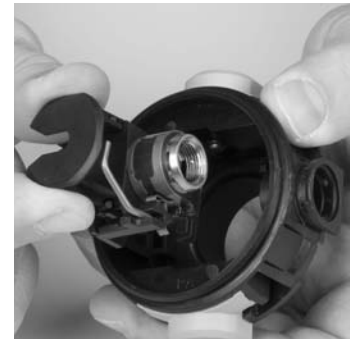


Note: Do not puncture the screen. The o-ring removal tool can be used to rotate the screen counterclockwise until it's loose.

Removing the Valve Assembly

- Remove the regulator cover, spring, and spring retainer. (See **Removing the Regulator Cover and Spring** for instructions.)
- Remove the diaphragm. (See **Removing the Diaphragm** for instructions.)
- Remove the bypass insert. (See **Disassembling the Bypass Assembly** for instructions.)

- Lift the valve assembly out of the regulator housing.



Disassembling the Regulator Housing Buttons

- Use the o-ring removal tool to remove the old o-rings.

- Be careful not to scratch the o-ring grooves. Discard the o-rings.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

b. Pull firmly on the buttons to remove them. Be careful not to lose the springs.



c. Remove the old o-rings. Be careful not to scratch the o-ring grooves. Discard the o-rings.



Removing the Seal Ring

1. Use the o-ring removal tool to remove the seal ring.

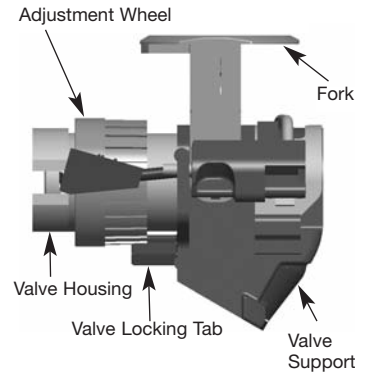


a. Discard the seal ring.

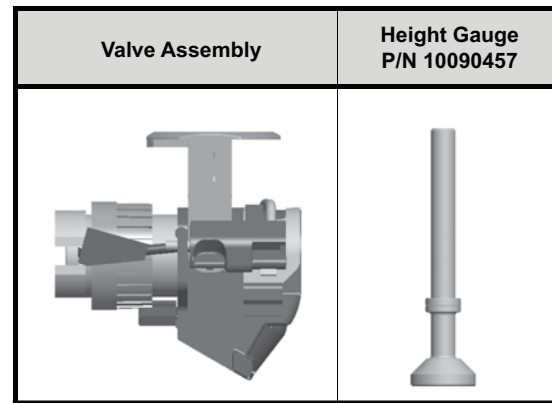
INSPECTION OF THE VALVE FORK FOR PROPER HEIGHT

Inspect and adjust valve fork height with the valve fork pointing toward you. The valve fork assembly must move up and down freely.

1. Press the top of the valve fork to check movement.



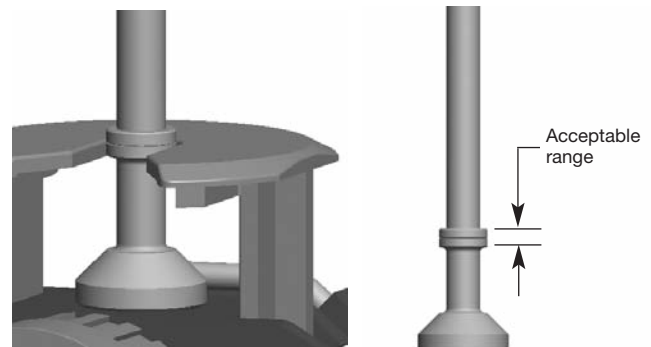
2. Use the Height Gauge to verify the fork height setting.



Note: See **Firehawk Second Stage Regulator Replacement and Overhaul Kits** for ordering information.

3. Center the gauge in the valve fork.

Note: Ensure that the valve assembly is vertical and can move freely.

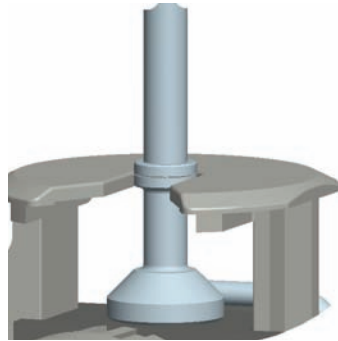


FIREHAWK RESPONDER SECOND STAGE REGULATOR

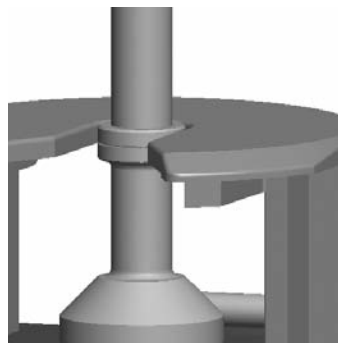
4. The top of the valve fork must be within the acceptable range.

Acceptable Valve Fork Heights

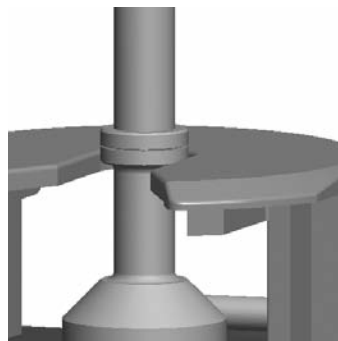
Nominal height – Top of fork level with center of acceptable range.



Maximum Height – Top of fork level with top of acceptable range.



Minimum Height – Top of fork level with bottom of acceptable range.



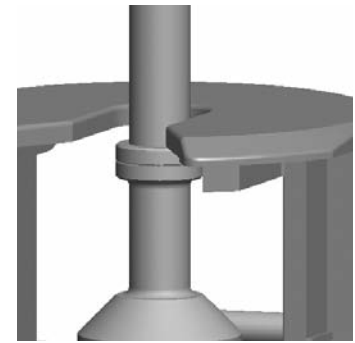
Note: If the top of the valve fork is above or below the acceptable range, adjust the valve. Normally the valve fork will not require adjustment. Do not adjust the valve if the fork is within the acceptable range.

Adjusting Valve Fork Height for Proper Performance

Adjustment of Valve Fork if Above the Maximum

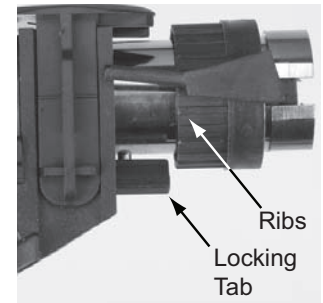
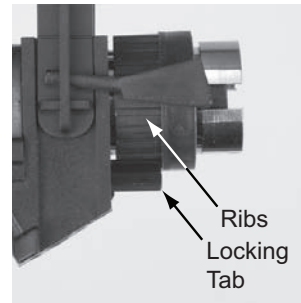
Inspect and adjust valve fork height with the valve fork pointing toward you. Turn the Adjustment Wheel clockwise to lower the fork. Turn the Adjustment Wheel counterclockwise to raise the fork.

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



1. Slide the adjustment wheel and valve housing slightly away from the valve support to allow the adjustment wheel to rotate.

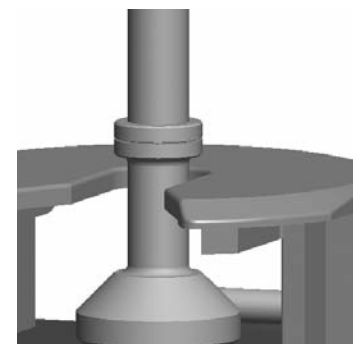
Note: The adjustment wheel cannot turn unless the ribs are free from the locking tab.



2. Turn the adjustment wheel clockwise to lower the fork.
3. Slide the adjustment wheel and valve housing back into place.
4. Ensure that the valve lever and fork do not bind. The fork should move up and down easily.

Adjustment for Valve Fork if Below the Minimum

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

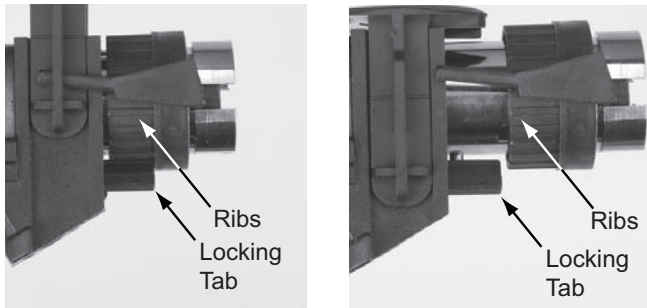


1. Slide the adjustment wheel and valve housing slightly away from the valve support to allow the adjustment wheel to rotate.

Note: The adjustment wheel cannot turn unless the ribs are free from the locking tab.

FIREHAWK RESPONDER SECOND STAGE REGULATOR

- Turn the adjustment wheel counterclockwise to raise the fork.



- Slide the valve housing back into place. Ensure that the locking tab engages the adjusting wheel.
- Ensure that the valve lever and fork do not bind. The fork should move up and down easily.

REASSEMBLY

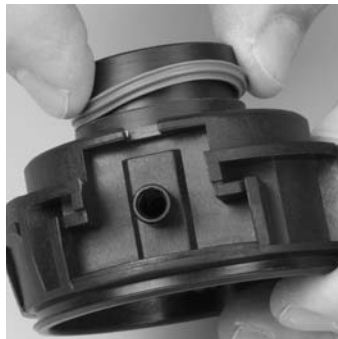
Note: Flow test the regulator on the PosiChek³ after reassembly.

Installing the Seal Ring

Seal Ring P/N 10031192

- Apply a thin film of Christo-Lube (P/N 604070) to the new seal.

- Install the new seal ring (P/N 10031192) onto the regulator outlet and seat it into the seal groove.



Note: An unseated seal ring can cause an air leak.

Installing the Regulator Housing Buttons

O-Ring P/N 10023509

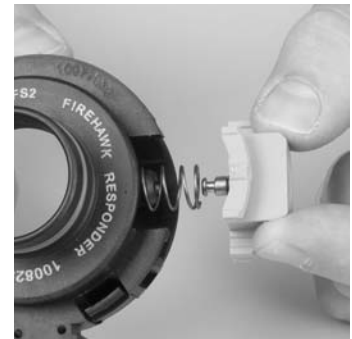
O-Ring P/N 10037951

- Install new o-rings on the button posts.
 - Protect the o-rings by covering the post with tape or thin pieces of paper.
 - Apply a thin film of Christo-Lube (P/N 604070) to the new o-rings.
 - Install the o-rings.

Note: Install the thinner o-ring (P/N 10023509) to the base of the post.



- Install the springs and insert the buttons.



- Push firmly on the buttons and install the inner o-rings (P/N 10037951).



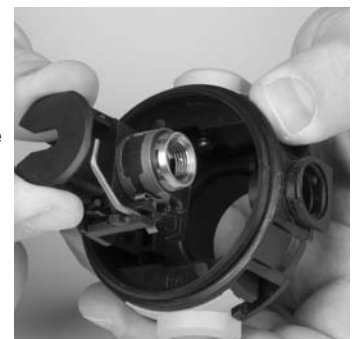
Note: Install the thicker o-ring (P/N 10037951) inside the housing.

Installing the Valve Assembly

Valve Assembly P/N 10087295

Note: Replacement of P/N 10030664-Valve Assembly, requires P/N 10087301-Housing Assembly, and P/N 10092041-Diaphragm Spring.

- Insert the valve into the regulator housing with the valve fork up and facing away from the bypass port.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

2. Push the valve into the regulator housing.

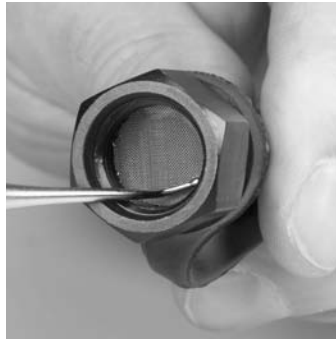
Installing the Bypass Screen

Bypass Screen P/N 10082485
O-Ring P/N 632736

1. Insert a new screen (P/N 10082485).



- a. Ensure that the screen seats all around the periphery.



2. Protect the o-ring from the thread with tape or thin pieces of paper.



3. Apply a small amount of Christo-Lube (P/N 604070) to a new o-ring (P/N 632736)



4. Install the o-ring.

5. Remove the protective tape or paper.



6. Carefully screw the nipple into the hose union.

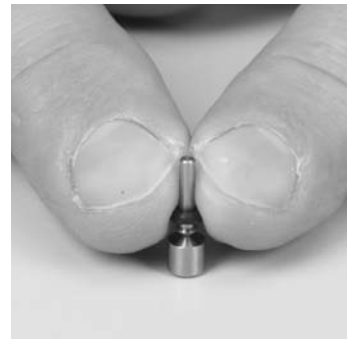


7. Use a **3/4" wrench** to hold the hose union and a **3/4" crowfoot and inch pound torque wrench** to tighten the nipple to **75 ± 5 in lbs.**

Assembling the Bypass Assembly

Bypass Stem P/N 10082482
O-Ring P/N 10082488

1. Install the bypass stem.
 - a. Apply a small amount of Christo-Lube (P/N 604070) to the o-ring.



- b. Install the o-ring (P/N 10082488) on the bypass stem (P/N 10082482).

- c. Insert the bypass stem.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

2. Install the bypass insert.
 - a. Install a new o-ring (P/N 697453).

- b. Protect the o-ring by covering the thread with tape or thin pieces of paper.



- c. Slide the silicone o-ring over the protective paper or tape.



Note: Use several pieces of tape or paper to protect the o-rings from all threads and edges.

- c. Apply a small amount of Christo-Lube (P/N 604070) to the o-rings.
 - d. Install the o-rings (P/N 10082487).



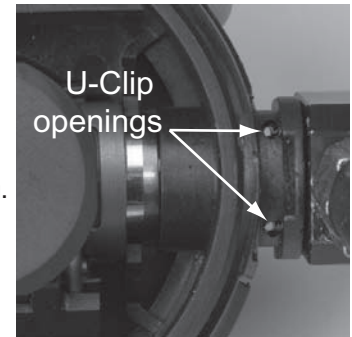
Note: Remove all protective tape or paper prior to assembly.



3. Carefully install the bypass assembly.



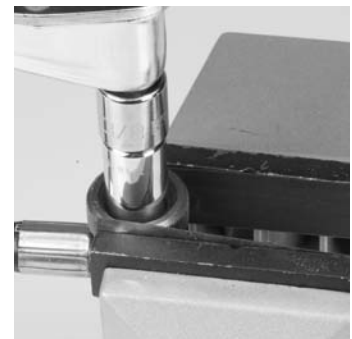
Note: To prevent damage to the o-ring, use extra caution when installing the bypass assembly. Check for evidence of o-ring damage before proceeding. O-ring damage may be visible through u-clip openings. Replace damaged o-rings.



- a. Apply a small amount of Loctite 271 to the thread of the bypass insert assembly.
 - b. Secure the bypass knob in a vise.

Note: Use rubber pads or electrical tape on the vise to protect the bypass knob.

- c. Use an inch-pound torque wrench, and **7/16" socket** to tighten the nut to **30 ± 5 in lbs.**



- d. Screw the bypass assembly into the valve assembly.



FIREHAWK RESPONDER SECOND STAGE REGULATOR

- e. Reinstall the u-clip.



Installing the Diaphragm

Diaphragm P/N 10039172
Spring Cap P/N 10047528
CBRN Shield P/N 10044026

- 1. Apply a thin coat of Christo-Lube (P/N 604070) to the top rim of the regulator housing.

- 2. Slide the diaphragm knob into the valve fork slot.



- 3. Slide the diaphragm toward the bypass to engage the fork.
 - a. Ensure that the tab is engaged to the fork by gently lifting the diaphragm.



- 4. Roll the diaphragm over the regulator housing rim.



Note: Replace the Spring Cap (P/N 10047528) and Tetraplex CBRN Shield (P/N 10044026) per overhaul frequency. (See **FireHawk® M7 Air Mask Maintenance and Repair, Introduction (P/N 10093079)** for required overhaul frequency.)

Note: While installing the shield, the valve fork must be in the UP position. Squeeze the buttons to ensure that the fork is in the up position.

- 5. Apply a thin coating of Christo-Lube (P/N 604070) to the bottom of the shield assembly.

- 6. Place the CBRN shield over the diaphragm assembly. Install the spring cap over the CBRN shield and lightly tap to remove the trapped air.



Installing the Regulator Cover

Regulator Cover P/N 10047664
Diaphragm Spring P/N 10092041

- 1. Install the spring into the cover. Ensure that the last coil is captured by the regulator cover tabs.



⚠ WARNING

Double-check proper engagement by gently pulling on the spring. Visually inspect the spring and tabs to make sure that both tabs engage the spring. Ensure that the spring is securely attached to the regulator cover. Do not stretch the spring. Failure to follow this warning may result in serious personal injury or death.

FIREHAWK RESPONDER SECOND STAGE REGULATOR

2. Push regulator cover and spring onto regulator housing until it locks.



⚠ WARNING

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