

WARNING: See hazardous material section for possible H₂S gas.

**STEP 1
ADJUSTING SCREW**

Use an adjustable wrench to remove the adjusting screw on top of the regulator, use 11/16" wrench to loosed locknut (Fig. 1.1)



Figure 1.1

**STEP 2
TUBING**

Remove the tubing (Fig. 2.1 and 2.2)



Figure 2.1

Figure 2.2

**STEP 3
GAUGE**

Use a pair of pliers as a backup on filter and then remove gauge with wrench. This avoids breaking the nipple in housing (Fig. 3.1)



Figure 3.1

**STEP 4
BONNET**

Remove the bonnet by loosening the top screws (Fig. 4.1)

Use a flat screwdriver to pry Bonnet loose (Fig. 4.2)



Figure 4.1

Figure 4.2

**STEP 5
SPRING**

Remove the spring and spring plates. (Fig. 5.1)



Figure 5.1



DISASSEMBLY

STEP 6
DIAPHRAGM HOUSING ASSEMBLY
Use a screw driver to pry up the housing
(Fig. 6.1)



Figure 6.1

Figure 6.2

Remove the upper seat with a 9/16" socket or wrench (Fig. 6.2)

Remove the 110 diaphragm (Fig. 6.3)



Figure 6.3

Figure 6.4

Remove the plate containing the 106P diaphragm (Fig. 6.4)

Use a pair of pliers to remove the nut plate from the plate (Fig. 6.5)
Use a pair of needle nose pliers to remove the spring located inside of the plate (Fig. 6.6)



Figure 6.5

Figure 6.6

Remove the diaphragm from the plate (Fig. 6.7)



Figure 6.7

STEP 7
FILTER
Start trying to remove the filter cap with an adjustable wrench (Fig. 7.1)



Figure 7.1

Figure 7.2

If the filter cap is too tight, tap the filter cap with a hammer (Fig. 7.2)

Use an impact gun and socket to remove the filter cap (Fig. 7.3) Remove the O-Ring from the filter cap using a pair of needle nose pliers or a pick (Fig. 7.4)



Figure 7.3

Figure 7.4

Use a slender screw driver and a pair of needle pliers to remove the 6 filters screens from the inside (Fig. 7.5 & 7.6)



Figure 7.5

Figure 7.6

**STEP 8
LOWER SEAT**

Use a socket to remove the lower seat (Fig. 8.1)



Figure 8.1

**STEP 9
UPPER HOUSING**

Loosen the bolts on the Upper Housing (Fig. 9.1)
Use a socket to remove the breather plug (Fig. 9.2)



Figure 9.1

Figure 9.2

Use a flat screw driver and wedge it between breather hole nipple in Lower Housing and the Upper Housing. Tap screw driver with a hammer. (Fig. 9.3)

Remove diaphragm (Fig. 9.4)

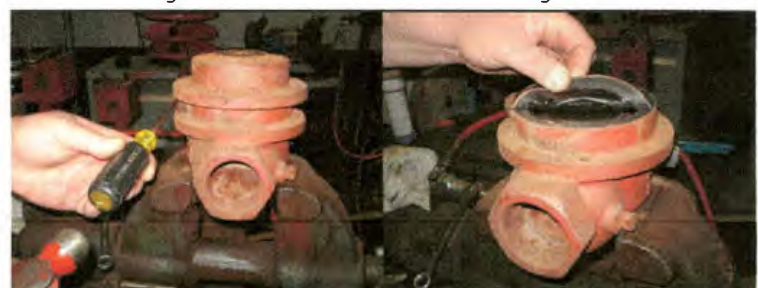


Figure 9.3

Figure 9.4



DISASSEMBLY

STEP 10

LOWER HOUSING

Use a flat screw driver and wedge it between breather hole nipple in lower housing and body. Tap screw driver with a hammer. (Fig. 10.1 and 10.2)



Figure 10.1

Figure 10.2

Use a socket to remove the Diaphragm plate (Fig. 10.3)



Figure 10.3

Figure 10.4

Remove the stem along with the disc (Fig. 10.4)

Note: Test the straightness of the stem with the table edge, (Fig. 10.5) if stem is bent than proceed (Fig. 10.6). The Seat Disc Might come apart first, if this happens loosen Diaphragm Plate by tapping it counter clock wise with a small ball peen hammer



Figure 10.5

Figure 10.6

Insert the brass jaws in the vice. Tighten the stem in the vice and remove lock nut (Figure 10.7 and 10.8)



Figure 10.7

Figure 10.8

Remove the seat and Ratio Plug from the Disc (Figure 10.9)



Figure 10.9

Figure 10.10

Remove the O-Ring and two backups from the lower housing (Figure 10.10)

STEP 11

BODY

Use a putty knife to remove the gasket from the body (Fig. 11.1)



Figure 11.1

REMOVABLE SEAT SECTION

KIMRAY SEAT WRENCHES	
PART NUMBER	LINE SIZE
272SW	2"
273SW	3"
274SW	4"
275SW	6"

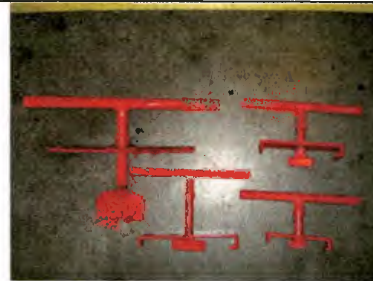


Figure 12.1

INSPECTION

Inspect the Removable Seat for excessive wear or scratches. If the Seat is in good shape leave it in place. Removing the Seat could result in additional damage (Fig. 13.1).



Figure 13.1

DISASSEMBLY

If the Seat needs to be replaced, insert the seat wrench and use a rubber hammer to break Seat loose (Fig. 13.2).

Note: For larger regulator sizes, the seat might not come apart easy. If this is the case try the following:

- Tap the handle with a shop hammer
- Insert a cheater pipe over the handle for additional leverage
- Heat the seat with a torch



Figure 13.2



NOTE: The parts should be cleaned and sandblasted before they are inspected

CLEANING TOOLS

Seat cleaning tool is made with 2" and 3" Gas Regulators Ratio Plugs, 2 nuts and 1 bolt. (Fig. A). Sand Paper has to be located in between the ratio plugs and in the flat side (Fig. B).

Example: 2" and 3" Gas Regulators Ratio Plugs will be used for a 2" Gas Valve (Fig. C)

Note: This tool is made from Kimray parts



Figure A



Figure B

Figure C

POWER TUBE BRUSH			
Diameter	Wire Size	Length	Stem Diameter
1/4"	0.004"	3 1/2"	1/8"
3/4"	0.006"	3 1/2"	1/4"
1 1/4"	0.008"	3 1/2"	1/4"

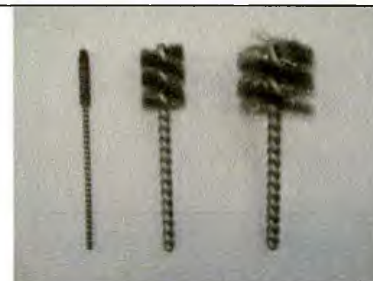


Figure D

Note: These are not Kimray Tools



INSPECTION & CLEANING

LOWER HOUSING

Repair :

- If there are dings in the Lower Housing (Fig. 1.1)



Figure 1.1

Note: Nicks can cause misalignment in the body surface. They can be repaired using a flat file (Fig. 1.2)



Figure 1.2

Cleaning:

- Wire brush the breather hole in the Lower Housing (figure 1.3)
- Wire brush the stem hole in the Lower Housing (fig. 1.4)



Figure 1.3



Figure 1.4

STEM

Replace:

- If stem is bent

Note: Roll the stem on a flat surface to check for straightness (Fig. 2.1)

Repair:

- If Stem shows light scratches in surface.



Figure 2.1



Figure 2.2

Note: Stems can be repaired by sanding the surface with a 220 grit sand paper or finer, if light scratches are present (Fig.2.2)

BODY

Repair:

- Look for scratches or extreme wear in the Body Seat (Fig. 3.1)



Figure 3.1

Figure 3.2

Note: Connect a speed wrench to the seat cleaning tool (Fig. 3.2). Insert the tool in the Body making a flat contact, spin the speed wrench and check for scratches and excessive wear on seat (Fig. 3.3).



Figure 3.3

UPPER HOUSING

Cleaning:

- Wire brush the breather hole in the Upper Housing (Fig. 4.1)
- Wire brush the seat hole in the Upper Housing (Fig. 4.2)
- Use an air nozzle to blow out the particles from inside (Fig. 4.3)



Figure 4.1

Figure 4.2

Note: It is important to get clean every part of the Upper Housing. Any particle left could cause leakage in the Pilot Plug.



Figure 4.3

FILTER

Cleaning:

- Wire brush the filter hole (Fig. 5.1)
- Use an air nozzle to blow out the dirt from inside (Fig. 5.2)

Note: It is important to make sure the Filter is clean. Any particle left could cause leakage in the pilot plug.



Figure 5.1

Figure 5.2



DIAPHRAGM PLATE

Cleaning:

- Wire brush the Diaphragm plate (Fig. 6.1)
- Use an air nozzle to blow out the particles from inside



Figure 6.1

Note:

Heat discoloration resulting from normal operation are not grounds for rejection.

Note:

Make sure the threads are clean prior to achieving running torque. A wet torque is applied when doing a running torque. Inspect internal free running threads as follows - visually inspect threads for obvious signs of damage. No visible damage is permitted.



KIMRAY STEM GUIDES	
PART NUMBER	LINE SIZE
1851	1"
1852	2"
1853	3"
1854	4"
1855	6"



Figure A

STEP 1
LOWER HOUSING ASSEMBLY
 Figure 1.1 shows the difference between the two types of backups located in the lower housing.

Insert the first backup in the lower housing groove with the smooth side facing up (Fig.1.2)



Smooth Side

Rough Side

Split Ring

Figure 1.1

Insert the O-Ring on top of the backup, using a slender screw driver (Fig. 1.3)



Figure 1.2

Figure 1.3

ASSEMBLY

Insert the second Backup with the smooth side facing down (Fig. 1.4)



Figure 1.4

Figure 1.5

Use a brush to grease backups and O-Ring (Fig. 1.5)

Screw Stem onto Diaphragm Plate (Fig. 1.6)



Figure 1.6

Insert the Stem Guide on Stem with the fillet side on top (Fig. 1.7). This prevents shearing the O-Ring.



Figure 1.7

Figure 1.8

Insert the stem in the Lower Housing as indicated in (Fig. 1.8)

Remove the Stem Guide from the Stem (Fig. 1.9)



Figure 1.9

Figure 1.10

Insert the Seat Disc on the stem with the machined part on top (Fig. 1.10)

Insert the Seat in Disc (Fig. 1.11)



Figure 1.11

Figure 1.12

Insert the Ratio Plug on top of the Seat (Fig. 1.12)

Start the Lock Nut threads (Fig. 1.13)
 Grasp the Seat Disc in one hand and use a socket to tighten the Lock Nut. Stop when you feel the Seat Disc starts to turn in your hand. You do not want to over tighten, but you also do not want the Disc spinning on the stem. (Fig. 1.14). You have to see a small gap between the Seat and the Seat Disc.



Figure 1.13

Figure 1.14

Grease the Lower Housing shoulder (Fig.1.15)

Place the Gasket on the Lower Housing shoulder (Fig. 1.16)



Figure 1.15

Figure 1.16

Grease top side of the Gasket (Fig. 1.17)

Insert the Lower Housing into the Body (Fig. 1.18). Make sure the breather hole aligns with the back side of the flow arrow.



Figure 1.17

Figure 1.18

Add oil to the Lower Housing (Fig. 1.19). A good way of knowing the amount of oil to add is making sure that the oil level is a little over the lower housing lubricating hole.



Figure 1.19

**STEP 2
 DIAPHRAGM**

Place the Diaphragm on top of the Diaphragm Plate. Make sure the Diaphragm is placed in a "Bowl" position (Fig. 2.1)



Figure 2.1



ASSEMBLY

STEP 3

UPPER HOUSING

Place the Upper Housing on top of the Lower Housing (Fig. 3.1). Align the breather hole between outlet holes in Body. Insert bolts and tighten them with an impact gun. Make sure you tighten them in a criss-cross pattern to avoid any miss alignment (Fig. 3.2)

2", 3", & 4": 25-30 ft/lb torque



Figure 3.1



Figure 3.2

STEP 4

LOWER SEAT

Insert Gasket on the Lower Seat (Fig. 4.1)

Use a socket to tighten the Lower Seat in the Upper Housing (Fig. 4.2)



Figure 4.1



Figure 4.2

STEP 5

FILTER

Insert 6 screens in the filter (Fig. 5.1)
Make sure the rounded side of the screen is facing up.

Insert O-Ring in the Filter Cap (Fig. 5.2)

Grease O-Ring in the Filter Cap (Fig. 5.3)

Start threads in the Filter Cap and tighten them with a wrench (Fig. 5.4)



Figure 5.1



Figure 5.2



Figure 5.3



Figure 5.4

STEP 6

DIAPHRAGM PLATE

Install the Pilot Diaphragm on the plate (Fig. 6.1)

Insert the Plate Nut on top and tighten it with a pair of pliers (Fig. 6.2)



Figure 6.1



Figure 6.2

Insert the Peanut Spring with the wider side on bottom (Fig. 6.3)



Figure 6.3

Insert the Pilot Diaphragm assembly underneath the Diaphragm Housing (Fig. 6.4)



Figure 6.4

Insert the Peanut with the larger ball diameter contacting the spring (Fig. 6.5)



Figure 6.5

Insert the Upper Seat in the Modulating Diaphragm (Fig. 6.6). Make sure you do not shear the Diaphragm with the Seat threads.



Figure 6.6

Thread the Upper Seat into the Diaphragm Plate (Fig. 6.7). Start threads by hand (Fig.6.8).



Figure 6.7

Figure 6.8

Tighten seat with a socket (Fig. 6.9)
Note: Do not over tighten Seat.
Diaphragm Plate might cut the 110 Diaphragm.



Figure 6.9

Figure 6.10

Make sure the Modulating Diaphragm and the Pilot Diaphragm are aligned (Fig. 6.10)

Place the Diaphragm Housing on top of the Upper Housing (Fig. 6.11)



Figure 6.11



ASSEMBLY

STEP 7
SPRING

Grease the Pivot on the Plate and place the Spring Plate on the Pivot (Fig. 7.1)

Place the Spring on the Spring Plate (Fig. 7.2)



Figure 7.1

Figure 7.2

Place the second Spring Plate on top of the Spring (Fig. 7.3)

Grease the pivot hole on the Spring Plate (Fig. 7.4)



Figure 7.3

Figure 7.4

STEP 8
BONNET

Insert the Bonnet on top of the Spring (Fig.8.1)

Insert bolts and tighten them with a speed wrench (Fig. 8.2)

Note: Do not over tighten Bonnet bolts. Tighten in a criss-cross pattern and give a 1/4 turn past snug. 10-15 ft/lb torque.



Figure 8.1

Figure 8.2

STEP 9
BREATHER PLUGS

Insert breather plugs in Lower Housing and Upper Housing (Fig. 9.1 and 9.2)



Figure 9.1

Figure 9.2

STEP 10
ADJUSTING SCREW

Thread the Adjusting Screw with nut on top of the Bonnet (Fig. 10.1)



Figure 10.1

**STEP 11
TUBING**

Connect the Tubing from the Upstream communicating hole to the Filter (Fig. 11.1)



Figure 11.1

**STEP 12
GAUGE**

Apply Loctite in the Gauge threads (Fig. 12.1)

Insert the Gauge in the Filter and tighten it with an adjustable wrench (Fig. 12.2)



Figure 12.1

Figure 12.2

ASSEMBLING THE REMOVABLE SEAT

KIMRAY SEAT WRENCHES	
PART NUMBER	LINE SIZE
272SW	2"
273SW	3"
274SW	4"
275SW	6"



Figure 13.1

Insert the Gasket in the Removable Seat and grease the surface (Fig.14.1)

Use your fingers to start the threads on the Removable Seat (Fig. 14.2)



Figure 14.1

Figure 14.2

Insert the seat wrench and tighten (Fig. 14.3)



Figure 14.3

EQUIPMENT & REQUIREMENTS

SUPPLY PRESSURE: 100 psi

SUPPLY CONNECTION: Device that will reduce your regulator end to any air supply connection.

Fig. A shows an example of this device. It is important to have a valve in this device for testing purposes.



Figure A

STEP 1

FLOW DIRECTION

Make sure the air is flowing from Upstream to Down stream (Fig. 1.1). Regulators have an arrow showing the direction of the flow.



Figure 1.1

STEP 2

ADJUSTING SCREW

Use an adjustable wrench to run the Adjustable Screw all the way down (Fig. 2.1)



Figure 2.1

STEP 3

APPLY UPSTREAM PRESSURE

Open the up stream flow by turning the ball valve handle (Fig. 3.1)



Figure 3.1



TESTING, PRESERVATION & STORAGE

STEP 4

CHECK FOR LEAKAGE

Turn supply air off and make sure the gauge is holding pressure on the Upstream side (Fig. 4.1). If gauge falls off then you have leakage.

Check if any leakage is coming out the Downstream side (Fig. 4.2)

Spray soaped water on Tubing, Housings, Breather Plugs and Plugs. The identification of leakage will be noted if any bubble shows up (Fig. 4.3 and 4.4)

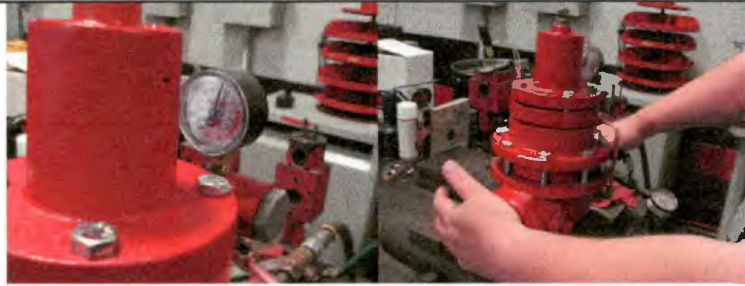


Figure 4.1

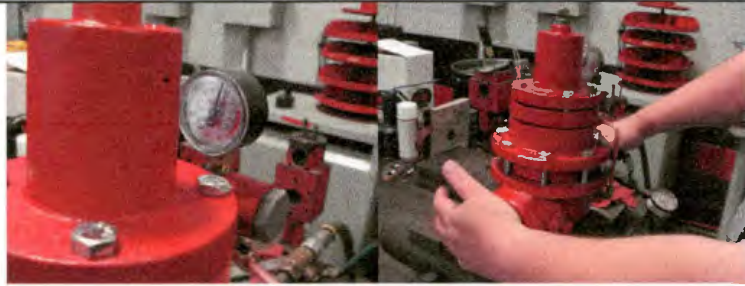


Figure 4.2



Figure 4.3



Figure 4.4

STEP 5

REGULATOR TEST

Once no leakage is detected, close Upstream flow.

Make sure the Regulator holds various levels of pressure (100 psi down to 5 psi) by turning the Adjusting Screw out. (Fig. 5.1)



Figure 5.1

PRESERVATION & STORAGE

STEP 1

Remove gage from the valve and place in smaller box, wrap the Plug, breather and the lower housing in bubble wrap and place into valve box as shown in Figure 1.1



Figure 1.1