Genuine

KIMRAY INC.®

Quality Since 1948

Repair Manual

Pressure Reducing Balanced

INDEX

NOTE: We reserve the right to modify or change, without prior notice, any statement or information contained herein. If exact dimensions or specifications are required by the customer certified prints will be furnished for a minimum charge upon request to KIMRAY, Inc.

INTRODUCTION

SCOPE

This instruction manual contains information concerning the balanced pressure reducing. Included are detailed instructions regarding disassembly, repair, assembly and testing.

DESCRIPTION

The **Balanced Pressure Reducing** regulator is commonly used as suction controllers for compressors and as supply controllers. The balanced aspect of this regulator allows for consistent control of downstream pressures with changing upstream pressures.

MAINTENANCE

Maintenance should be performed on a regular basis. Initial interval of 12 months is recommended. The maintenance interval may increase or decrease depending on changing application enviroments.

WARNING

Before performing any service to regulator verify all system pressures are bled-off or regulator is properly isolated and de-pressurized.

GENERAL SPECIFICATIONS

Working Pressures	125-300 Hydrostatic Test: ANSI B16.37		
Body materials	Grey Iron	ASTM A48-94a	Class 20
	Ductile Iron	ASTM A395	Class 65-45-12
	Steel	ASTM A 216	WCB
Bonnet materials	Grey Iron	ASTM A48-94a	Class 20
	Ductile Iron	ASTM A395	Class 65-45-12
	Steel	ASTM A216	WCB
Body types	Thru		
Connection types	Screw, Flange		
Elastomers	Buna-N (Nitrile)		

To get the long service you have come to expect from Kimray products, always use **GENUINE KIMRAY PARTS** when doing repairs. Remember, parts made to less than Kimray specifications don't save you money!!!

ELASTOMER MATERIALS

AFLAS ® is a trade mark of Asahi Glass Co

TEMPERATURE:
-25° to +500° F
-30° to +260° C

APPLICATION:
Crude Oil & Gas Production (High heat), Steam Flood Production Chemicals (corrosion inhibitors) Amine Sweetener Systems, Gasoline, Diesel, Fuel Oil Systems

FLUID / GAS:
Crude Oil & Gas Production, H2S, Steam, Petroleum fluids, Sea Water

HSN (Highly Saturated Nitrile)

TEMPERATURE:
-15° to +300° F
-26° to +149° C

APPLICATION:
Crude Oil & Gas Production w/ H2S C02

FLUID / GAS:
Crude Oil & Gas H2S, C02, Sea Water

NITRILE

TEMPERATURE:
Buna-N:
-40° to +220° F
-40° to +105° C
Low-Temp:
-85° to +120° F
-65° to +49° C

APPLICATION:
Crude Oil & Gas Production Glycol Dehydrators, Gasoline, Jet Fuel & Diesel Fuel Pumping, Water Disposal, Methanol Injection Pumps, Water pump seals, hydraulic pump seals

FLUID / GAS:
Crude Oil & Gas, Good to Poor in Sour Production (See HSN), Water, Glycols, Hydraulic Oils, Resistance to crude oil in the presence of hydrogen sulfide and amines, Diesel fuel, fuel oils

DO NOT USE WITH:
Aromatic hydrocarbons, chlorinated hydrocarbons, phosphate esters (hydraulic fluids)

GYLON

TEMPERATURE:
-350° to +500° F

APPLICATION:
High heat, high chemical resistance, highly resistance to gas permeation

VITON ® is a trade mark of Dupont

TEMPERATURE:
-10° to +350° F
-23° to +177° C

APPLICATION:
Crude Oil & Gas Production, Glycol Dehydrators, Gasoline, Jet Fuel & Diesel Fuel Pumping, Water Disposal, Methanol Injection Pumps. (Also Vacuum Service) (Gas permeability is very low)

FLUID / GAS:
Crude Oil & Gas, Sour Gas (C02), Propane, Gasoline, Diesel, Fuel Oil Systems

DO NOT USE WITH:
Hot Water, Not preferred for wet H2S, Methyl Alcohol, Amines, Sodium hydroxide solutions

ETHYLENE PROPYLENE

TEMPERATURE:
-65° to +300° F
-54° to +148° C

APPLICATION:
Steam Flood

FLUID / GAS:
Steam, Water, Alcohol

DO NOT USE WITH:
Crude Oil & Gas, Diester Lubricants (Lube Oils)

POLYURETHANE

TEMPERATURE:
-40° to +220° F
-40° to +104° C

APPLICATION:
High abrasion resistance Seats, Diaphragms

FLUID / GAS:
Crude Oil gas and Water, Sour Gas (C02), propane, butane, fuel, mineral oil and grease

POLYACRYLATE

TEMPERATURE:
±0° to +300° F
-17° to +149° C

APPLICATION:
Production Heaters, Thermostats

FLUID / GAS:
Crude Oil & Gas at High Temperature

DO NOT USE WITH:
Alcohol, Glycols

STEP 1
TUBING
Wrench loose compression nuts on the upper tubing (Fig. 1.1 & 1.2)

Figure 1.1

Figure 1.2

and remove the tube (Fig. 1.3)

Figure 1.3

Wrench loose the compression nuts for the lower tubing (Fig. 1.4)

Figure 1.4

and remove the tubing (Fig. 1.5)

Figure 1.5

Wrench loose the compression nuts on the supply tube (Fig. 1.6 & 1.7)

Figure 1.6

Figure 1.7

and remove (Fig. 1.8)

Figure 1.8

DISASSEMBLY

Wrench loose compression nuts on the sense tube (Fig. 1.9 & 1.10)

Figure 1.9

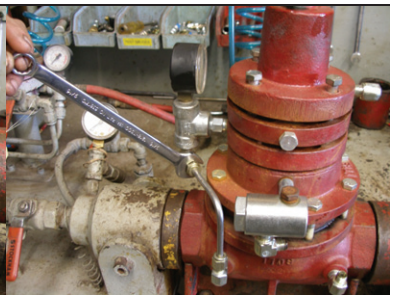


Figure 1.10

and remove (Fig. 1.11).

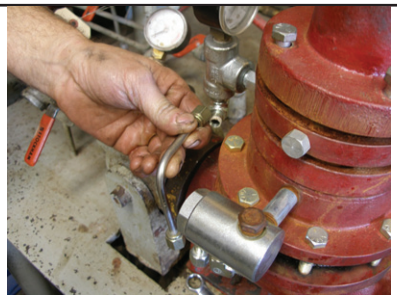


Figure 1.11

STEP 2
BONNET
Wrench loose the lock-nut on adjustment screw (Fig. 2.1).

Remove adjustment screw (Fig. 2.2).

Figure 2.1

Figure 2.2

Wrench loose the four bolts attaching bonnet to upper housing (Fig. 2.3).

Remove bolts (Fig. 2.4).

Figure 2.3

Figure 2.4

Remove bonnet (Fig. 2.5) and spring (Fig. 2.6).

Figure 2.5

Figure 2.6

Remove gasket from bonnet (Fig. 2.7).

Figure 2.7

STEP 3
HOUSING'S
Remove spacer (Fig. 3.1 & 3.2).
Some prying may be necessary

Figure 3.1

Figure 3.2

Wrench loose breather plug (Fig. 3.3).

Wrench loose pivot screw (Fig. 3.4).

Figure 3.3

Figure 3.4

Remove pivot screw and diaphragm (Fig. 3.5).

Separate pivot screw from diaphragm and discard diaphragm (Fig. 3.6).

Figure 3.5

Figure 3.6

Remove top housing (Fig. 3.7).

Remove next housing and wrench loose upper seat (Fig. 3.8).

Figure 3.7

Figure 3.8

DISASSEMBLY

Remove seat and diaphragm from housing (Fig. 3.9).

Seperate seat from diaphragm and discard diaphragm (Fig. 3.10).

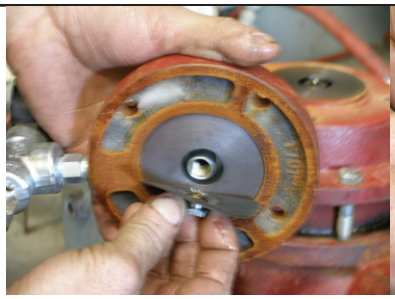


Figure 3.9

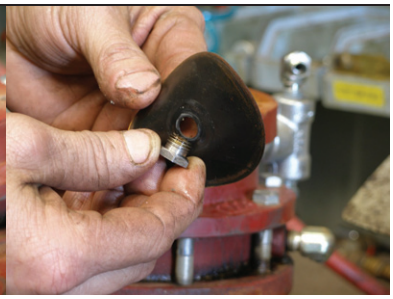


Figure 3.10

Remove diaphragm/ diaphragm plate assembly (Fig. 3.11) and place in vise. (Fig. 3.12)

Figure 3.11

Figure 3.12

Wrench loose upper diaphragm plate (Fig. 3.13)

and remove (Fig. 3.14).

Figure 3.13

Figure 3.14

Remove diaphragm from plate and discregard (Fig. 3.15).

The **tee** must be secured while removing the pressure gauzge. Failure to do so can damage the nipple attaching the **tee** to the body (Fig. 3.16)

Figure 3.15

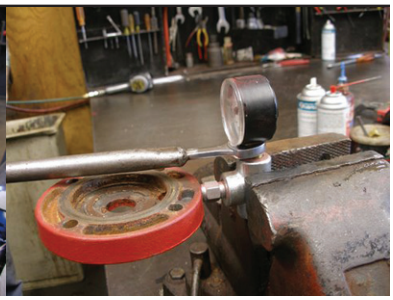


Figure 3.16

Remove pressure guage and set aside for further inspection (Fig. 3.17).

Wrench loose the lower seat (Fig. 3.18).

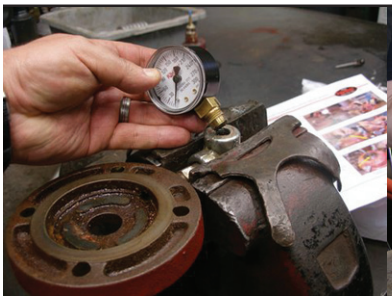


Figure 3.17

Figure 3.18

Remove lower seat and discard (Fig. 3.19).

Discard pilot plug and gasket (Fig. 3.20).

Figure 3.19

Figure 3.20

Remove booster spring and discard (Fig. 3.21).

Wrench loose bolts attaching housing to valve body (Fig. 3.22).

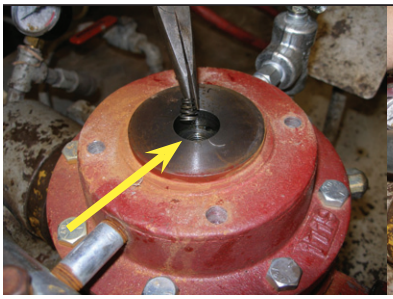


Figure 3.21

Figure 3.22

Wrench loose cap on filter (Fig. 3.23)

and remove (Fig. 3.24).

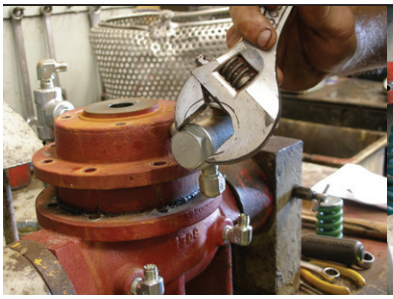


Figure 3.23

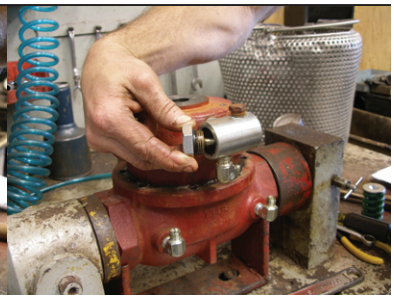


Figure 3.24

Remove O-Ring from cap and discard (Fig. 3.25).

Remove wire-mesh screens and discard (Fig. 3.26).

Figure 3.25

Figure 3.26

Remove diaphragm and discard (Fig. 3.27).

Lift-off lower housing (Fig. 3.28)
Flip lower housing 180 degrees and place back upon valve body

Figure 3.27

Figure 3.28

DISASSEMBLY

Remove gasket and discard (Fig. 3.29).

Wrench off stainless steel lock-nut and discard (Fig. 3.30).

Note: Occasionally the lock-nut will require chiseling to remove.

Figure 3.29

Figure 3.30

Lift seat/disk/ratio plug off (Fig. 3.31).

Seperate ratio plug from disk and set aside (Fig. 3.32).

Figure 3.31

Figure 3.32

Lift lower body and spring from stem assembly and set aside (Fig. 3.33 & 3.34).

Figure 3.33

Figure 3.34

With a “glancing tap” break the diaphragm plate loose from the stem threads and remove (Fig. 3.35).

Extract (2) leather back-ups and (1) O-ring from the lower body (Fig. 3.36).

Magnified View (Fig. 3.37).

Figure 3.35

Figure 3.36

Note: It is recommended to discard the stem at this point. But, if a replacement is not readily available the current one *may* be re-used with some success.

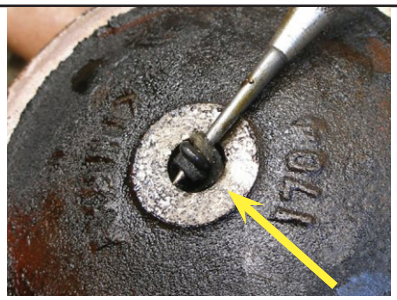


Figure 3.37

REMOVABLE SEAT

Ductile bodied regulators have ***Removable*** seats. Shown to the right are seat wrenches (Fig. 4.0).

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

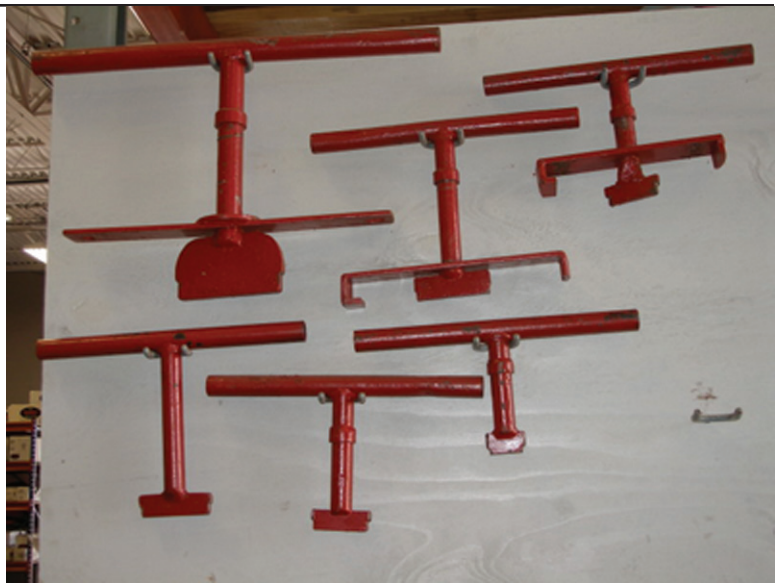


Figure 4.0

Shown in Fig. 4.1 is the top-view of a removable seat in a regulator body.

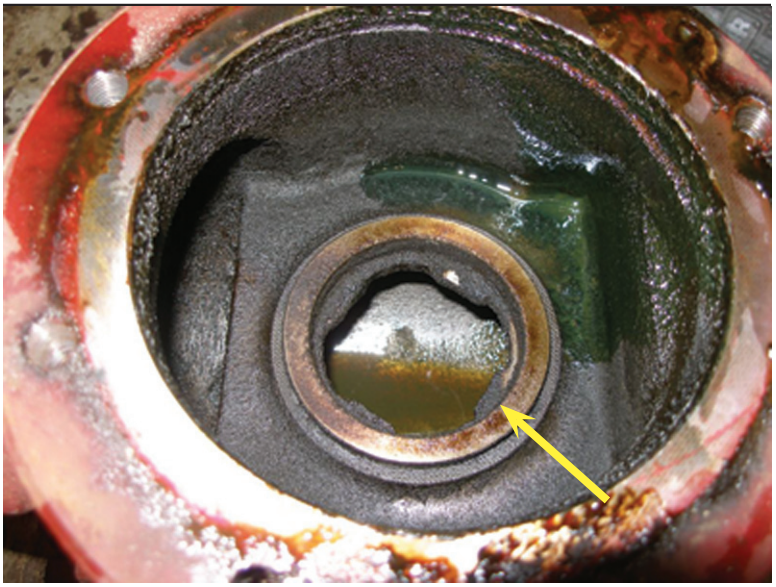


Figure 4.1

Use the appropriate size seat-wrench to remove the seat for replacement or closer inspection (Fig. 4.2 & 4.3).

Figure 4.2

Figure 4.3

NOTES

ALL PARTS AND SURFACES *MUST* BE CLEANED AND ALL OLD GASKET MATERIAL REMOVED.
For optimal results all valve parts should be sandblasted.

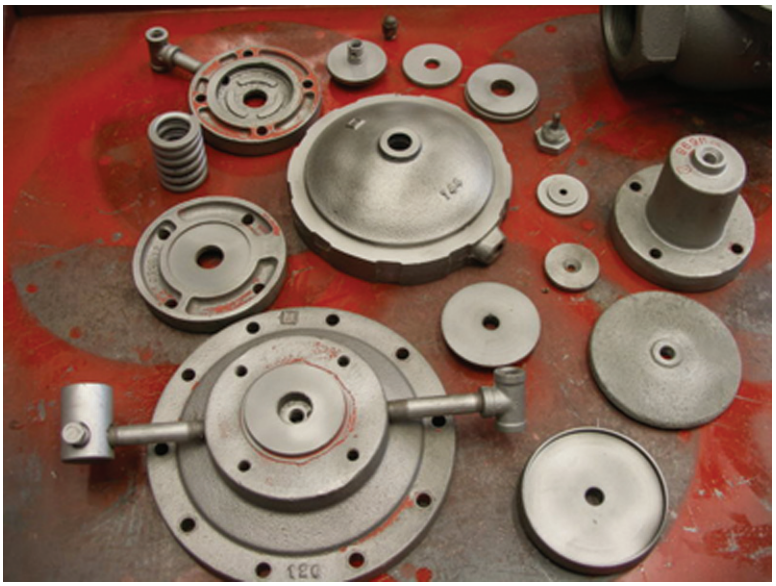
In the process of cleaning the valve there are a few essential areas that must be addressed:
1. All thread surfaces.

2. Insure all gasket material is removed.

3. Exterior free of all solvents, debris and fluids if the body is to be re-painted.

4. Interior free of all solvent, debris and fluids that may damage elastomers and affect 0-ring/ gasket seals.

5. Remove dead rodents.



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 1.2

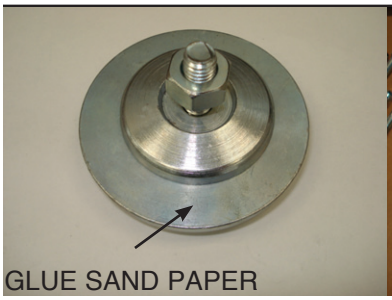


Figure 1.3

Figure 1.4

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"

Note: These are not Kimray Tools

Figure 1.5

THREAD SURFACES
Inspect all thread surfaces for pits, debris and flat spots and clean as needed.

BONNET	Fig. 5.1
STEM	Fig. 5.2
BODY	Fig. 5.3
HOUSING	Fig. 5.4
	Fig. 5.5
	Fig. 5.6
FILTER	Fig. 5.7

A drill-mounted wire brush works well to remove debris from the threads.

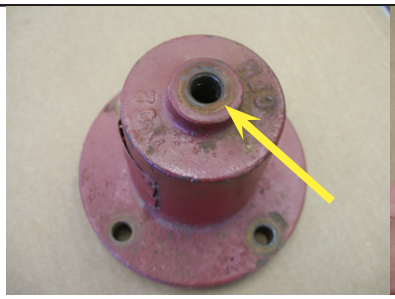


Figure 2.1

Figure 2.2

Figure 2.3

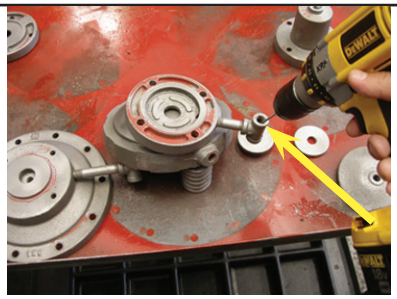


Figure 2.4

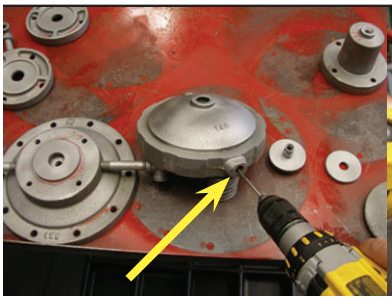


Figure 2.5

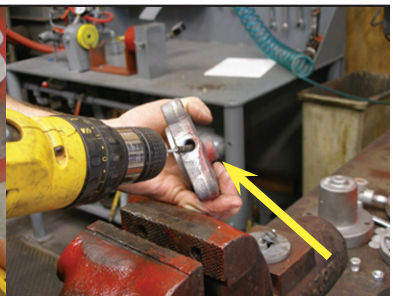


Figure 2.6

Figure 2.7

LOWER HOUSING
Identify all dents and/or burrs on the lower-housing face (Fig. 3.1).

Minor repairs may be made to the lower housing using a flat file (Fig. 3.2).

Figure 3.1

Figure 3.2

Verify all gasket material is removed (Fig. 3.3)

Figure 3.3

RATIO PLUG
Inspect the surfaces for burrs and scratches that may damage the soft seat prematurely.
If an excessive amount of erosion/corrosion has occurred discard and replace (Fig. 4.1).

Roll the stem on a flat surface to verify it is not bent (Fig. 4.2).

Figure 4.1

Figure 4.2

STEM
Inspect the stem for excessive damage (i.e. flattened threads, scatches) (Fig. 4.3).

Use 120 grit emery cloth to buff the surface of the stem (Fig. 4.4).

Figure 4.3

Figure 4.4

SEAT DISK
Inspect the “cup” of the disk and verify a uniform edge is available to hold the seat in-place (Fig. 4.5).

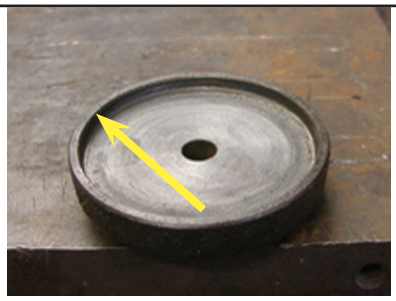


Figure 4.5

SEAT

NON-REMOVABLE

If the seat surface is beyond repair then replace the body (Fig. 4.6).

Figure 4.6

Figure 4.7

REMOVABLE

See section 4 for removal.
The seat cleaning tool can be used on both removable and non-removable seats (Fig. 4.8).

Attach a speed-wrench to the seat tool and spin the tool on the seat, taking care to have even contact on the seat surface (Fig. 4.9).

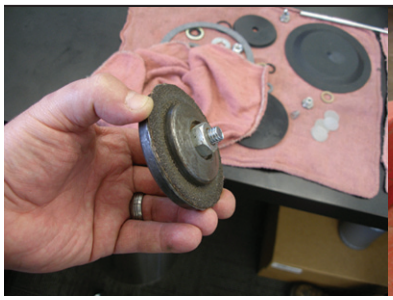


Figure 4.8

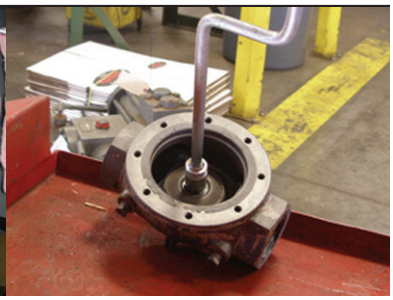
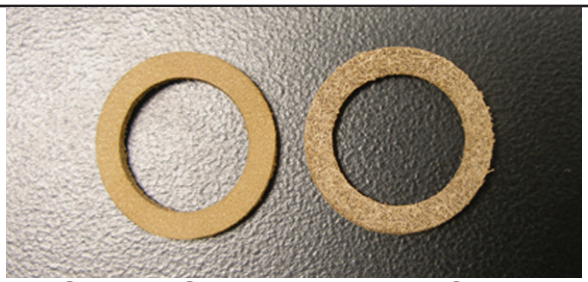


Figure 4.9

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

Figure A

Figure to the right demonstrates the difference between the opposites sides of a back-up to be installed in the lower-housing.



Smooth Side Rough Side

Figure B

ASSEMBLY

STEP 1
LOWER HOUSING ASSEMBLY

Install the first leather back-up into the counter-groove,rough side down, in the housing bore (Fig. 1.1).

Install the rubber o-ring next (Fig. 1.2).

Figure 1.1

Figure 1.2

Install second back-up rough side up on top of o-ring (Fig. 1.3).

NOTE: BACK-UPS AND O-RING NEED TO BE FIRMLY PRESSED INTO GROOVE TO AVOID DAMAGE WHEN INSTALLING STEM.

Figure 1.3

Apply grease to the face of the lower housing (Fig. 1.4).

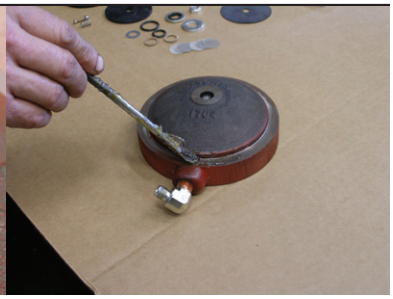


Figure 1.4

Install the gasket on the housing (the grease will keep the gasket from falling off and ease future rebuilds) (Fig. 1.5).

Application of grease on the back-up and o-ring will help minimize damage that can occur when installing stem (Fig. 1.6).

Figure 1.5

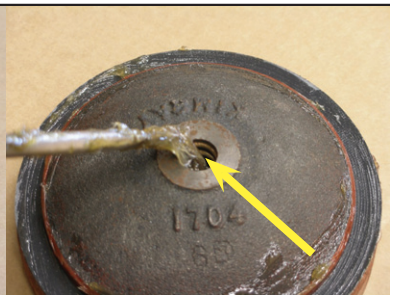


Figure 1.6

Apply thread-lock to the end to be inserted into the diaphragm plate. This end is indicated by an ***A*** (Fig. 1.7).

Turning clockwise, thread the stem into the diaphragm plate (Fig. 1.8).

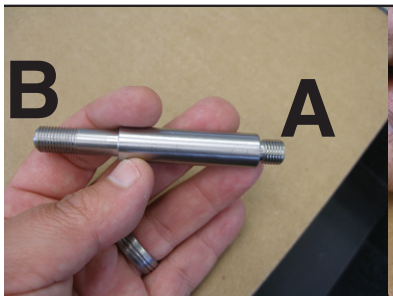


Figure 1.7

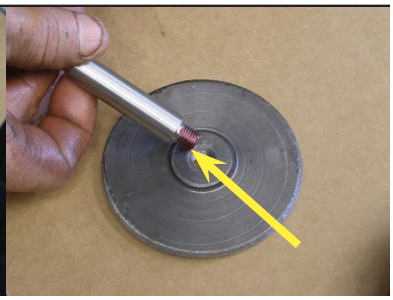


Figure 1.8

Slide the spring over the stem and onto the diaphragm plate (Fig. 1.9).

Slide the appropriate stem guide onto the stem (Fig. 1.10).

Figure 1.9

Figure 1.10

Once stem guide is in place slide the lower-housing onto the stem, taking care not to damage back-ups / o-ring. (Fig. 1.11).

Remove stem guide once housing is in place (Fig. 1.12).

Figure 1.11

Figure 1.12

This lower-body is ready to install the seat assembly (Fig. 1.13).

Install the seat disk over the stem and onto the lower-body (Fig. 1.14).

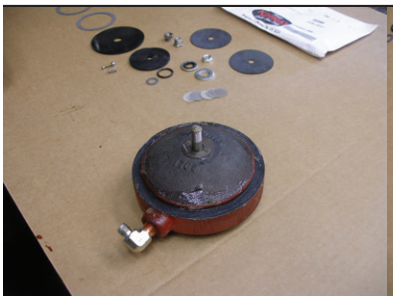


Figure 1.13

Figure 1.14

Install the seat over the stem and onto the lower housing (Fig. 1.15).

Install ratio-plug onto diaphragm (Fig. 1.16).

Figure 1.15

Figure 1.16

Install the stainless-steel lock-nut onto the stem (Fig.1.17).

Place lower-housing / seat assembly in a vise (Fig.1.18).

Figure 1.17

Figure 1.18

Tighten the 3/8” lock-nut snuggly. (Fig.1.19).

CAUTION! DO NOT OVERTIGHTEN, THIS COULD CAUSE THE SOFT-SEAT TO BULGE.

Figure 1.19

NOTE: WHEN THE SEAT DISC STOPS SPINNING WHILE TIGHTENING THE PROPER AMOUNT OF TORQUE HAS BEEN REACHED.

STEP 2
FILTER
Install the filter screens into the filter body (Fig. 2.1).

Install the o-ring into the filter cap (Fig. 2.2).

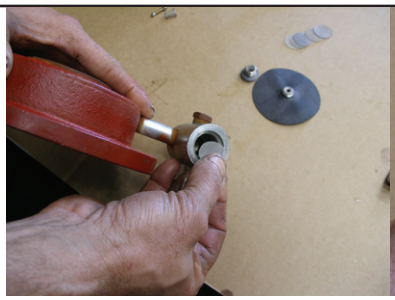


Figure 2.1

Figure 2.2

Thread the cap into the fliter body (Fig. 2.3).

Wrench tight the cap. (Fig. 2.4).

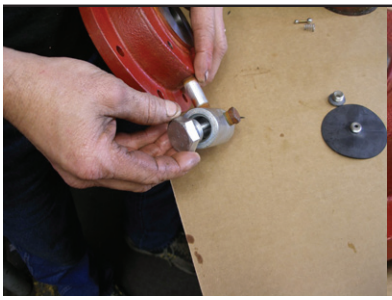


Figure 2.3

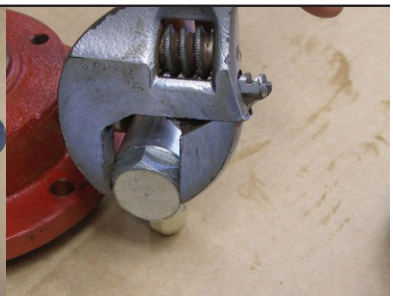


Figure 2.4

NOTE:
THE MESH SCREENS FOR THE FILTER BODY HAVE A SIDE WITH A RAISED EDGE, INSERT INTO BODY FLAT SIDE FIRST, ONE AT A TIME.
(Fig. 2.5)

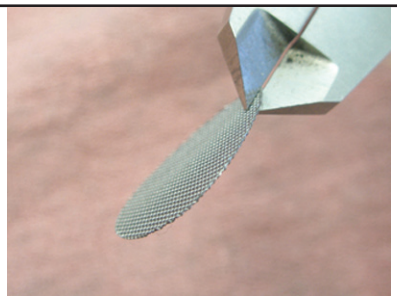


Figure 2.5

STEP 3
UPPER HOUSING
Install spring “fat” side down into the tapped hole (Fig. 3.1).

Install the gasket onto the lower seat (Fig. 3.2).

Figure 3.1

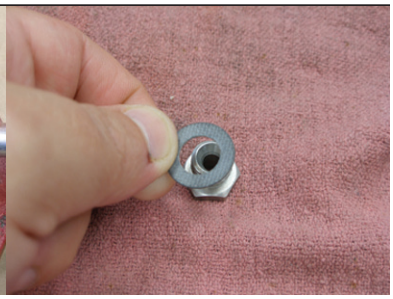


Figure 3.2

Install the small end of the pilot plug thru the seat. If done properly the larger end of the pilot plug will seat against the cone of the seat (Fig 3.3).

Thread seat/pilot plug assembly into the housing (Fig. 3.4).

Figure 3.3

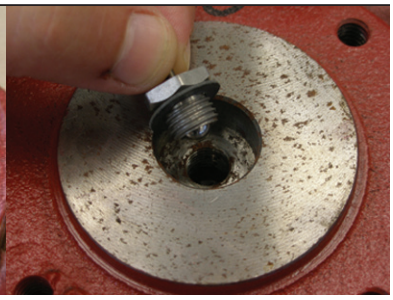


Figure 3.4

Using a socket wrench the seat tight. Careful not to overtighten (Fig 3.5).

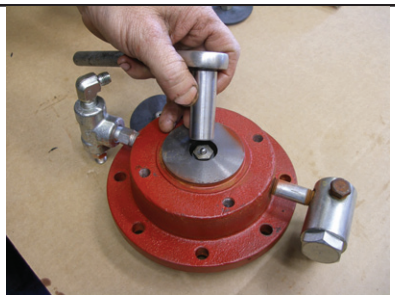


Figure 3.5

STEP 4
DIAPHRAGM HOUSING
With the diaphragm plate secured install the diaphragm (Fig. 4.1) and next the diaghragm nut (Fig. 4.2).

Figure 4.1

Figure 4.2

Torque the diaphragm nut onto the diaphragm plate (Fig. 4.3).

Install the nut/diaphragm plate assembly into the houseing (Fig. 4.4).

Figure 4.3

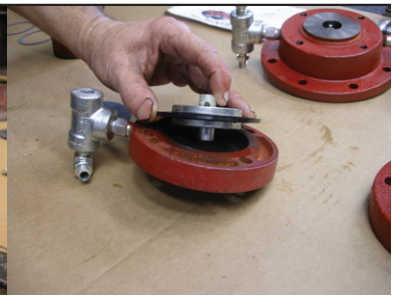


Figure 4.4

Verify you are using the proper seat for the next step (Fig. 4.5).

Install the upper seat into the diaphragm (Fig. 4.6).

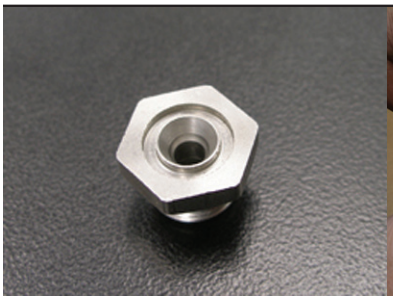


Figure 4.5

Figure 4.6

Thread the upper seat onto the diaphragm plate and wrench tight (Fig.4.7).

Install the middle body onto the upper body (Fig. 4.8).

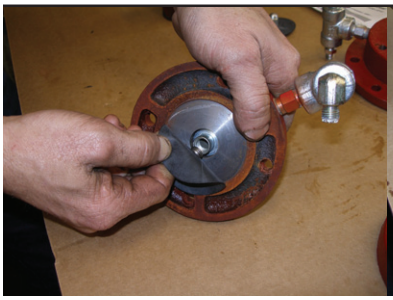


Figure 4.7

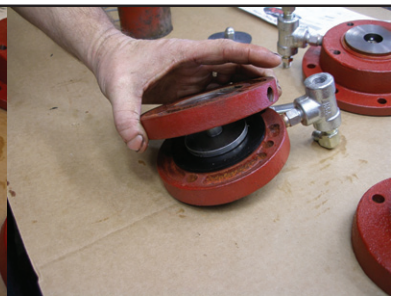


Figure 4.8

ASSEMBLY

Install pivot nut onto the balancing diaphragm (Fig. 4.9).

Thread balancing diaphragm/nut assembly onto the pivot screw (Fig. 4.10).

Figure 4.9

Figure 4.10

Tighten pivot nut (excessive torque not necessary) (Fig. 4.11).

Place the spacer over the pivot nut (Fig. 4.12).

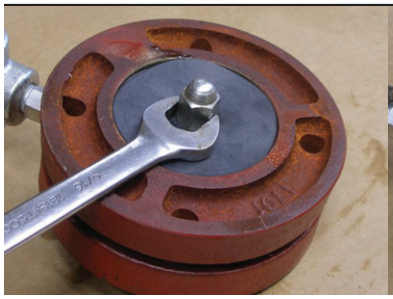


Figure 4.11

Figure 4.12

Set aside assembled diaphragm housings (Fig. 4.13).

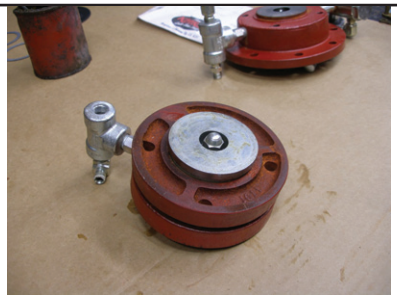


Figure 4.13

STEP 5
HOUSING
Place the diaphragm on top of the diaphragm plate. Make sure the diaphragm is placed in a “Bowl Up” position. (Fig. 5.1)

Install middle housing onto lower housing (Fig. 5.2).

Figure 5.1

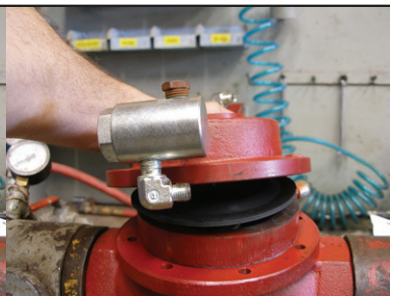


Figure 5.2

Install bolts for alignment purposes, but do not torgue down at this time. (Fig. 5.3)

Attach tubing connecting the lower and middle housings. ***Hand tight only at this point.*** (Fig. 5.4).

Figure 5.3

Figure 5.4

Torque down the bottom bolts in an alternating pattern (Fig. 5.5).

Figure 5.5

STEP 6
TUBING
Wrench tight the fittings on the lower tube (Fig. 6.1 & 6.2).

Figure 6.1

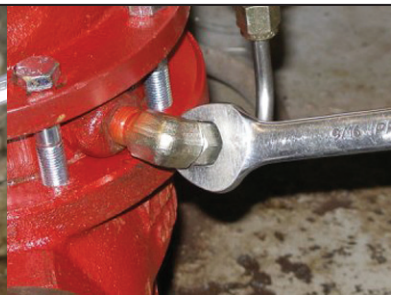


Figure 6.2

Attach the tubing connecting the supply tap to the filter cage (Fig. 6.3).

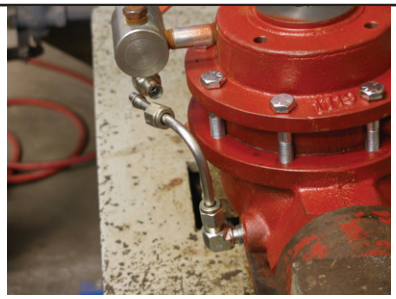


Figure 6.3

Wrench tight upper and lower fiittings (Fig. 6.4 & 6.5).

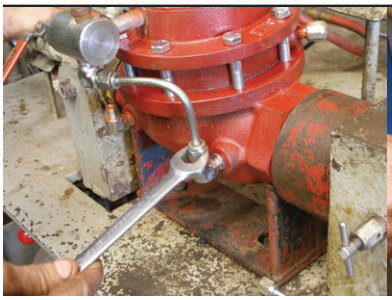


Figure 6.4

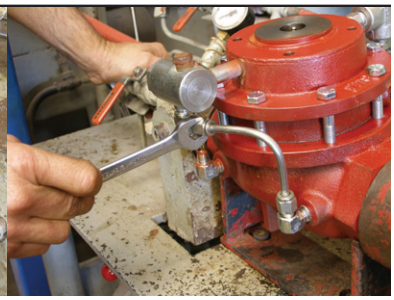


Figure 6.5

STEP 7
UPPER HOUSINGS
Place diaphragm housing upon lower housing (Fig. 7.1).

Place lock-tight onto the aluminum breather plug (Fig. 7.2).

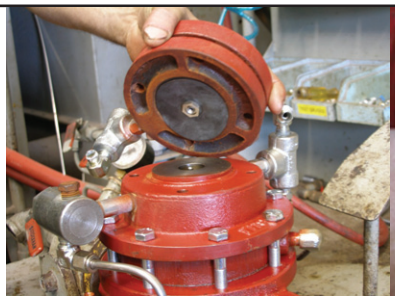


Figure 7.1

Figure 7.2

Install the breather plug and wrench tight (careful not to overtighten) (Fig. 7.3 & 7.4)

Figure 7.3

Figure 7.4

Install the sense-line tubing (Fig. 7.5).

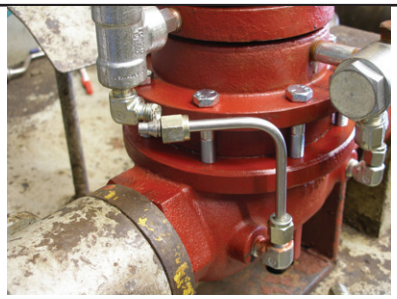


Figure 7.5

Wrench tight upper and lower fittings (Fig. 7.6 & 7.7).

Figure 7.6

Figure 7.7

Wrench tight upper and lower fittings (Fig. 7.8, &, 7.9).

Figure 7.8

Figure 7.9

STEP 8
BONNET
Place spring over the spacer, making sure the spring plate is centered on the pivot screw (Fig. 8.1).

Apply grease to the bottom side of the bonnet (Fig. 8.2).

Figure 8.1

Figure 8.2

Place the bonnet over spring, careful to keep spring plate centered under the adjustment screw (Fig. 8.3)

Install the screws into the bonnet. Bodies must be rotated in the correct position to allow the tubing to be properly re-installed. (Fig. 8.4)

Figure 8.3

Figure 8.4

Tighten the screws down, excessive torque is not necessary for a good seal (Fig. 8.5).

Figure 8.5

STEP 9
TUBING
Attach the balancing tube (Fig. 9.1)

Attach the sense tubing (Fig. 9.2)

Figure 9.1

Figure 9.2

Tighten all newly replaced tubing fittings (Fig. 9.3).

Figure 9.3

NOTES

Shop air is sufficient to test the regulator. Typical shop pressure is 90-100psi.

An adapter will be needed to connect from inlet thread size to air chuck. It will look similar to this (Fig. 1.1).

Screw ***npt*** end of adapter into inlet side of valve (Fig 1.2).

Figure 1.1

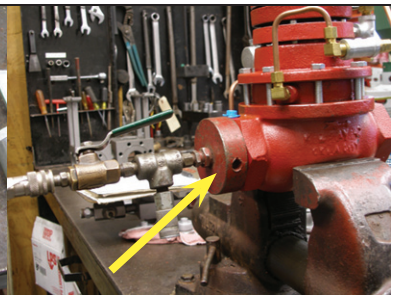


Figure 1.2

Choke downstream to create back-pressure for proper testing (Fig. 1.3).

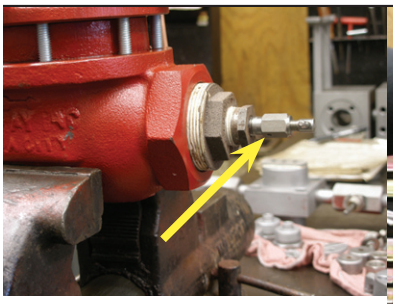


Figure 1.3

With the adjustment screw completely backed out the regulator should be closed. To test this, close-off the downstream and verify the pressure gauge reads zero (Fig. 1.5).

Figure 1.5

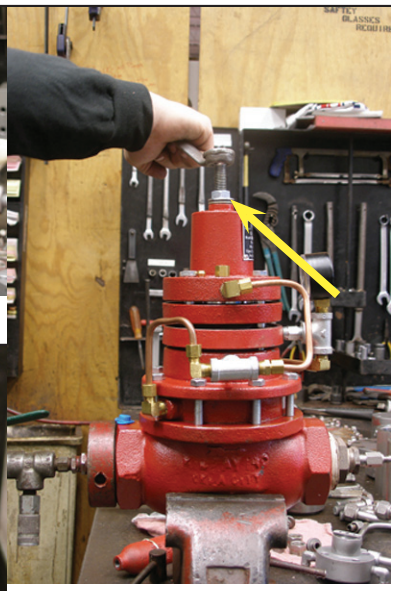


Figure 1.4

TESTING

Once the regulator is pressured-up and appears to be in working order several other points of possible leakage should be inspected:

A. Visual inspection of all tubing.

B. “Feel” around all fittings to check for leaks.

C. Body joints are another common point of leakage.

D. A functioning “balanced” regulator will have gas in the bonnet, so an inspection of the adjusting screw is necessary.

E. Inspect the breather plug for leakage.

Note: If continous venting occurs from the breather plug, this indicates improperly installed or damaged sense diaphragm.

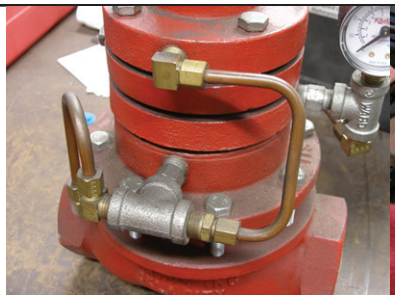


Figure 1.6

Figure 1.7

Figure 1.8

Figure 1.9

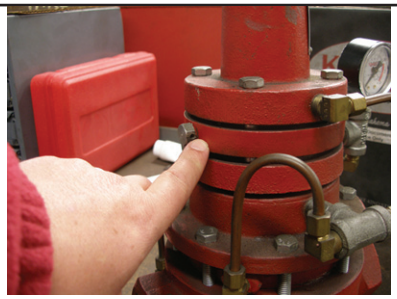


Figure 1.10

APPLICATIONS:

Regulation of inlet pressure to gas compressors and control of supply or distribution system pressures where the pressure to the regulator varies significantly and regulated pressure must remain constant.

PRESSURE RANGE:

Cast Iron:
- Upstream: 10 psig to 125 psig
- Downstream: 5 psig to 300 psig

Ductile Iron:
- Upstream: 10 psig to 300 psig
- Downstream: 5 psig to 300 psig

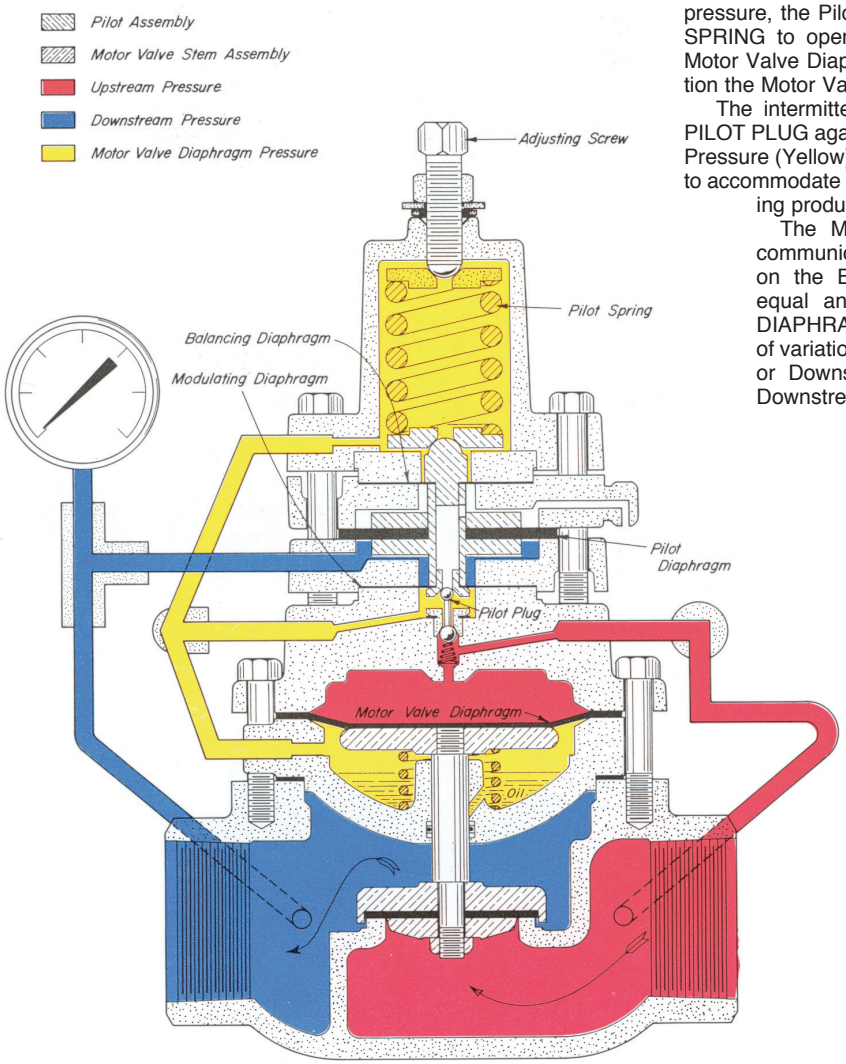
Steel:
- Upstream: 10 psig to 300 psig
- Downstream: 5 psig to 300 psig

NOTE:

For upstream pressure less than 10 psig use outside source of supply to operate Motor Valve Diaphragm.

CAPACITY:

Refer to Table of Contents.



OPERATION:

The Pilot Assembly and Motor Valve Stem Assembly (Crosshatched) are the only moving units in the regulator.

The PILOT PLUG consists of two stainless balls rigidly connected together. Upstream Pressure (Red) is the supply pressure to the pilot and is also in constant communication with the top side of the MOTOR VALVE DIAPHRAGM. The area of the MOTOR VALVE DIAPHRAGM is twice the area of the motor valve seat, assuring a positive shut-off.

The lower seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The upper seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere). The PILOT SPRING loads the upper side of the Pilot Assembly and is opposed on the underneath side by the controlled Downstream Pressure (Blue).

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a desired Downstream Pressure setting. With Downstream Pressure (Blue) too low, the PILOT SPRING forces the Pilot Assembly downward to close the upper seat (Yellow to Atmosphere) and open the lower seat (Red to Yellow).

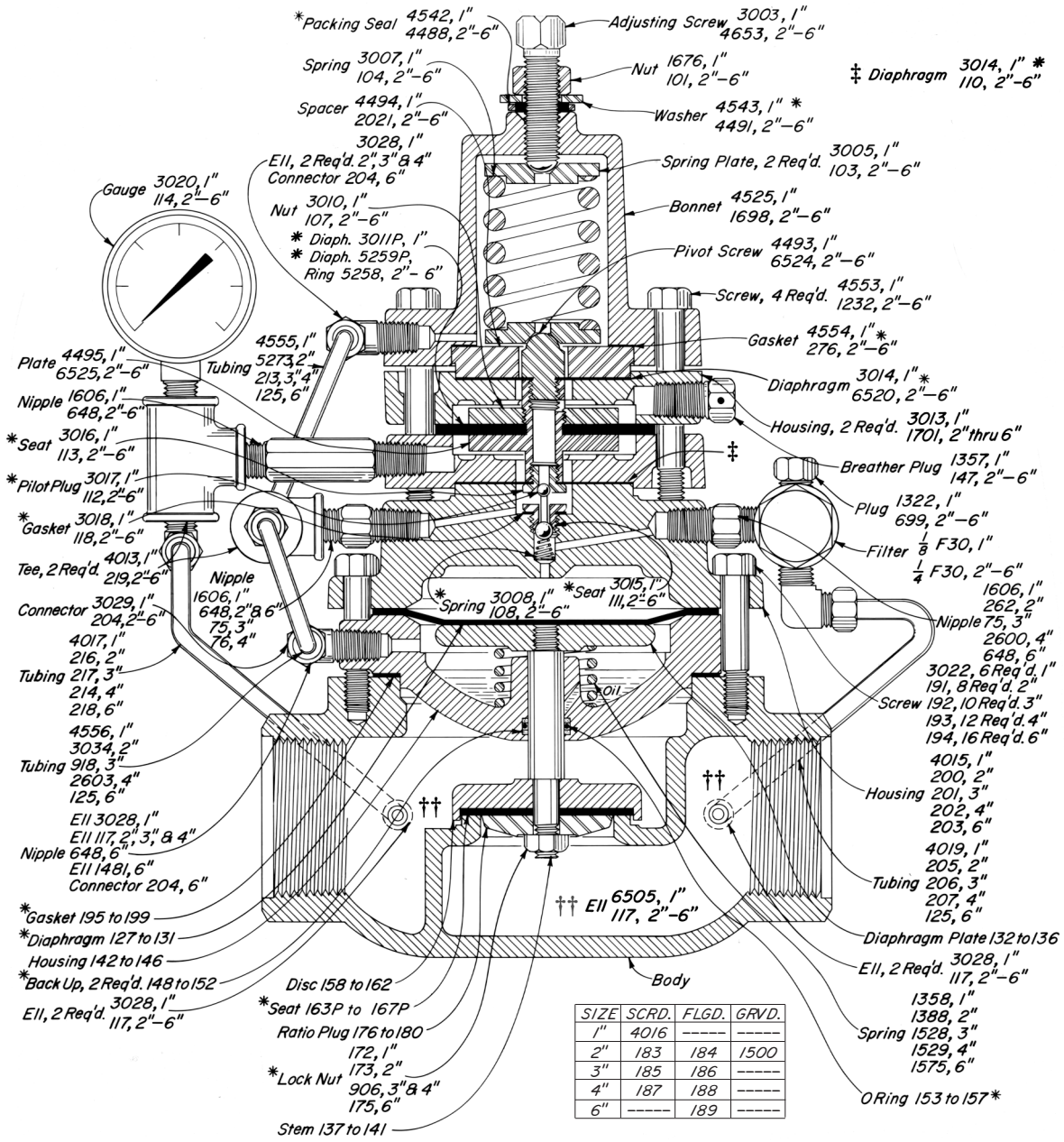
This lets full Upstream Pressure (Red) load the underneath side of the MOTOR VALVE DIAPHRAGM to balance the pressure on the top side. Upstream Pressure (Red) acting under the motor valve seat, opens the valve. As Downstream Pressure (Blue) increases to the set pressure, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

Should Downstream Pressure (Blue) rise above the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to open the pressure vent (Yellow to Atmosphere). Motor Valve Diaphragm Pressure (Yellow) decreases to reposition the Motor Valve Stem Assembly.

The intermittent bleed pilot, three-way valve action of the PILOT PLUG against its seat adjusts the Motor Valve Diaphragm Pressure (Yellow), repositioning the Motor Valve Stem Assembly to accommodate any rate of flow. The rapid but stable repositioning produces a true throttling action.

The Motor Valve Diaphragm Pressure (Yellow) is communicated to the bonnet area, this pressure acts on the BALANCING DIAPHRAGM to counteract the equal and opposite pressure on the MODULATING DIAPHRAGM. This balancing action reduces the effect of variation in Upstream Pressure (Red) on the controlled or Downstream Pressure (Blue) resulting in constant Downstream Pressure (Blue).

CATALOG SHEET



SIZE	SCRD.	FLGD.	GRVD.
1"	4016	-----	-----
2"	183	184	1500
3"	185	186	-----
4"	187	188	-----
6"	-----	189	-----

THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKI	1" SCRD.	112 SGT PRB	125	175	RRF
AJA	2" SCRD.	212 SGT PRB	125	175	RRI
AJB	2" FLGD.[a]	212 FGT PRB	125	175	RRI
AJC	2" GRVD.	212 GGT PRB	125	175	RRI
AJD	3" SCRD.	312 SGT PRB	125	175	RRJ
AJE	3" FLGD.[a]	312 FGT PRB	125	175	RRJ
AJF	4" SCRD.	412 SGT PRB	125	175	RRK
AJG	4" FLGD.[a]	412 FGT PRB	125	175	RRK
AJH	6" FLGD.[a]	612 FGT PRB	125	175	RRL

[a]Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

NOTES:

Dimensions, refer to Table of Contents.

*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Diaphragm 127-1", 128-2",129-3", 130-4", 131-6".

NOTES

KIMRAY
Pressure Reducing Balanced

Repair Manual

www.kimray.com