

# Product Catalog | *Oil & Gas*



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- REGULATORS - GAS PILOT OPERATED - 125 to 500 lb. W.P.** \_\_\_\_\_ **A**  
Maintain a set upstream, downstream or differential pressure or vacuum by utilizing a gas pilot to operate a motor valve.
- FLOAT OPERATED CONTROLS** \_\_\_\_\_ **C<sub>1</sub>**  
Maintain liquid level by utilizing a float to actuate a pneumatic pilot which operates a motor valve.
- MECHANICAL OIL VALVES & TRUNNIONS** \_\_\_\_\_ **C<sub>2</sub>**  
Maintain liquid level by utilizing a float and lever arm to mechanically operate a dump valve.
- TREATER or SALT WATER DISPOSAL VALVES "W" SERIES - 60 to 125 lb. W.P.** \_\_\_\_\_ **D**  
Maintain liquid level by utilizing the weight of the liquid to operate a mechanical dump valve.
- HIGH PRESSURE MOTOR VALVES - 800 to 4000 lb. W.P.** \_\_\_\_\_ **E<sub>1</sub>**  
Diaphragm operated gas motor valves.
- LOW PRESSURE MOTOR VALVES - 125 to 400 lb. W.P.** \_\_\_\_\_ **E<sub>2</sub>**  
Diaphragm operated gas motor valves.
- BALANCED MOTOR VALVES - 125 to 400 lb. W.P.** \_\_\_\_\_ **E<sub>3</sub>**  
Diaphragm operated oil or water valves.
- 3 WAY MOTOR VALVES - 125 to 3000 lb. W.P.** \_\_\_\_\_ **E<sub>4</sub>**  
Motor valves designed to divert flow with pneumatic signal.
- GLYCOL PUMPS - 1500 lb. W.P.** \_\_\_\_\_ **G**  
Circulate Glycol in reboiler system utilizing the energy of wet glycol at absorber pressure.
- TEMPERATURE CONTROLLERS (bi-metal) - 30° to 750°F.** \_\_\_\_\_ **H**  
Maintain temperature by providing a pneumatic signal to control burner valve.
- PILOTS & ACCESSORIES** \_\_\_\_\_ **Y**  
Pneumatic, mechanical and electrical pilots, filters, check valves, and supply gas regulators.

# PRESSURE REGULATORS



# KIMRAY

INC. ®

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**GAS BACK PRESSURE**

**APPLICATION:**

Vent lines on oil and gas separators, flow treaters, compressor stations, gas gathering systems.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 10.1	Pg. 10.2
Ductile	250/300 psig Max.	Pg. 10.1	Pg. 10.3
Steel	285 psig Max.	Pg. 10.1	Pg. 10.4
Steel	500 psig Max.	Pg. 10.5	Pg. 10.6

**PRESSURE REDUCING BALANCED**

**APPLICATION:**

Regulation of inlet pressure to gas compressors and control of supply or distribution system pressures where the pressure to the regulator varies more than 2:1.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 30.1	Pg. 30.2
Ductile	250/300 psig Max.	Pg. 30.1	Pg. 30.3
Steel	285 psig Max.	Pg. 30.1	Pg. 30.4

**GAS BACK PRESSURE NON VENTING**

**APPLICATION:**

Vent lines or pressure regulation on separators, heater treaters, compressor stations, gas gathering and distribution systems where it is desired that no gas be vented.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 15.1	Pg. 15.2
Ductile	250/300 psig Max.	Pg. 15.1	Pg. 15.3

**LIQUID BACK PRESSURE**

**APPLICATION:**

Control back pressure in liquid packed systems where an auxiliary source of supply gas pressure is available.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 40.1	Pg. 40.2
Ductile	250/300 psig Max.	Pg. 40.1	Pg. 40.3
Steel	285 psig Max.	Pg. 40.1	Pg. 40.4

**PRESSURE REDUCING**

**APPLICATION:**

Regulation of inlet pressure to gas compressors. Control of supply or distribution systems pressures.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 20.1	Pg. 20.2
Ductile	250/300 psig Max.	Pg. 20.1	Pg. 20.3
Steel	285 psig Max.	Pg. 20.1	Pg. 20.4
Steel	500 psig Max.	Pg. 20.5	Pg. 20.6

**GAS PRESSURE DIFFERENTIAL**

**APPLICATION:**

For maintaining a constant pressure drop across meter systems.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 50.1	Pg. 50.2
Ductile	250/300 psig Max.	Pg. 50.1	Pg. 50.3
Steel	285 psig Max.	Pg. 50.1	Pg. 50.4

**PRESSURE REDUCING NON VENTING**

**APPLICATION:**

Regulation of inlet pressure to gas compressors. Control of supply or distribution system pressures.

Regulation of down stream pressure where it is desired that no gas be vented.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 25.1	Pg. 25.2
Ductile	250/300 psig Max.	Pg. 25.1	Pg. 25.3

**GAS BACK PRESSURE VACUUM**

**APPLICATION:**

Positive pressure control of systems flowing into down-stream vacuum gathering lines.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	125 psig Max.	Pg. 70.1	Pg. 70.2

**LOW PRESSURE BACK PRESSURE**

**APPLICATION:**

Control 3 to 20 psig back pressure on low pressure vessels and vent line of separators, treaters, compressors, and gas gathering systems.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	20 psig Max.	Pg. 90.1	Pg. 90.2

**OUNCES PRESSURE REDUCING VACUUM**

**APPLICATION:**

Used to regulate a downstream vacuum from 0.1" to 5.0" Hg.

Material	Size	Operating Pressure	Description of Operation	Parts List
Ductile	1"	5/10/30 Hg.	Pg. 120.1	Pg. 120.2
Ductile	2"-6"	5/10/30 Hg.	Pg. 120.1	Pg. 120.3

**OUNCES BACK PRESSURE TO ATMOSPHERE**

**APPLICATION:**

Valve designed to regulate ounces (0.5 oz to 2.5 psig) back pressure on a tank and vent to atmosphere when pressure exceeds set point. An outside supply of 10 psig is raised to operate motor valve.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	2.5/5/20 psig Max.	Pg. 95.1	Pg. 95.2
Ductile	2.5/5/20 psig Max.	Pg. 95.1	Pg. 95.3

**GAS CAPACITY CHART**

Material	Operating Pressure	Page Number
Ductile	125 psig Max.	140.0-140.2
Ductile	300 psig Max.	140.3-140.6
Steel	285 psig Max.	140.3-140.6
Steel	500 psig Max.	140.3

**OUNCES BACK PRESSURE TO VACUUM**

**APPLICATION:**

To maintain ounces of positive pressure on systems flowing into a downstream vacuum, such as vapor recovery systems.

Material	Operating Pressure	Description of Operation	Parts List
Ductile	2.5/5/20 psig Max.	Pg. 100.1	Pg. 100.2

**LIQUID CAPACITY CHART**

Material	Operating Pressure	Parts List
Ductile	125 psig Max.	140.7
Ductile	300 psig Max.	140.7
Steel	285 psig Max.	140.7

**DIMENSIONS**

Regulator Dimensions	140.8
----------------------	-------

**OUNCES PRESSURE REDUCING**

**APPLICATION:**

This valve is used to regulate downstream pressure (sense line) from 0.5 oz to 2.5 psig or on vapor recovery systems to bypass a compressor when tank pressure falls too low.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Ductile	1"	2.5/5/20 psig Max.	Pg. 110.1	Pg. 110.2
Ductile	2"-6"	2.5/5/20 psig Max.	Pg. 110.1	Pg. 110.3

**OTHER APPLICATIONS**

For other applications please refer to our web site.

#### GENERAL SPECIFICATIONS

##### DUCTILE IRON 125 psig W.P

Body - Ductile Iron, ASME SA-395 / ASTM A-395  
Flanges - Dimensions & Rating, 150 lb. ANSI Std.  
Interior Parts - Gray Iron, Ductile Iron, Steel, and  
Stainless Steel  
Tubing - Copper, ASTM B-280  
Fittings - Brass  
Seat - Buna N

##### DUCTILE IRON, 250 and 300 psig W.P.

Body - Ductile Iron, ASME SA-395 / ASTM-A395  
Flanges - Dimensions & Rating 150 lb. ANSI  
Interior Parts - Ductile Iron and Stainless Steel  
Tubing - 304 Stainless Steel  
Fittings - Steel  
Seat - Polyurethane  
(alternate - Buna N, if specified)

##### STEEL, 285 psig W.P.

Body - Cast Steel, A216-WCB  
Flanges - Dimensions & Rating, 150 lb. Steel ANSI  
Interior Parts - Steel and Stainless Steel  
Tubing - 304 Stainless Steel  
Fittings - Steel  
Seat - Polyurethane w / insert  
(alternate - Buna N, if specified)

##### STEEL, 500 psig W.P.

Body - Cast Steel, A216-WCB  
Flanges - Dimensions & Rating 300 lb. Steel ANSI  
Interior Parts - Steel and Stainless Steel  
Tubing - 304 Stainless Steel  
Fittings - Steel  
Seat - Polyurethane w / insert  
(alternate - Buna N, if specified)

#### CODING FOR KIMRAY CONTROLS

##### EXAMPLE: 212 SGT BP

First Number: Line Size (2")

Remaining Numbers:  
Multiply by 10 for Working Pressure (120)

First Letter: Body (screwed)  
"S" Screwed  
"F" Flanged  
"G" Grooved

Second Letter: Type (G)  
"G" Gas Pilot Regulator  
"O" Float Operated Valve  
"W" Treater Valve  
"M" Motor Valve  
"L" Pilot Liquid Valve

Third Letter: Style of Body (through)  
"A" Angle  
"T" Through  
"3W" 3 Way

Letters Following Coding: Service (Back Pressure)  
"BP" Back Pressure  
"PR" Pressure Reducing  
"PD" Pressure Differential  
"LBP" Liquid Back Pressure  
"VAC" Vacuum  
"PRB" Pressure Reducing-Balanced  
"PO" Pressure Opening  
"PC" Pressure Closing

#### PILOT CODING

##### Example: 12 PL

Numbers:  
Multiply by 10 for Working Pressure (120)

First Letter: (pilot)  
"P" Pilot

Second Letter: (liquid)  
"G" Gas  
"L" Liquid  
"S" Snap  
"T" Throttle  
"M" Mechanical  
"F" Float Operated

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.

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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

#### APPLICATION:

Vent lines on oil separators, flow treaters, compressor stations, gas gathering systems.

#### PRESSURE RANGE:

Ductile Iron: 5 psig to 125 psig  
 Ductile Iron: 10 psig to 280 psig  
 Steel: 10 psig to 280 psig

#### 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. The upper seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The lower seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere).

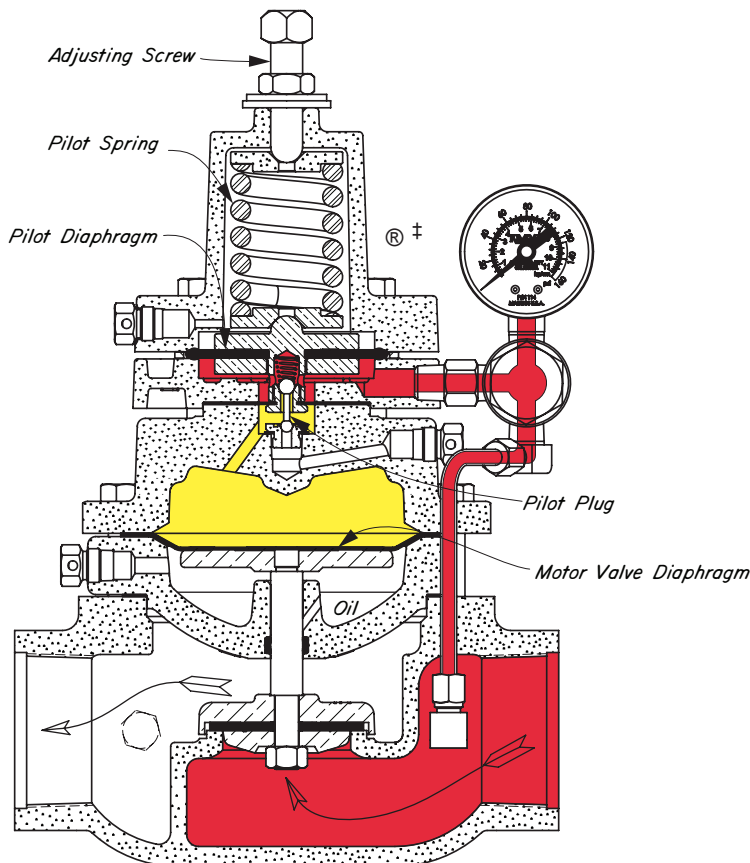
The PILOT SPRING in the bonnet loads the upper side of the Pilot Assembly and is opposed on the underside by Upstream Pressure (Red).

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Upstream Pressure (Red). The Pilot Assembly is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the upper seat for the PILOT PLUG (Red to Yellow) is open. This lets full Upstream Pressure (Red) load the motor valve. The area of the MOTOR VALVE DIAPHRAGM is twice the area of the motor valve seat, assuring a positive shut-off.

As the Upstream Pressure (Red) increases to the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to first close the upper seat (Red to Yellow) and open the pressure vent (Yellow to Atmosphere). As the Motor Valve Diaphragm Pressure (Yellow) is decreased, the Upstream Pressure (Red) acting under the motor valve seat, opens the valve. With relief of Upstream Pressure (Red) through the motor valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

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.

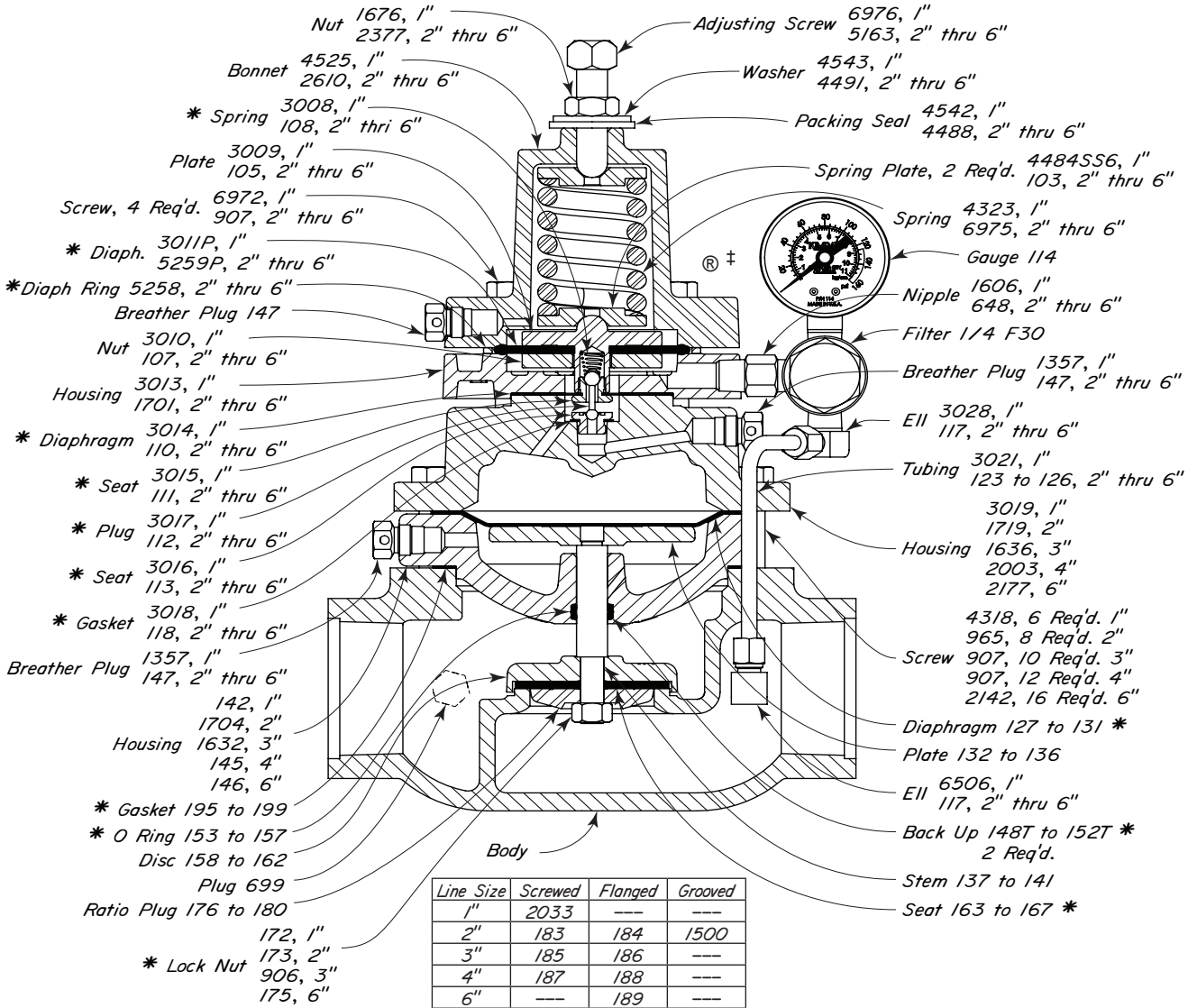
-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Motor Valve Diaphragm Pressure



# PRESSURE REGULATORS



## GAS BACK PRESSURE DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKA	1" SCRD.	112 SGT BP	125	175	RRT
AAA	2" SCRD.	212 SGT BP	125	175	RAA
AAB	2" FLGD. <sup>a</sup>	212 FGT BP	125	175	RAA
AAC	2" GRVD.	212 GGT BP	125	175	RAA
AAD	3" SCRD.	312 SGT BP	125	175	RAB
AAE	3" FLGD. <sup>a</sup>	312 FGT BP	125	175	RAB
AAF	4" SCRD.	412 SGT BP	125	175	RAC
AAG	4" FLGD. <sup>a</sup>	412 FGT BP	125	175	RAC
AAH	6" FLGD. <sup>a</sup>	612 FGT BP	125	175	RAD

### NOTES:

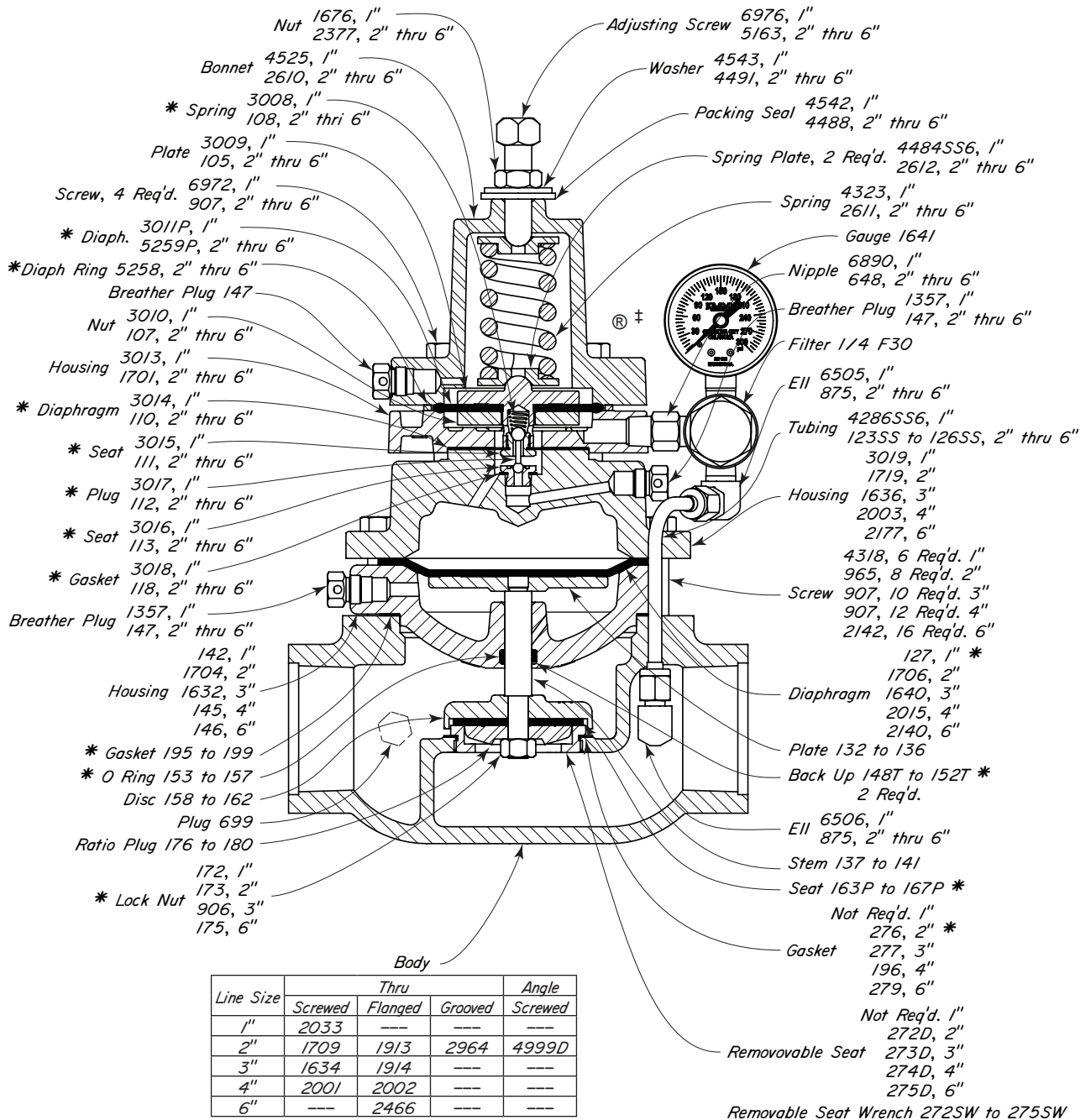
Dimensions, refer to Table of Contents.

\*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".

‡Configuration of Back Pressure Valve is a trademark of Kimray, Inc.

### GAS BACK PRESSURE DUCTILE IRON



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKB	1" SCR.D.	130 SGT BP-D	300	300	RRU
AAR	2" SCR.D.	230 SGT BP-D	300	300	RDG
AAS	2" FLGD.	218 FGT BP-D	250	250	RDG
AAQ	2" GRVD.	230 GGT BP-D	300	300	RDG
AAT	3" SCR.D.	330 SGT BP-D	300	300	RDH
AAU	3" FLGD.	318 FGT BP-D	250	250	RDH
AAW	4" SCR.D.	430 SGT BP-D	300	300	RDI
AAX	4" FLGD.	418 FGT BP-D	250	250	RDI
AAZ	6" FLGD.	618 FGT BP-D	250	250	RDJ

#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ASR	2" SCR.D.	230 SGA BP-D	300	300	RDG

Dimensions, refer to Table of Contents.

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

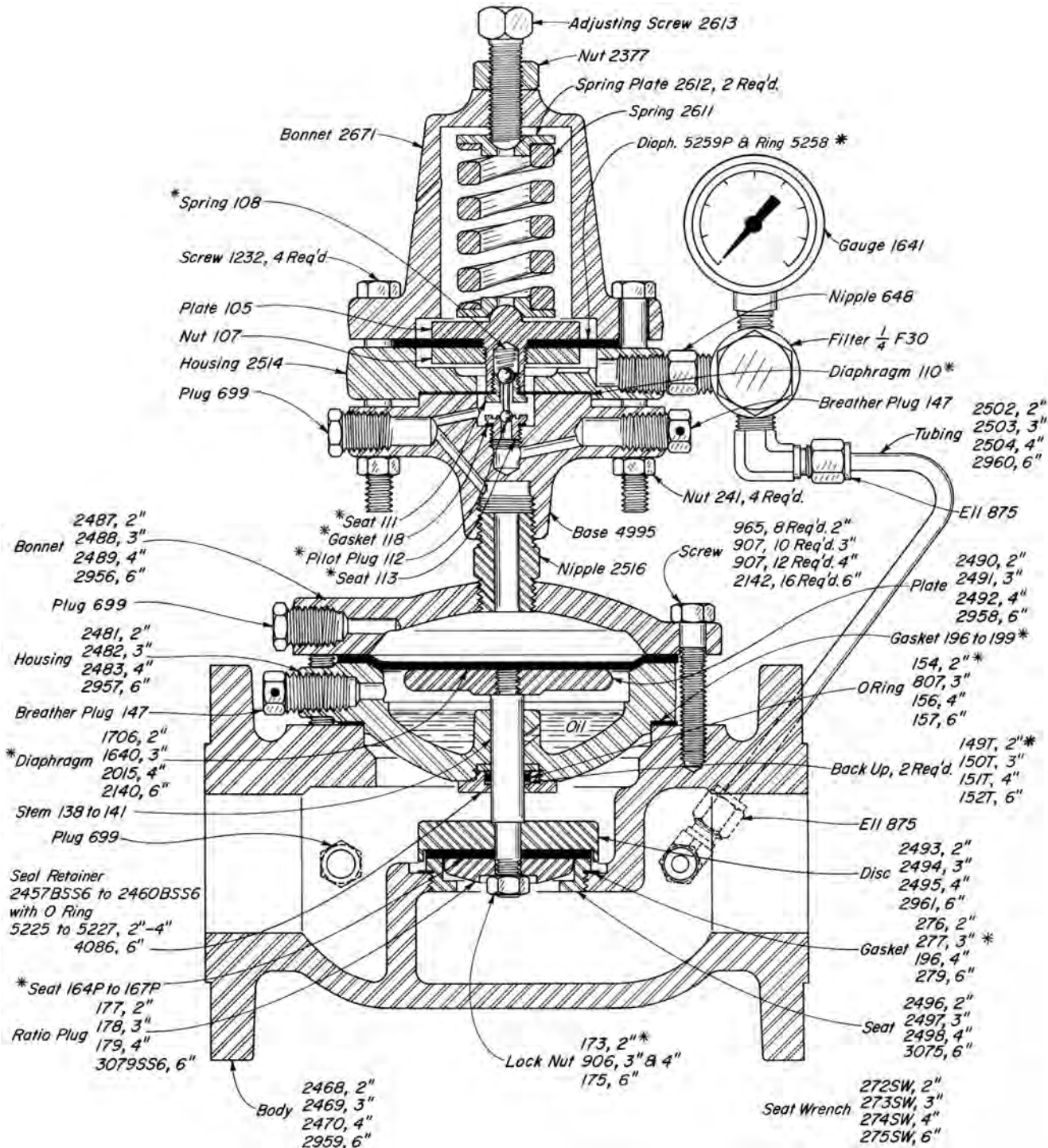
The numbers of a series assigned to a part indicate different line sizes. For example: Seat 163P-1", 164P-2", 165P-3", 166P-4", 167P-6".

‡Configuration of the Back Pressure valve is a trademark of Kimray, Inc.

# PRESSURE REGULATORS



## GAS BACK PRESSURE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AGB	2" FLGD.	227 FGT BP-S	285	285	RAE
AGC	3" FLGD.	327 FGT BP-S	285	285	RAF
AGD	4" FLGD.	427 FGT BP-S	285	285	RAG
AGE	6" FLGD.	627 FGT BP-S	285	285	RAH

### 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: Stem 138-2", 139-3", 140-4", 141-6".



#### APPLICATION:

Vent lines on oil and gas separators, flow treaters, compressor stations, gas gathering systems.

#### PRESSURE RANGE:






75 psig to 500 psig

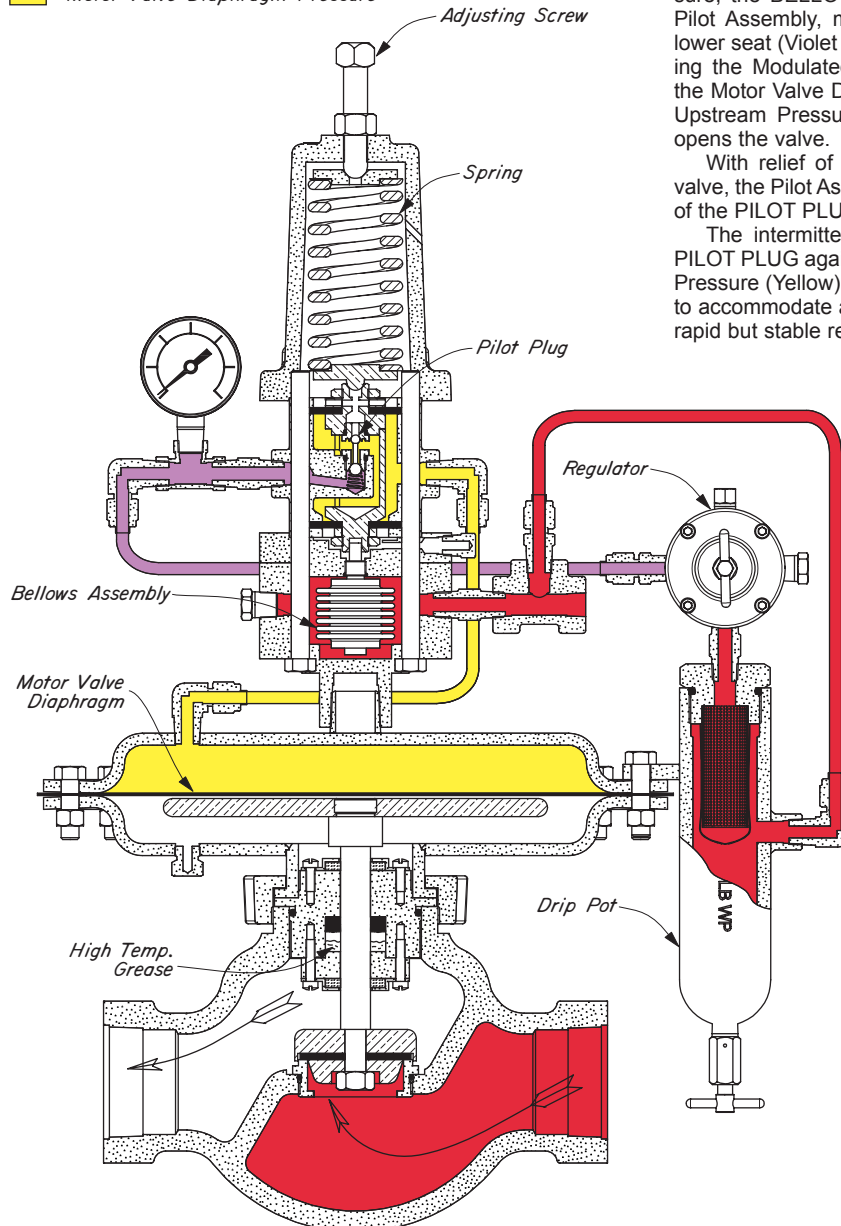
#### PILOT SUPPLY PRESSURE:

40 psig

#### CAPACITY:

Refer to Table of Contents.

-  Pilot Bellows Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Pilot Supply Pressure
-  Motor Valve Diaphragm Pressure



#### 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. The upper seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Violet to Yellow). The lower seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere).

The PILOT SPRING in the bonnet loads the upper side of the Pilot Assembly and is opposed on the underside by Upstream Pressure (Red) in the BELLOWS ASSEMBLY.

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Sense Pressure (Red). The DIAPHRAGM ASSEMBLY is forced downward by the SPRING. The upper seat of the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Violet to Yellow) is open. This allows Pilot Supply Pressure (Yellow) to load the top of the MOTOR VALVE DIAPHRAGM to close the motor valve. The area of the MOTOR VALVE DIAPHRAGM is sixteen times the area of the motor valve seat, thus insuring a positive shut-off.

As the Upstream Pressure (Red) increases to the set pressure, the BELLOWS ASSEMBLY expands upward against the Pilot Assembly, moving the PILOT SPRING to first close the lower seat (Violet to Yellow) and then open the upper seat allowing the Modulated Output to vent (Yellow to Atmosphere). As the Motor Valve Diaphragm Pressure (Yellow) is decreased, the Upstream Pressure (Red) acting under the motor valve seat, opens the valve.

With relief of Upstream Pressure (Red) through the motor valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

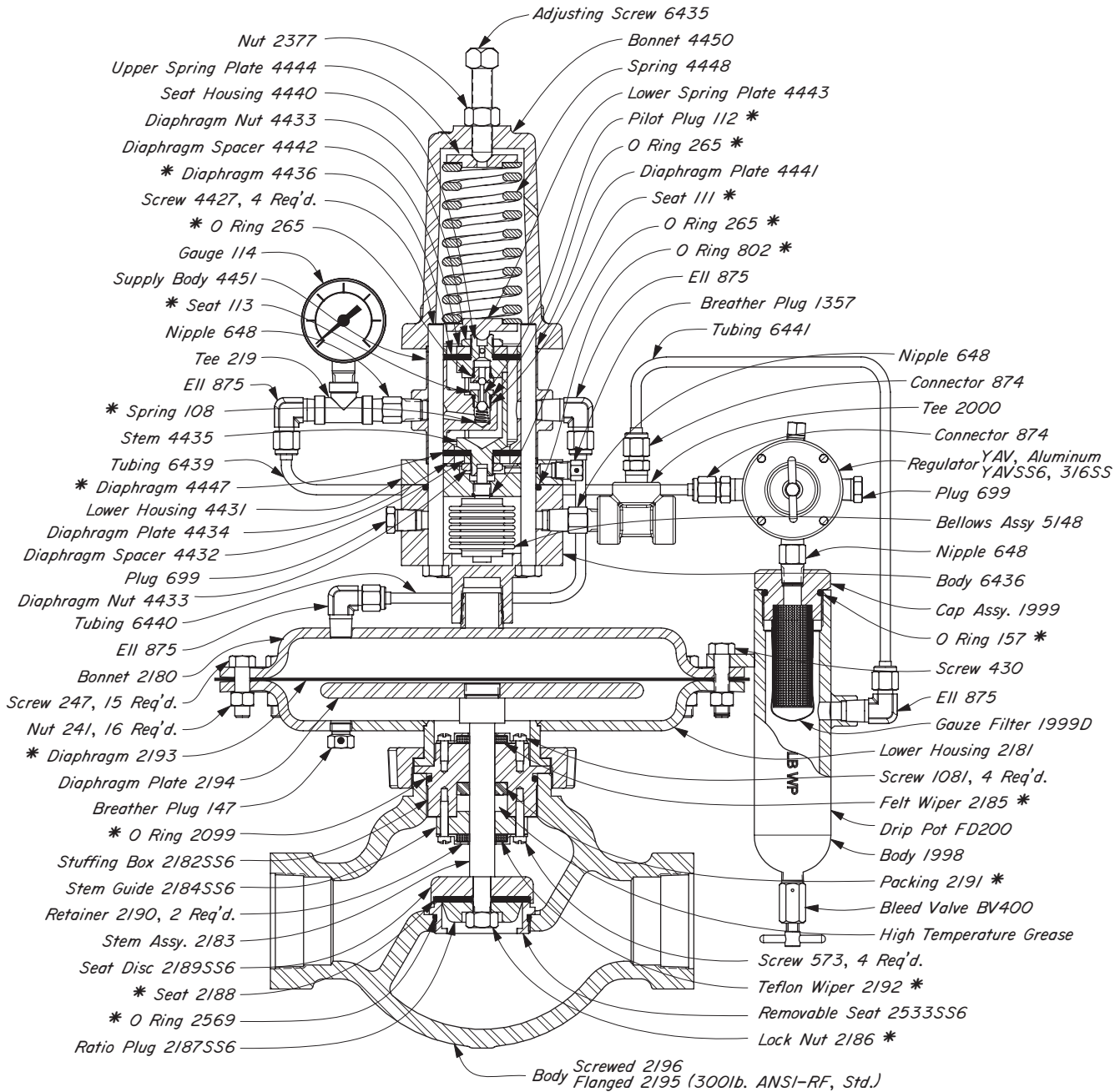
The intermittent bleed pilot, three-way valve action of the PILOT PLUG against its seat adjusts the Motor Valve Diaphragm Pressure (Yellow), repositioning the Motor Valve Stem Assembly to accommodate any rate of flow within the valves capacity. The rapid but stable repositioning produces a true throttling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



# PRESSURE REGULATORS



## GAS BACK PRESSURE STEEL / ALL STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ABB	2" SCRD.	250 SGT BP-S	500	500	RAI
ABA	2" FLGD.	250 FGT BP-S	500	500	RAI
ABB1	2" SCRD.	250 SGT BP-STL	500	500	RAI
ABA1	2" FLGD.	250 FGT BP-STL	500	500	RAI

### NOTES:

Dimensions, refer to Table of Contents.

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

#### APPLICATION:

Vent lines or pressure regulation on separators, heater treaters, compressor stations, gas gathering and distribution systems where it is desired that no gas be vented.

- Inside Buildings
- In populated areas
- Emissions regulated areas
- Sour or poisonous gas systems

#### PRESSURE RANGE:

Ductile Iron: 5 psig to 125 psig  
 Ductile Iron: 10 psig to 280 psig  
 Steel: 10 psig to 280 psig

#### CAPACITY:

Refer to Table of Contents

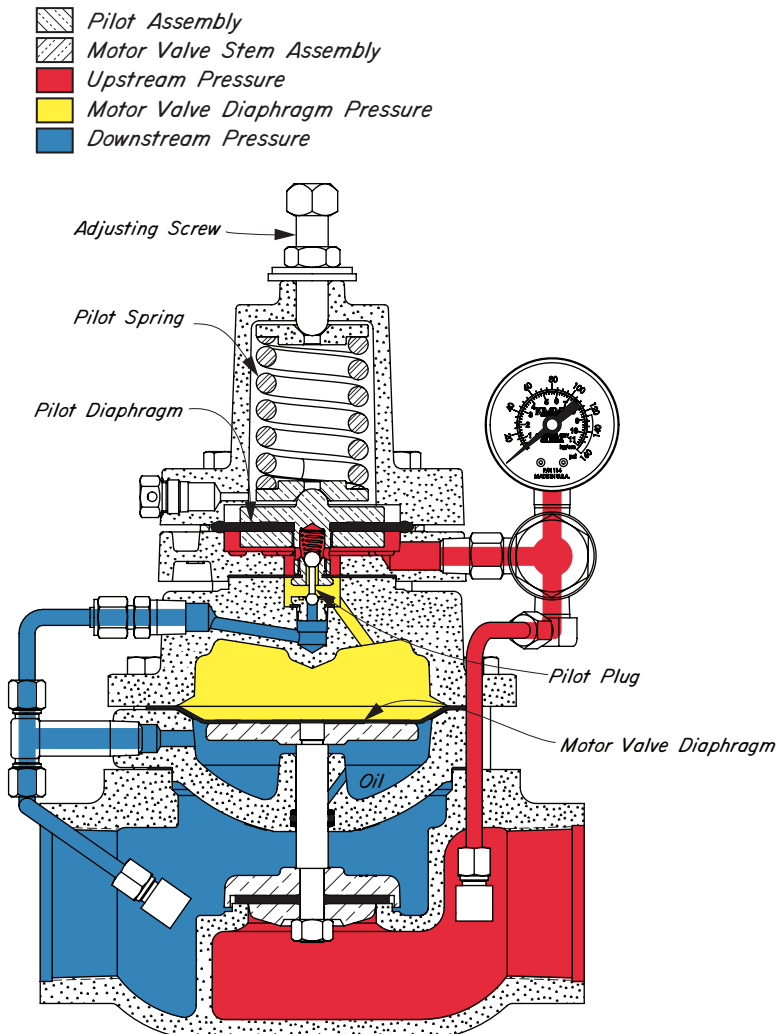
#### OPERATION:

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Upstream Pressure (Red). The Pilot Assembly is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Blue) is closed and the upper seat for the PILOT PLUG (Red to Yellow) is open. This lets full Upstream Pressure (Red) load the MOTOR VALVE DIAPHRAGM to close the valve.

As the Upstream Pressure (Red) increases to the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to first close the upper seat (Red to Yellow) and open the lower seat (Yellow to Blue). Motor Valve Diaphragm Pressure (Yellow) is vented to the Downstream (Blue).

As the Motor Valve Diaphragm Pressure (Yellow) is decreased, the Upstream Pressure (Red) acting under the motor valve seat, opens the valve. With relief of the Upstream Pressure (Red) through the valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

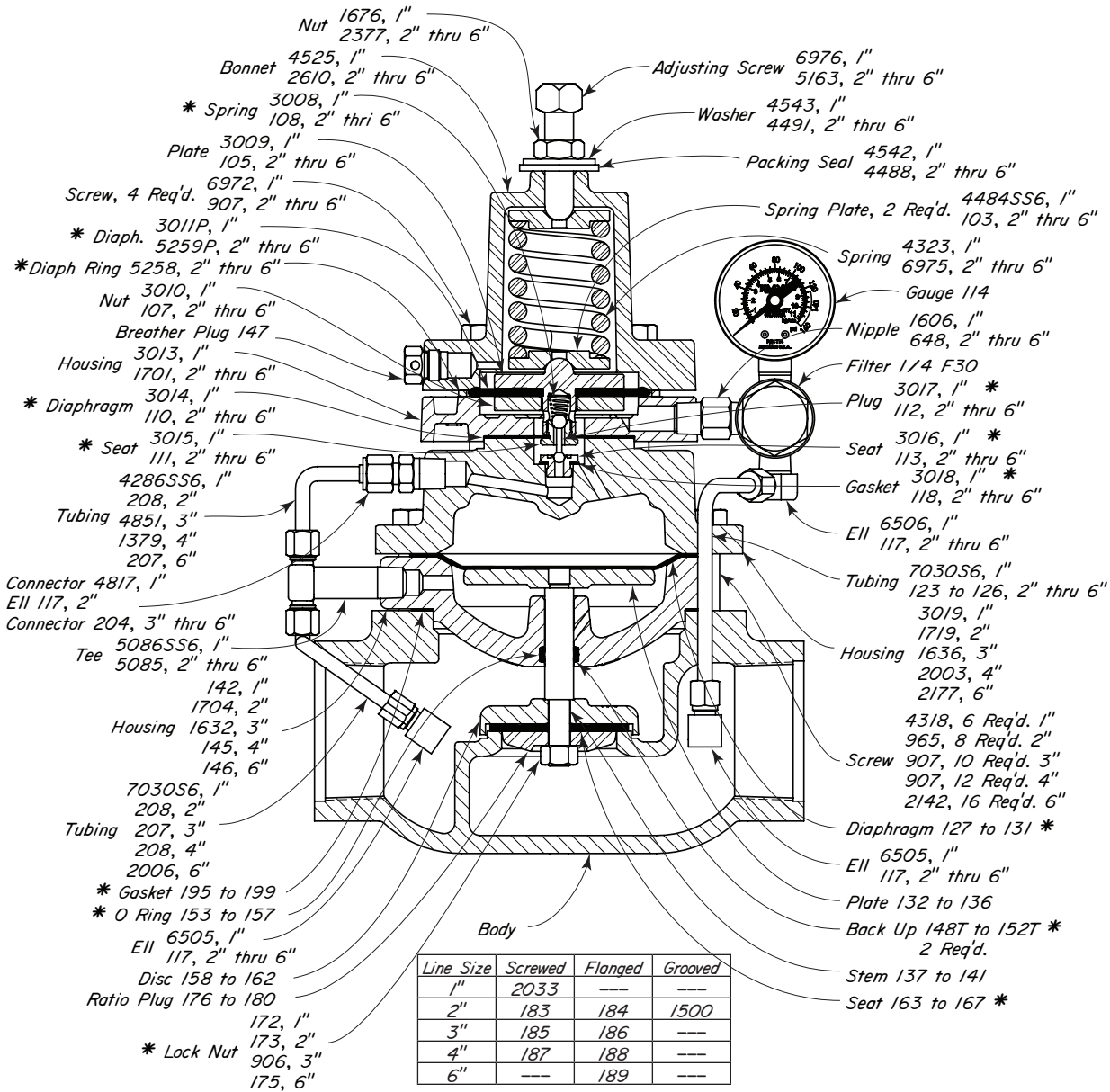
Motor Valve Diaphragm Pressure (Yellow) is regulated by the intermittent bleed pilot three-way valve action of the PILOT PLUG to reposition the Motor Valve Stem Assembly for changes in flow rate. The rapid but stable repositioning produces a true throttling action.



# PRESSURE REGULATOR



## GAS BACK PRESSURE NON VENTING DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ALD	1" SCRD.	112 SGT BP-NV	125	175	RRT
ALE	2" SCRD.	212 SGT BP-NV	125	175	RAA
ALF	2" FLGD. <sup>a</sup>	212 FGT BP-NV	125	175	RAA
ALG	2" GRVD.	212 GGT BP-NV	125	175	RAA
ALH	3" SCRD.	312 SGT BP-NV	125	175	RAB
ALI	3" FLGD. <sup>a</sup>	312 FGT BP-NV	125	175	RAB
ALJ	4" SCRD.	412 SGT BP-NV	125	175	RAC
ALK	4" FLGD. <sup>a</sup>	412 FGT BP-NV	125	175	RAC
ALL	6" FLGD. <sup>a</sup>	612 FGT BP-NV	125	175	RAD

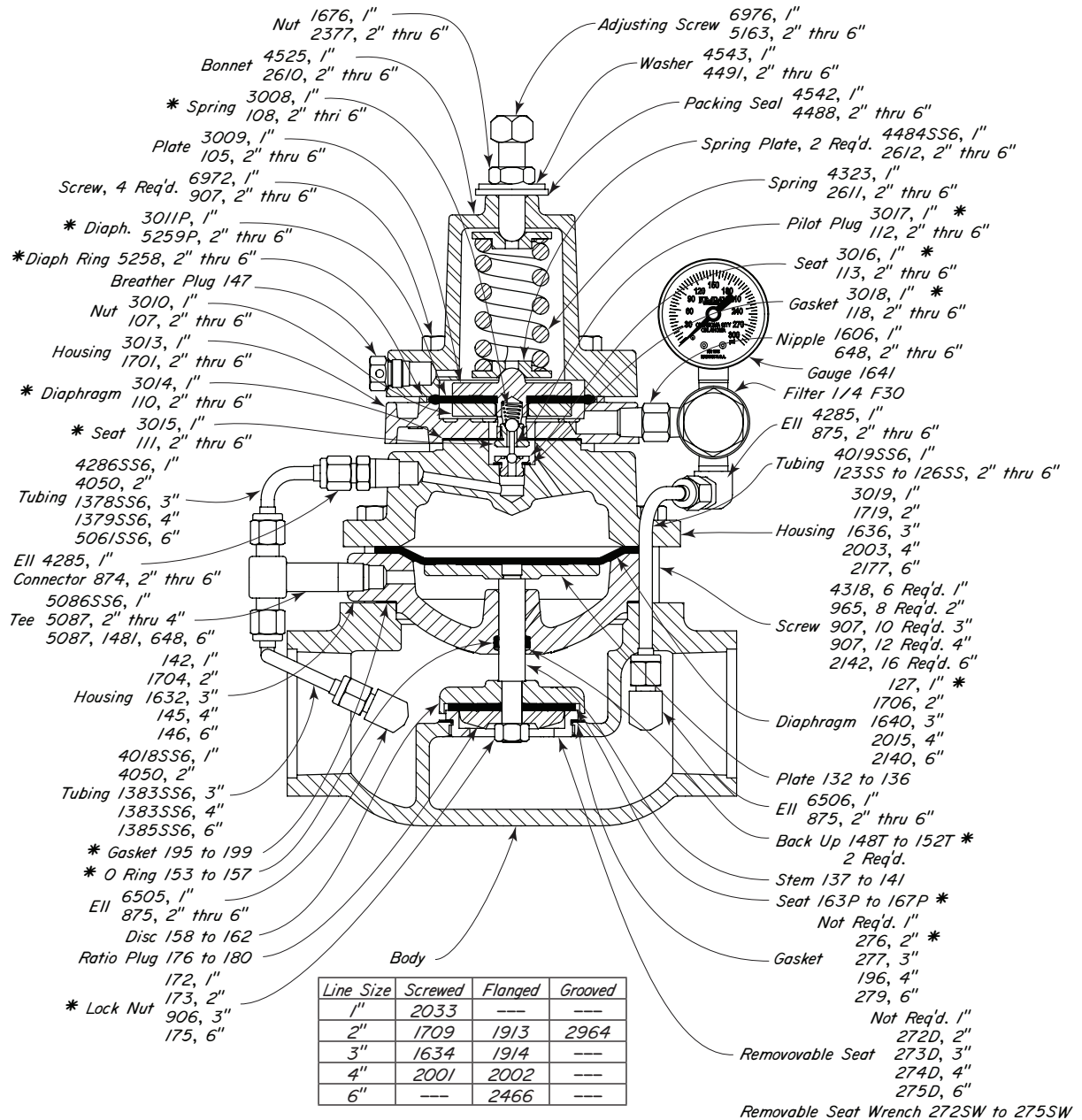
### NOTES:

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".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ALDD	1" SCR.D.	130 SGT BP-NV-D	300	300	RRU
ALED	2" SCR.D.	230 SGT BP-NV-D	300	300	RDG
ALFD	2" FLGD.	218 FGT BP-NV-D	250	250	RDG
ALGD	2" GRVD.	230 GGT BP-NV-D	300	300	RDG
ALHD	3" SCR.D.	330 SGT BP-NV-D	300	300	RDH
ALID	3" FLGD.	318 FGT BP-NV-D	250	250	RDH
ALJD	4" SCR.D.	430 SGT BP-NV-D	300	300	RDI
ALKD	4" FLGD.	418 FGT BP-NV-D	250	250	RDI
ALLD	6" FLGD.	618 FGT BP-NV-D	250	250	RDJ

#### NOTES:

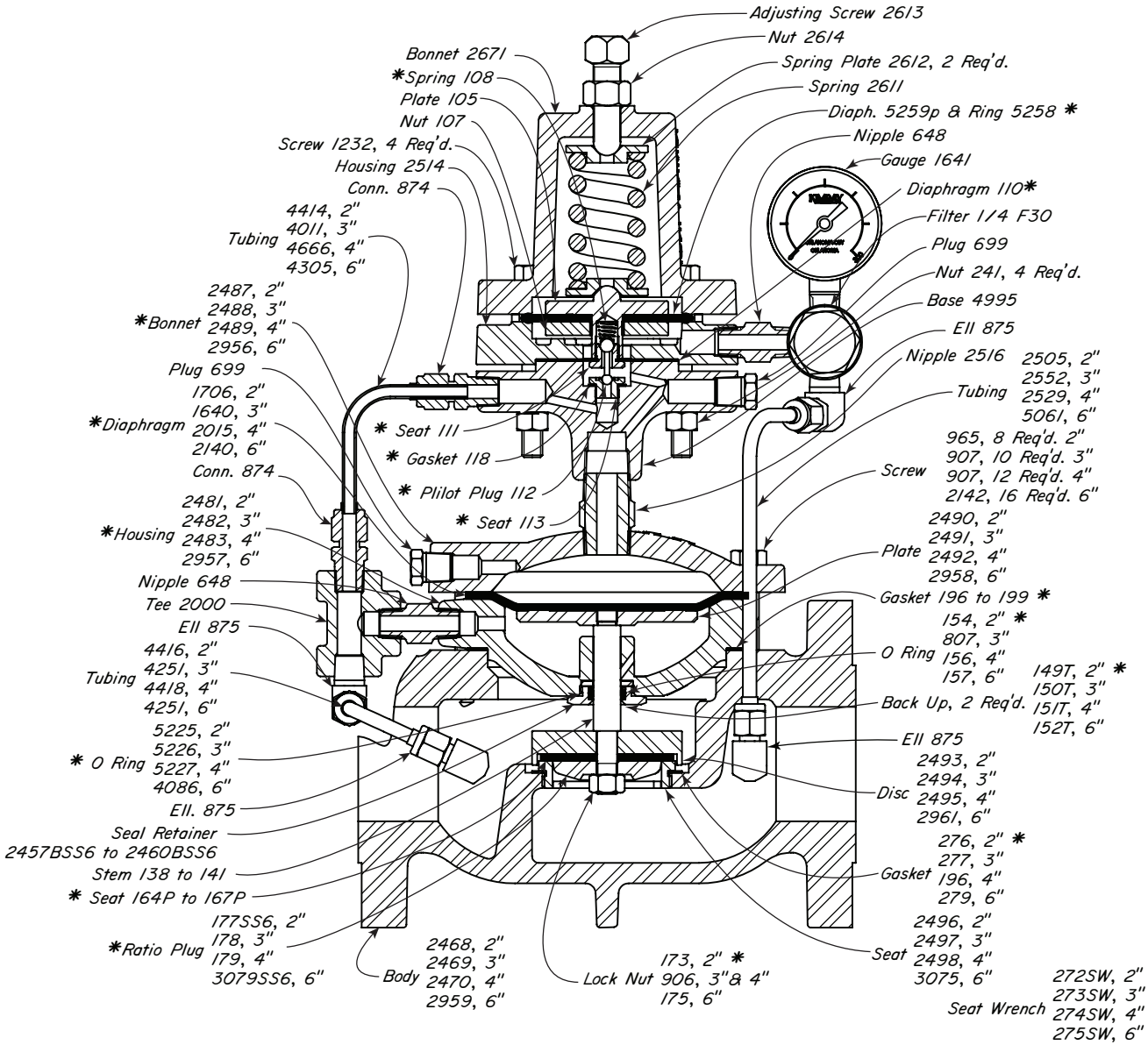
Dimensions, refer to Table of Contents.

\*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: Seat 163P-1", 164P-2", 165P-3", 166P-4", 167P-6".

# PRESSURE REGULATOR

GAS BACK PRESSURE NON VENTING  
STEEL



## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AGF	2" FLGD.	227 FGT BP-S-NV	285	285	RAE
AGV	3" FLGD.	327 FGT BP-S-NV	285	285	RAF
AGP	4" FLGD.	427 FGT BP-S-NV	285	285	RAG
AGU	6" FLGD.	627 FGT BP-S-NV	285	285	RAH

## 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: Stem 138-2", 139-3", 140-4", 141-6".

#### APPLICATION:

Regulation of inlet pressure to gas compressors. Control of supply or distribution system pressure

#### PRESSURE RANGE:

Ductile Iron:

Upstream: 10 psig to 125 psig  
Downstream: 5 psig to 125 psig

Ductile Iron:

Upstream: 10 psig to 300 psig  
Downstream: 10 psig to 300 psig

Steel:

Upstream: 10 psig to 300 psig  
Downstream: 10 psig to 300 psig

#### 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.

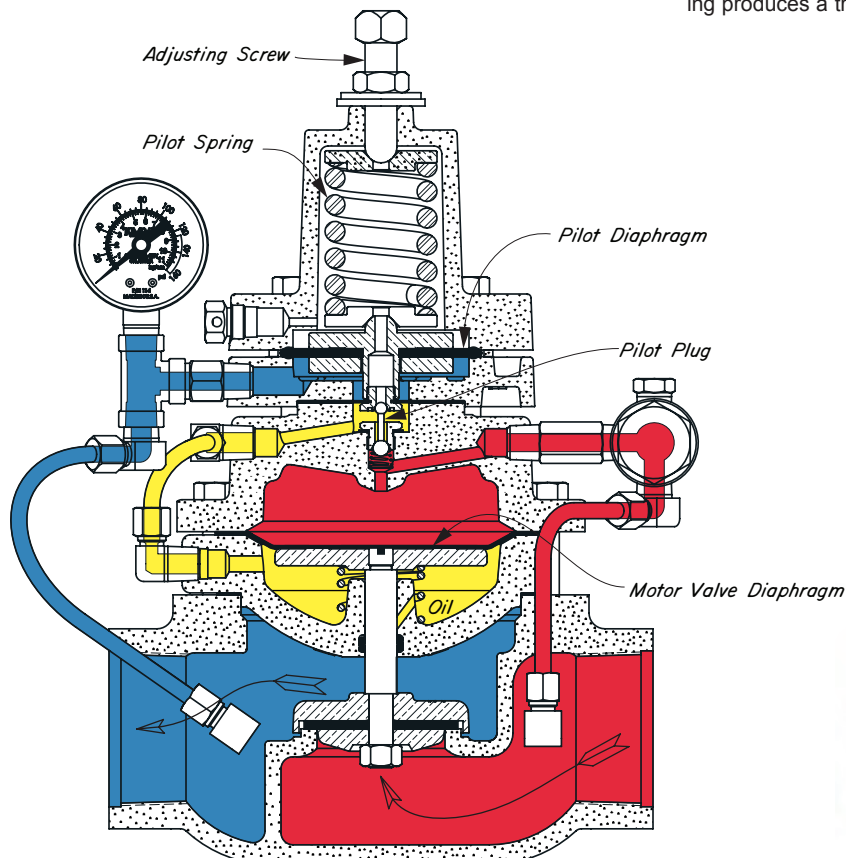
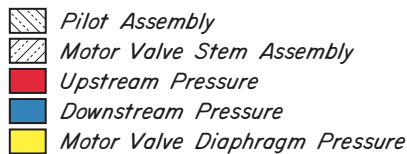
The lower seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The upper seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere). The PILOT SPRING loads the upper side of the Pilot Assembly and is opposed on the underneath side by the controlled Downstream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

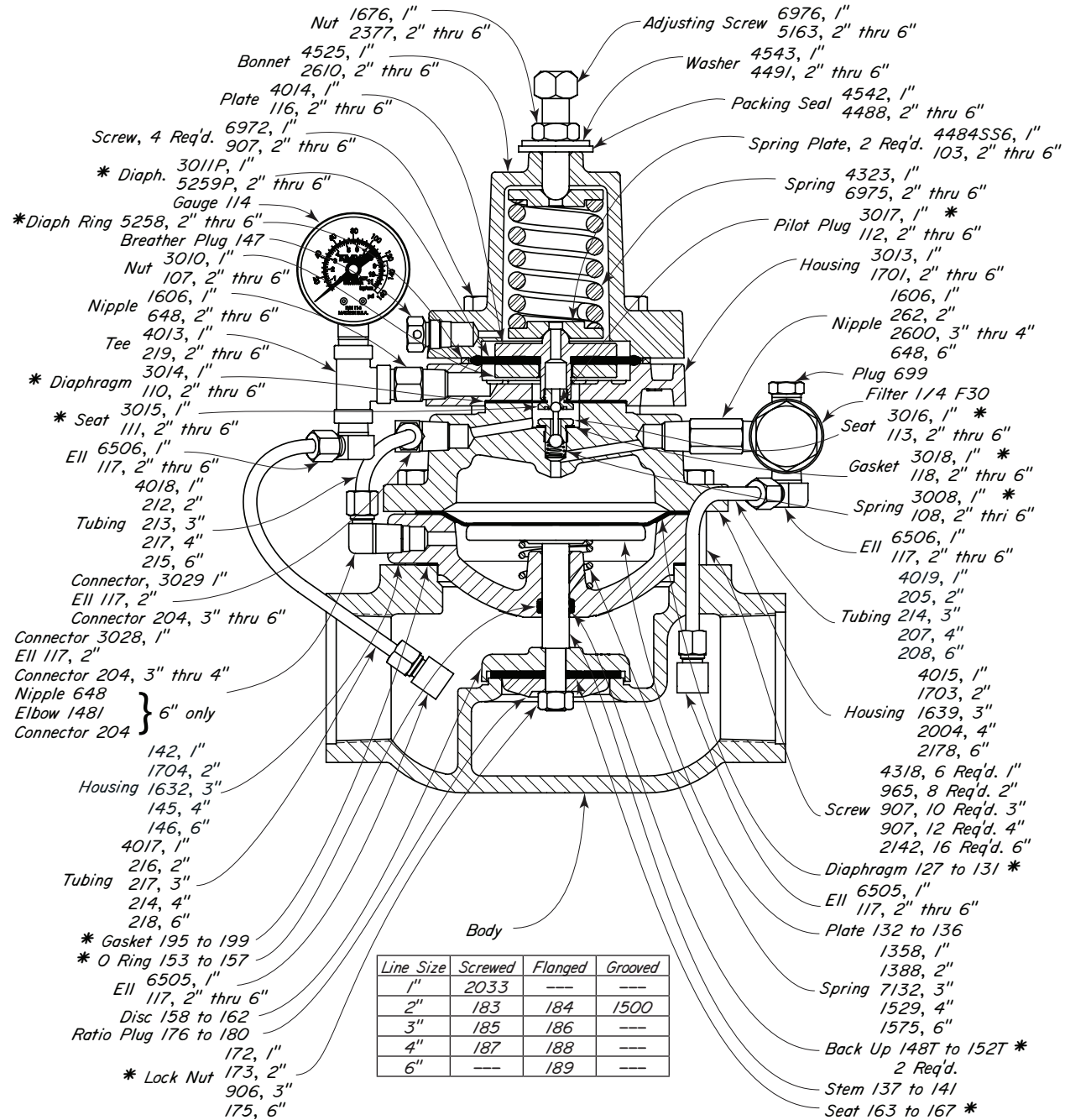
The intermittent bleed pilot, three-way valve action of the PILOT PLUG against its seat adjusts the Motor Valve Diaphragm Pressure (Yellow), repositioning the Motor Valve stem Assembly to accommodate any rate of flow. The rapid but stable repositioning produces a true throttling action.



# PRESSURE REGULATOR



## PRESSURE REDUCING DUCTILE IRON



Line Size	Screwed	Flanged	Grooved
1"	2033	---	---
2"	183	184	1500
3"	185	186	---
4"	187	188	---
6"	---	189	---

### THRU VALVES AVAILABLE:

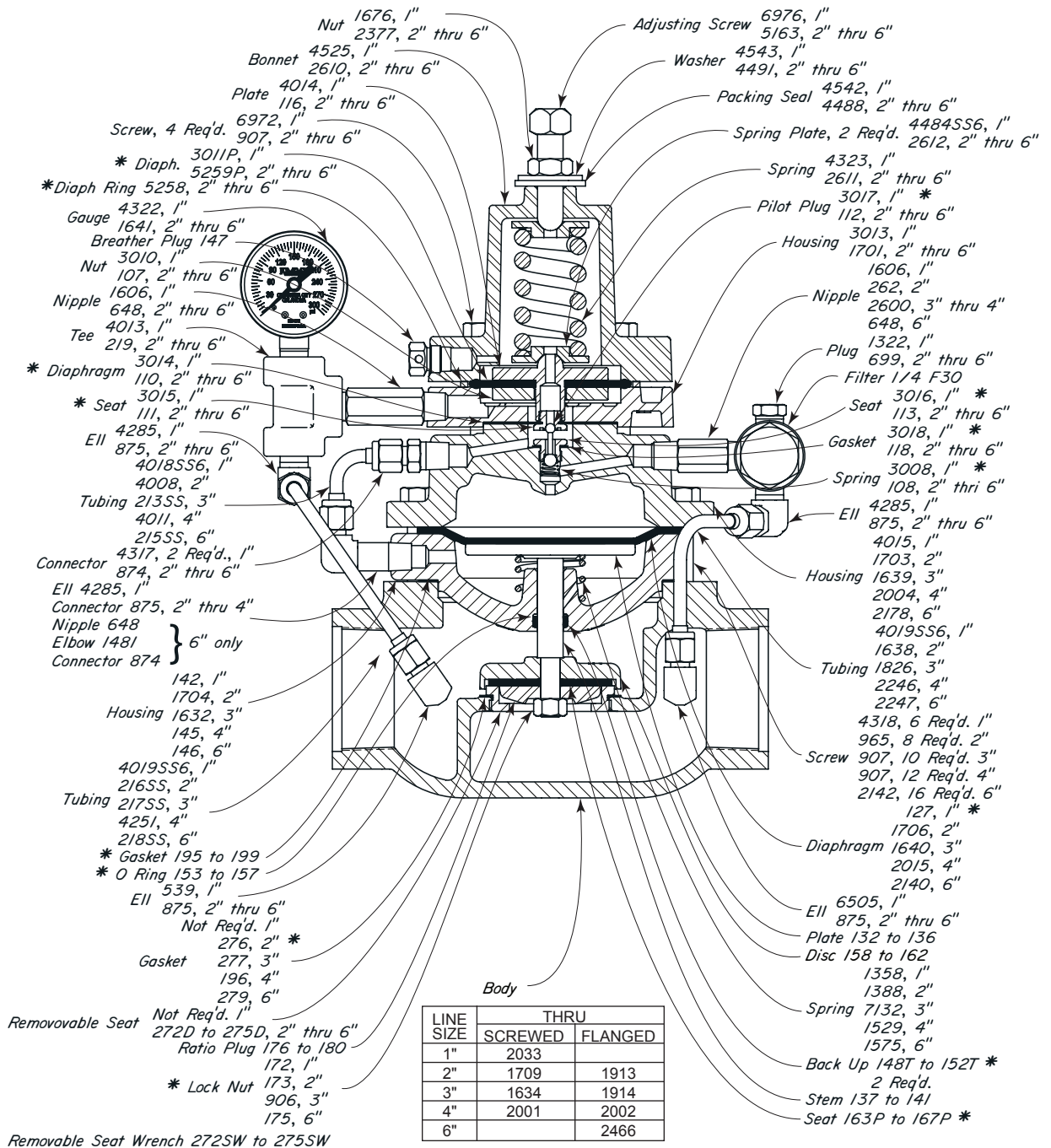
CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKE	1" SCRD.	112 SGT PR	125	175	RRT
ABK	2" SCRD.	212 SGT PR	125	175	RAA
ABL	2" FLGD. <sup>a</sup>	212 FGT PR	125	175	RAA
ABM	2" GRVD.	212 GGT PR	125	175	RAA
ABN	3" SCRD.	312 SGT PR	125	175	RAB
ABP	3" FLGD. <sup>a</sup>	312 FGT PR	125	175	RAB
ABR	4" SCRD.	412 SGT PR	125	175	RAC
ABS	4" FLGD. <sup>a</sup>	412 FGT PR	125	175	RAC
ABT	6" FLGD. <sup>a</sup>	612 FGT PR	125	175	RAD

### 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".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.





#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKF	1" SCR.D.	130 SGT PR-D	300	300	RRU
ABU	2" SCR.D.	230 SGT PR-D	300	300	RDG
ABW	2" FLGD.	218 FGT PR-D	250	250	RDG
ABX	3" SCR.D.	330 SGT PR-D	300	300	RDH
ABY	3" FLGD.	318 FGT PR-D	250	250	RDH
ACA	4" SCR.D.	430 SGT PR-D	300	300	RDI
ACB	4" FLGD.	418 FGT PR-D	250	250	RDI
ACC	6" FLGD.	618 FGT PR-D	250	250	RDJ

#### NOTES:

Dimensions, refer to Table of Contents.

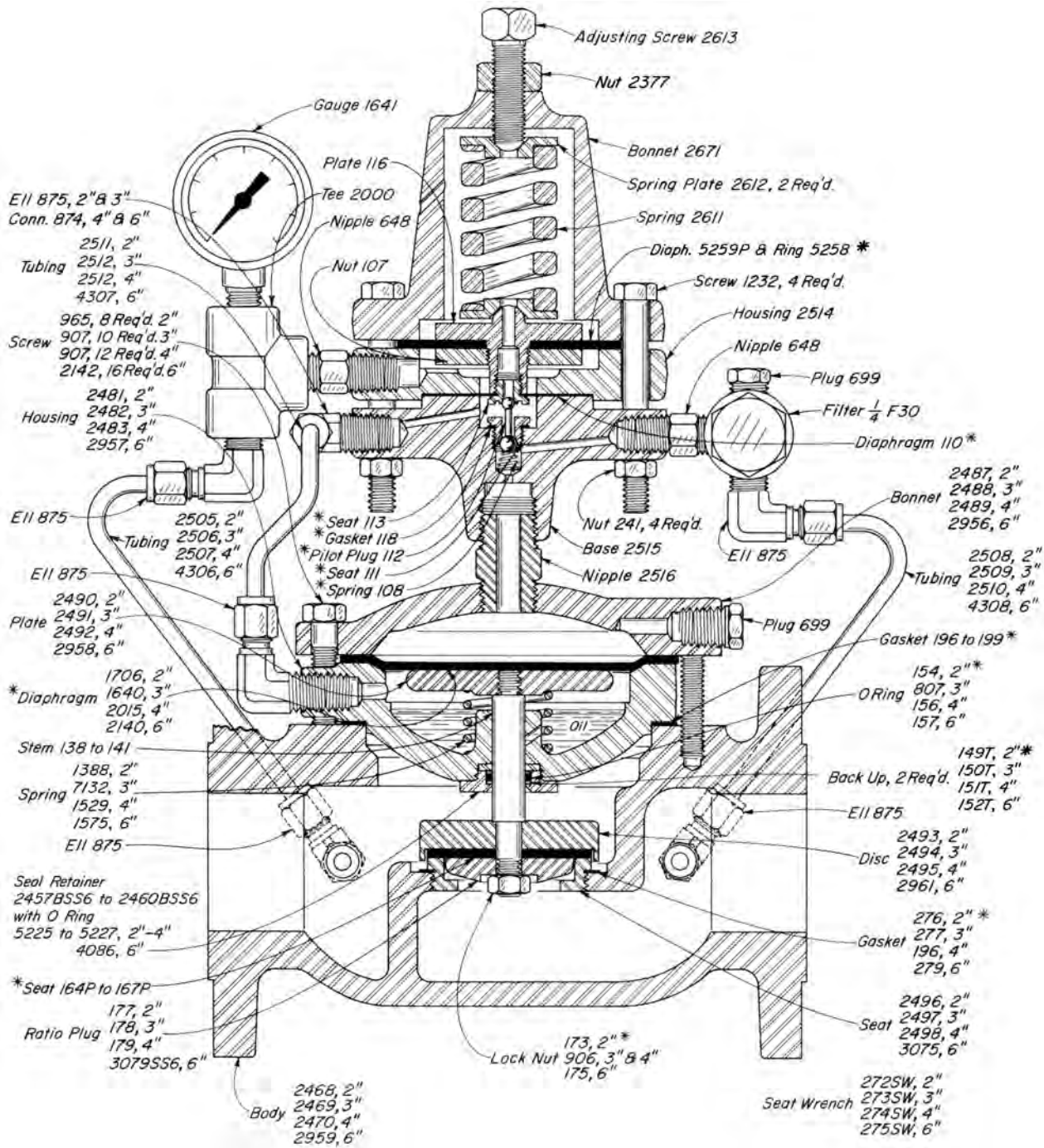
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Seats 163-1", 164-2", 165-3", 166-4", 167-6".

# PRESSURE REGULATOR



## PRESSURE REDUCING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AGG	2" FLGD.	227 FGT PR-S	285	285	RAE
AGH	3" FLGD.	327 FGT PR-S	285	285	RAF
AGI	4" FLGD.	427 FGT PR-S	285	285	RAG
AGJ	6" FLGD.	627 FGT PR-S	285	285	RAH

### 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: Stem 138-2", 139-3", 140-4", 141-6".

#### APPLICATIONS:

Regulation of inlet pressure to gas compressors. Control of supply or distribution system pressures.

#### PRESSURE RANGE:

Upstream: 75 psig to 500 psig  
Downstream: 75 psig to 500 psig

#### PILOT SUPPLY PRESSURE:







40 psig

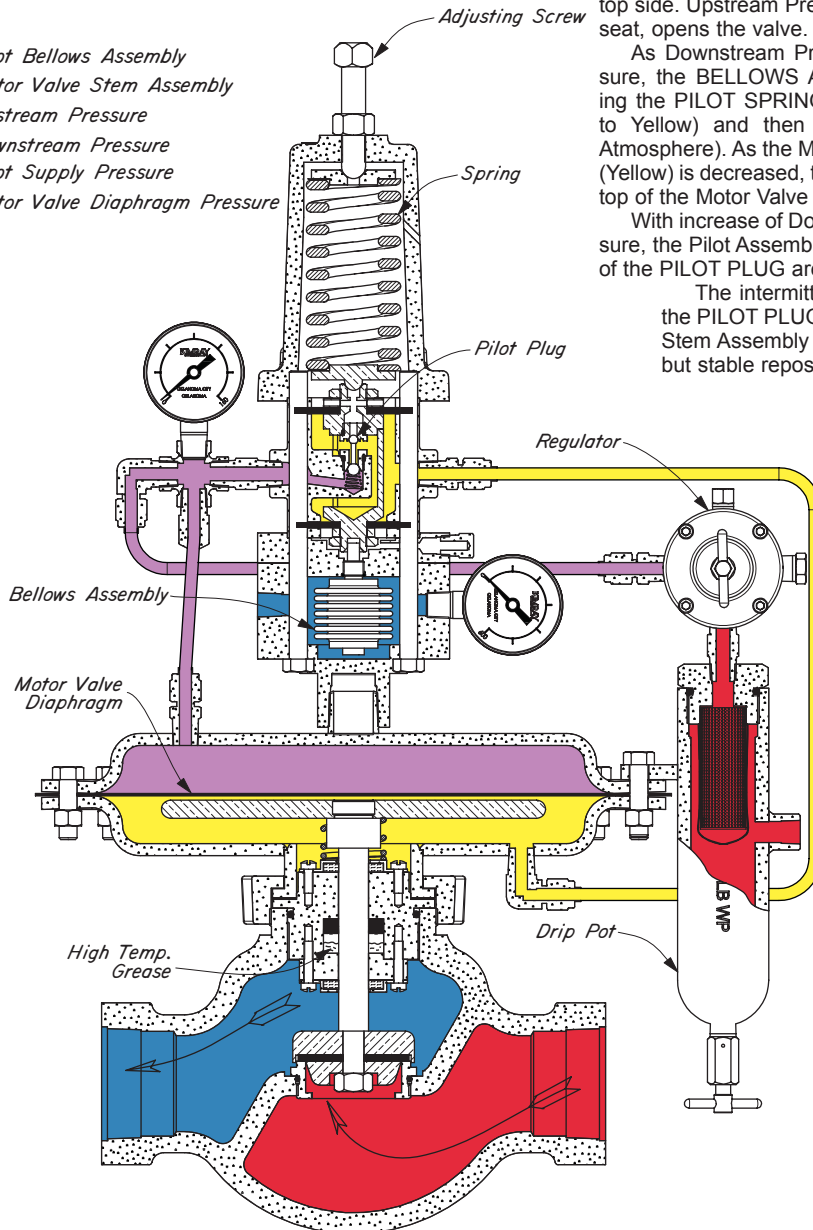
#### NOTE:

For upstream pressure less than 50 psig use outside source of supply to operate MOTOR VALVE DIAPHRAGM.

#### CAPACITY:

Refer to Table of Contents.

-  Pilot Bellows Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Downstream Pressure
-  Pilot Supply Pressure
-  Motor Valve Diaphragm Pressure



#### 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. The upper seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Violet to Yellow). The lower seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere).

The Pilot Supply Pressure (Violet) leads the MOTOR VALVE DIAPHRAGM to provide the closing force for the Motor Valve against the Upstream Pressure.

The PILOT SPRING in the bonnet loads the upper side of the Pilot Assembly and is opposed in the under side by Downstream Pressure (Blue) in the BELLOWS ASSEMBLY. Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Downstream Pressure (Blue) in the BELLOWS ASSEMBLY. The Pilot Assembly is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the upper seat for the PILOT PLUG (Violet to Yellow) is open. This allows Pilot Supply Pressure (Violet) to 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 BELLOWS ASSEMBLY expands upward, compressing the PILOT SPRING and first closing the upper seat (Violet to Yellow) and then opening the pressure vent (Yellow to Atmosphere). As the MOTOR VALVE DIAPHRAGM PRESSURE (Yellow) is decreased, the PILOT SUPPLY PRESSURE acting on top of the Motor Valve Diaphragm begins to close the valve.

With increase of Downstream Pressure (Blue) to the set pressure, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

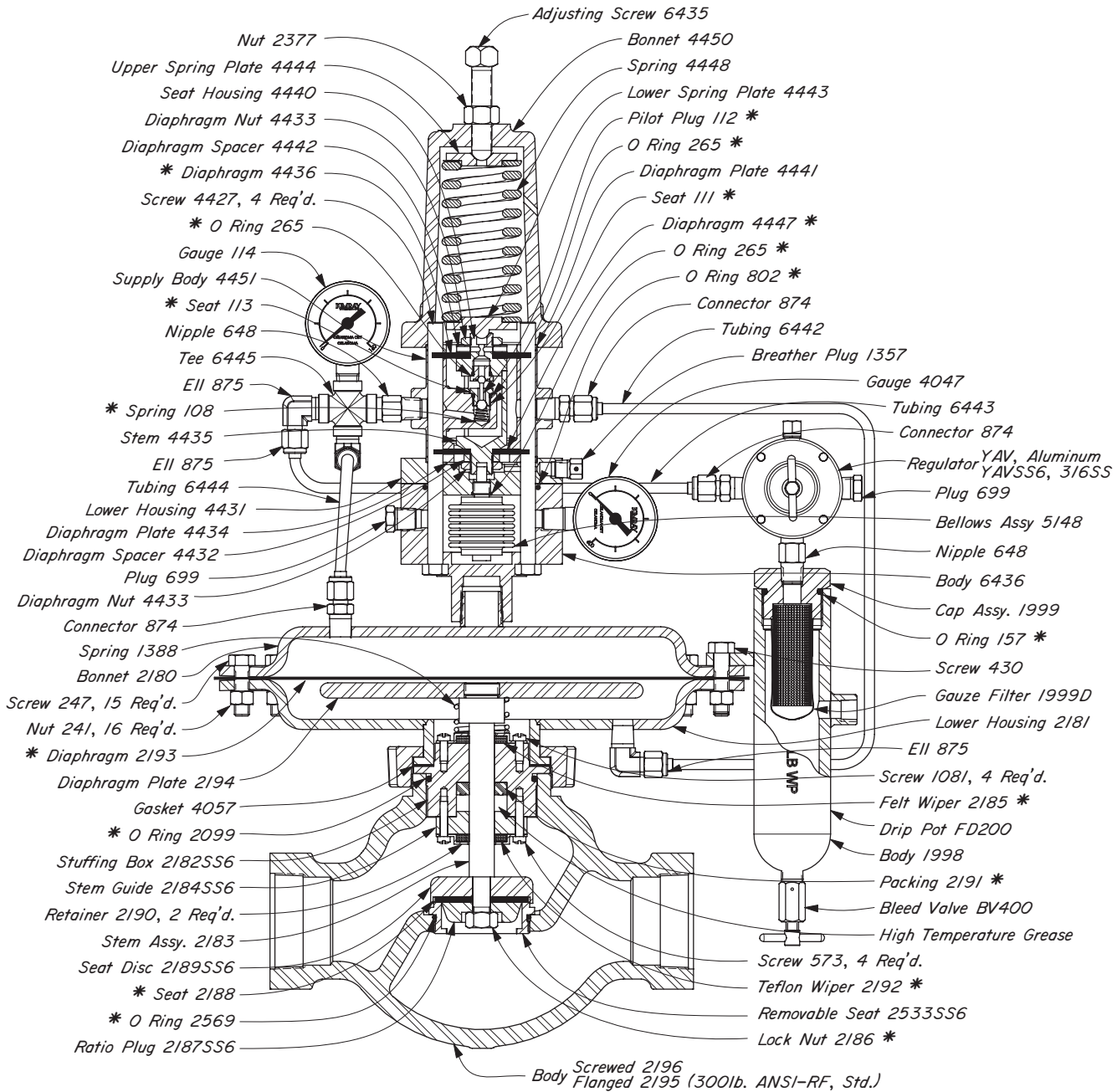
The intermittent bleed pilot, three-way valve action of the PILOT PLUG against its seats adjusts the Motor Valve Stem Assembly to accommodate any flow rate. The rapid but stable repositioning produces a true throttling action.



# PRESSURE REGULATOR



## PRESSURE REDUCING STEEL / ALL STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ACD	2" SCRD.	250 SGT PR-S	500	500	RAI
ACE	2" FLGD.	250 FGT PR-S	500	500	RAI
ACD1	2" SCRD.	250 SGT PR-STL	500	500	RAI
ACE1	2" FLGD.	250 FGT PR-STL	500	500	RAI

### NOTES:

Dimensions, refer to Table of Contents.

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

#### APPLICATIONS:

Regulation of inlet pressure to gas compressors. Control of supply or distribution system pressures.

Regulation of down stream pressure where it is desired that no gas be vented.

- Inside Buildings
- In Populated Areas
- Emissions Regulated Areas
- Sour or Poisonous Gas Systems

#### PRESSURE RANGE:

Ductile Iron:

Upstream: 10 psig to 125 psig

Downstream: 5 psig to 125 psig

Ductile Iron:

Upstream: 10 psig to 300 psig

Downstream: 10 psig to 300 psig

Minimum Differential:

5 psig

#### 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.

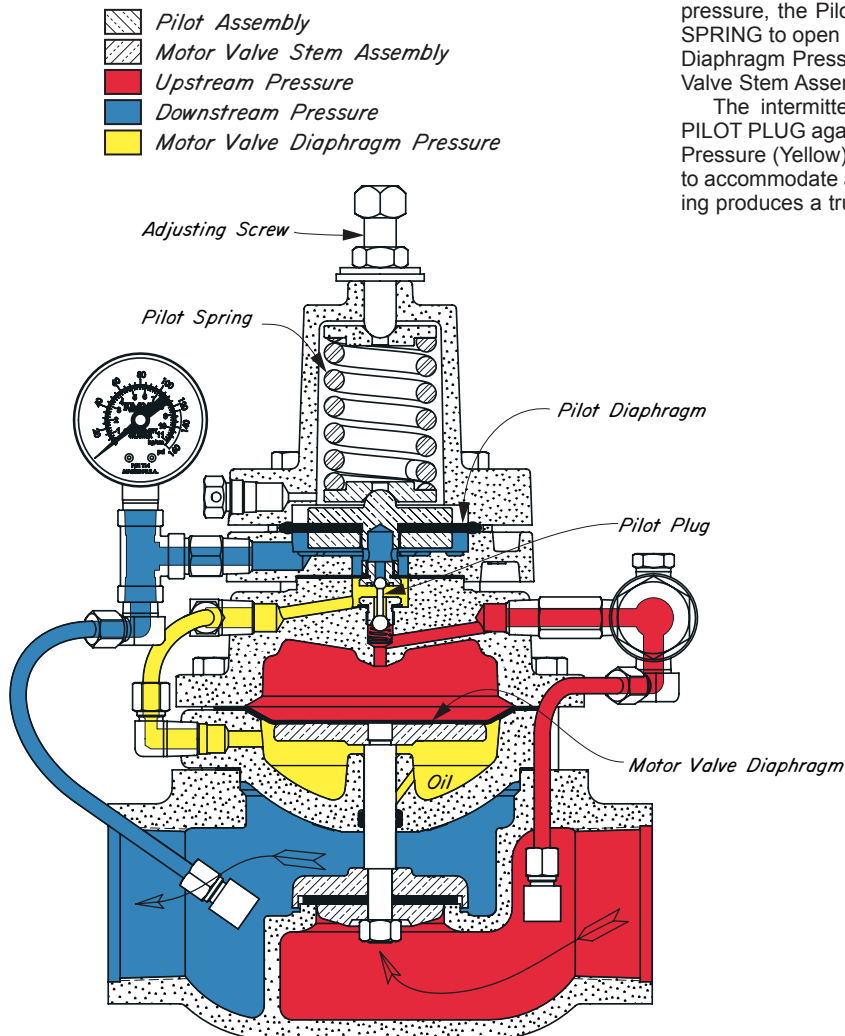
The lower seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The upper seat for the PILOT PLUG is the pressure vent (Yellow to Blue). The PILOT SPRING loads the upper side of the Pilot Assembly and is opposed on the underneath side by controlled Downstream Pressure (Blue).

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 Blue) and open the lower seat (Red to Yellow).

This lets full Upstream Pressure (Red), if necessary, 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 Blue). Motor Valve Diaphragm Pressure (Yellow) decreases to reposition the Motor Valve Stem Assembly.

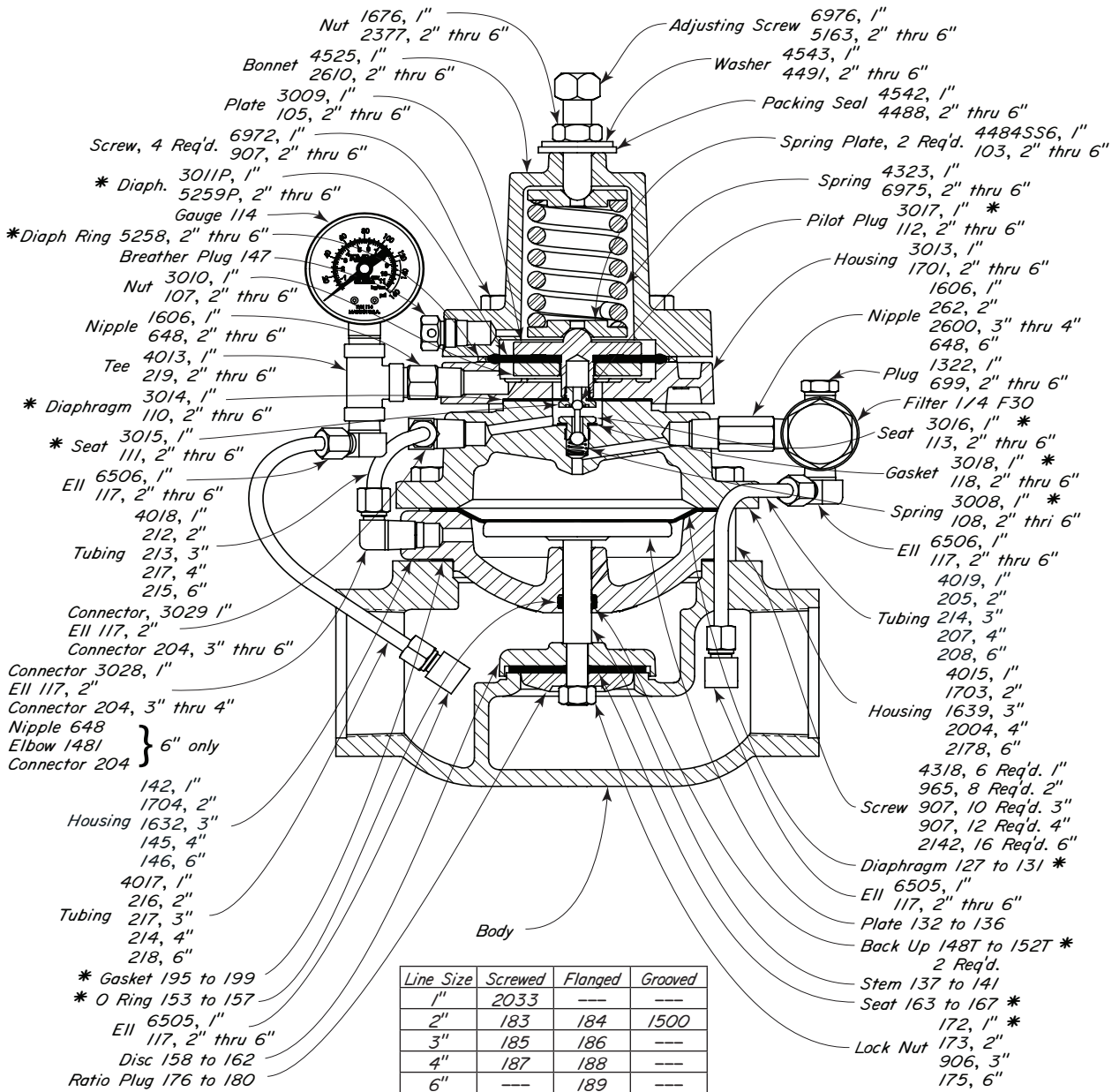
The intermittent bleed pilot, three-way valve action of the PILOT PLUG against its seat adjusts the Motor Valve Diaphragm Pressure (Yellow), repositioning the Motor Valve Stem Assembly to accommodate any rate of flow. The rapid but stable repositioning produces a true throttling action.



# PRESSURE REGULATOR



## PRESSURE REDUCING NON VENTING DUCTILE IRON



Line Size	Screwed	Flanged	Grooved
1"	2033	---	---
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
AKL	1" SCRD.	112 SGT PR-NV	125	175	RRT
AKM	2" SCRD.	212 SGT PR-NV	125	175	RAA
AKN	2" FLGD. <sup>a</sup>	212 FGT PR-NV	125	175	RAA
AKO	2" GRVD.	212 GGT PR-NV	125	175	RAA
AKP	3" SCRD.	312 SGT PR-NV	125	175	RAB
AKQ	3" FLGD. <sup>a</sup>	312 FGT PR-NV	125	175	RAB
AKR	4" SCRD.	412 SGT PR-NV	125	175	RAC
AKS	4" FLGD. <sup>a</sup>	412 FGT PR-NV	125	175	RAC
AKT	6" FLGD. <sup>a</sup>	612 FGT PR-NV	125	175	RAD

### NOTES:

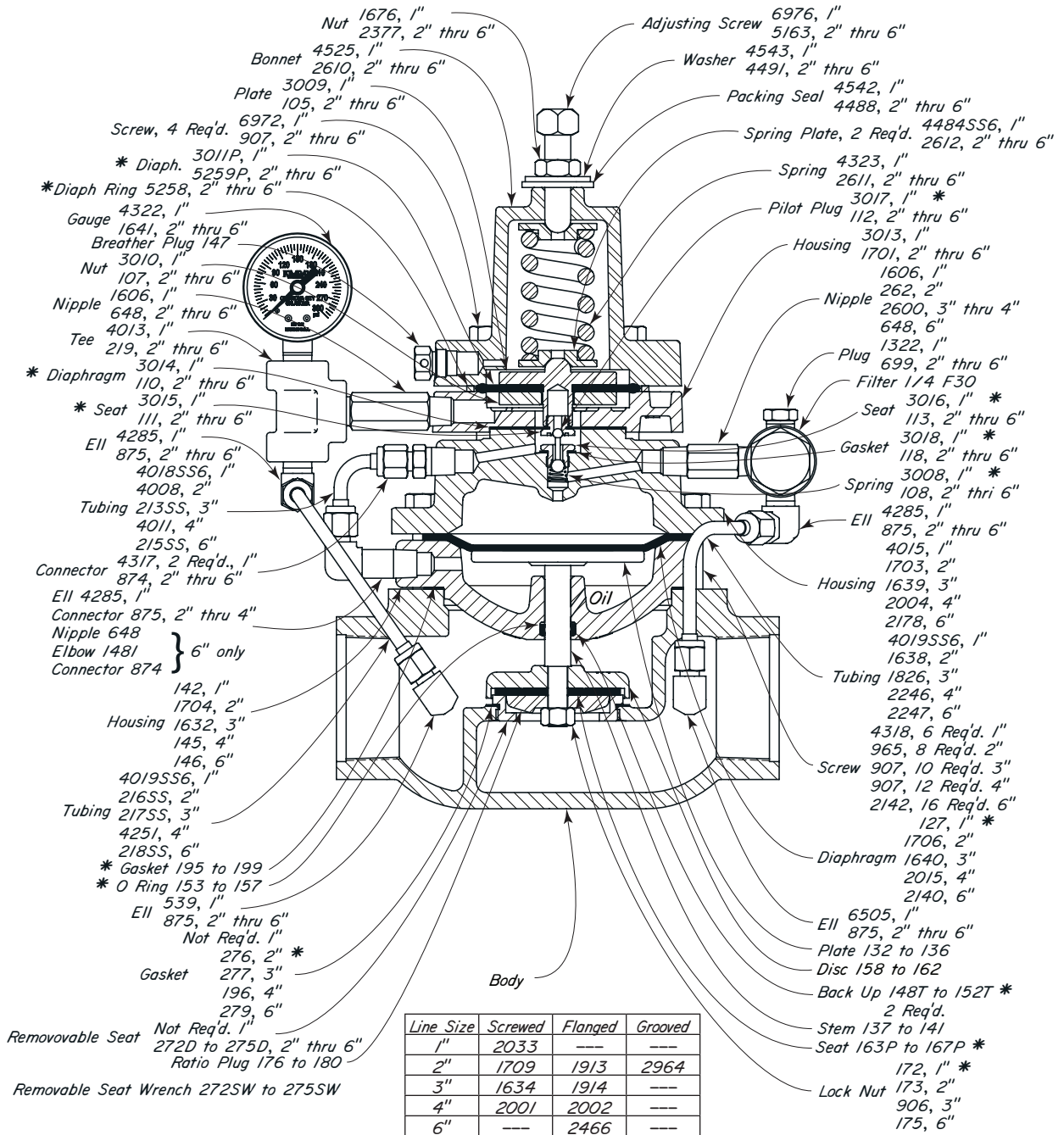
Dimensions, refer to Table of Contents.

\*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".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

### PRESSURE REDUCING NON VENTING DUCTILE IRON



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKLD	1" SCR.D.	130 SGT PR-NV-D	300	300	RRU
AKMD	2" SCR.D.	230 SGT PR-NV-D	300	300	RDG
AKND	2" FLGD.	218 FGT PR-NV-D	250	250	RDG
AKOD	2" GRVD.	230 GGT PR-NV-D	300	300	RDG
AKPD	3" SCR.D.	330 SGT PR-NV-D	300	300	RDH
AKQD	3" FLGD.	318 FGT PR-NV-D	250	250	RDH
AKRD	4" SCR.D.	430 SGT PR-NV-D	300	300	RDI
AKSD	4" FLGD.	418 FGT PR-NV-D	250	250	RDI
AKTD	6" FLGD.	618 FGT PR-NV-D	250	250	RDJ

#### NOTES:

Dimensions, refer to Table of Contents.

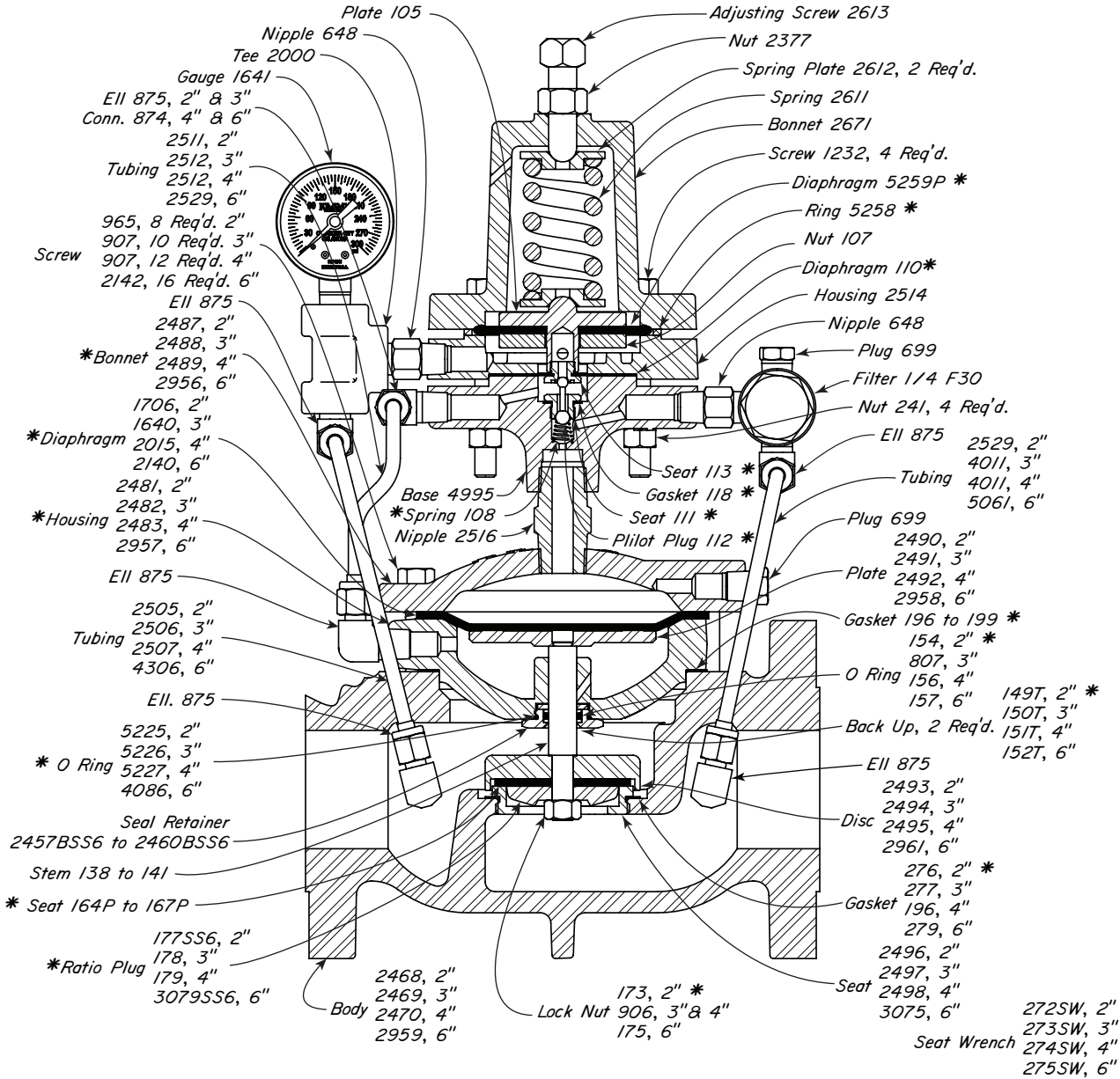
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Seat 163P-1", 164P-2", 165P-3", 166P-4", 167P-6".

# PRESSURE REGULATOR



## PRESSURE REDUCING NON VENTING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AEV	2" FLGD.	227 FGT PR-S NV	285	285	RAE
AEW	3" FLGD.	327 FGT PR-S NV	285	285	RAF
AEX	4" FLGD.	427 FGT PR-S NV	285	285	RAG
AEY	6" FLGD.	627 FGT PR-S NV	285	285	RAH

### 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: Stem 138-2", 139-3", 140-4", 141-6".



#### 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:

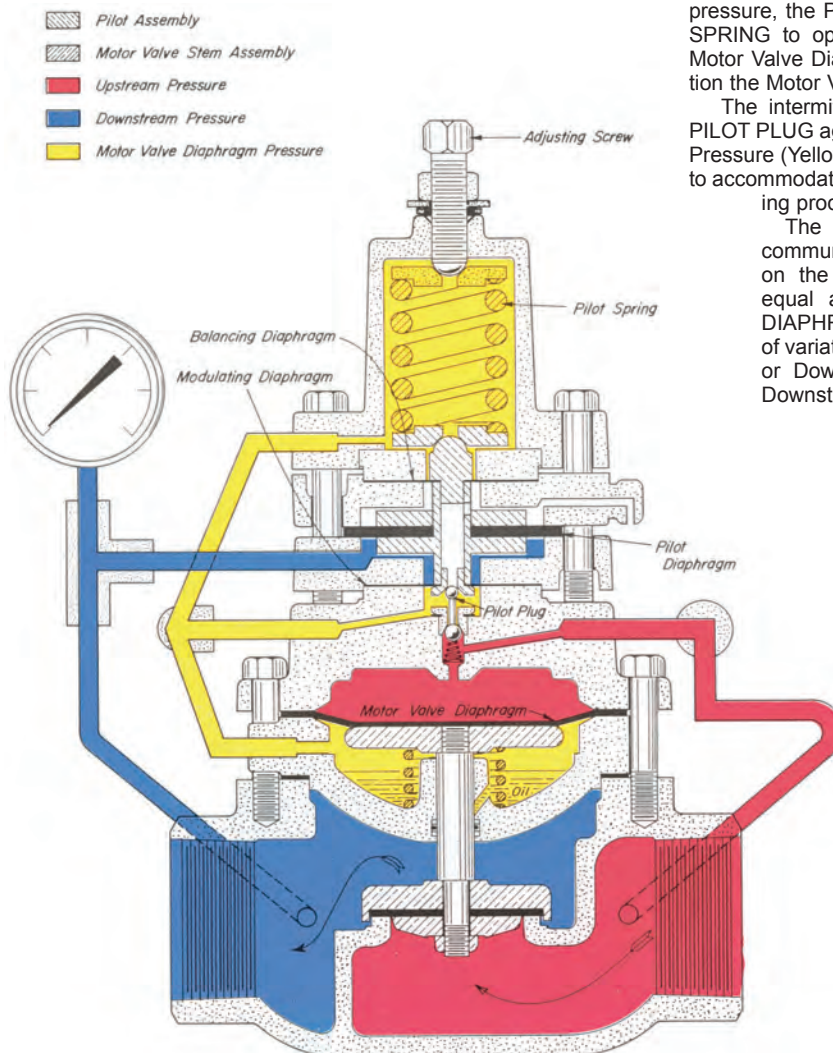
Ductile Iron:	Upstream: 10 psig to 125 psig
	Downstream: 5 psig to 125 psig
Ductile Iron:	Upstream: 10 psig to 300 psig
	Downstream: 5 psig to 300 psig
Steel:	Upstream: 10 psig to 300 psig
	Downstream: 5 psig to 300 psig

#### 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.

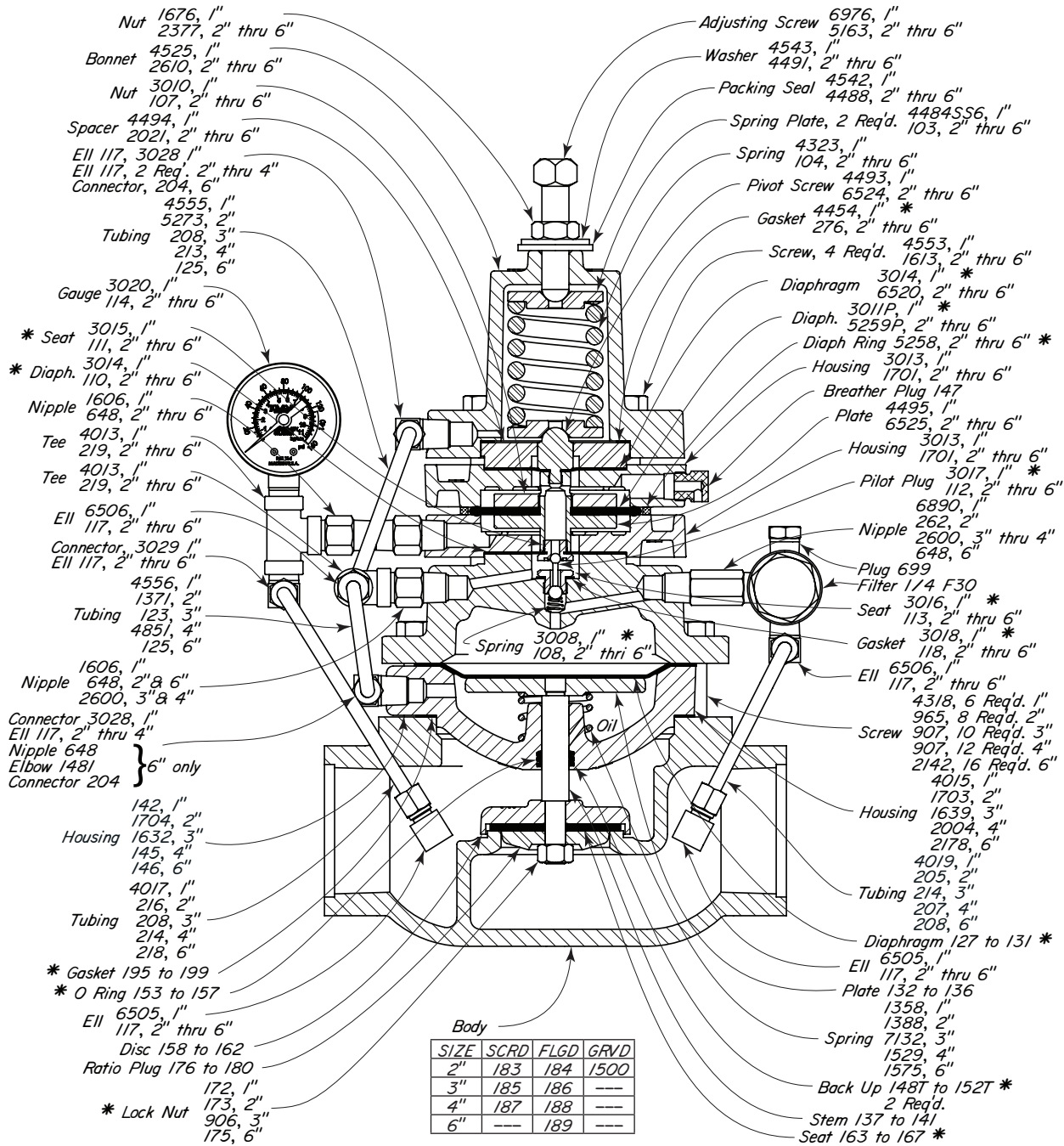
The Motor Valve Diaphragm Pressure (Yellow) is communicated to the bonnet area, this pressure acts on the BALANCING DIAPHRAGM to counteract the equal and opposite pressure on the MODULATING DIAPHRAGM. This balancing action reduces the effect of variation in Upstream Pressure (Red) on the controlled or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



# PRESSURE REGULATOR



## PRESSURE REDUCING BALANCED DUCTILE IRON



### 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. <sup>a</sup>	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. <sup>a</sup>	312 FGT PRB	125	175	RRJ
AJF	4" SCRD.	412 SGT PRB	125	175	RRK
AJG	4" FLGD. <sup>a</sup>	412 FGT PRB	125	175	RRK
AJH	6" FLGD. <sup>a</sup>	612 FGT PRB	125	175	RRL

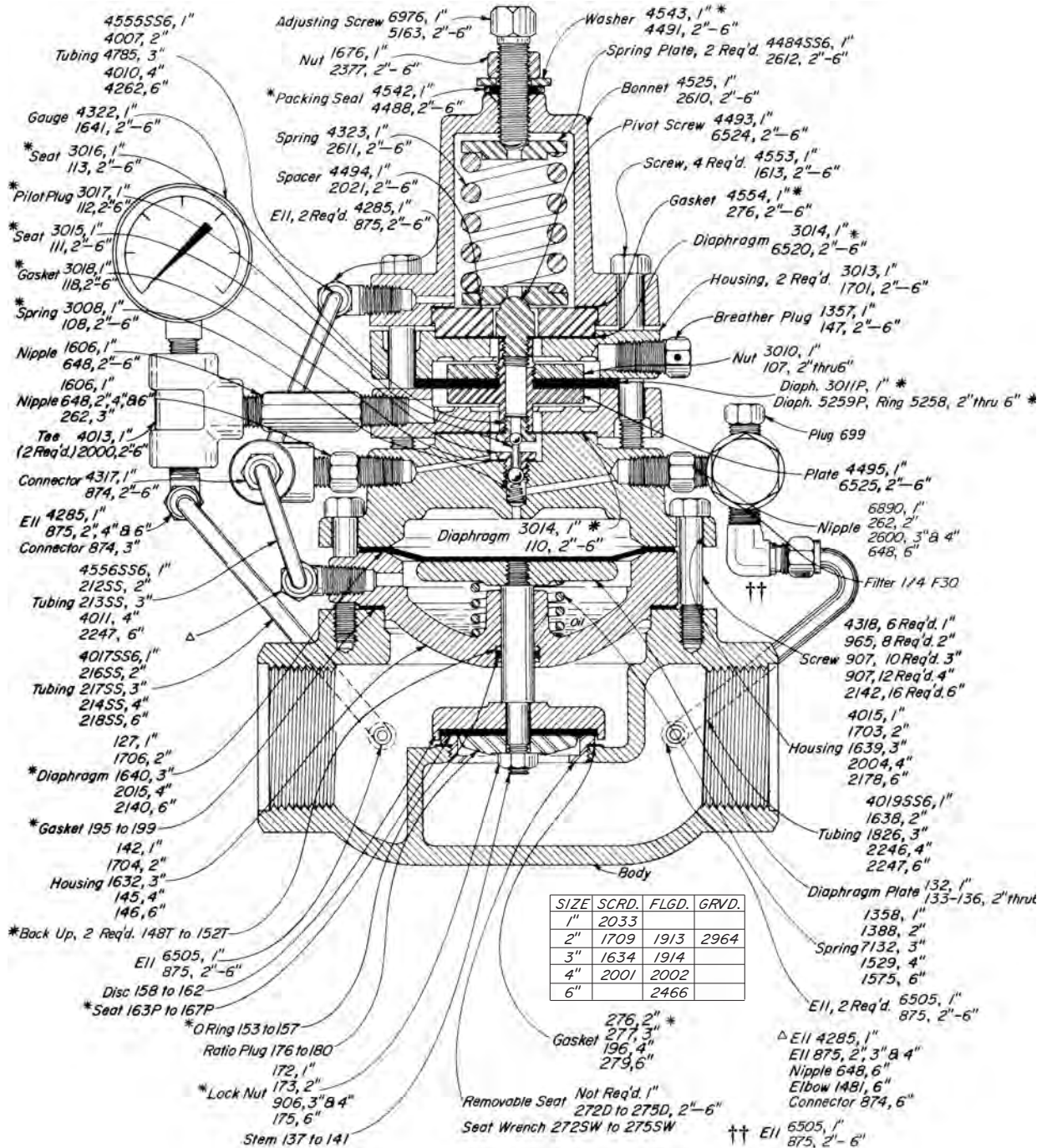
### NOTES:

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".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AKJ	1" SCRD.	130 SGT PRB-D	300	300	RRZ
AJ	2" SCRD.	230 SGT PRB-D	300	300	RRM
AJ	2" FLGD.	218 FGT PRB-D	250	250	RRM
AJK	3" SCRD.	330 SGT PRB-D	300	300	RRN
AJL	3" FLGD.	318 FGT PRB-D	250	250	RRN
AJM	4" SCRD.	430 SGT PRB-D	300	300	RRO
AJN	4" FLGD.	418 FGT PRB-D	250	250	RRO
AJP	6" FLGD.	618 FGT PRB-D	250	250	RRP

#### NOTES:

Dimensions, refer to Table of Contents.

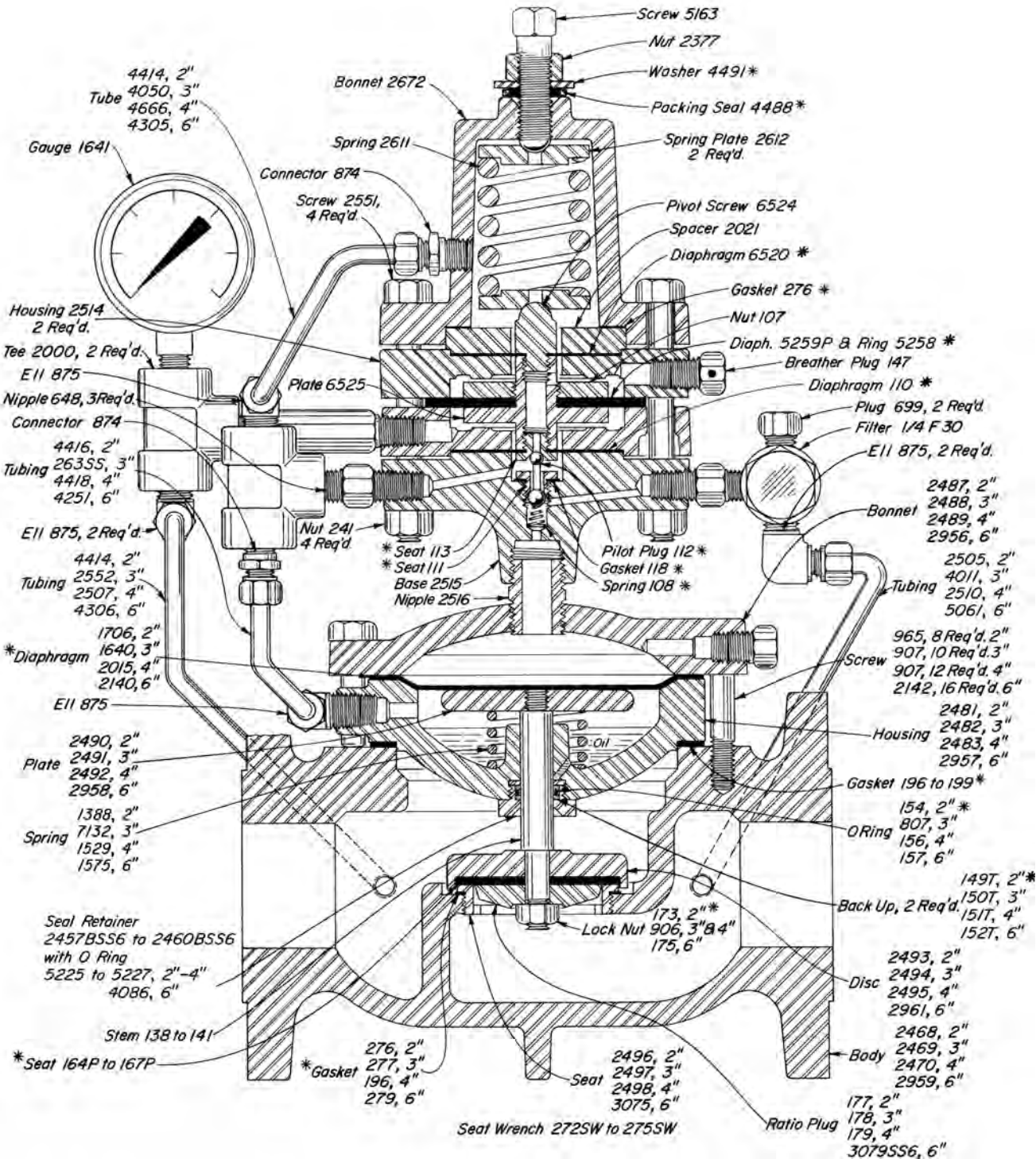
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Seat 163P-1", 164P-2", 165P-3", 166P-4", 167P-6".

# PRESSURE REGULATOR



## PRESSURE REDUCING BALANCED STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AJR	2" FLGD.	227 FGT PRB-S	285	285	RRQ
AJS	3" FLGD.	327 FGT PRB-S	285	285	RRR
AJT	4" FLGD.	427 FGT PRB-S	285	285	RRS
AJU	6" FLGD.	627 FGT PRB-S	285	285	RRX

### 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: Gasket 196-2", 197-3", 198-4", 199-6".

#### APPLICATION:

Control back pressure in liquid packed systems where an auxiliary source of supply gas pressure is available.

#### PRESSURE RANGE:

Ductile Iron: 5 psig to 125 psig  
 Ductile Iron: 10 psig to 300 psig  
 Steel: 10 psig to 300 psig

#### SUPPLY PRESSURE:

Equal to or not less than 60% of controlled pressure upstream.

#### CAPACITY:

Refer to Table of Contents.

#### OPERATION:

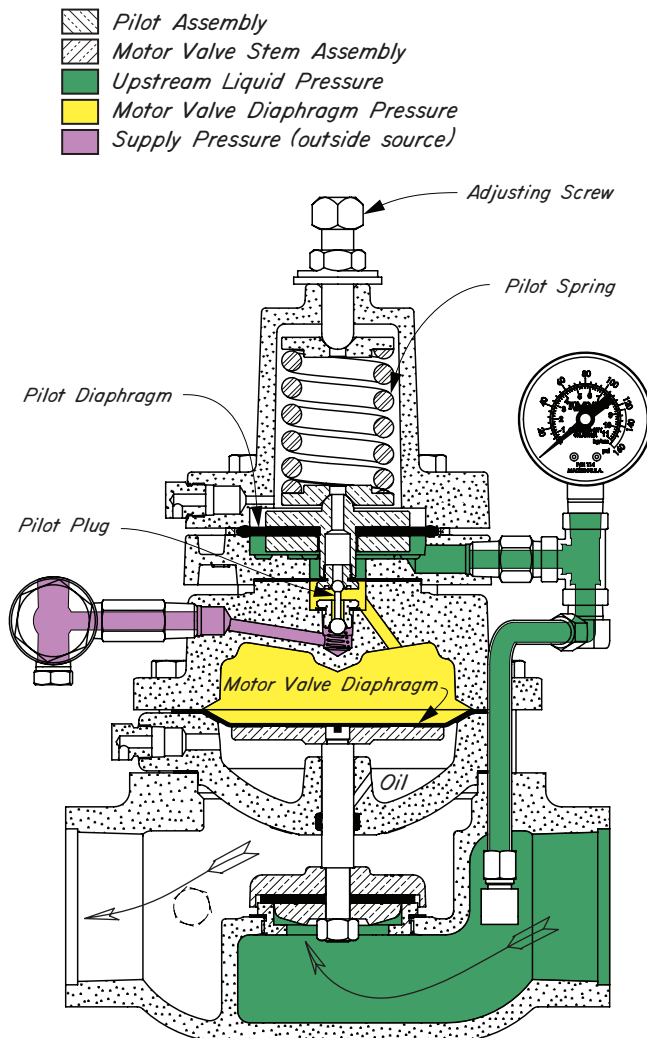
The Pilot Assembly and Motor Valve Stem Assembly (Crosshatched) are the only moving units in the regulator. The PILOT PLUG consists of two stainless balls rigidly connected together. The lower seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Purple to Yellow). The upper seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere).






The PILOT SPRING in the bonnet loads the upper side of the Pilot Assembly and is opposed on the underside by Upstream Liquid Pressure (Green).

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Upstream Liquid Pressure (Green). The Pilot Assembly is forced downward by the PILOT SPRING. The upper seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Purple to Yellow) is open. This lets full Supply Pressure (Purple) load the MOTOR VALVE DIAPHRAGM to close the motor valve. The area of the MOTOR VALVE DIAPHRAGM is twice the area of the motor valve seat, assuring a positive shut-off.

As the Upstream Liquid Pressure (Green) increases to the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to first close the lower seat (Purple to Yellow) and open the pressure vent (Yellow to Atmosphere). As the Motor Valve Diaphragm Pressure (Yellow) is decreased, the Upstream Liquid Pressure (Green) acting under the motor valve seat, opens the valve. With relief of Upstream Liquid Pressure (Green) through the motor valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

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.



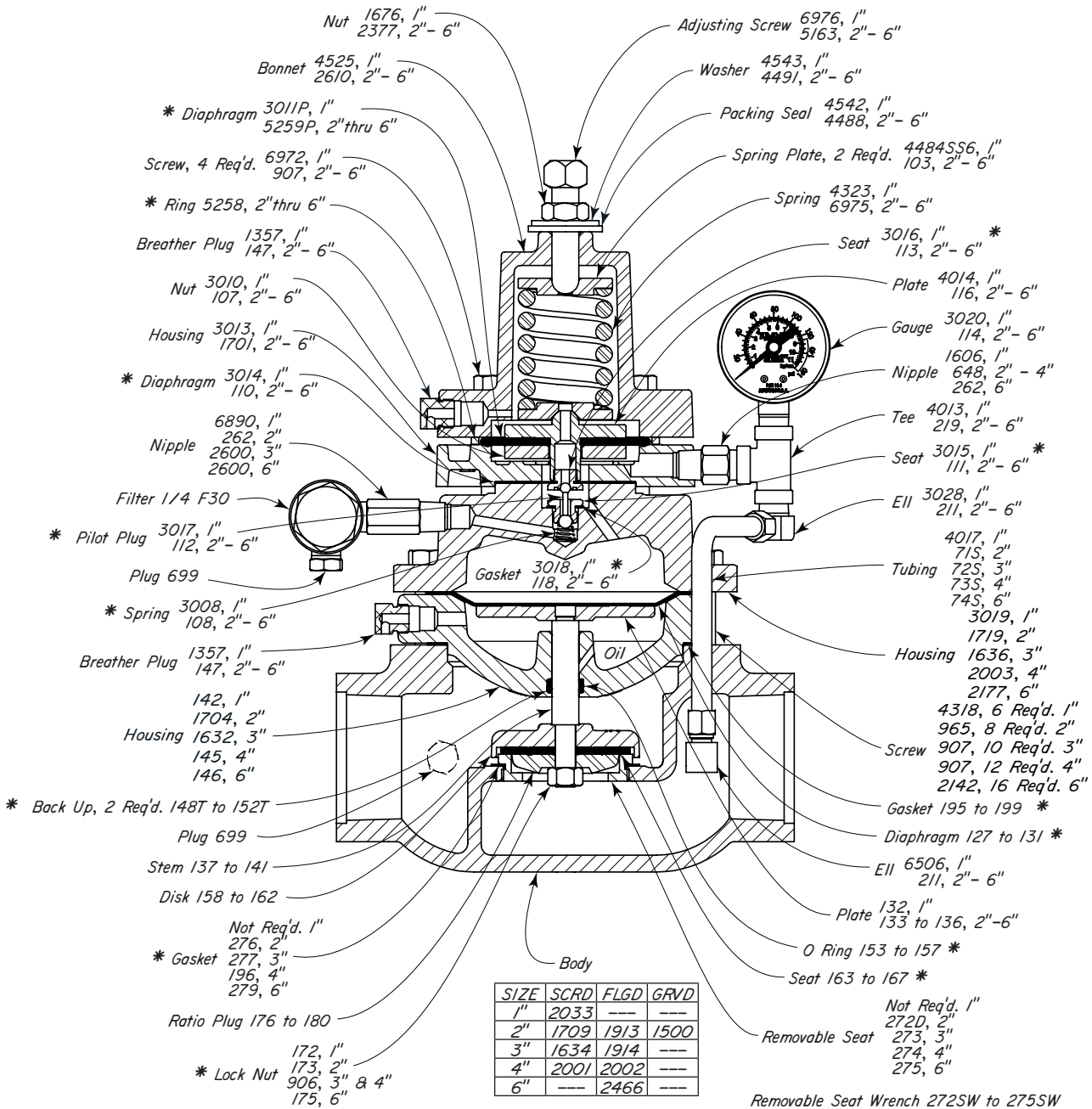
-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Upstream Liquid Pressure
-  Motor Valve Diaphragm Pressure
-  Supply Pressure (outside source)



# PRESSURE REGULATOR



## LIQUID BACK PRESSURE DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ACF	1" SCRD.	112 SGT LBP	125	175	RRT
AEE	2" SCRD.	212 SGT LBP	125	175	RAA
AEF	2" FLGD. <sup>a</sup>	212 FGT LBP	125	175	RAA
AEG	2" GRVD.	212 GGT LBP	125	175	RAA
AEH	3" SCRD.	312 SGT LBP	125	175	RAB
AEI	3" FLGD. <sup>a</sup>	312 FGT LBP	125	175	RAB
AEJ	4" SCRD.	412 SGT LBP	125	175	RAC
AEK	4" FLGD. <sup>a</sup>	412 FGT LBP	125	175	RAC
AEL	6" FLGD. <sup>a</sup>	612 FGT LBP	125	175	RAD

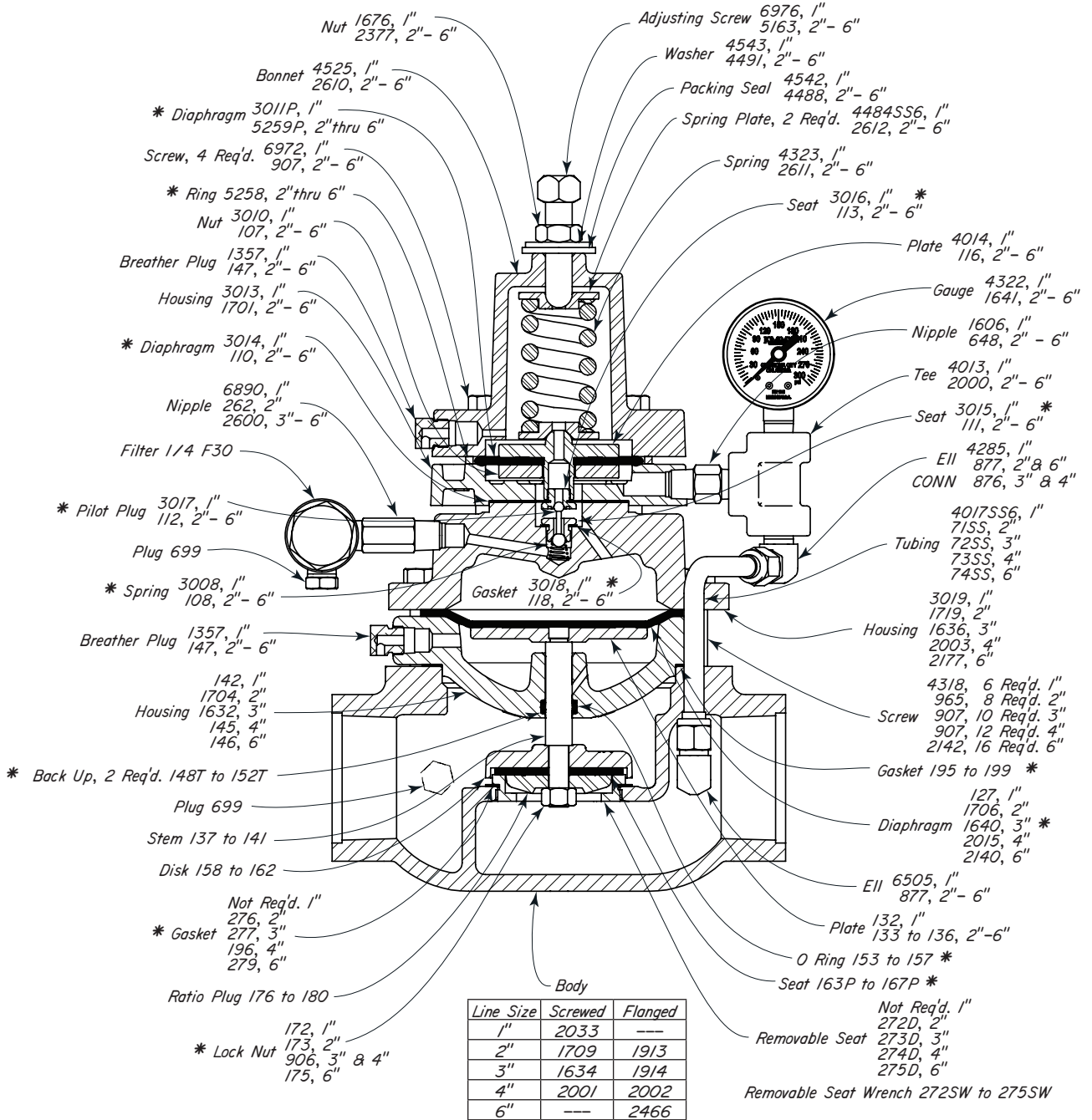
### NOTES:

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: Seat 163-1", 164-2", 165-3", 166-4", 167-6".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ACG	1" SCR.D.	130 SGT LBP-D	300	300	RRU
AEM	2" SCR.D.	230 SGT LBP-D	300	300	RDG
AEN	2" FLGD.	218 FGT LBP-D	250	250	RDG
AEP	3" SCR.D.	330 SGT LBP-D	300	300	RDH
AER	3" FLGD.	318 FGT LBP-D	250	250	RDH
AES	4" SCR.D.	430 SGT LBP-D	300	300	RDI
AET	4" FLGD.	418 FGT LBP-D	250	250	RDI
AEU	6" FLGD.	618 FGT LBP-D	250	250	RDJ

#### NOTES:

Dimensions, refer to Table of Contents.

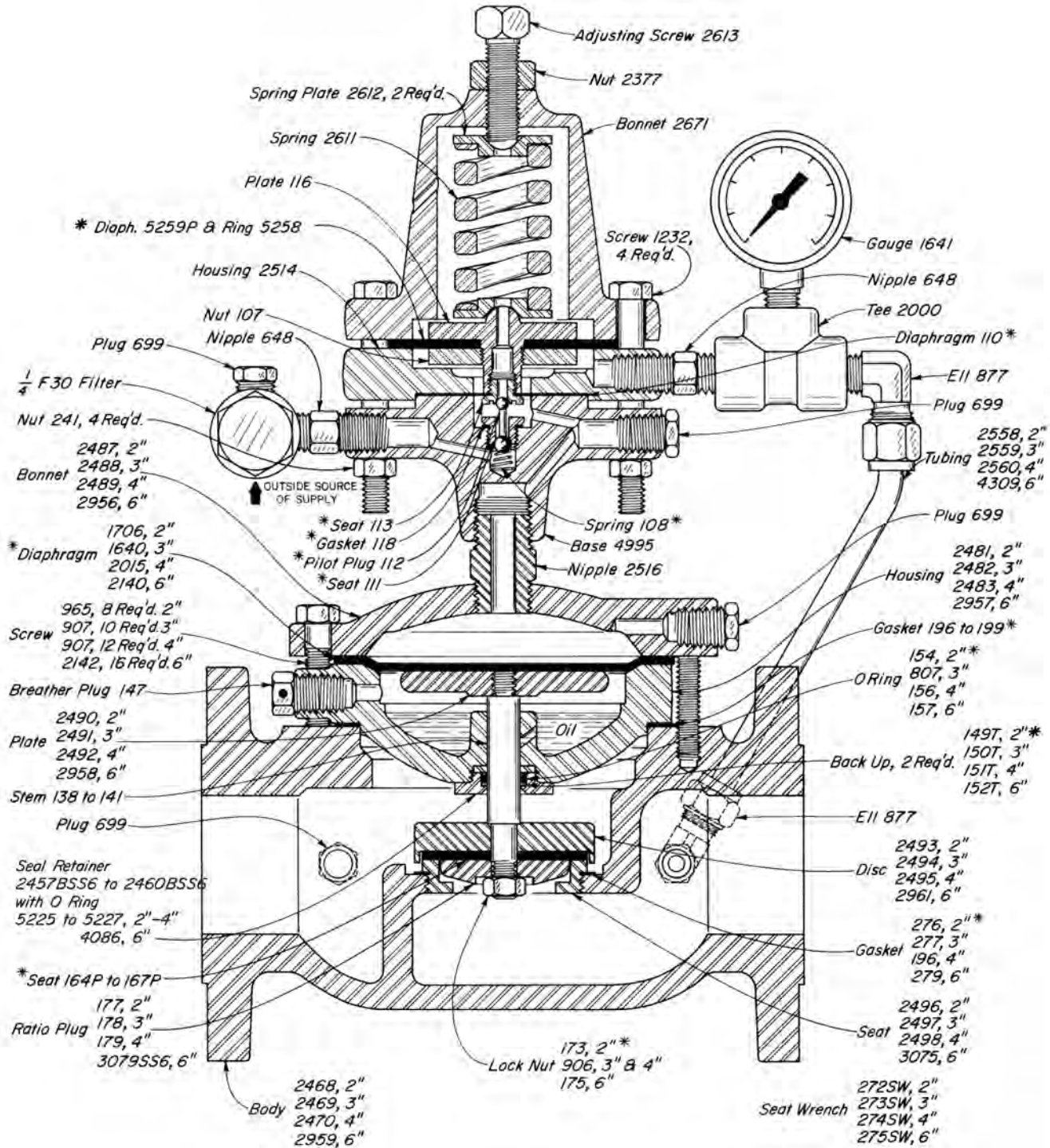
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Seat 164P-2", 165P-3", 166P-4", 167P-6".

# PRESSURE REGULATOR



## LIQUID BACK PRESSURE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AGW	2" FLGD.	227 FGT LBP-S	285	285	RAE
AGX	3" FLGD.	327 FGT LBP-S	285	285	RAF
AGY	4" FLGD.	427 FGT LBP-S	285	285	RAG
AGZ	6" FLGD.	627 FGT LBP-S	285	285	RAH

### 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: Gasket 196-2", 197-3", 198-4", 199-6".



#### APPLICATION:






For maintaining a constant pressure drop across meter systems.

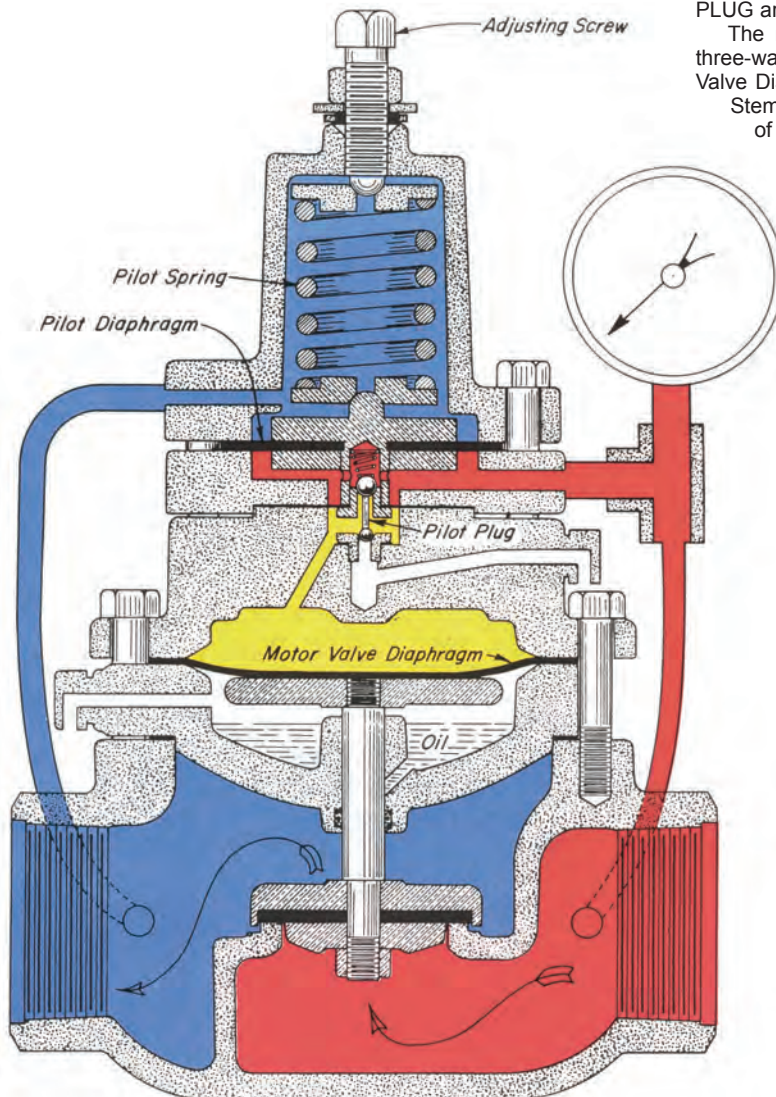
#### PRESSURE RANGE:

Ductile Iron: 5 psig to 125 psig  
 Ductile Iron: 10 psig to 300 psig  
 Steel: 10 psig to 300 psig

#### CAPACITY:

Refer to Table of Contents.

-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Downstream Pressure
-  Upstream Pressure
-  Motor Valve Diaphragm Pressure



#### OPERATION:

This regulator is designed to control a set difference between Upstream Pressure (Red) and Downstream Pressure (blue). The differential pressure is set by changing the PILOT SPRING load with the ADJUSTING SCREW.

Any change in Downstream Pressure (Blue) will position the Motor Valve Stem Assembly until a like change in Upstream Pressure (Red) has occurred to maintain the set differential pressure.

Assume the load produced by the PILOT SPRING and Downstream Pressure (Blue) acting on the Pilot Assembly has caused it to move downward. This opens the upper seat of the PILOT PLUG (Red to Yellow) and closes the lower seat (Yellow to Atmosphere) admitting full Upstream Pressure (Red) to the MOTOR VALVE DIAPHRAGM, closing the motor valve seat. The area of the MOTOR VALVE DIAPHRAGM is twice the area of the motor valve seat, assuring tight shut-off.

As the Upstream Pressure (Red) increases to the set differential pressure, the Pilot Assembly moves upward to first close the upper seat (Red to Yellow) and open the pressure vent (Yellow to Atmosphere). The resulting decrease in Motor Valve Diaphragm Pressure (Yellow) permits the increased Upstream Pressure (Red), acting under the motor valve seat, to open the valve. With the motor valve open, the Upstream Pressure (Red) will decrease until the differential pressure across the PILOT DIAPHRAGM reaches the set point at which time the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

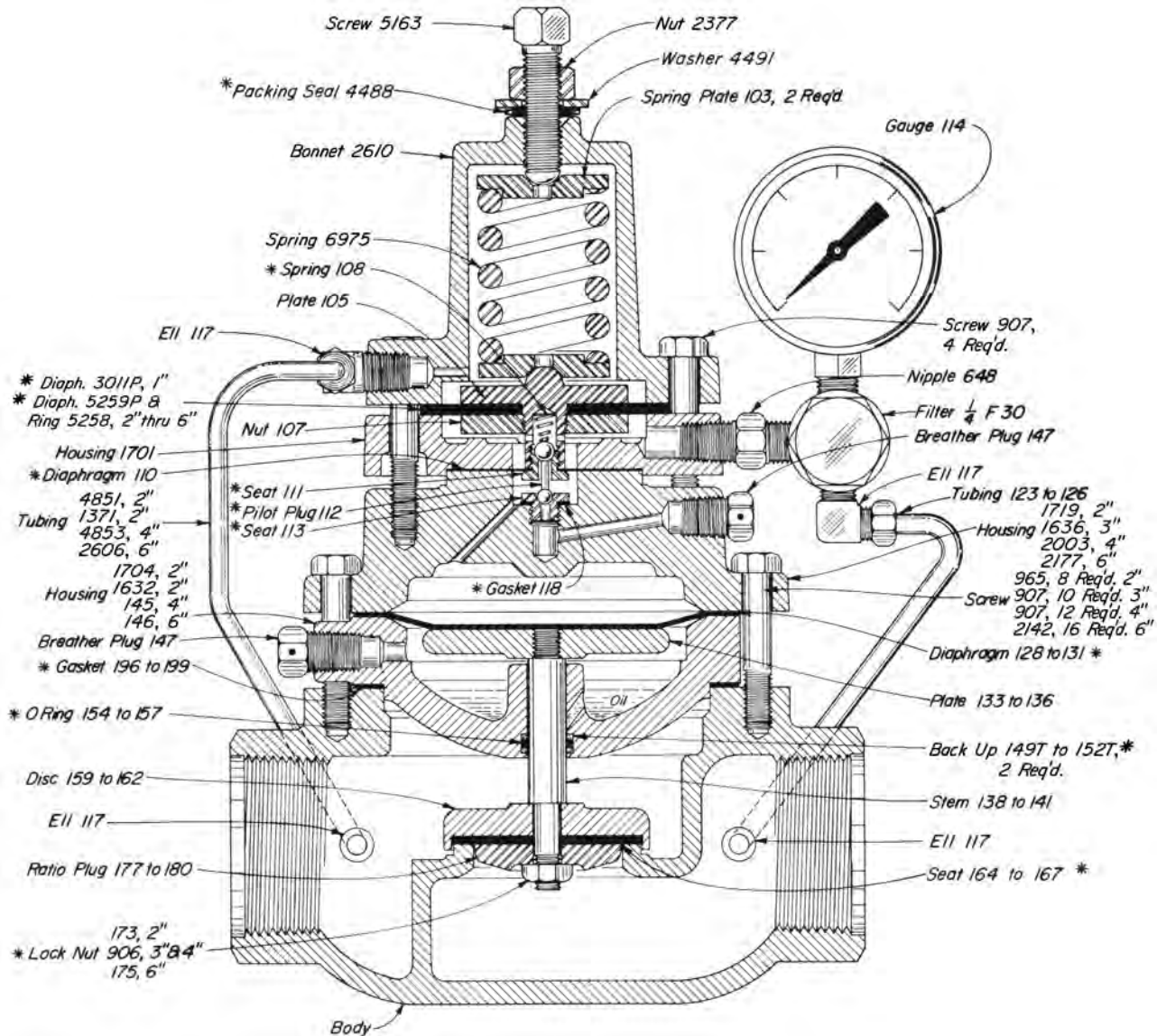
The rapid but stable repositioning, intermittent bleed pilot, three-way valve action of the PILOT PLUG adjust the Motor Valve Diaphragm Pressure (Yellow) to position the Motor Valve Stem Assembly and provide true throttling action for any rate of flow.



# PRESSURE REGULATOR



GAS PRESSURE DIFFERENTIAL  
DUCTILE IRON



Line Size	Screwed	Flanged	Grooved
1"	2033	---	---
2"	183	184	1500
3"	185	186	---
4"	187	188	---
6"	---	189	---

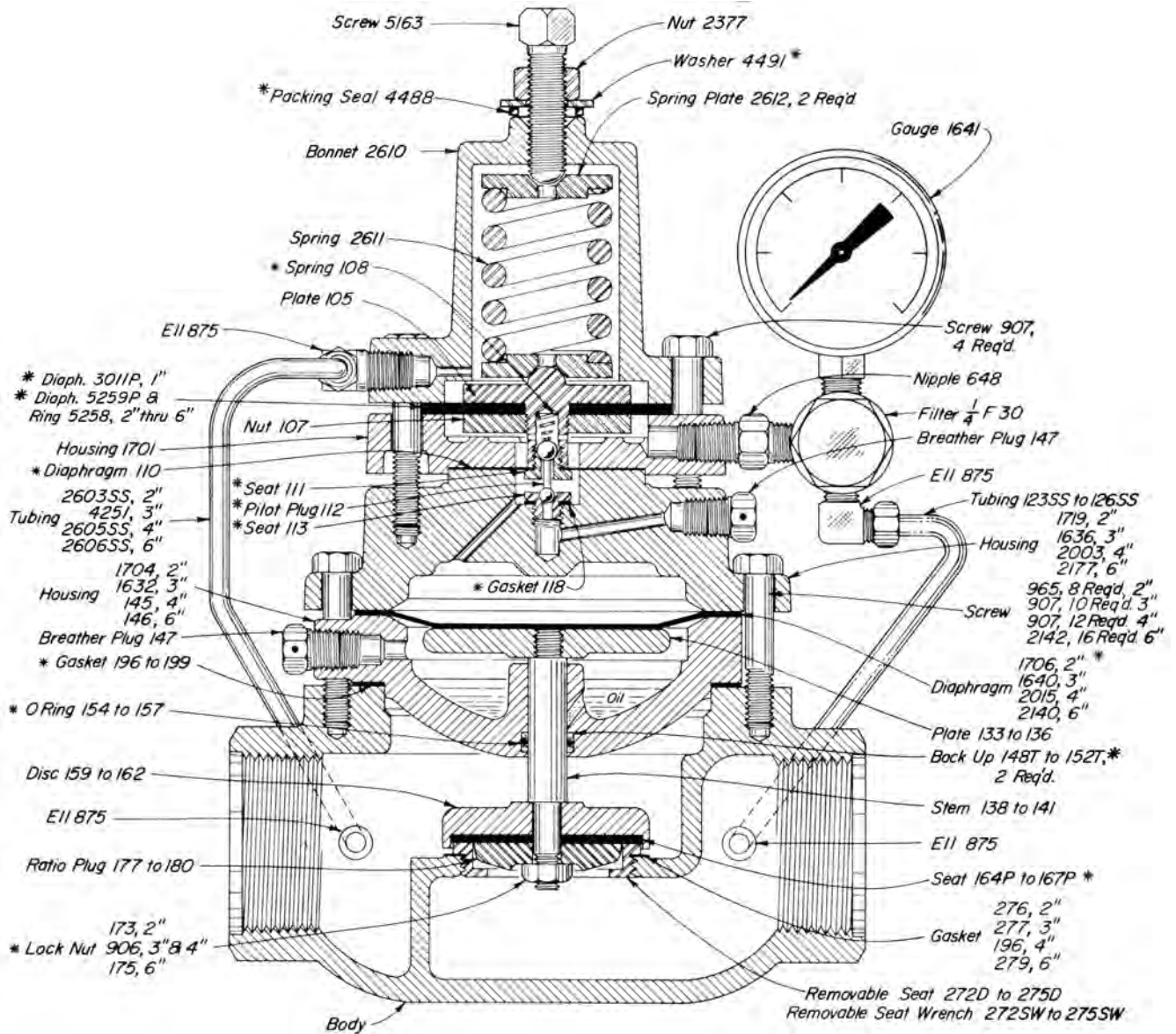
## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ACK	2" SCRD.	212 SGT PD	125	175	RPO
ACL	2" FLGD. <sup>a</sup>	212 FGT PD	125	175	RPO
ACM	2" GRVD.	212 GGT PD	125	175	RPO
ACN	3" SCRD.	312 SGT PD	125	175	RPP
ACP	3" FLGD. <sup>a</sup>	312 FGT PD	125	175	RPP
ACR	4" SCRD.	412 SGT PD	125	175	RPQ
ACS	4" FLGD. <sup>a</sup>	412 FGT PD	125	175	RPQ
ACT	6" FLGD. <sup>a</sup>	612 FGT PD	125	175	RPR

<sup>a</sup>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 128-2", 129-3", 130-4", 131-6".



LINE SIZE	THRU	
	SCREWED	FLANGED
2"	1709	1913
3"	1634	1914
4"	2001	2002
6"	-----	2466

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ACU	2" SCR.D.	230 SGT PD-D	300	300	RPK
ACW	2" FLGD.	218 FGT PD-D	250	250	RPK
ACX	3" SCR.D.	330 SGT PD-D	300	300	RPL
ACY	3" FLGD.	318 FGT PD-D	250	250	RPL
ADA	4" SCR.D.	430 SGT PD-D	300	300	RPM
ADB	4" FLGD.	418 FGT PD-D	250	250	RPM
ADC	6" FLGD.	618 FGT PD-D	250	250	RPN

#### NOTES:

Dimensions, refer to Table of Contents.

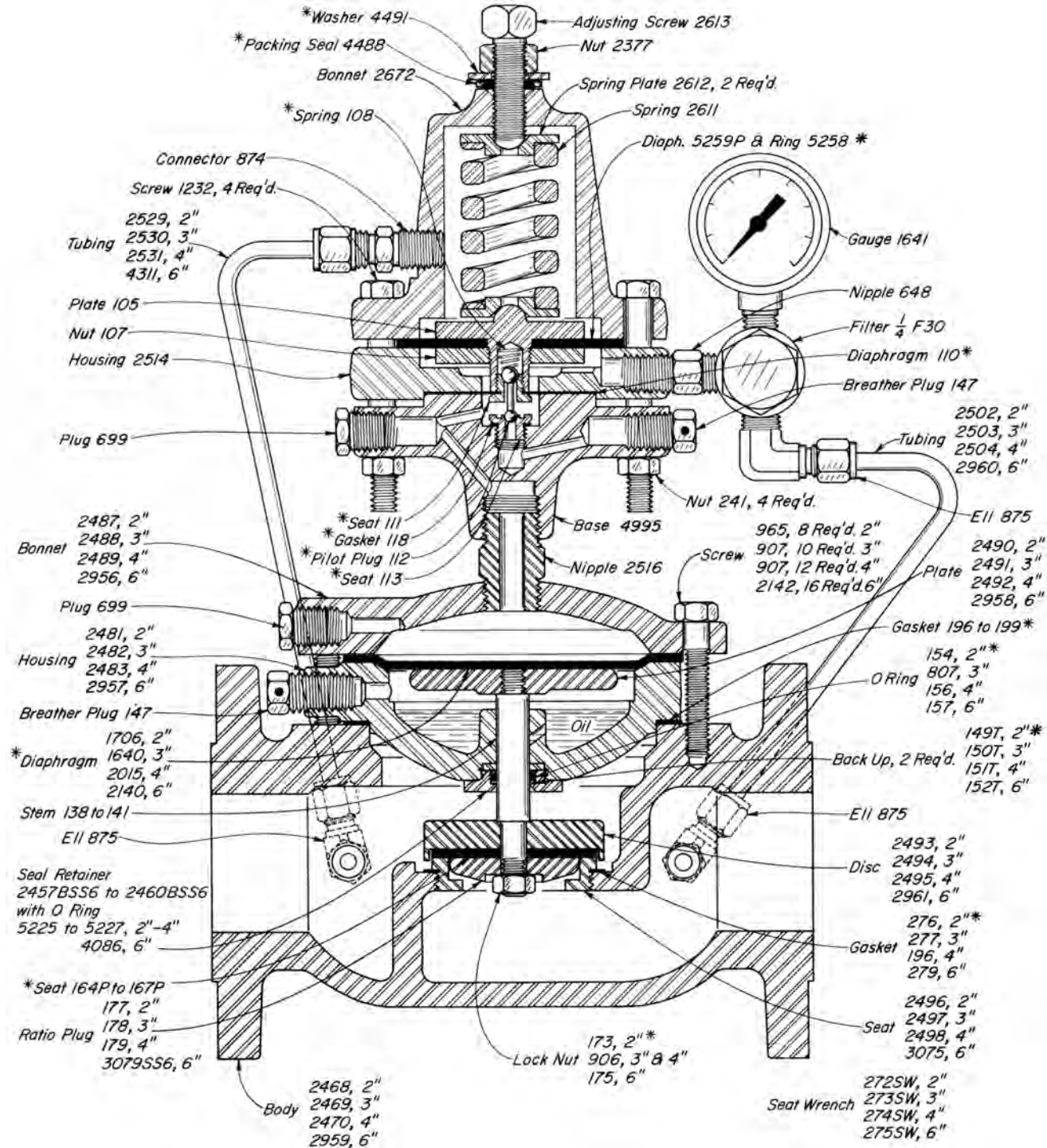
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Stem 138-2", 139-3", 140-4", 141-6".

# PRESSURE REGULATOR



## GAS PRESSURE DIFFERENTIAL STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AGL	2" FLGD.	227 FGT PD-S	285	285	RBV
AGM	3" FLGD.	327 FGT PD-S	285	285	RBZ
AGN	4" FLGD.	427 FGT PD-S	285	285	RCA
AGO	6" FLGD.	627 FGT PD-S	285	285	RBW

### 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: Seat 164P-2", 165P-3", 166P-4", 167P-6".

#### APPLICATION:

Positive pressure control of systems flowing into downstream vacuum gathering line.

#### PRESSURE RANGE:

Upstream: 5 psig minimum

Downstream: Vacuum

(Though designed for downstream vacuum, the regulator will function with positive pressure downstream)

#### CAPACITY:

Refer to Table of Contents

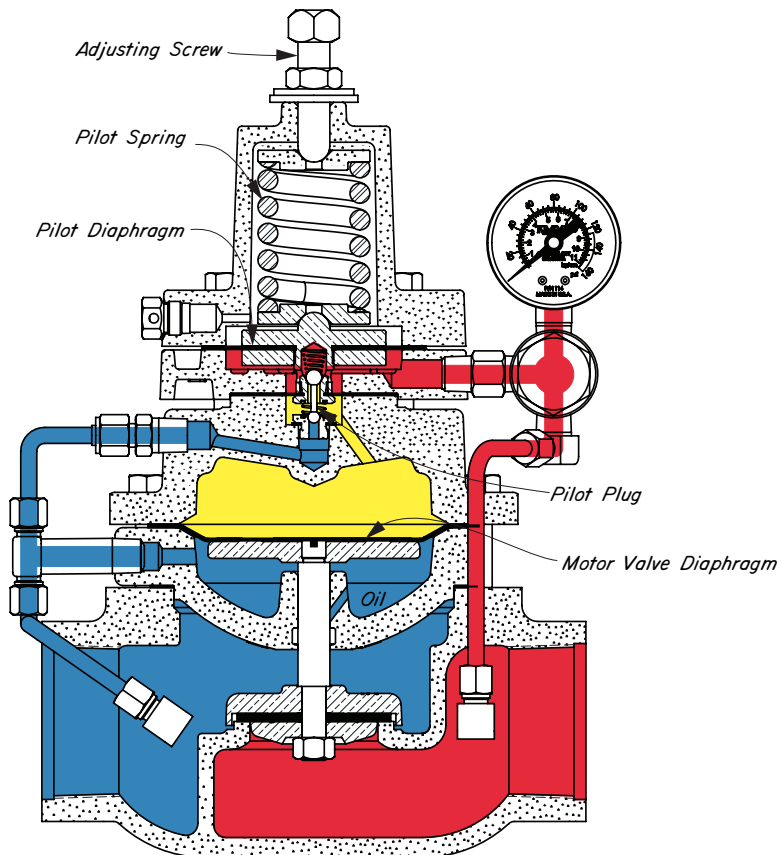
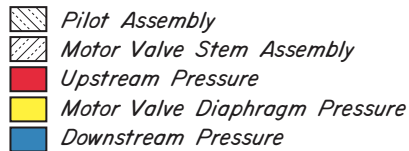
#### OPERATION:

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Upstream Pressure (Red). The Pilot Assembly is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Blue) is closed and the upper seat for the PILOT PLUG (Red to Yellow) is open. This lets full Upstream Pressure (Red) load the MOTOR VALVE DIAPHRAGM to close the valve. Additional closing effort is provided by Downstream Vacuum Pressure (Blue) under the MOTOR VALVE DIAPHRAGM.

As the Upstream Pressure (Red) increases to the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to first close the upper seat (Red to Yellow) and open the lower seat (Yellow to Blue). Motor Valve Diaphragm Pressure (Yellow) is vented to the Downstream Vacuum Pressure (Blue).

As the Motor Valve Diaphragm Pressure (Yellow) is decreased, the Upstream Pressure (Red) acting under the motor valve seat and the Downstream Vacuum Pressure (Blue) acting on top of the motor valve seat, opens the valve. With relief of the Upstream Pressure (Red) through the valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

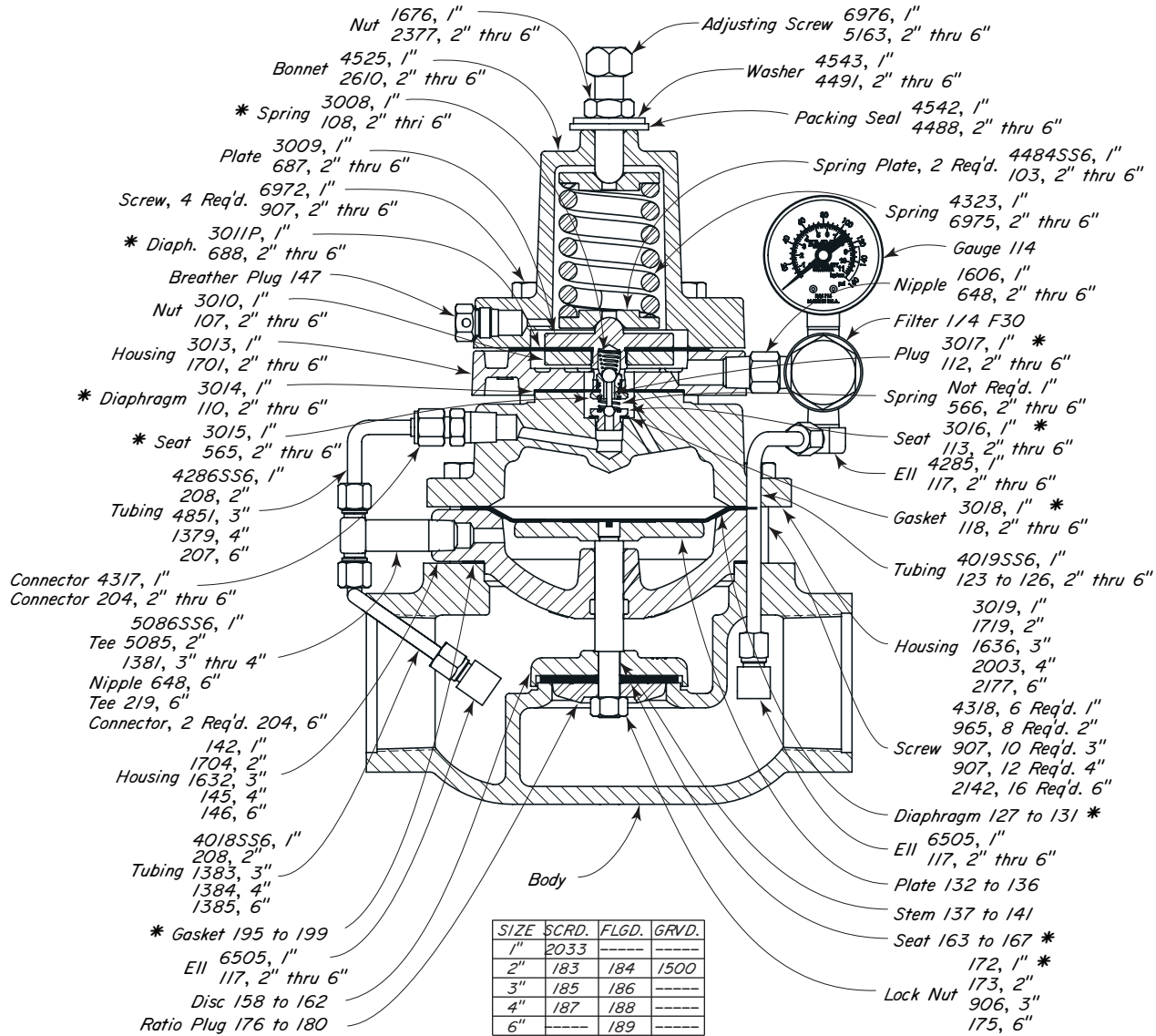
Motor Valve Diaphragm Pressure (Yellow) is regulated by the intermittent bleed pilot three-way valve action of the PILOT PLUG to reposition the Motor Valve Stem Assembly for changes in flow rate. The rapid but stable repositioning produces a true throttling action.



# PRESSURE REGULATOR



GAS BACK PRESSURE TO VACUUM  
DUCTILE IRON



## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AMS	1" SCR.D.	112 SGT BPV	125	175	RBB
ADU	2" SCR.D.	212 SGT BPV	125	175	RBC
ADW	2" FLGD. <sup>a</sup>	212 FGT BPV	125	175	RBC
ADX	2" GRVD.	212 GGT BPV	125	175	RBC
ADY	3" SCR.D.	312 SGT BPV	125	175	RBD
AEA	3" FLGD. <sup>a</sup>	312 FGT BPV	125	175	RBD
AEB	4" SCR.D.	412 SGT BPV	125	175	RBE
AEC	4" FLGD. <sup>a</sup>	412 FGT BPV	125	175	RBE
AED	6" FLGD. <sup>a</sup>	612 FGT BPV	125	175	RBF

## 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".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

#### APPLICATIONS:

Control 3 to 20 psig back pressure on low pressure vessels and vent lines of separators, treaters, compressors, and gas gathering systems.

#### FEATURES:

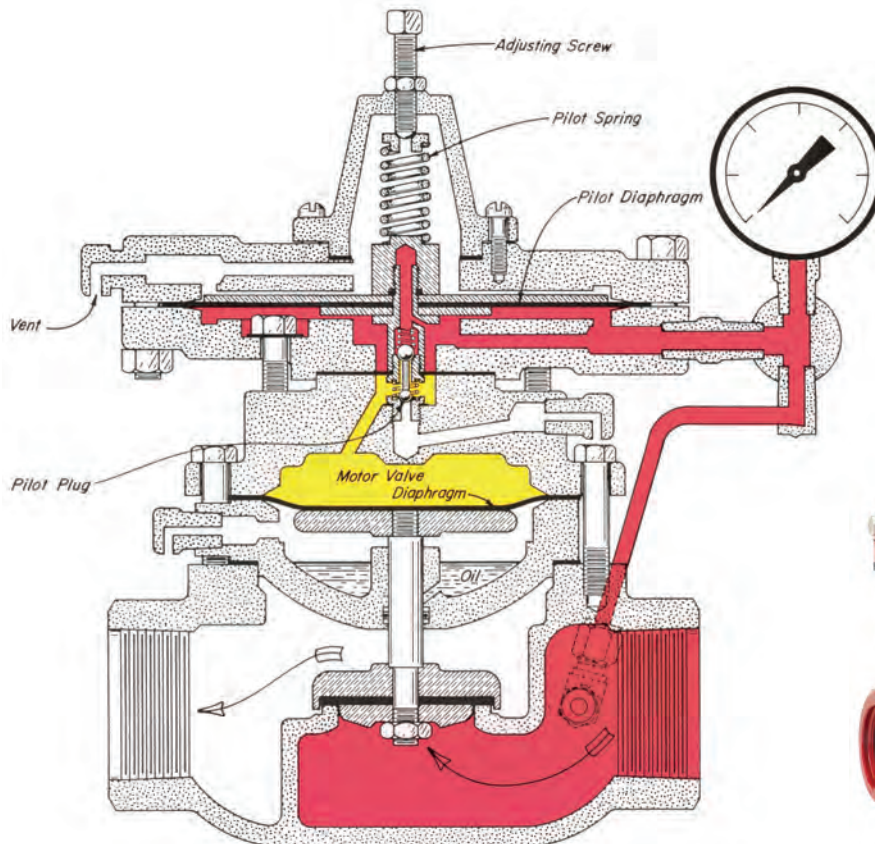
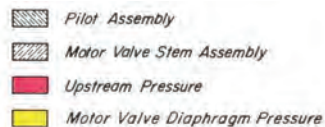
- Intermittent bleed pilot
- Soft seat for bubble tight shut-off
- High capacity (Full opening seat)
- High accuracy in maintaining upstream pressure

#### PRESSURE RANGE:

Upstream: 5 psig to 20 psig

#### CAPACITY:

See capacity chart, this section.



#### OPERATION:

This valve maintains a constant back pressure (upstream of the valve) in the 3 psig to 20 psig range. It has a high degree of sensitivity to upstream changes and extremely fine set-point adjustment capability.

The moving parts in this regulator are the Pilot Assembly and the Motor Valve Stem Assembly (crosshatched). The PILOT PLUG consists of two stainless balls rigidly connected. The upper seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure vent (Yellow to Atmosphere). The lower seat for the PILOT PLUG is the Motor Valve Diaphragm Pressure inlet (Red to Yellow).

The PILOT SPRING loads the upper side of the Pilot Assembly. Upstream Pressure (Red) opposes the PILOT SPRING from the under side of the Pilot Assembly.

Assume a desired pressure setting greater than current Upstream Pressure (Red). The ADJUSTING SCREW compresses the PILOT SPRING. The PILOT SPRING forces the Pilot Assembly downward. The upper seat for the PILOT PLUG (Yellow to Atmosphere) closes. The lower seat for the PILOT PLUG (Red to Yellow) opens. Motor Valve Diaphragm Pressure (Yellow) increases. The Motor Valve Stem Assembly moves downward closing the valve.

The Upstream Pressure (Red) increases towards the set pressure. The Pilot Assembly moves upward closing the lower seat (Red to Yellow) then opening the upper seat (Yellow to Atmosphere). The Motor Valve Diaphragm Pressure (Yellow) decreases. Upstream Pressure (Red) acting under the Motor Valve Stem Assembly opens the motor valve.

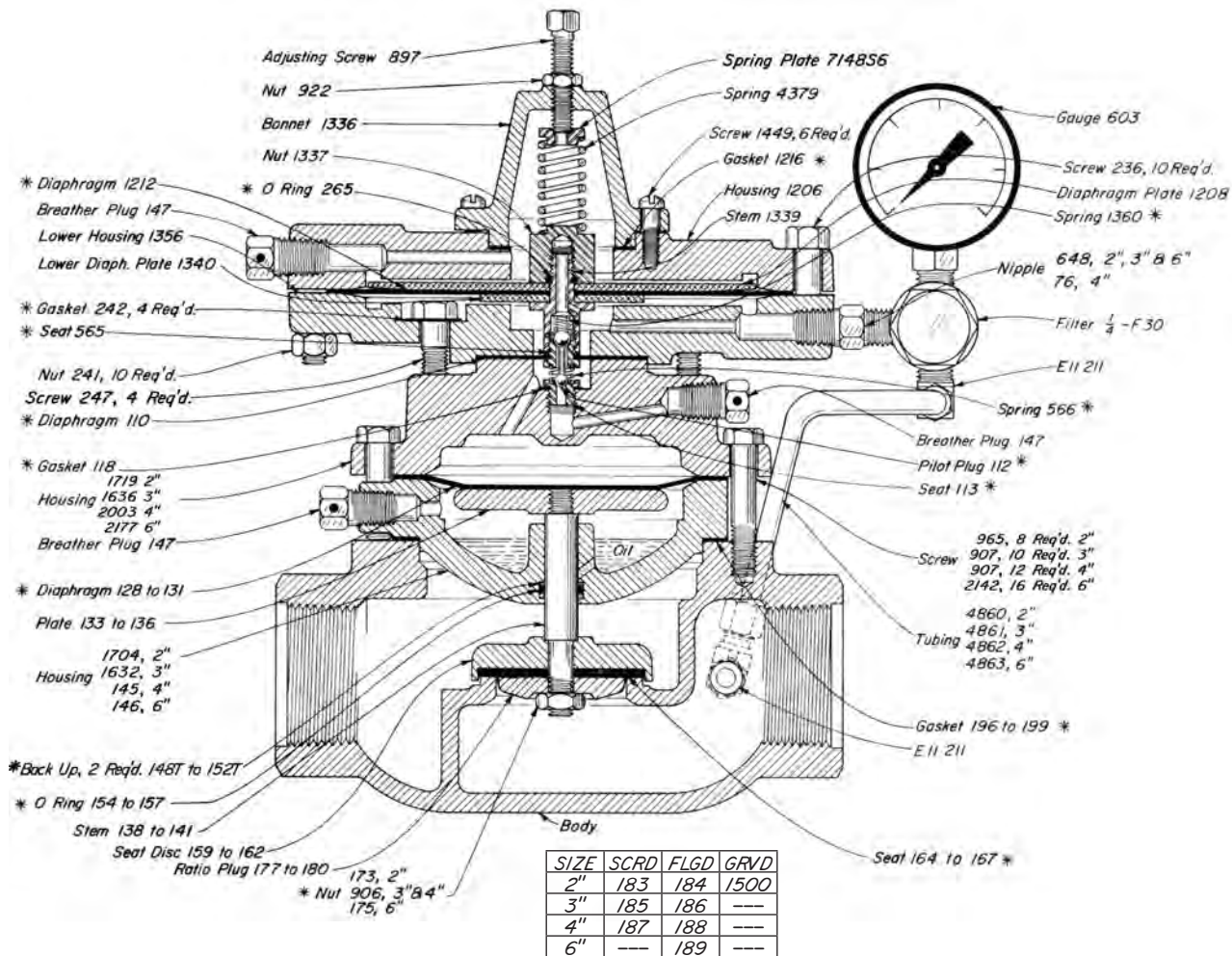
The relief of Upstream Pressure (Red) through the motor valve brings the Pilot assembly to a position closing both seats of the PILOT PLUG.

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

# PRESSURE REGULATOR



## LOW PRESSURE BACK PRESSURE DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AOD	2" SCRD.	202 SGT BP	20	175	RUI
AOE	2" FLGD. <sup>a</sup>	202 FGT BP	20	175	RUI
AOF	2" GRVD.	202 GGT BP	20	175	RUI
AOG	3" SCRD.	302 SGT BP	20	175	RUI
AOH	3" FLGD. <sup>a</sup>	302 FGT BP	20	175	RUJ
AOJ	4" SCRD.	402 SGT BP	20	175	RUK
AOK	4" FLGD. <sup>a</sup>	402 FGT BP	20	175	RUK
AON	6" FLGD. <sup>a</sup>	602 FGT BP	20	175	RUP

<sup>a</sup>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 128-2", 129-3", 130-4", 131-6".



#### APPLICATIONS:

Valve designed to regulate ounces (0.5 oz to 2.5 psig) back pressure on a tank and vent to atmosphere when pressure exceeds set point. An outside supply of 10 psig is raised to operate motor valve.

#### FEATURES:







- Intermittent bleed pilot
- Soft seat for bubble tight shut-off
- High capacity (Full opening seat)
- External pilot isolating process stream from instrument supply gas

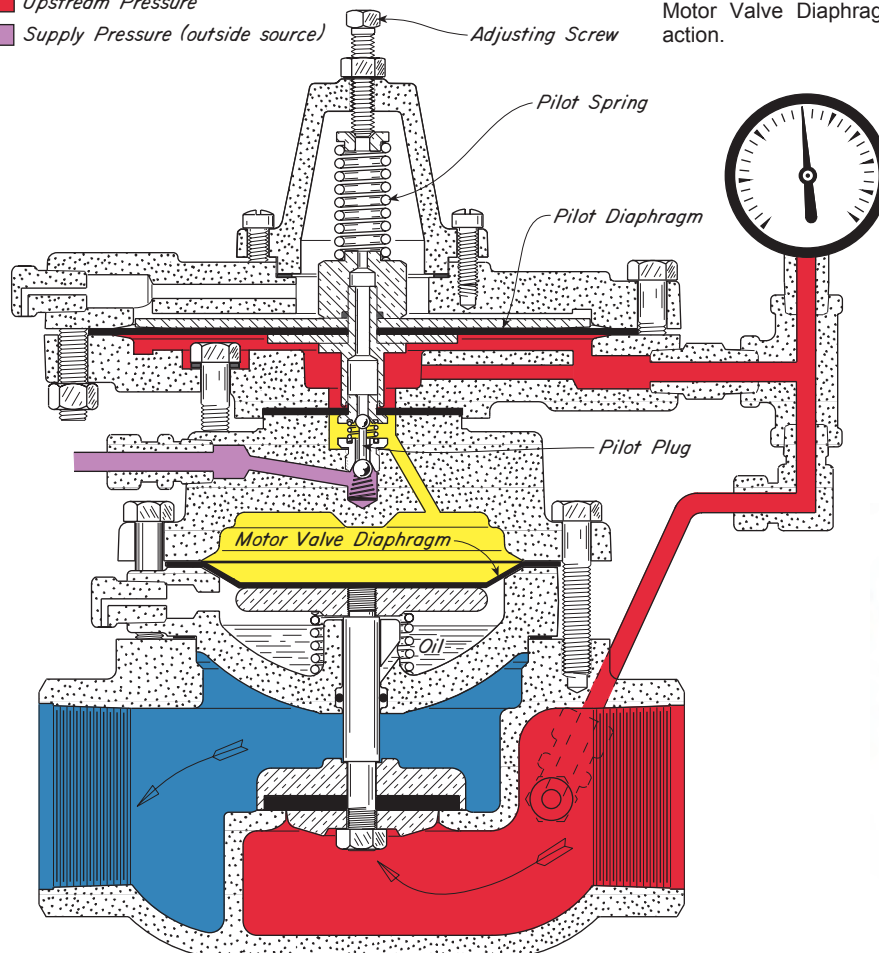
#### PRESSURE RANGE:

UPSTREAM PRESSURE: .5 oz to 2.5 psig  
 Optional springs provide a set point of:  
 1 oz to 5 psig or  
 1 psig to 20 psig

#### CAPACITY:

See Table of Contents

-  Motor Valve Assembly
-  Pilot Assembly
-  Motor Valve Diaphragm Pressure
-  Downstream Pressure
-  Upstream Pressure
-  Supply Pressure (outside source)



#### OPERATION:

This Regulator maintains a low pressure back pressure by relieving to a lower pressure or atmosphere. The pressure to operate the valve is an outside pressure source. The Regulator consists of a three-way pilot operating a motor valve. The only moving parts are the Pilot Assembly and the Motor Valve Stem Assembly (Crosshatched). The three-way pilot action is due to the operation of the PILOT PLUG. The PILOT PLUG consists of two stainless balls rigidly connected. The upper PILOT PLUG seat is the Motor Valve Diaphragm Pressure vent (Yellow to Atmosphere). The lower PILOT PLUG seat is the Motor Valve Diaphragm Pressure inlet (Violet to Yellow). The Pilot Assembly actuates the PILOT PLUG. The force of the PILOT SPRING above the PILOT DIAPHRAGM acts against the Upstream Pressure (Red) below the PILOT DIAPHRAGM to determine the motion of the Pilot Assembly.

Assume a desired Upstream Pressure (Red) greater than the current setting. The ADJUSTING SCREW compresses the PILOT SPRING. The PILOT SPRING forces the Pilot Assembly downward. First, the upper PILOT PLUG seat (Yellow to Atmosphere) closes, then the lower PILOT PLUG seat (Violet to Yellow) opens. Increased Motor Valve Diaphragm Pressure (Yellow) pushes the Motor Valve Stem Assembly downward and closes the motor valve.

Assume the Upstream Pressure (Red) increases. The increased Upstream Pressure pushes the Pilot Assembly upward against the PILOT SPRING. This first, closes the lower PILOT PLUG seat (Violet to Yellow), then opens the upper PILOT PLUG seat (Yellow to Atmosphere). Motor Valve Diaphragm Pressure (Yellow) decreases, Upstream Pressure (Red) pushes the Motor Valve Diaphragm Assembly upward. The motor valve opens.

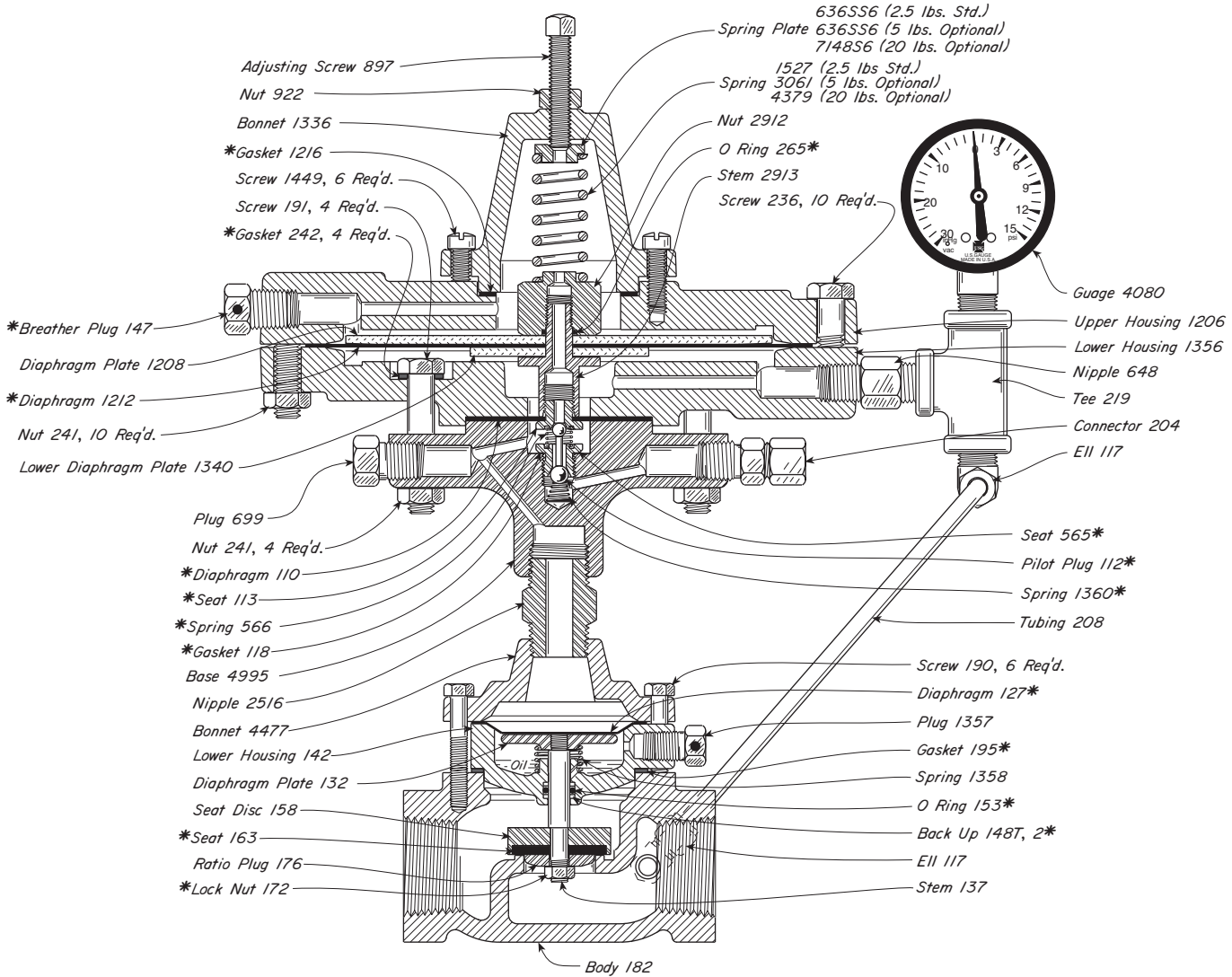
This rapid but stable interaction of the Pilot Assembly and Motor Valve Diaphragm Assembly produce a true throttling action.



# OUNCES PRESSURE REGULATOR



BACK PRESSURE TO ATMOSPHERE W/OUTSIDE SUPPLY  
DUCTILE IRON



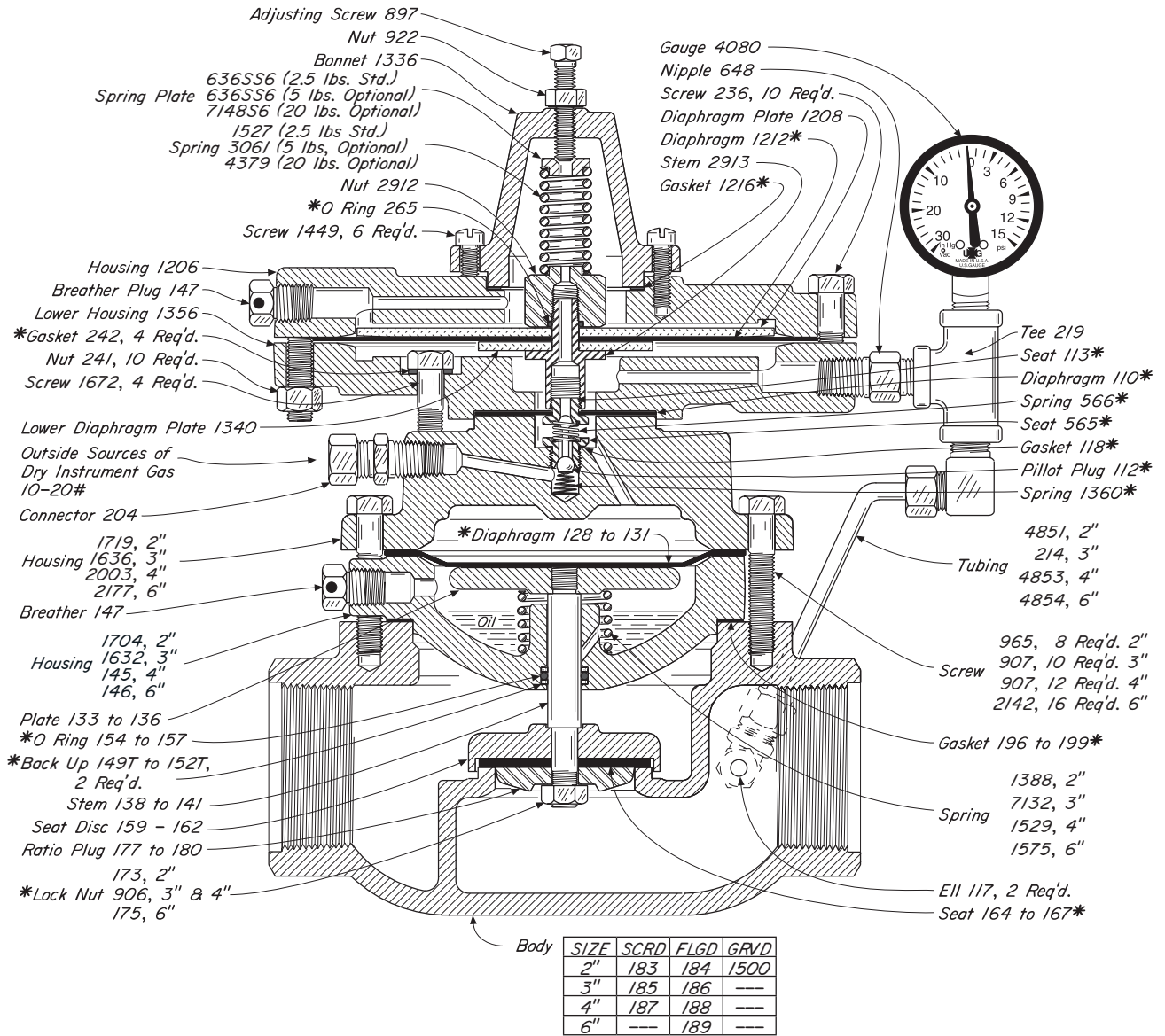
## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
ABG2.5	1" SCR.D.	1.2 SGT OBPA	2.5	175	RRY
ABG5	1" SCR.D.	1.5 SGT OBPA	5	175	RRY
ABG20	1" SCR.D.	102 SGT OBPA	20	175	RRY

## NOTES:

Dimensions refer to Table of Contents.

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



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AAI2.5	2" SCR.D.	2.2 SGT OBPA	2.5	175	RUI
AAI5	2" SCR.D.	2.5 SGT OBPA	5	175	RUI
AAI20	2" SCR.D.	202 SGT OBPA	20	175	RUI
AAJ2.5	2" FLGD. <sup>a</sup>	2.2 FGT OBPA	2.5	175	RUI
AAJ5	2" FLGD. <sup>a</sup>	2.5 FGT OBPA	5	175	RUI
AAJ20	2" FLGD. <sup>a</sup>	202 FGT OBPA	20	175	RUI
AAK2.5	2" GRVD.	2.2 GGT OBPA	2.5	175	RUI
AAK5	2" GRVD.	2.5 GGT OBPA	5	175	RUI
AAK20	2" GRVD.	202 GGT OBPA	20	175	RUI
AAL2.5	3" SCR.D.	3.2 SGT OBPA	2.5	175	RUJ
AAL5	3" SCR.D.	3.5 SGT OBPA	5	175	RUJ
AAL20	3" SCR.D.	302 SGT OBPA	20	175	RUJ
AAM2.5	3" FLGD. <sup>a</sup>	3.2 FGT OBPA	2.5	175	RUJ
AAM5	3" FLGD. <sup>a</sup>	3.5 FGT OBPA	5	175	RUJ
AAM20	3" FLGD. <sup>a</sup>	302 FGT OBPA	20	175	RUJ

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AAN2.5	4" SCR.D.	4.2 SGT OBPA	2.5	175	RUK
AAN5	4" SCR.D.	4.5 SGT OBPA	5	175	RUK
AAN20	4" SCR.D.	402 SGT OBPA	20	175	RUK
AAO2.5	4" FLGD. <sup>a</sup>	4.2 FGT OBPA	2.5	175	RUK
AAO5	4" FLGD. <sup>a</sup>	4.5 FGT OBPA	5	175	RUK
AAO20	4" FLGD. <sup>a</sup>	402 FGT OBPA	20	175	RUK
AAP2.5	6" FLGD. <sup>a</sup>	6.2 FGT OBPA	2.5	175	RTY
AAP5	6" FLGD. <sup>a</sup>	6.5 FGT OBPA	5	175	RTY
AAP20	6" FLGD. <sup>a</sup>	602 FGT OBPA	20	175	RTY

<sup>a</sup>These parts are recommended spare parts and are stocked as repair kits.

The number of a series assigned to a part indicated different line sizes. For example: Diaphragm 128-2", 129-3", 130-4" and 131-6".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

Dimensions refer to Table of Contents.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:






To maintain ounces of positive pressure on systems flowing into a downstream vacuum, such as vapor recovery systems.

#### PRESSURE RANGE:

Upstream: 0.5 ounces to 2.5 psig  
Downstream: 6" Hg. Vacuum, minimum

#### CAPACITY:

See capacity chart, this section.

-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Downstream Pressure
-  Motor Valve Diaphragm Pressure

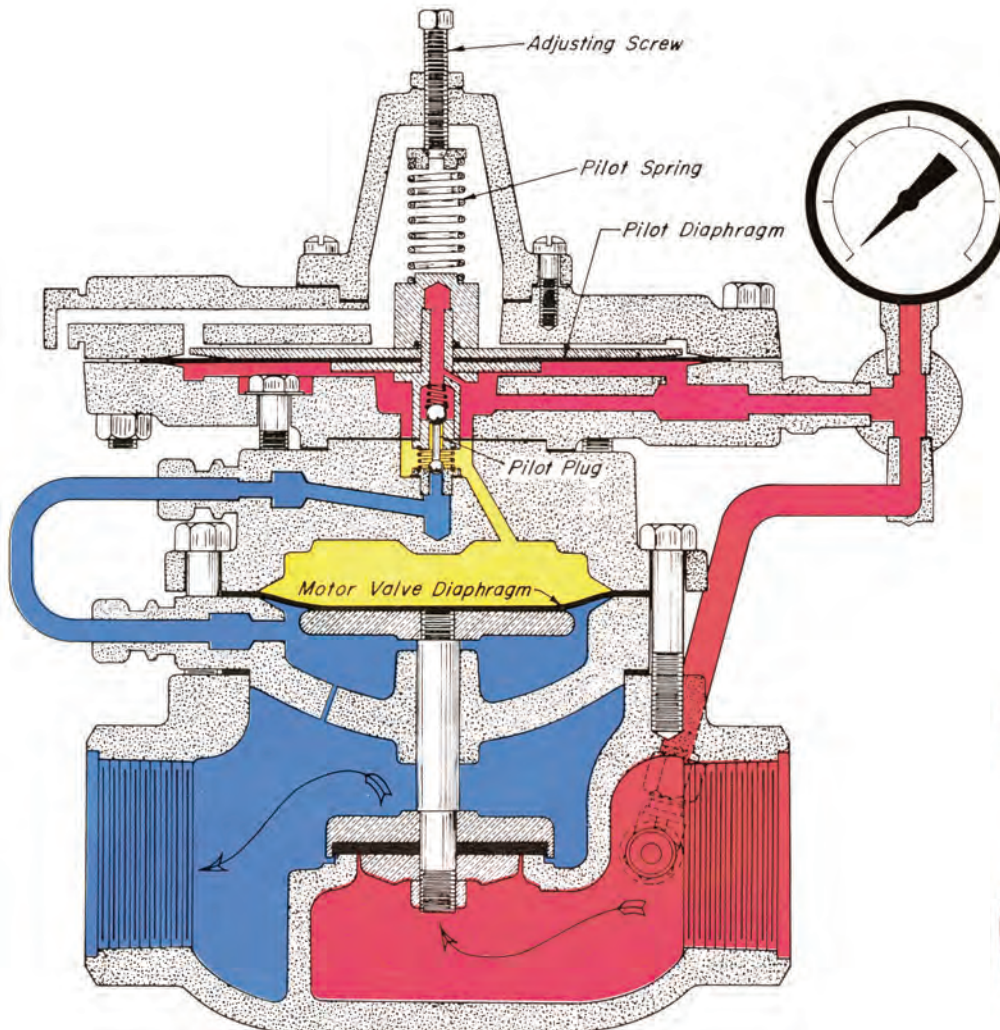
#### OPERATION:

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Upstream Pressure (Red). The Pilot Assembly is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Blue) is closed and the upper seat for the PILOT PLUG (Red to Yellow) is open. This lets full Upstream Pressure (Red) load the MOTOR VALVE DIAPHRAGM to close the valve. Additional closing effort is provided by Downstream Vacuum (Blue) under the MOTOR VALVE DIAPHRAGM.

As the Upstream Pressure (Red) increases to the set pressure, the Pilot Assembly moves upward against the PILOT SPRING to first close the upper seat (Red to Yellow) and open the lower seat (Yellow to Blue). Motor Valve Diaphragm Pressure (Yellow) is vented to the Downstream Vacuum (Blue).

As the Motor Valve Diaphragm Pressure (Yellow) is decreased the Upstream Pressure (Red) acting under the motor valve seat and the Downstream Vacuum (Blue) acting on top of the motor valve seat, opens the valve. With relief of the Upstream Pressure (Red) through the valve, the Pilot Assembly assumes a position in which both seats of the PILOT PLUG are closed.

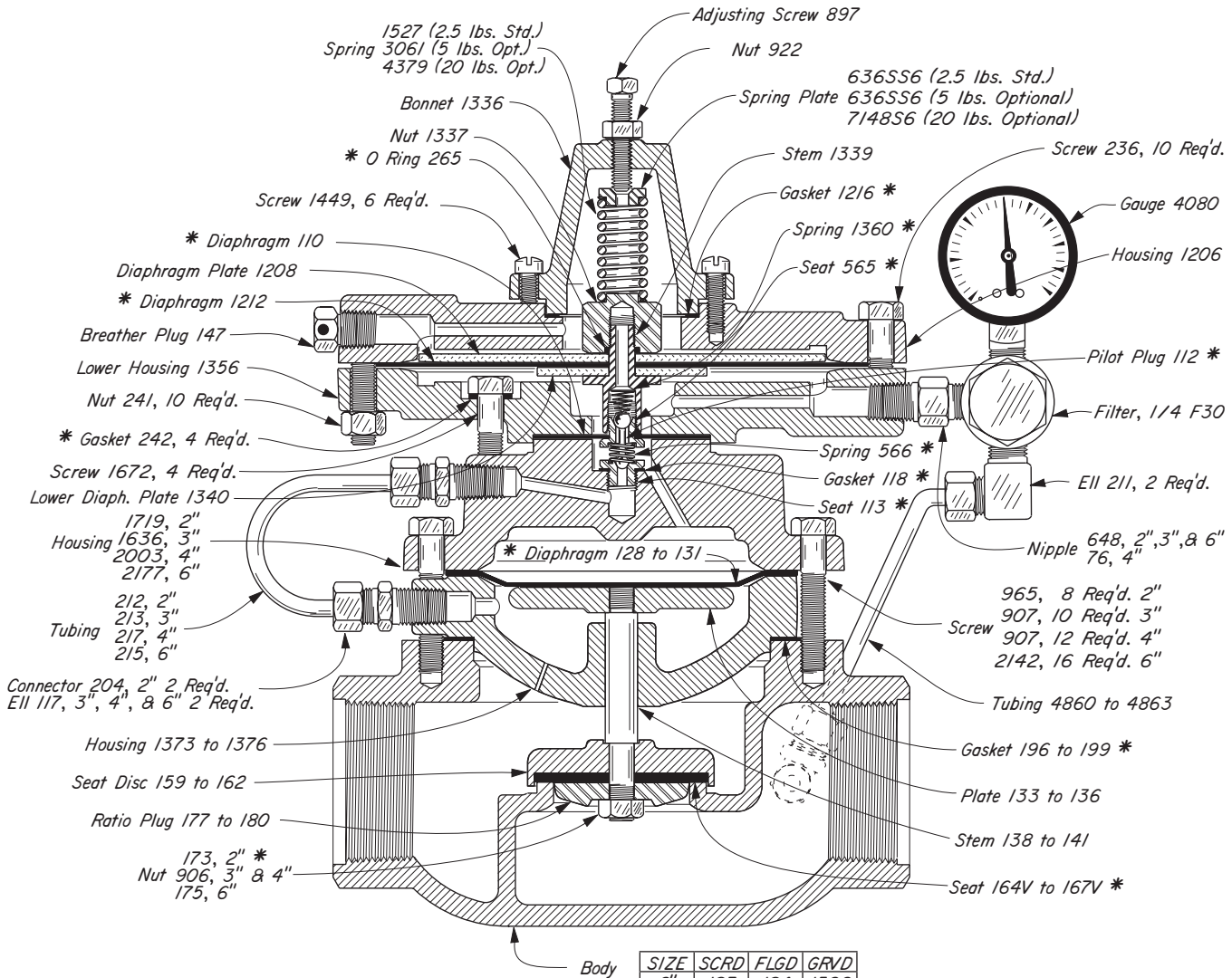
Motor Valve Diaphragm Pressure (Yellow) is regulated by the intermittent bleed pilot three-way valve action of the PILOT PLUG to reposition the Motor Valve Stem Assembly for changes in flow rate. The rapid but stable repositioning produces a true throttling action.



# OUNCES PRESSURE REGULATOR



BACK PRESSURE TO VACUUM  
DUCTILE IRON



SIZE	SCRD	FLGD	GRVD
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
AFE2.5	2" SCRD.	2.2 SGT OBPV	2.5	175	RBG
AFE5	2" SCRD.	2.5 SGT OBPV	5	175	RBG
AFE20	2" SCRD.	202 SGT OBPV	20	175	RBG
AFF2.5	2" FLGD.³	2.2 FGT OBPV	2.5	175	RBG
AFF5	2" FLGD.³	2.5 FGT OBPV	5	175	RBG
AFF20	2" FLGD.³	202 FGT OBPV	20	175	RBG
AFG2.5	2" GRVD.	2.2 GGT OBPV	2.5	175	RBG
AFG5	2" GRVD.	2.5 GGT OBPV	5	175	RBG
AFG20	2" GRVD.	202 GGT OBPV	20	175	RBG
AFH2.5	3" SCRD.	3.2 SGT OBPV	2.5	175	RBH
AFH5	3" SCRD.	3.5 SGT OBPV	5	175	RBH
AFH20	3" SCRD.	302 SGT OBPV	20	175	RBH
AFI2.5	3" FLGD.³	3.2 FGT OBPV	2.5	175	RBH
AFI5	3" FLGD.³	3.5 FGT OBPV	5	175	RBH
AFI20	3" FLGD.³	302 FGT OBPV	20	175	RBH

## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AFJ2.5	4" SCRD.	4.2 SGT OBPV	2.5	175	RBI
AFJ5	4" SCRD.	4.5 SGT OBPV	5	175	RBI
AFJ20	4" SCRD.	402 SGT OBPV	20	175	RBI
AFK2.5	4" FLGD.³	4.2 FGT OBPV	2.5	175	RBI
AFK5	4" FLGD.³	4.5 FGT OBPV	5	175	RBI
AFK20	4" FLGD.³	402 FGT OBPV	20	175	RBI
AFL2.5	6" FLGD.	6.2 FGT OBPV	2.5	175	RBK
AFL5	6" FLGD.	6.5 FGT OBPV	5	175	RBK
AFL20	6" FLGD.	602 FGT OBPV	20	175	RBK

Dimensions refer to Table of Contents.

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

The number of a series assigned to a part indicated different line sizes. For example: Diaphragm 128-2", 129-3", 130-4" and 131-6".

³Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

#### APPLICATIONS:

Low pressure regulator for maintaining vapor pressure on storage tanks, controlling compressor by-pass for gas recirculation and maintaining low pressure head on flash separators.

#### FEATURES:






- Intermittent bleed pilot
- Soft seat for bubble tight shut-off
- Static sense line allowing remote sensing
- Outside pilot supply can be used to isolate process stream from instrument supply gas.

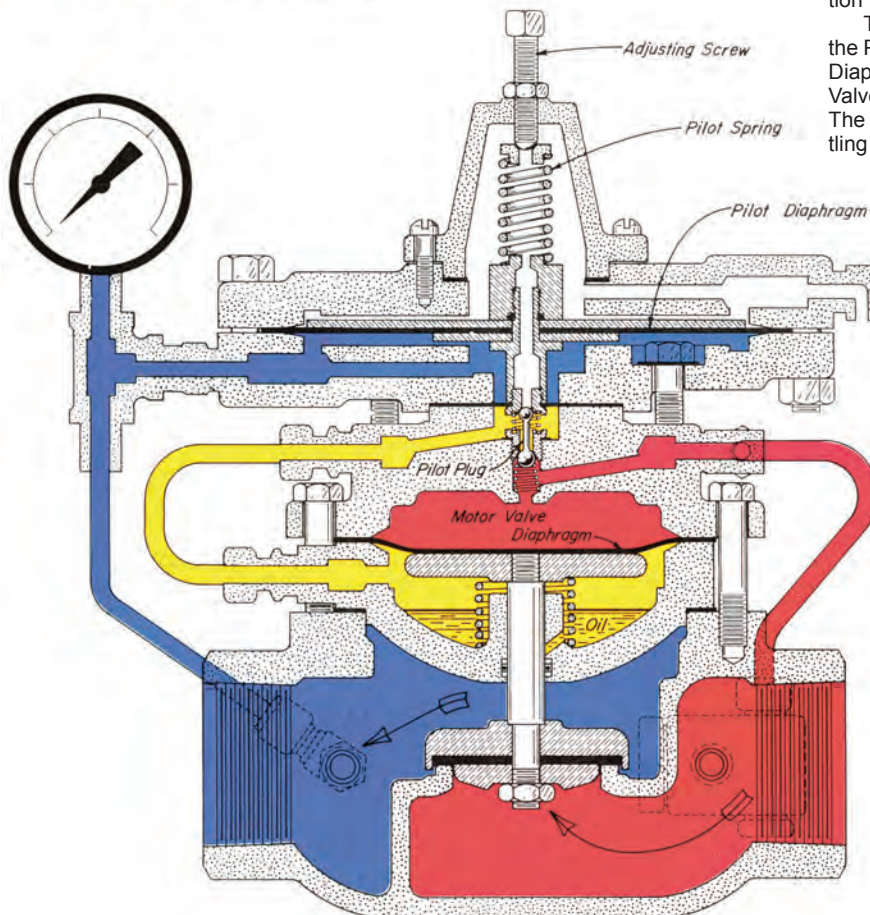
#### PRESSURE RANGE:

- Downstream: 0.5 oz psig to 2.5 psig (additional spring ranges are available to 20 psig)
- Upstream: 5 psig to 125 psig

#### CAPACITY:

See capacity chart, this section.

-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Downstream Pressure
-  Motor Valve Diaphragm Pressure



#### OPERATION:

This valve is used to regulate Downstream Pressure (Blue) from 0.5 oz to 2.5 psig by metering gas from the upstream source to the downstream side as required.

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 upper seat for the PILOT PLUG is the pressure vent (Yellow to Atmosphere). The lower PILOT PLUG seat is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The Pilot Assembly actuates the PILOT PLUG. 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.

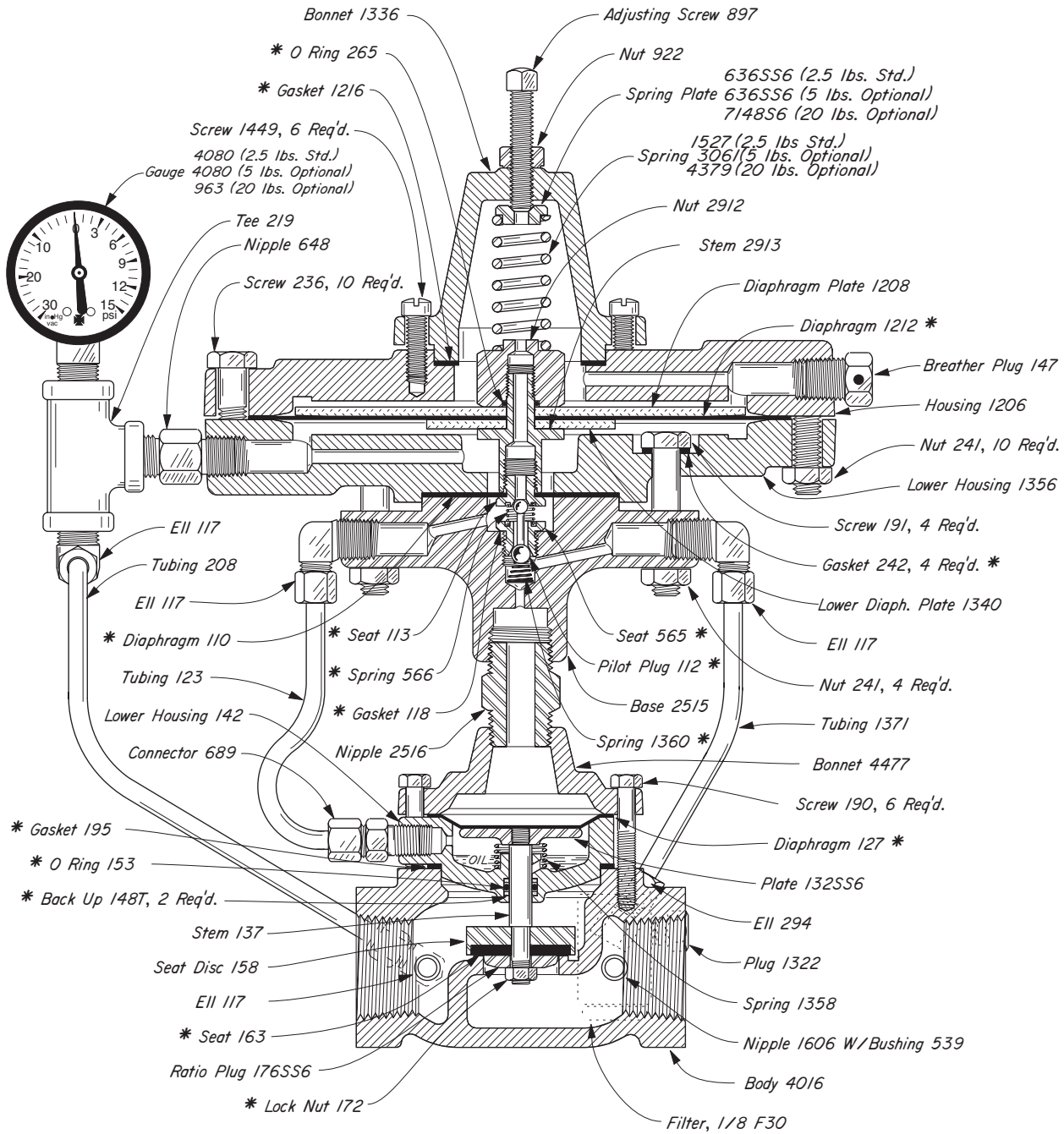
The intermittent bleed pilot three-way valve action of the PILOT PLUG against its seat adjusts the Motor Valve Diaphragm Pressure (Yellow) to reposition the Motor Valve Stem Assembly to accommodate any rate of flow. The rapid but stable repositioning produces a true throttling action.



# OUNCES PRESSURE REGULATOR



PRESSURE REDUCING  
DUCTILE IRON



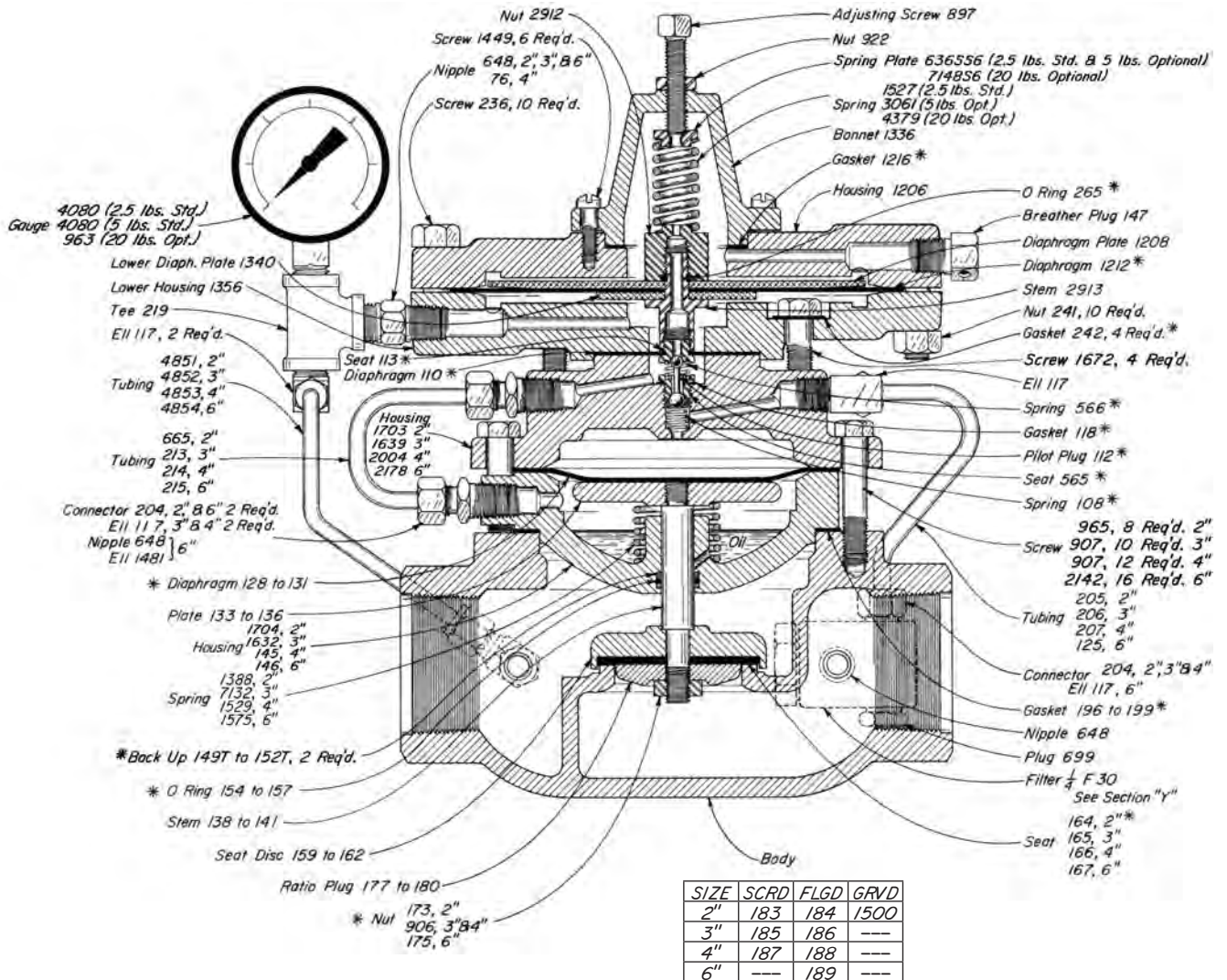
## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AOP-2.5	1" SCR.D.	1.2 SGT OPR	2.5	175	RRY
AOP-5	1" SCR.D.	1.5 SGT OPR	5	175	RRY
AOP-20	1" SCR.D.	102 SGT OPR	20	175	RRY

## NOTES:

Dimensions, refer to Table of Contents.  
 \*These parts are recommended spare parts and are stocked as repair kits.





#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AOS2.5	2" SCRD.	2.2 SGT OPR	2.5	175	RUA
AOS5	2" SCRD.	2.5 SGT OPR	5	175	RUA
AOS20	2" SCRD.	202 SGT OPR	20	175	RUA
AOT2.5	2" FLGD.º	2.2 FGT OPR	2.5	175	RUA
AOT5	2" FLGD.º	2.5 FGT OPR	5	175	RUA
AOT20	2" FLGD.º	202 FGT OPR	20	175	RUA
AOU2.5	2" GRVD.	2.2 GGT OPR	2.5	175	RUA
AOU5	2" GRVD.	2.5 GGT OPR	5	175	RUA
AOU20	2" GRVD.	202 GGT OPR	20	175	RUA
AOV2.5	3" SCRD.	3.2 SGT OPR	2.5	175	RUB
AOV5	3" SCRD.	3.5 SGT OPR	5	175	RUB
AOV20	3" SCRD.	302 SGT OPR	20	175	RUB
AOW2.5	3" FLGD.º	3.2 FGT OPR	2.5	175	RUB
AOW5	3" FLGD.º	3.5 FGT OPR	5	175	RUB
AOW20	3" FLGD.º	302 FGT OPR	20	175	RUB

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
AOY2.5	4" SCRD.	4.2 SGT OPR	2.5	175	RUC
AOY5	4" SCRD.	4.5 SGT OPR	5	175	RUC
AOY20	4" SCRD.	402 SGT OPR	20	175	RUC
AOZ2.5	4" FLGD.º	4.2 FGT OPR	2.5	175	RUC
AOZ5	4" FLGD.º	4.5 FGT OPR	5	175	RUC
AOZ20	4" FLGD.º	402 FGT OPR	20	175	RUC
APC2.5	6" FLGD.º	6.2 FGT OPR	2.5	175	RUD
APC5	6" FLGD.º	6.5 FGT OPR	5	175	RUD
APC20	6" FLGD.º	602 FGT OPR	20	175	RUD

Dimensions refer to Table of Contents.

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

The number of a series assigned to a part indicated different line sizes. For example: Diaphragm 128-2", 129-3", 130-4" and 131-6".

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

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

### APPLICATIONS:

Gas compressor suction regulation. Vapor pressure recovering systems and vacuum distribution systems, and compressor by-pass lines.

### FEATURES:






- Intermittent bleed pilot
- Soft seat for bubble tight seal
- High capacity (full opening seat)
- Low sensitivity to upstream pressure variations ( $\approx 22:1$ )
- Outside pilot supply can be used to isolate process stream
- Static sense line allowing remote sensing

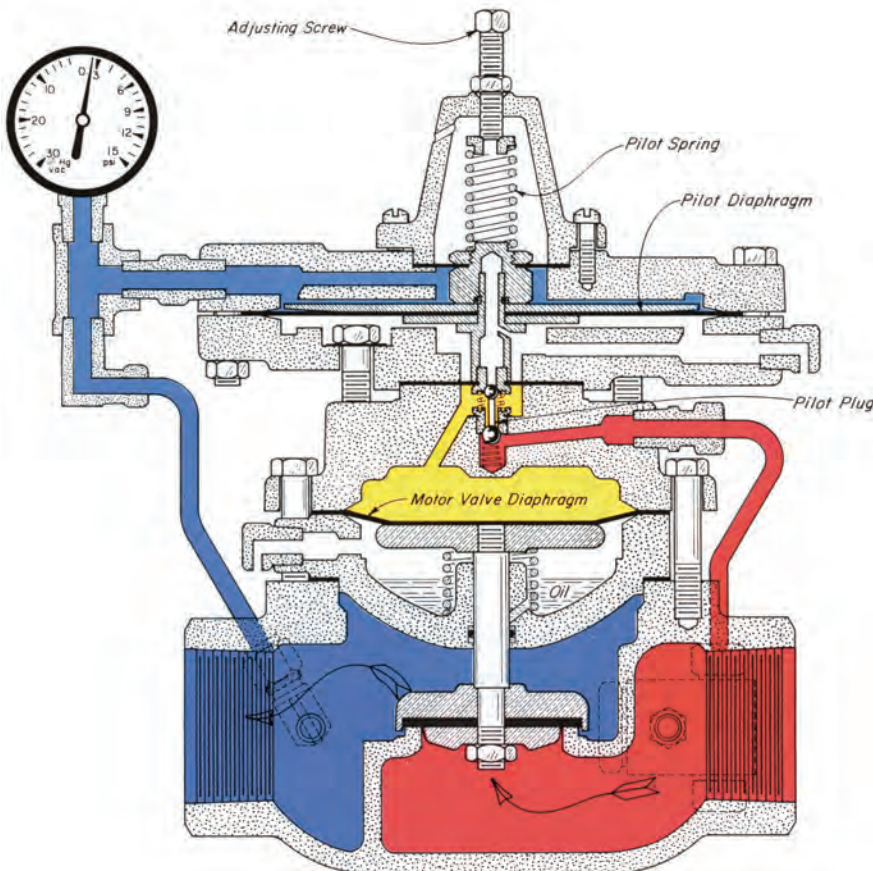
### PRESSURE RANGE:

- Upstream: 0.5 psig to 125 psig
- Downstream: 1" to 6" Hg. standard (spring ranges to 30" Hg. available)

### CAPACITY:

See capacity chart, this section.

-  Pilot Assembly
-  Motor Valve Stem Assembly
-  Upstream Pressure
-  Downstream Vacuum
-  Motor Valve Diaphragm Pressure



### OPERATION:

This valve is used to regulate a downstream vacuum from 1" to 6" Hg. with an upstream pressure of 0.5 psig or more. The only moving parts are the Pilot Assembly and the Motor Valve Stem Assembly (Crosshatched). The three-way pilot action is due to the operation of the PILOT PLUG. The PILOT PLUG consists of two stainless balls rigidly connected. The upper PILOT PLUG seat is the Motor Valve Diaphragm Pressure vent (Yellow to Atmosphere). The lower PILOT PLUG seat is the Motor Valve Diaphragm Pressure inlet (Red to Yellow). The Pilot Assembly actuates the PILOT PLUG. The combined forces of the PILOT SPRING and the Downstream Vacuum (Blue) above the PILOT DIAPHRAGM working against atmosphere below the PILOT DIAPHRAGM determine the motion of the Pilot Assembly.

Assume a desired Downstream Vacuum greater than the current gauge reading. The ADJUSTING SCREW compresses the PILOT SPRING. The PILOT SPRING forces the Pilot Assembly downward. First, the upper PILOT PLUG (Yellow to Atmosphere) closes, then the lower PILOT PLUG seat (Red to Yellow) opens. Increasing Motor Valve Diaphragm Pressure (Yellow) pushes the Motor Valve Stem Assembly downward and closes the motor valve.

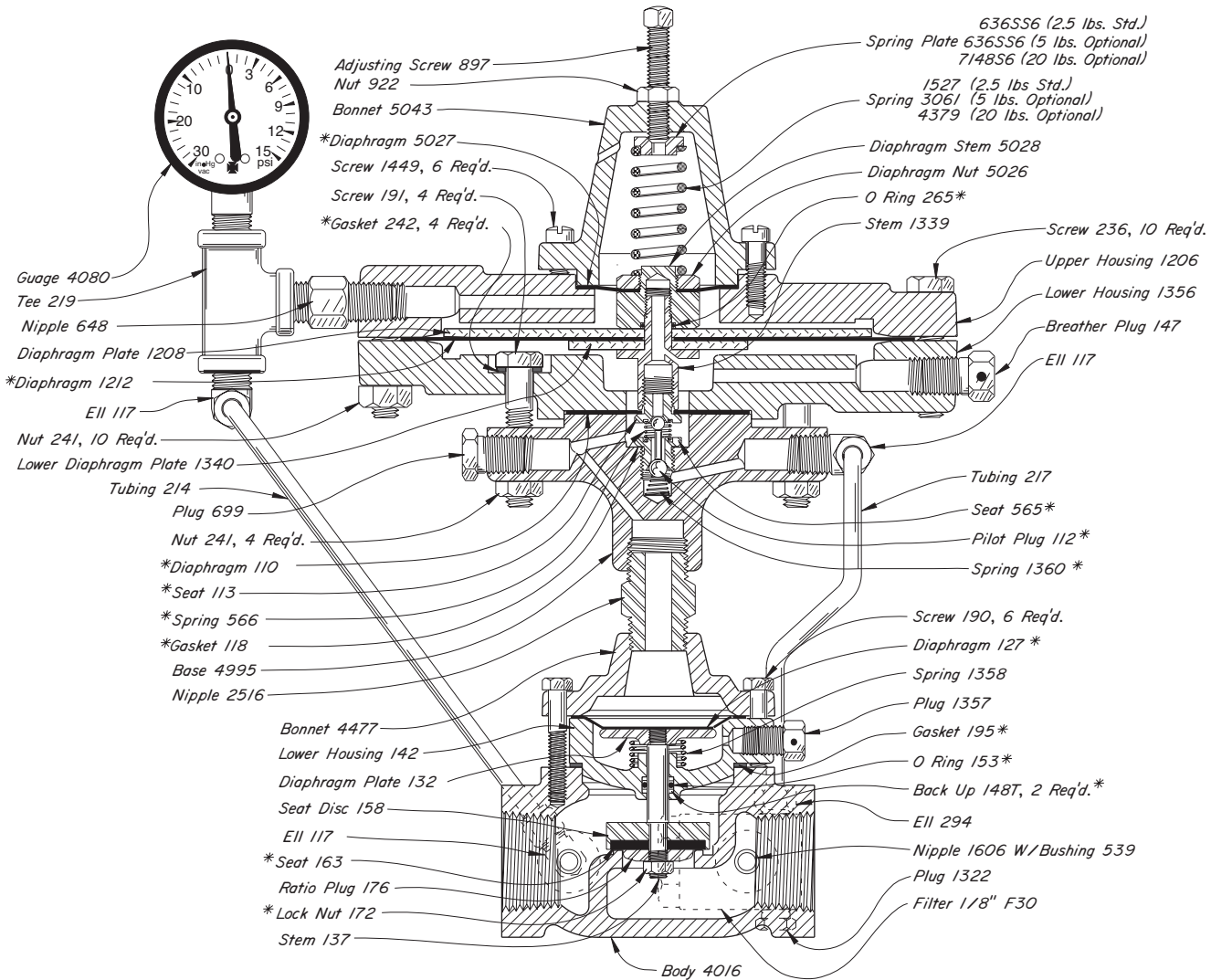
Assume Downstream Vacuum increases. The increased vacuum pulls the Pilot Assembly upward against the PILOT SPRING. This first, closes the lower PILOT PLUG seat (Red to Yellow), then opens the upper PILOT PLUG seat (Yellow to Atmosphere). Motor Valve Diaphragm Pressure (Yellow) decreases, The force of the spring and Upstream Pressure (Red), acting under the motor valve seat, pushes the Motor Valve Stem Assembly upward. The motor valve opens.

This rapid but stable interaction of the Pilot Assembly and Motor Valve Stem Assembly produce a true throttling action accommodating any rate of flow.

# OUNCES PRESSURE REGULATOR



PRESSURE REDUCING VACUUM  
DUCTILE IRON



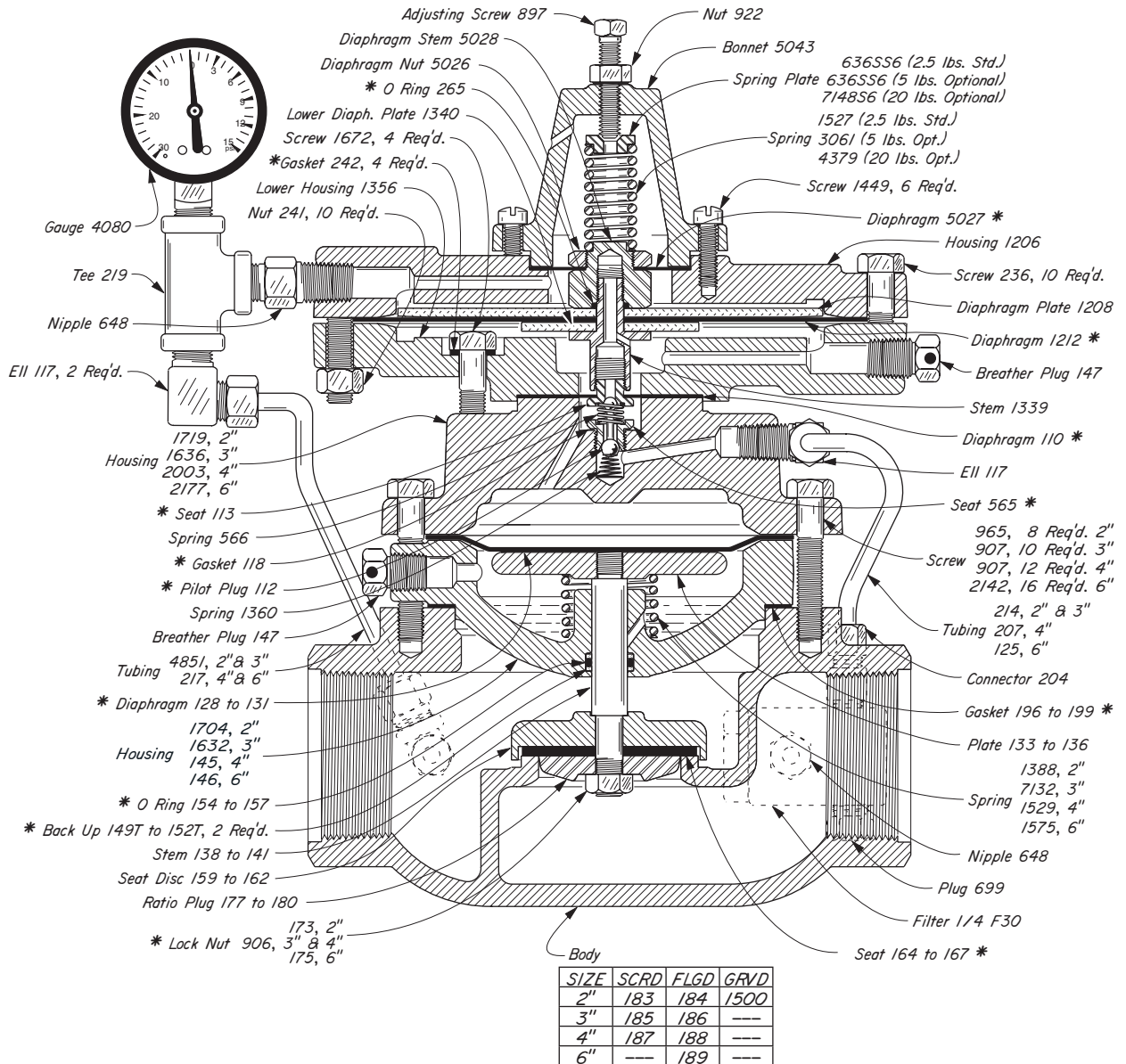
## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
APE-2.5	1" SCR.D.	1.2 SGT OPRV	2.5" Hg.	175	RUL
APE5	1" SCR.D.	1.5 SGT OPRV	10" Hg.	175	RUL
APE20	1" SCR.D.	102 SGT OPRV	30" Hg.	175	RUL

## NOTES:

Dimensions refer to Table of Contents.

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



#### THRU VALVES AVAILABLE: CAST IRON

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
APH2.5	2" SCRD.	2.2 SGT OPRV	5" Hg.	175	RUE
APH5	2" SCRD.	2.5 SGT OPRV	10" Hg.	175	RUE
APH20	2" SCRD.	202 SGT OPRV	30" Hg.	175	RUE
API2.5	2" FLGD. <sup>a</sup>	2.2 FGT OPRV	5" Hg.	175	RUE
API5	2" FLGD. <sup>a</sup>	2.5 FGT OPRV	10" Hg.	175	RUE
API20	2" FLGD. <sup>a</sup>	202 FGT OPRV	30" Hg.	175	RUE
APJ2.5	2" GRVD.	2.2 GGT OPRV	5" Hg.	175	RUE
APJ5	2" GRVD.	2.5 GGT OPRV	10" Hg.	175	RUE
APJ20	2" GRVD.	202 GGT OPRV	30" Hg.	175	RUE
APK2.5	3" SCRD.	3.2 SGT OPRV	5" Hg.	175	RUF
APK5	3" SCRD.	3.5 SGT OPRV	10" Hg.	175	RUF
APK20	3" SCRD.	302 SGT OPRV	30" Hg.	175	RUF
APL2.5	3" FLGD. <sup>a</sup>	3.2 FGT OPRV	5" Hg.	175	RUF
APL5	3" FLGD. <sup>a</sup>	3.5 FGT OPRV	10" Hg.	175	RUF
APL20	3" FLGD. <sup>a</sup>	302 FGT OPRV	30" Hg.	175	RUF

#### THRU VALVES AVAILABLE: CAST IRON

CAT. NO.	SIZE TYPE	REG. NO	OPER. PRES.	MAX W.P.	KIT
APN2.5	4" SCRD.	4.2 SGT OPRV	5" Hg.	175	RUG
APN5	4" SCRD.	4.5 SGT OPRV	10" Hg.	175	RUG
APN20	4" SCRD.	402 SGT OPRV	30" Hg.	175	RUG
APO2.5	4" FLGD. <sup>a</sup>	4.2 FGT OPRV	5" Hg.	175	RUG
APO5	4" FLGD. <sup>a</sup>	4.5 FGT OPRV	10" Hg.	175	RUG
APO20	4" FLGD. <sup>a</sup>	402 FGT OPRV	30" Hg.	175	RUG
APR2.5	6" FLGD. <sup>a</sup>	6.2 FGT OPRV	5" Hg.	175	RUH
APR5	6" FLGD. <sup>a</sup>	6.5 FGT OPRV	10" Hg.	175	RUH
APR20	6" FLGD. <sup>a</sup>	602 FGT OPRV	30" Hg.	175	RUH

Dimensions refer to Table of Contents.

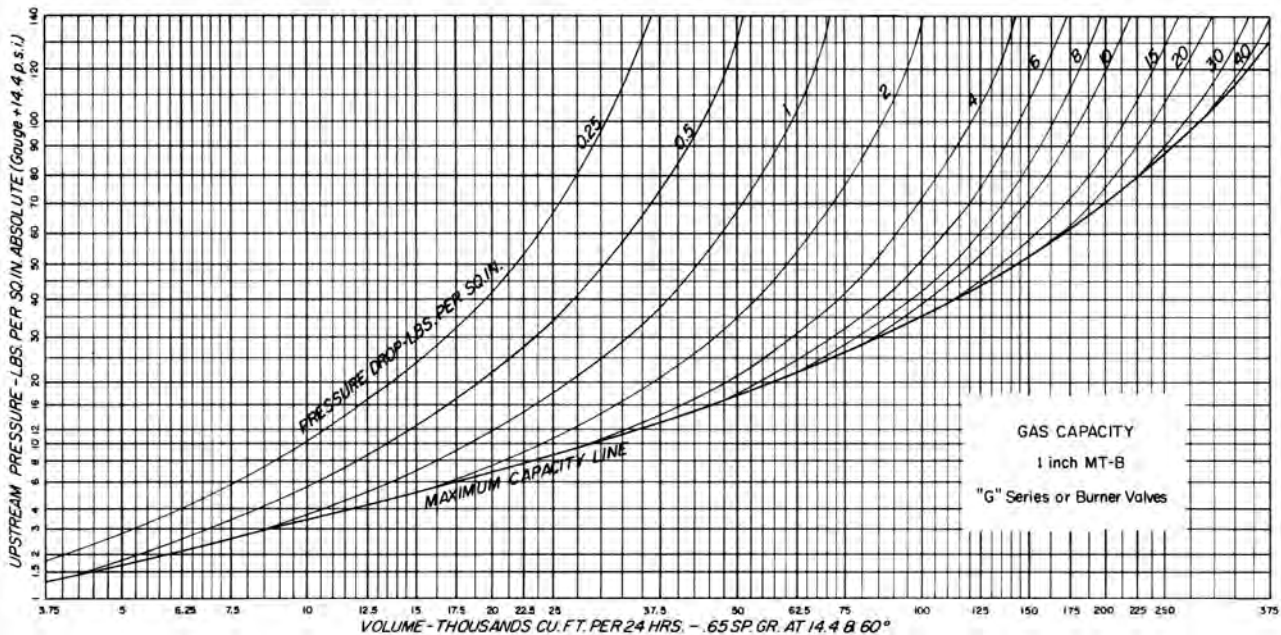
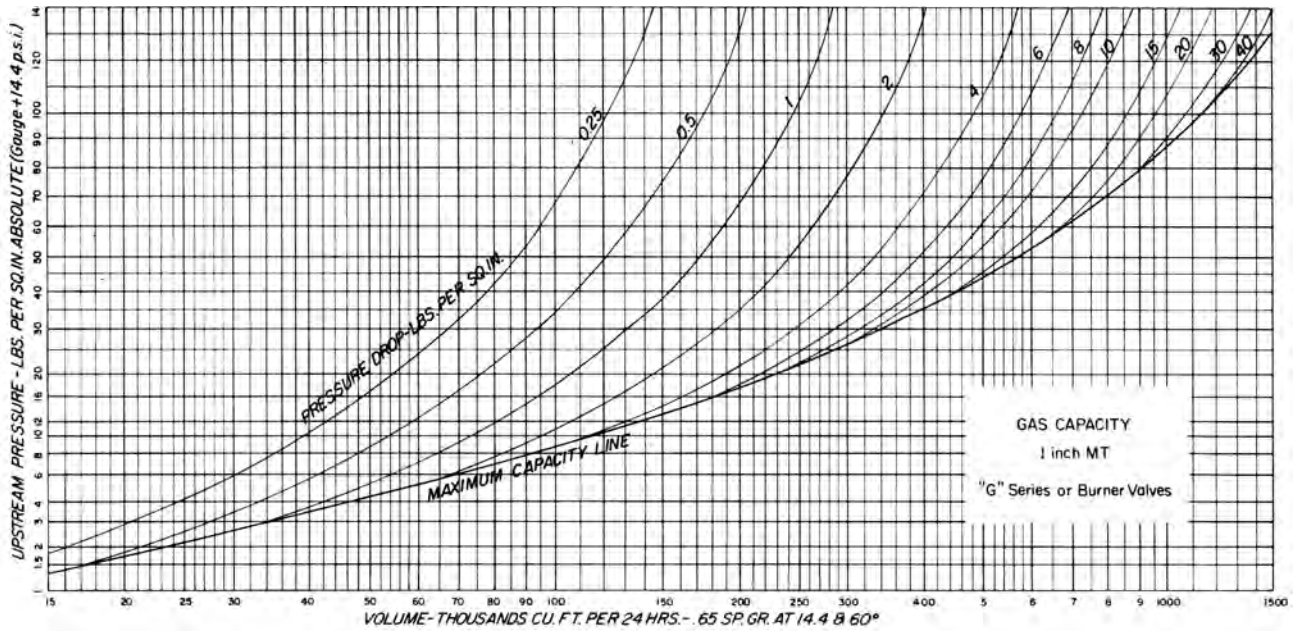
<sup>a</sup>These parts are recommended spare parts and are stocked as repair kits.

The number of a series assigned to a part indicated different line sizes. For example: Diaphragm 128-2", 129-3", 130-4" and 131-6".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

# GAS CAPACITY CHARTS

125 psig Maximum W.P. Valves

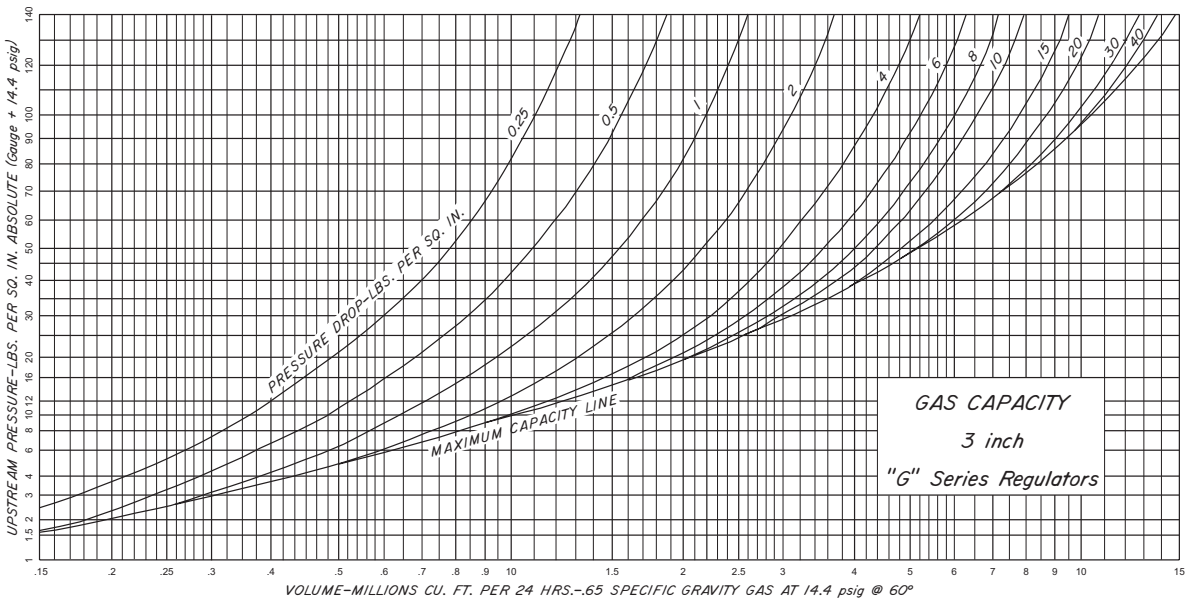
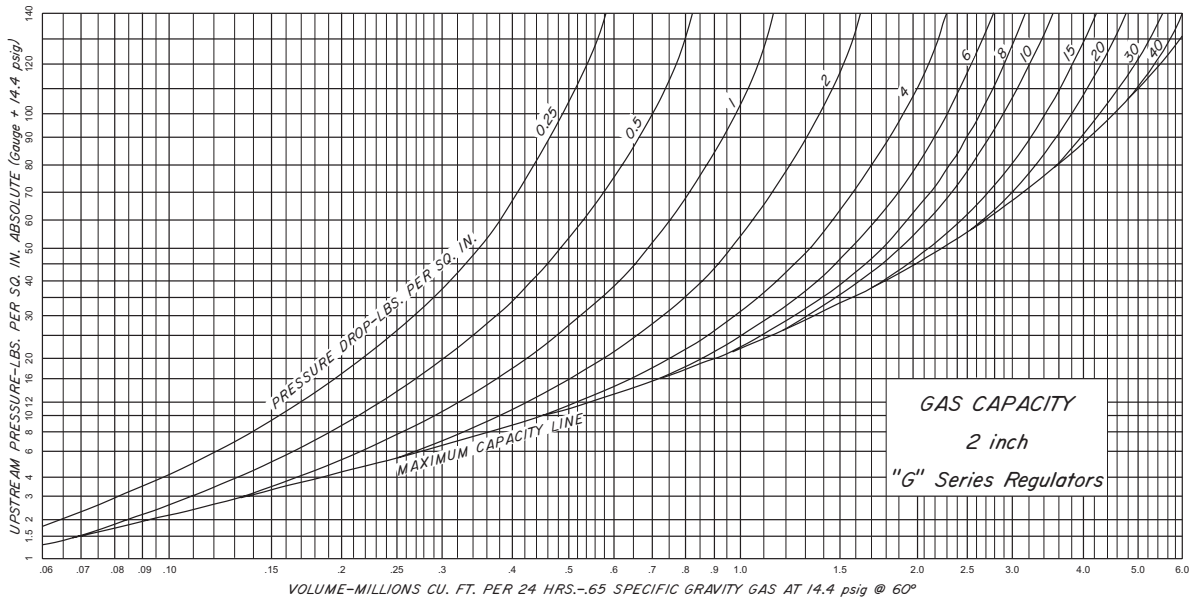


Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.



Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

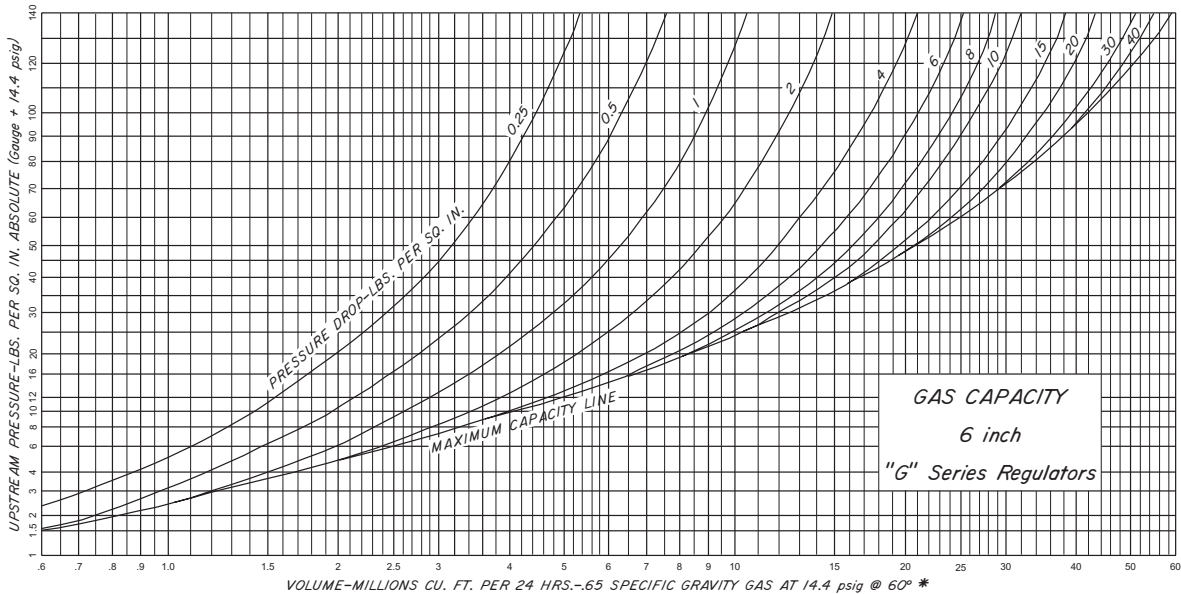
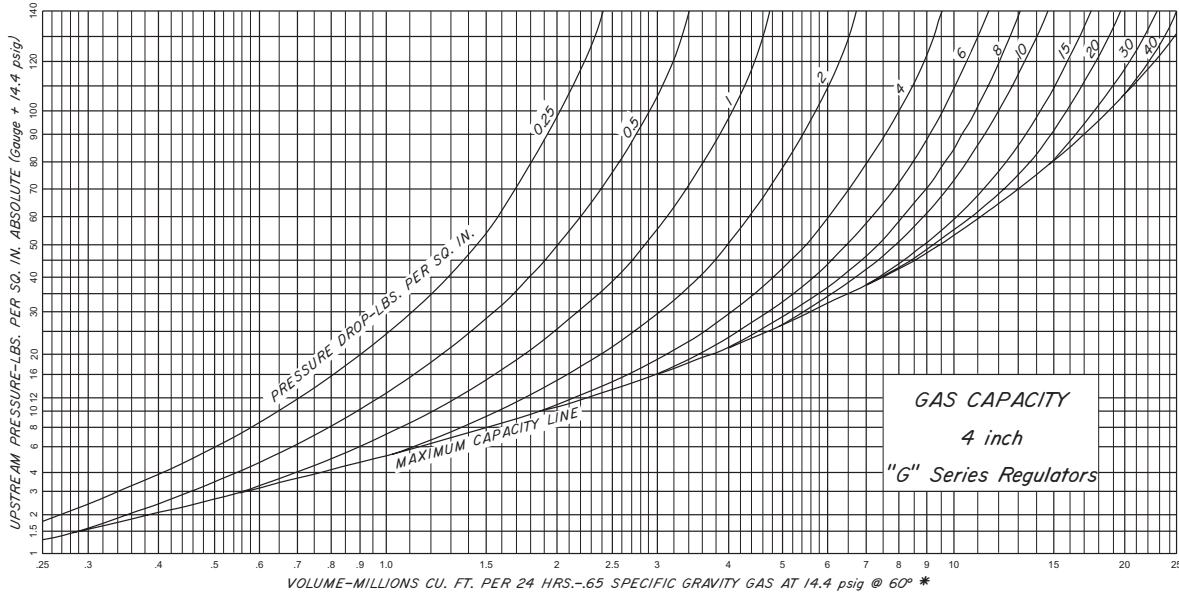
Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.

# GAS CAPACITY CHARTS

125 psig Maximum W.P. Valves



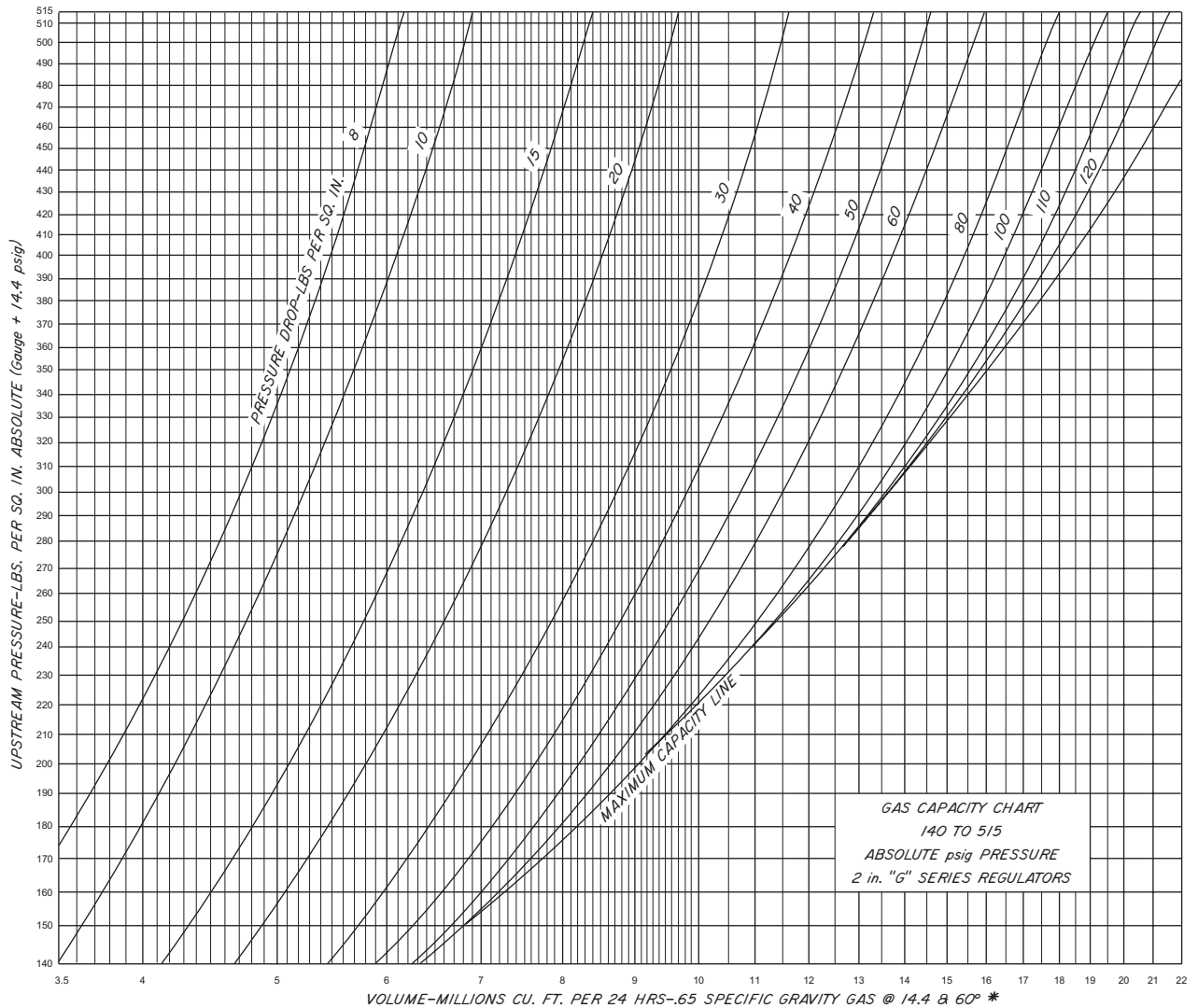
Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.





Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

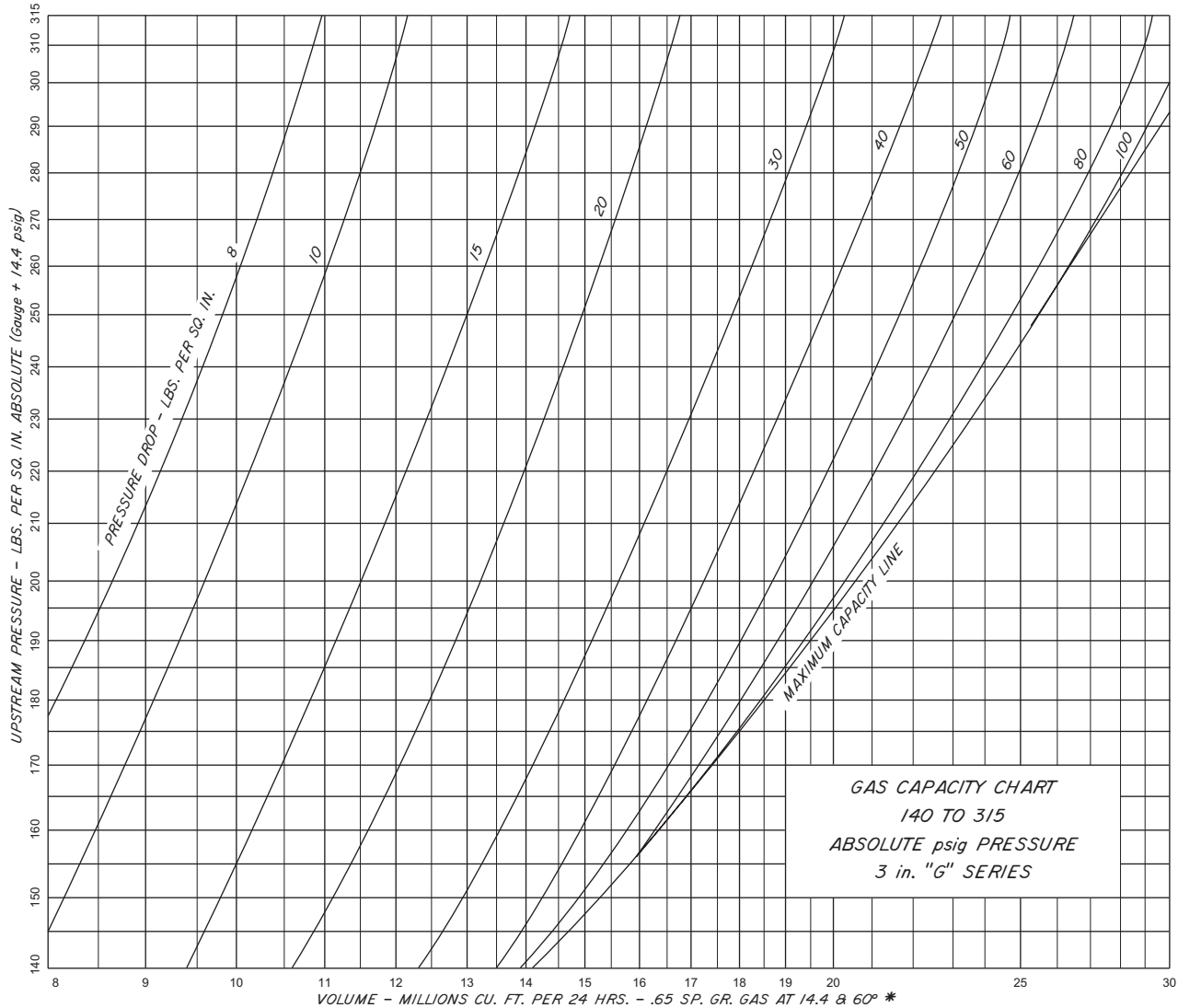
Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.

# GAS CAPACITY CHARTS

220, 285, & 300 psig Maximum W.P. Valves

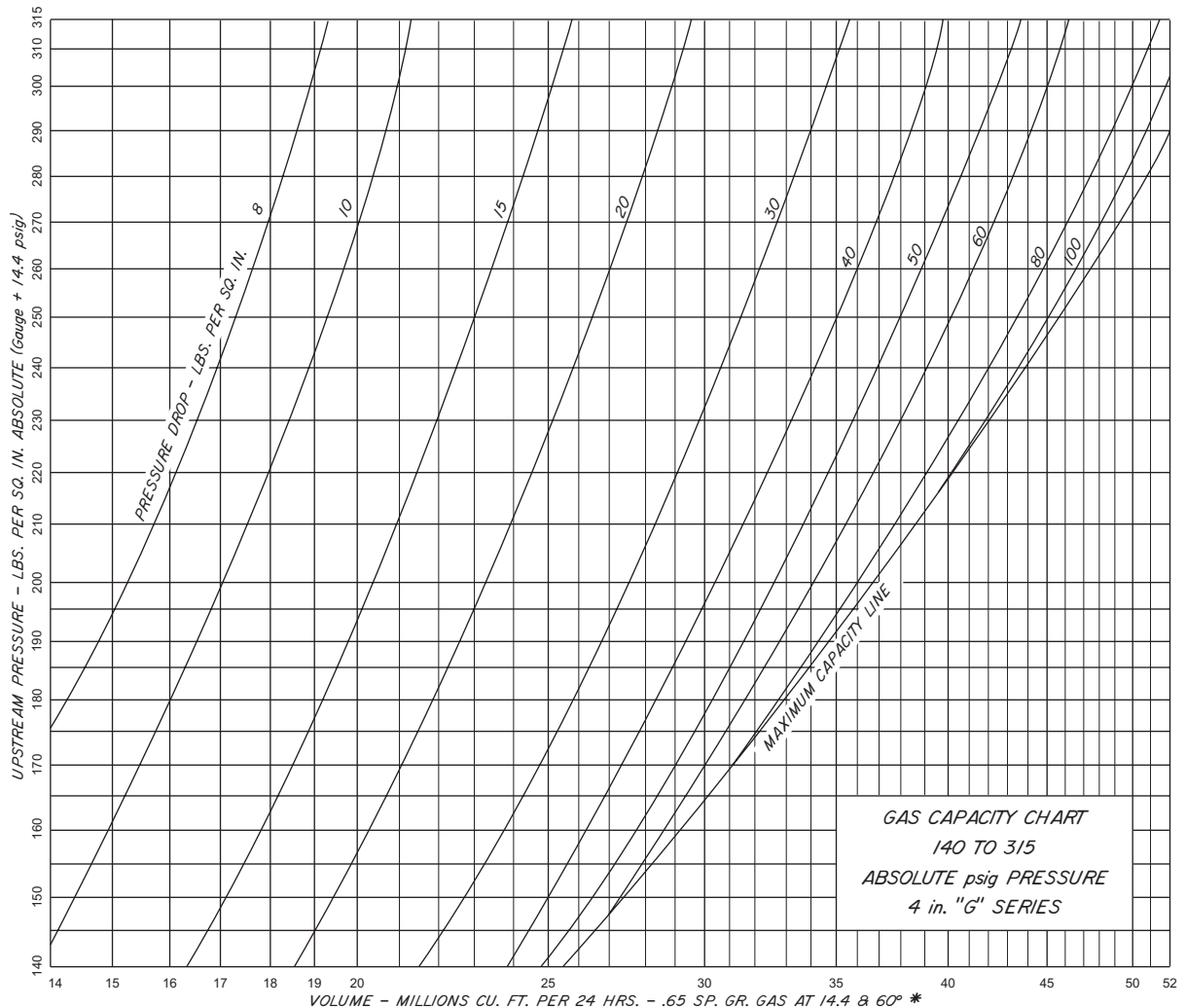


Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.



Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

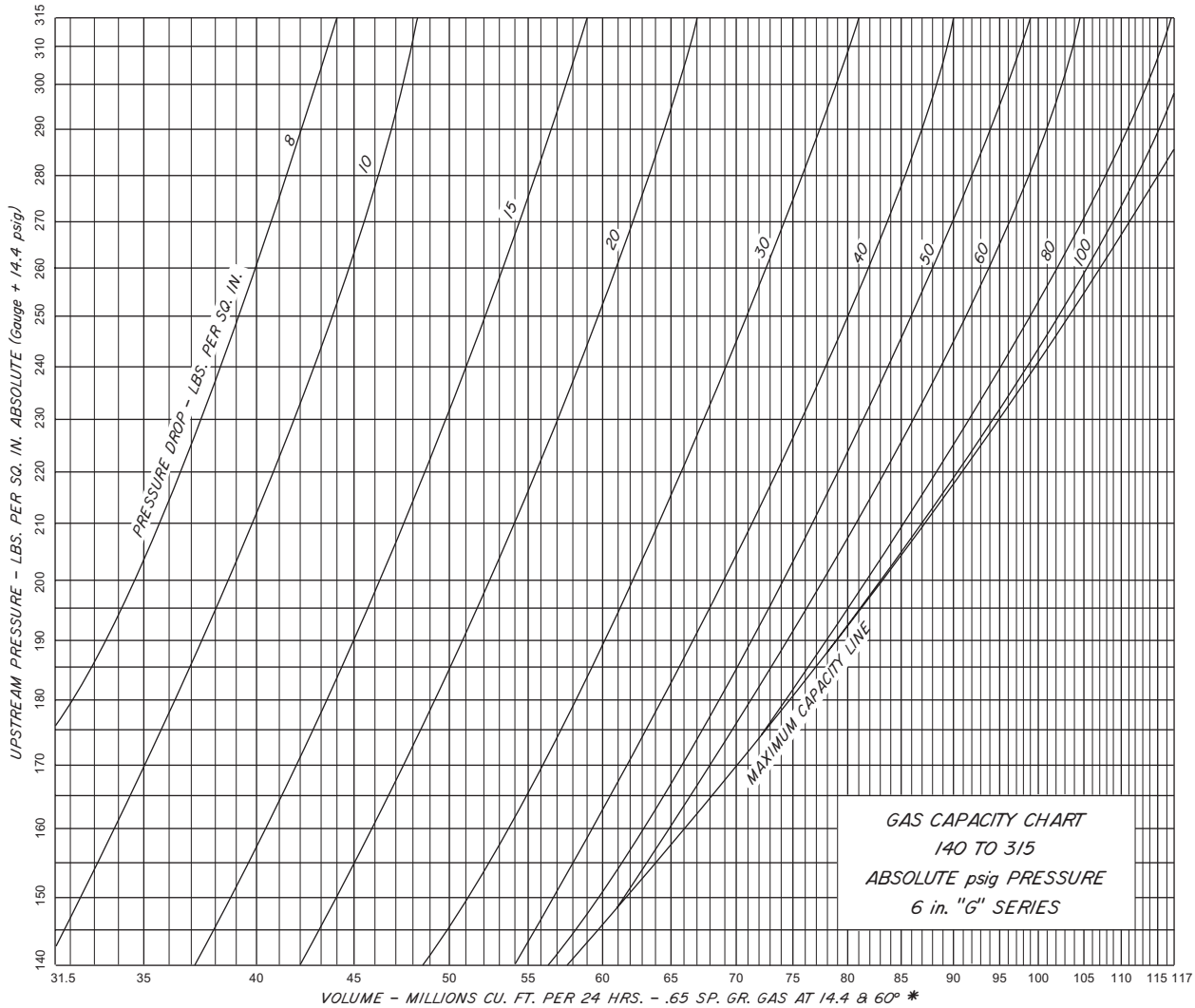
Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE as left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$  where G equals specific gravity of gas.

# GAS CAPACITY CHARTS

220, 285 & 300 psig Maximum W.P. Valves



Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

Critical flow exists across a valve or orifice when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

**HOW TO USE CHARTS:** Locate UPSTREAM PRESSURE at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{65}{G}}$ , where G equals specific gravity of gas.

## CAPACITY-Bbls. Water/Day, Steady Flow

PRESSURE DROP ACROSS VALVE PSIG	VALVE SIZE - INCHES			
	1	2	3	4
1	745	1,760	3,350	7,800
2	1,060	2,500	4,900	11,000
3	1,300	3,050	6,100	13,500
4	1,500	3,500	7,000	15,600
5	1,700	3,900	7,800	17,500
10	2,300	5,600	11,000	24,700
15	2,900	6,800	13,500	30,200
20	3,300	7,900	15,600	34,900
30	4,100	9,600	19,200	42,700
40	4,700	11,100	22,100	49,300
50	5,300	12,400	24,800	55,200
60	5,800	13,600	27,100	60,500
70	6,200	14,700	29,300	65,400
80	6,700	15,700	31,300	69,800
100	7,500	17,600	33,500	78,200
125	8,400	19,700	39,200	87,500
150	9,300	21,500	40,750	93,000
200	10,750	25,000	47,000	108,000
250	12,100	28,000	52,000	120,000
300	13,300	30,900	57,250	130,000

For gravity correction, multiply the above figures by  $\sqrt{\frac{1}{G}}$   
 Where "G" is the specific gravity of the flowing liquid.

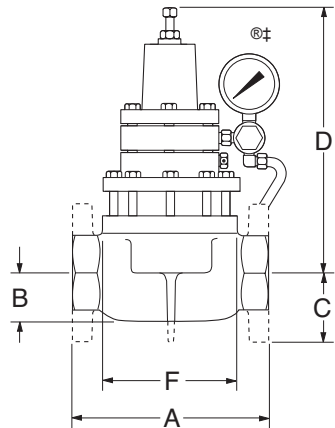
# GAS SERIES REGULATOR



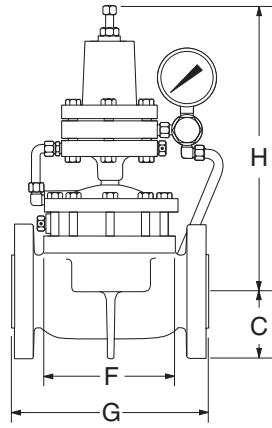
## DIMENSIONS

**FOR:** BACK PRESSURE  
UPSTREAM DIFFERENTIAL PRESSURE  
PRESSURE REDUCING-BALANCED  
PRESSURE REDUCING VACUUM

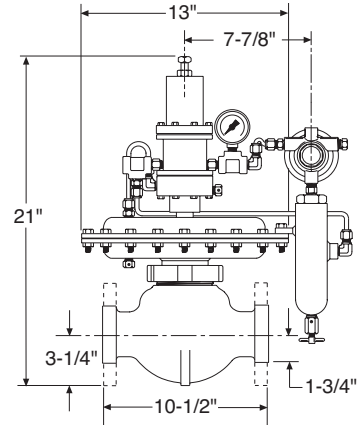
PRESSURE DIFFERENTIAL  
PRESSURE REDUCING  
BACK PRESSURE VACUUM  
LIQUID BACK PRESSURE



**CAST IRON OR DUCTILE**

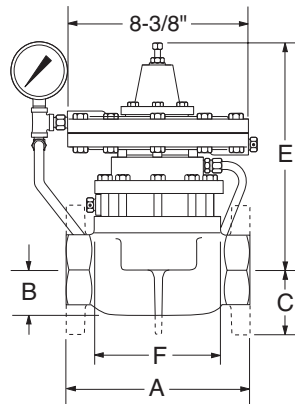


**STEEL**

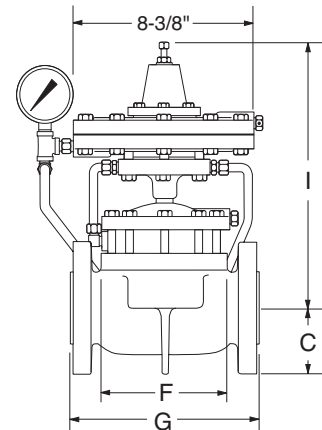


**250 S/FGT-BP-S**

**FOR:** LOW PRESSURE BACK PRESSURE  
OUNCES BACK PRESSURE TO VACUUM  
OUNCES PRESSURE REDUCING  
OUNCES PRESSURE REDUCING VACUUM  
VACUUM BACK PRESSURE TO VACUUM



**CAST IRON OR DUCTILE**



**STEEL**

LINE SIZE	BODY STYLE	A	B	C	D*	E	F	G	H*	I
1 "	SCRD	4 3/8"	1 1/8"		7 1/2"	11 5/8"	3 1/4"			
2 "	SCRD	8 1/2"	2 1/8"		11 1/2"	10 1/2"	6 1/2"			
	FLGD	9"		3 "	11 1/2"	10 1/2"	6 1/2"	9 1/8"	14 1/2"	14"
	GRVD	8 3/4"	2 1/8"		11 1/2"	10 1/2"	6 1/2"			
250 S/FGT	SCRD			1 3/4"				10 1/2"		
	FLGD			3 1/4"				10 1/2"		
3 "	SCRD	12"	3 1/16"		13"	12"	8 1/2"			
	FLGD	12 3/16"		3 3/4"	13"	12"	8 1/2"	12 5/16"	16 1/2"	15 1/2"
4 "	SCRD	15"	4"		14 1/2"	13 3/16"	10 1/2"			
	FLGD	15 1/8"		4 1/2"	14 1/2"	13 3/16"	10 1/2"	15"	18 1/2"	16 11/16"
6 "	FLGD	22 1/8"		5 1/2"	17"	14 7/8"	16"	22"	20 1/2"	18 3/8"

FLANGE DIMENSIONS ARE ANSI 125/150 STANDARD. \*Add 7/8" to PRB and USDP Regulators for this dimension.

# LEVEL CONTROLS FLOAT OPERATED



SECTION C1

# KIMRAY INC.®

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.  
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**FLOAT OPERATED PILOTS**

Kimray Float Operated Pilots sense liquid top level or liquid interface level and provide a 0-30 psig pneumatic signal for operation of diaphragm operated motor valves or dump valves.

**LIQUID LEVEL CONTROLLER**

GEN II SIDE MOUNT .....01.1  
 GEN II BACK MOUNT .....01.3  
 GEN II ELECTRONIC BACK MOUNT .....01.5

**ELECTRIC LEVEL SWITCH**

HORIZONTAL ELS WITH MANUAL OVERRIDE .....05.2  
 HORIZONTAL ELS W/O MANUAL OVERRIDE .....05.3

**TOP LEVEL or LIQUID INTERFACE CONTROL**

SNAP ACTION PFS .....10.1  
 High sensitivity, solid, displacement float operated pilot provides on-off signal as set interface level.  
  
 THROTTLE ACTION PFT .....10.3  
 High sensitivity, solid, displacement float operated pilot provides varying signal at set interface level.

**LIQUID LEVEL CONTROL**

SNAP ACTION PFS-1 .....10.5  
 Solid, displacement float operated pilot provide on-off signal at ends of wide level spread.  
  
 HIGH LOW SNAP ACTION PFM .....20.1  
 Solid, displacement float operated pilot provided on-off or varying signal with adjustable level spread.  
  
 COMPACT PFB .....30.1  
 Solid, displacement float operated pilot provides on-off or varying signal at set level.  
  
 PNEUMATIC LEVEL SWITCH ULC .....45.1  
 General application solid, displacement float operated pilot provides on-off signal at level pilot is installed.

**ACCESSORIES**

PF BODIES .....50.1  
 Plates and Adapters designed to install pilots in a wide variety of openings.  
  
 GEN II BODIES .....50.2  
 Plates and Adapters designed to install GEN II pilots in a wide variety of openings.  
  
 PF FLOATS .....60.1  
 Floats and extensions designed for a wide variety of fluids and temperatures.  
  
 CONTROL PILOTS .....70.1  
 Pilots designed for reversing, multiplying, boosting or on-off switching of a pneumatic signal to operate motor valves, burner valves or dump valves.  
  
 PF PILOT DIMENSIONS .....80.1  
 Installation and system design dimensions of Kimray Float Operated Pilots.  
  
 GEN II DIMENSIONS .....80.2  
  
 GEN II BACK MOUNT DIMENSIONS .....80.3  
  
 ELEC. LEVEL SWITCH CAGES .....90.1  
  
 PNEUMATIC LEVEL SWITCH CAGES .....90.3

**ORDERING INFORMATION**

To order standard Float Operated Pilots, refer to Pilots Available chart on each parts reference page. Determine which Pilot is needed and order by "Cat. No."  
 Standard pilot body is a 2" NPT male connection rated at 4000 psig W.P. for other connections and their ratings refer to Bodies in Table of Contents.  
 Standard Displacement float material is Delrin or Polyethylene, Nickel plated aluminum or Teflon floats are available on request. An additional charge will be made for nonstandard floats. For floats available, refer to Floats, in Table of Contents.  
 To order PF Pilots with materials or features not listed in "Pilots Available" chart, contact the KIMRAY, Inc. Authorized Distributor in your area. For a listing of Authorized distributors, refer to the distributor list in the catalog.

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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

#### APPLICATIONS:

Liquid level controller for oil and gas separators, water knock-outs, gas scrubbers and accumulators.

Liquid interface control in fluids of 0.20 minimum differential specific gravities with the standard displacer. Other displacers are available to control liquid interface to 0.10 minimum specific gravities.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3, and E4 for diaphragm operated motor valves.

#### FEATURES:

- Compact design
- Snap or throttle control in one pilot
- Intermittent bleed pilot (Preferred EPA Natural Gas Star BMP)
- Bleed Rate (@ 30 psi - 0.4 scfd snap; 0.6 scfd throttle)
- Conditional NACE MR0175 Wetted Parts
- Low Temp Process Seal (Std.) (-50°F to 300°F)
- Powder coated enclosure
- Vibration tough
- No vent gas in Enclosure
- PVC Displacer (Std.) (4000 psi, 175°F);
- 316 SS Displacer (1500 psi, 350°F)
- 40 micron supply gas filter
- 1/4" NPT vented pilot
- Simple pilot removal

#### SUPPLY PRESSURE:

5 to 30 psig

#### OPERATING PRESSURE:

0 to 4000 psig

#### OPERATION:

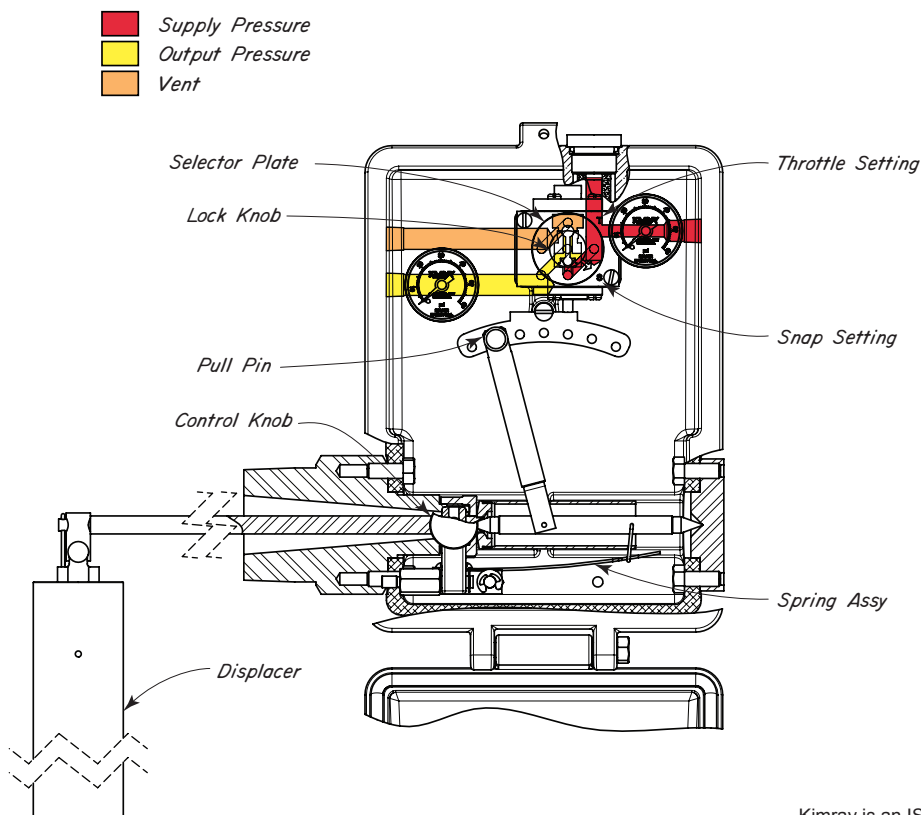
The GEN II Side Mount Liquid Level Controller consists of a DISPLACER for monitoring the changing liquid level, a SPRING for counterbalancing the weight of the DISPLACER, a WAGGLE ARM to transmit DISPLACER movement, a CASE upon which the controller mechanism is mounted, a 30 psig PILOT, a LINK and TANGENT ARM for setting the pilot sensitivity and direct/indirect action of the controller.

The color cross section of the pilot is shown identifying the supply, output and vent connections. In SNAP SERVICE the SELECTOR PLATE is position to the "S". To operate a Pressure Opening Motor Valve, the PULL PIN is place in the outer most hole of the TANGENT ARM right of the PIVOT. As the vessel liquid rises to partially submerge the DISPLACER, the displaced volume of liquid causes the counterbalance spring to exert a downward force at the end of the WAGGLE ARM HOUSING. The resulting downward movement of the LINK moves the TANGENT ARM downward from the ACTUATOR of the PILOT. The generated force of the DISPLACER continues until it activates and SNAPS the PILOT on. YELLOW OUTPUT pressure opens the Pressure Opening Motor Valve allowing the vessel liquid to drain.

As the vessel liquid lowers, the DISPLACER flexes the COUNTERBALANCE SPRING, causing an upward force. The WAGGLE ARM transmits the action through the linkage to the ACTUATOR on the PILOT. The force on the ACTUATOR of the PILOT continues to increase until the PILOT SNAPS off. The YELLOW OUTPUT pressure is vented through the PILOT allowing the Motor Valve to close.

The TANGENT ARM can be adjusted to increase or decrease the SNAP RANGE from 5" to 10" in water. Moving the PULL PIN inward will increase the SNAP RANGE.

For THROTTLE mode the LOCK KNOB is loosened and the SELECTOR PLATE is moved from the "S" position to the "T" position. The PULL PIN is placed left of the PIVOT for a Pressure Open Motor Valve and right of the PIVOT for a Pressure Close Motor Valve.

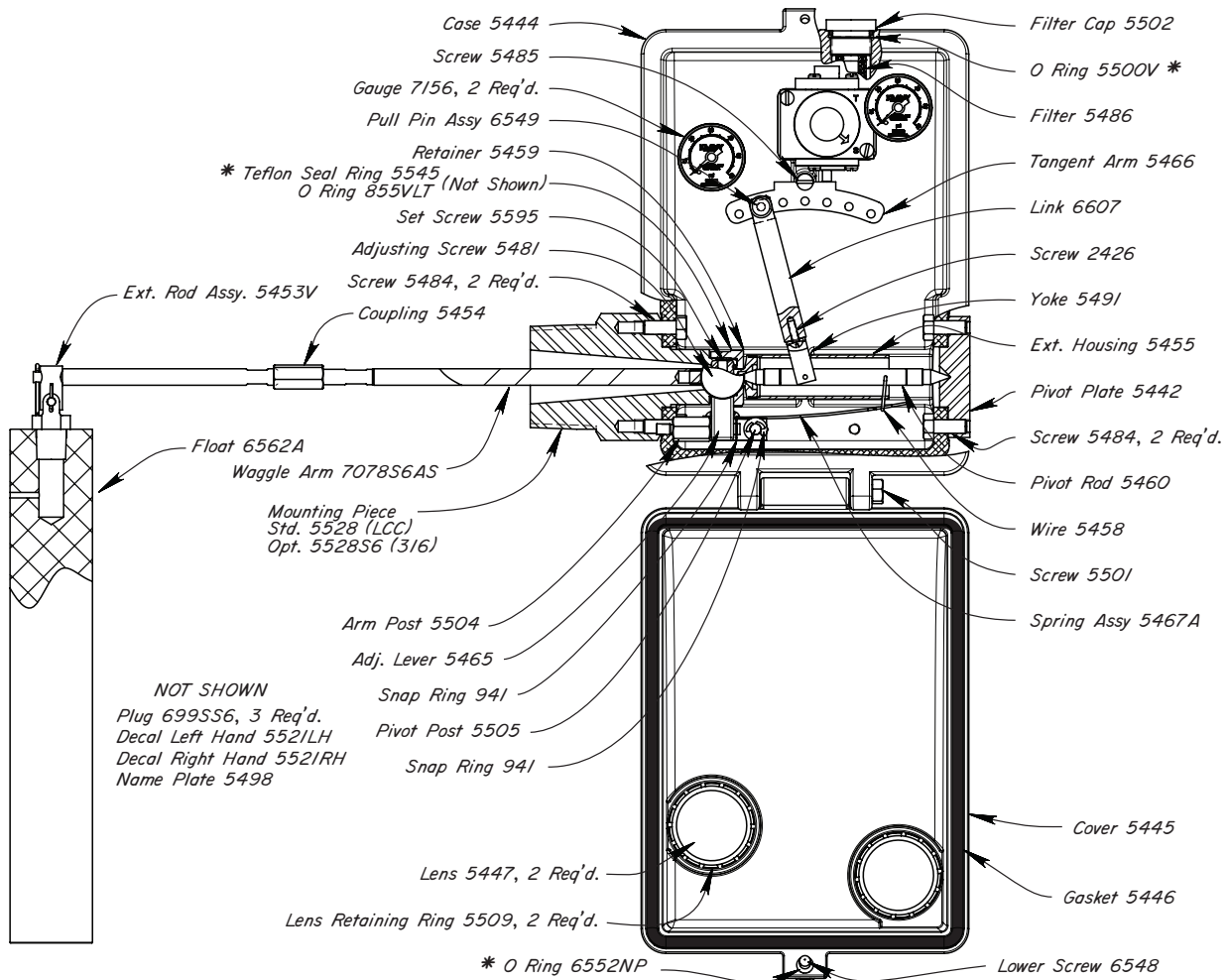


Kimray is an ISO 9001- certified manufacturer.

# FLOAT OPERATED LEVEL CONTROLLER



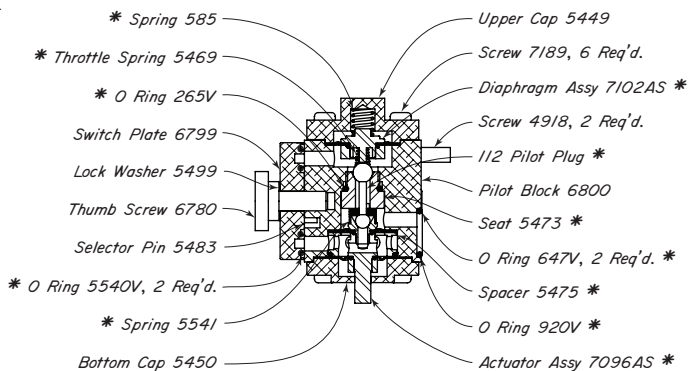
GEN II  
LCC, SS6 STEEL BODY



## PILOTS AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.	REPAIR KIT
CMK	2" NPT	2" GEN II LLC RH	4000	RMD
CML	2" NPT	2" GEN II LLC LH	4000	RMD

## YBT PILOTS



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

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#### APPLICATIONS:

Liquid level controller for oil and gas separators, water knock-outs, gas scrubbers and accumulators.

Liquid interface control in fluids of 0.20 minimum differential specific gravities with the standard displacer. Other displacers are available to control liquid interface to 0.10 minimum specific gravities.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3, and E4 for diaphragm operated motor valves.

#### FEATURES:

- Compact design
- Snap or throttle control in one pilot
- Intermittent bleed pilot (Preferred EPA Natural Gas Star BMP)
- Bleed Rate (@ 30 psi - 0.4 scfd snap; 0.6 scfd throttle)
- Conditional NACE MR0175 Wetted Parts
- Low Temp Process Seal (Std.) (-50°F to 300°F)
- Powder coated enclosure
- Vibration tough
- No vent gas in Enclosure
- PVC Displacer (Std.) (4000 psi, 175°F);
- 316 SS Displacer (1500 psi, 350°F)
- 40 micron supply gas filter
- 1/4" NPT vented pilot
- Adjustment knob snap range (Patent Pending)
- Simple pilot removal

#### SUPPLY PRESSURE:

5 to 30 psig

#### OPERATING PRESSURE:

0 to 4000 psig

#### OPERATION:

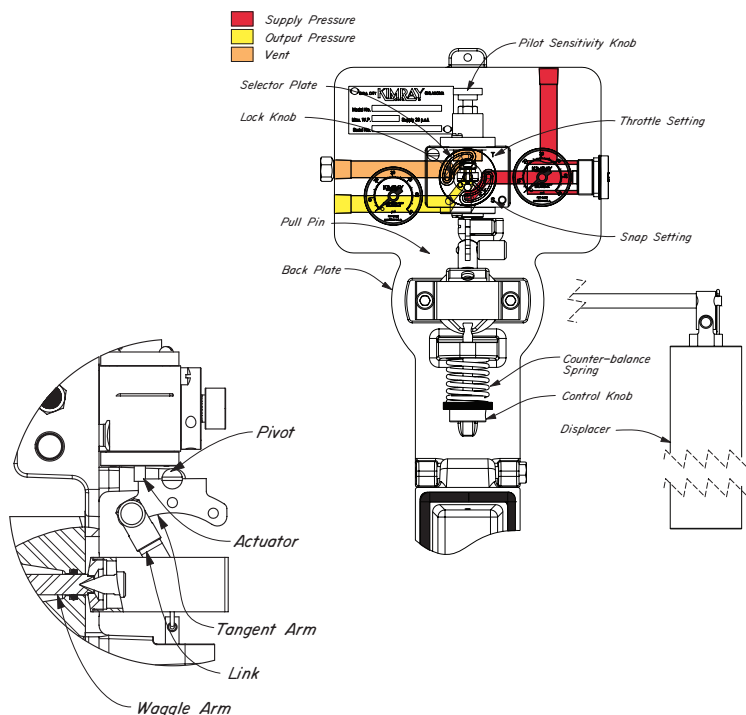
The GEN II Back Mount Liquid Level Controller consists of a DISPLACER for monitoring the changing liquid level, a SPRING for counterbalancing the weight of the DISPLACER, a WAGGLE ARM to transmit DISPLACER movement, a BACK PLATE upon which the controller mechanism is mounted, a 30 psig PILOT, a LINK and TANGENT ARM for setting the pilot sensitivity and direct/indirect action of the controller.

The color cross section of the pilot is shown identifying the supply, output and vent connections. In SNAP SERVICE the SELECTOR PLATE is position to the "S". To operate a Pressure Opening Motor Valve, the PULL PIN is place in the outer most hole of the TANGENT ARM left of the PIVOT. As the vessel liquid rises to partially submerge the DISPLACER. The displaced volume of liquid causes the counterbalance spring to exert a downward force at the end of the WAGGLE ARM HOUSING. The resulting downward movement of the LINK moves the TANGENT ARM downward from the ACTUATOR of the PILOT. The generated force of the DISPLACER continues until it activates and SNAPS the PILOT on. YELLOW OUTPUT pressure opens the Pressure Opening Motor Valve allowing the vessel liquid to drain.

As the vessel liquid lowers, the DISPLACER compresses the COUNTERBALANCE SPRING. The WAGGLE ARM transmits the action through the linkage to the ACTUATOR on the PILOT. The force on the ACTUATOR of the PILOT continues to increase until the PILOT SNAPS off. The YELLOW OUTPUT pressure is vented through the PILOT allowing the Motor Valve to close.

The PILOT SENSITIVITY KNOB can be turned to increase or decrease the SNAP RANGE from 4" to 9" in water. Turning the PILOT SENSITIVITY KNOB clockwise will increase the SNAP RANGE. The PILOT SENSITIVITY KNOB is not functional in the THROTTLE mode.

For THROTTLE mode the LOCK KNOB is loosened and the SELECTOR PLATE is moved from the "S" position to the "T" position. The PULL PIN is placed right of the PIVOT for a Pressure Open Motor Valve and left of the PIVOT for a Pressure Close Motor Valve.

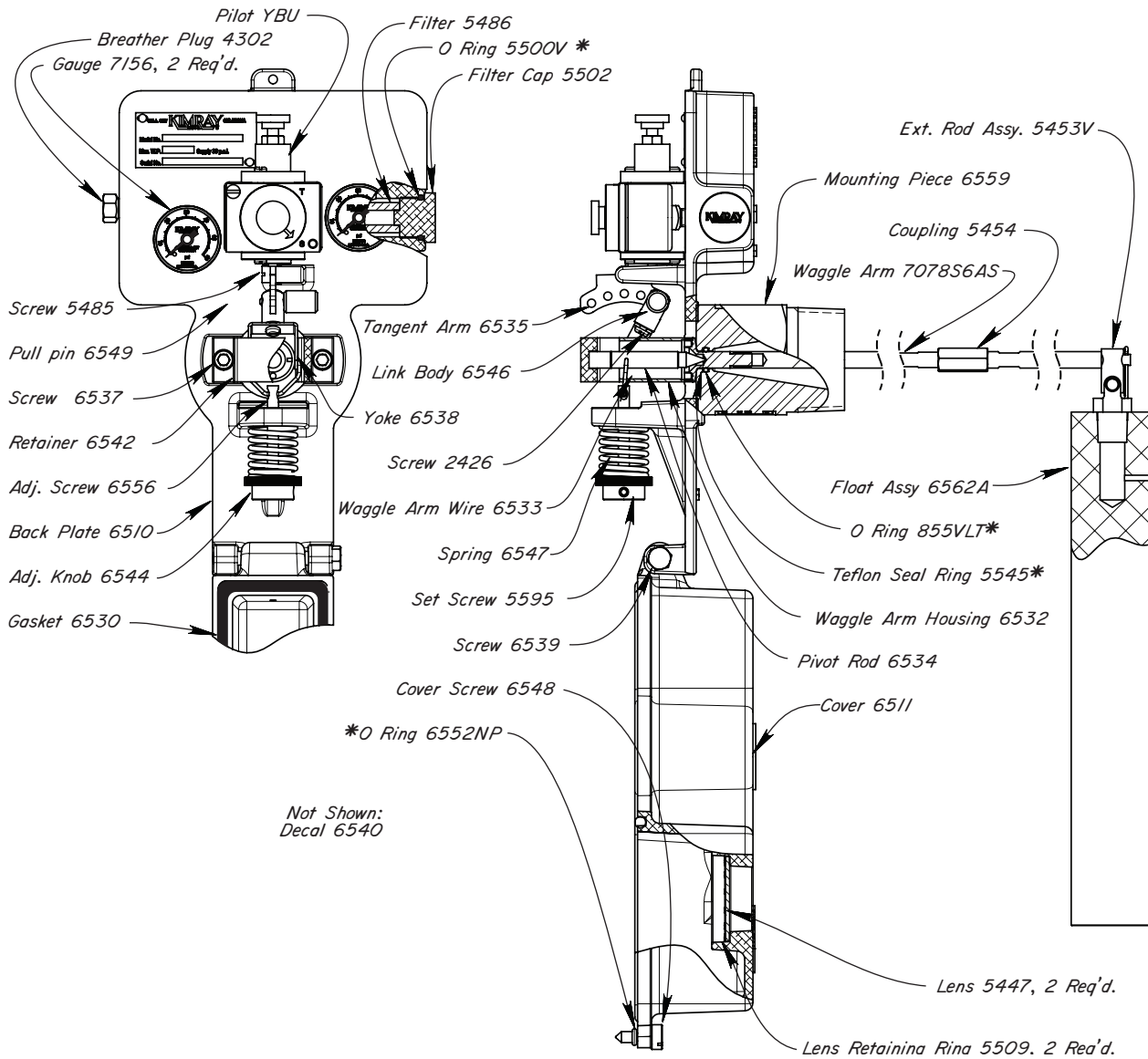


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# FLOAT OPERATED LEVEL CONTROLLER



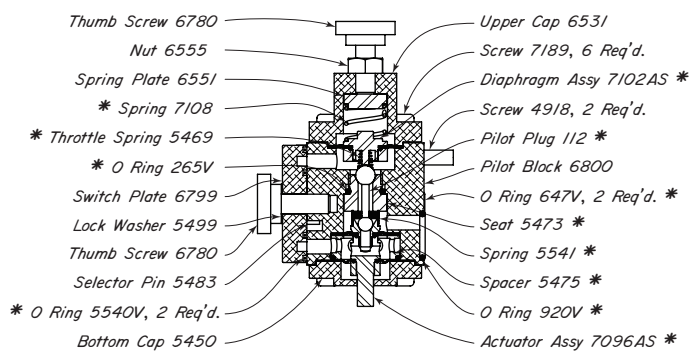
GEN II BACK MOUNT  
LCC, SS6 STEEL BODY



## PILOTS AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.	REPAIR KIT
CMM	2" NPT	2" GEN II LLC	4000	RMG
CMY	2" NPT SS6	2" GEN II LLC	4000	RMG

## YBU PILOT



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

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Liquid level controller for oil and gas separators, water knock-outs, gas scrubbers and accumulators.

Liquid interface control in fluids of 0.20 minimum differential specific gravities with the standard displacer. Other displacers are available to control liquid interface to 0.10 minimum specific gravities.

#### FEATURES:

- Compact design
- Snap Action
- Conditional NACE MR0175 Wetted Parts
- Low Temp Process Seal (Std.) (-50°F to 300°F)
- Powder coated enclosure
- Vibration tough
- PVC Displacer (Std.) (4000 psi, 175°F);
- 316 SS Displacer (1500 psi, 350°F)
- Adjustment knob snap range (Patent Pending)
- 2 NAMURs Sensor (Intrinsically Safe, Class I Div 1)
- Type 3r Enclosure

#### POWER SPECS (6841 I.S. BARRIER):

- 10-30 VDC, ≤ 1.5W (Intrinsically Safe Barrier, Class I Div 2)
- Barrier output Relay Contacts: ≤ 2A @ 250 VAC / 120 VDC

#### OPERATING PRESSURE:

- 0 to 4000 psig

#### OPERATION:

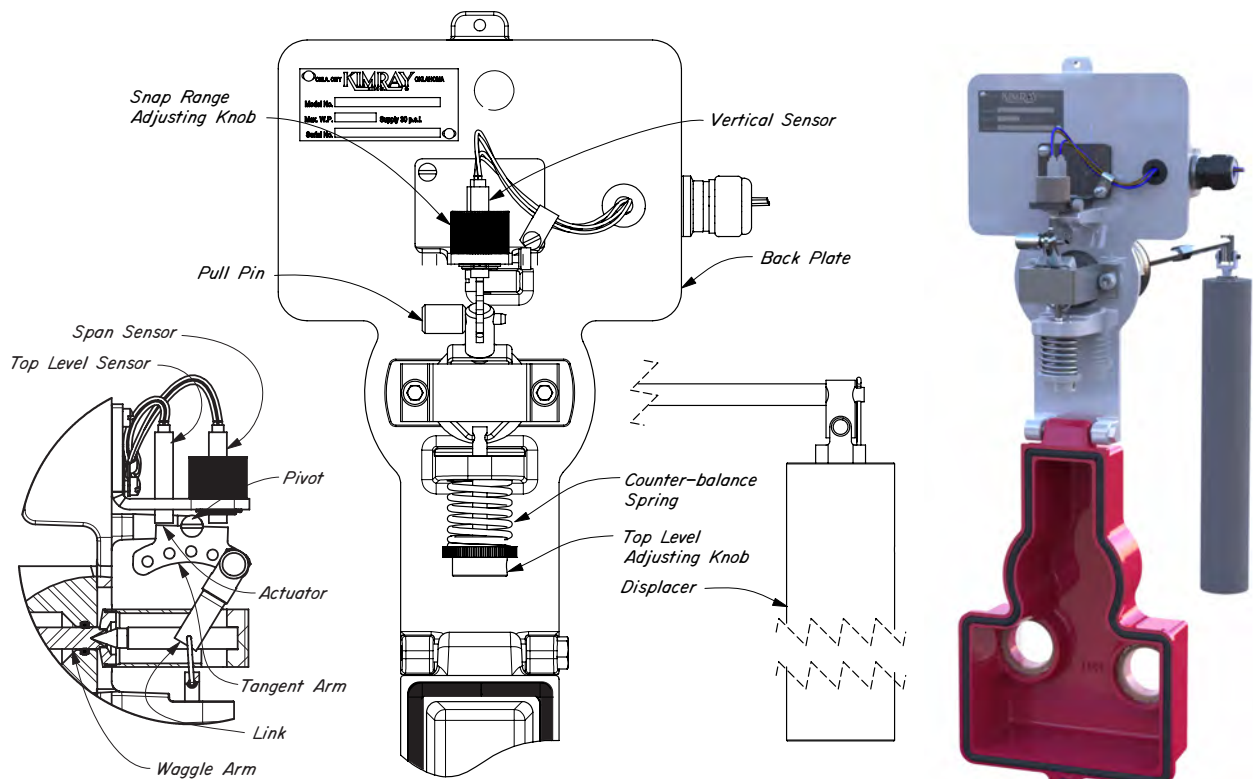
The GEN II Electronic Back Mount Liquid Level Controller consists of a DISPLACER for monitoring the changing liquid level, a SPRING for counterbalancing the weight of the DISPLACER, a WAGGLE ARM to transmit DISPLACER movement, a BACK PLATE upon which the controller mechanism is mounted, a LINK a TANGENT ARM for setting the pilot sensitivity, a SNAP RANGE ADJUSTING KNOB for setting liquid level spans, and 2 NAMUR SENSORS.

The PULL PIN is placed in the outer most hole of the TANGENT ARM right of the PIVOT. As the vessel liquid rises to partially submerge the DISPLACER. The displaced volume of liquid causes the counterbalance spring to exert a downward force at the end of the WAGGLE ARM HOUSING. The resulting downward movement of the LINK moves the TANGENT ARM upward toward the TOP LEVEL SENSOR until the TOP LEVEL SENSOR activates.

As the vessel liquid lowers, the DISPLACER compresses the COUNTERBALANCE SPRING. The WAGGLE ARM transmits the action through the linkage to the TANGENT ARM. The TANGENT ARM continues to move until the SNAP SENSOR activates.

The SNAP RANGE ADJUSTING KNOB can be turned to increase or decrease the SNAP RANGE from 2" to 9" in water. Turning the KNOB clockwise will increase the SNAP RANGE.

The SENSOR leads are wired to a Class I Div 2 IS barrier for output to a controller such as a RTU, PLC, etc.

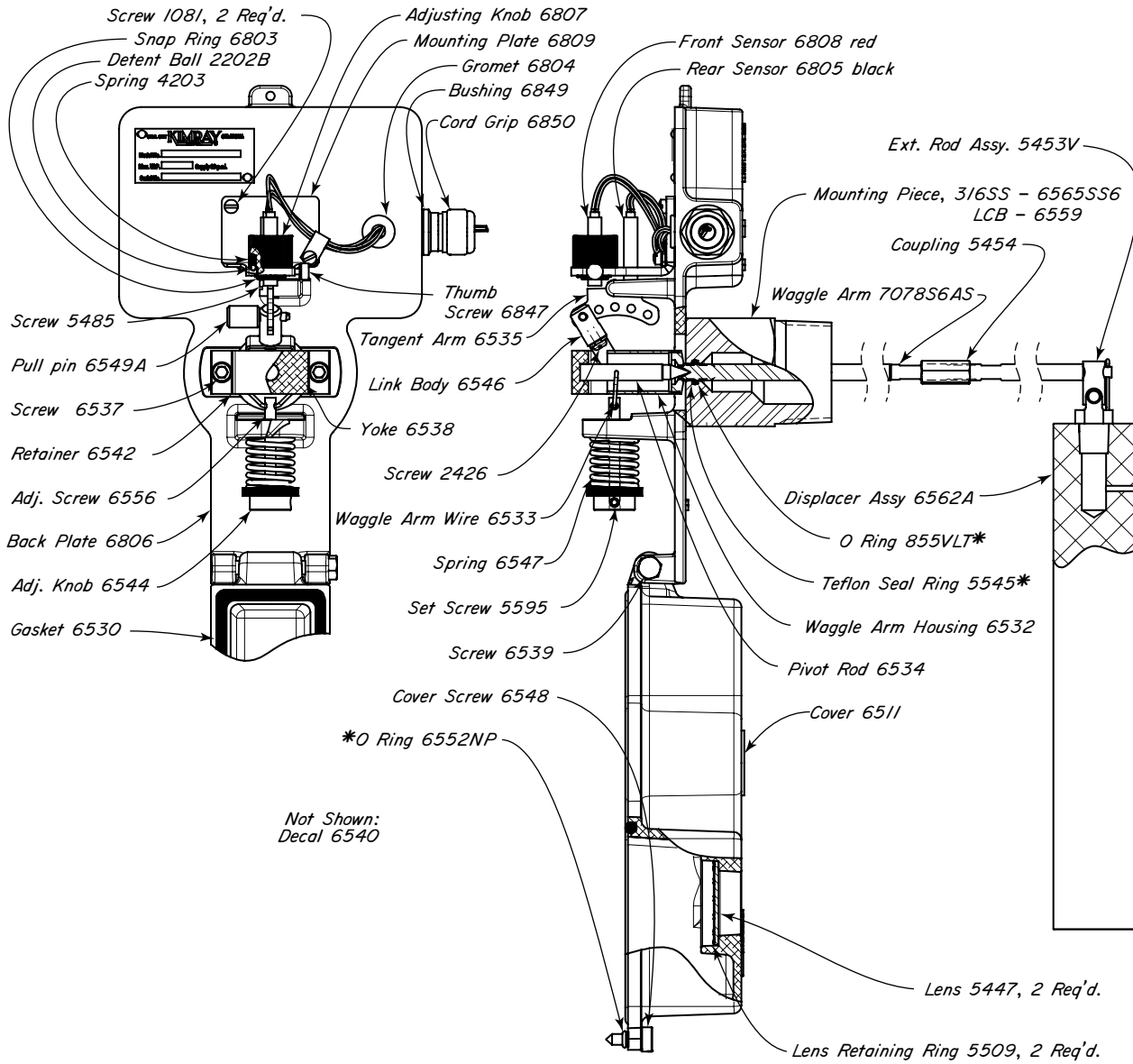


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# FLOAT OPERATED LEVEL CONTROLLER



## GEN II ELECTRONIC BACK MOUNT LCB, SS6 STEEL BODY



### PILOTS AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.	REPAIR KIT
CMME	2" NPT LCB	GEN II EBM LLC	4000	RMG
CMMES6B	2" NPT SS6	GEN II EBM LLC	4000	RMG
CMMES6F	2" NPT LCB	GEN II EBM LLC	1500	RMG
CMMES6BF	2" NPT SS6	GEN II EBM LLC	1500	RMG

### NOTES:

SUFFIX	INCLUDES ACCESSORIES
-	I.S. Barrier and 20' cables
L50	I.S. Barrier and 50' cables
L100	I.S. Barrier and 100' cables

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

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#### APPLICATIONS:

Senses a specific liquid level and produces electric output.  
High or low level control.  
Electric output can activate alarms, solenoid valves or other electrically switched devices.

#### FEATURES:

316 SS Wetted Parts  
Sealed Hermetic Reed Switch  
SPDT Reed Switch  
CSA Certificate #1662451, USA and Canada  
Expl. Proof – Class I, Groups A,B,C,D  
Class II, Groups E,F,G, Class III  
Class I, Zone 1, AExdIIC, ExdIIC  
(Stainless steel float only)  
Additional seal not required

#### NEMA4X

Available with manual override for testing.  
Minimum Specific Gravity 0.4.

#### MAXIMUM WORKING PRESSURES:

See Catalog Code

#### TEMPERATURE RANGE:

Temp: - 50F to 350F - SS6 Float  
Temp: - 50F to 200F - Polypropylene Float

#### CONNECTIONS:

1 1/2" NPT  
2" NPT

ELECTRICAL RATINGS	
STANDARD	0.83A @ 120VAC
	2A @ 50VDC
	3A MAXIMUM
	PWR: 3W MIN, 100W MAX
LOW POWER	0.2A @ 120VAC
	1A @ 25VDC
	1A MAXIMUM
	PWR : 25W MAX

#### OPERATION:

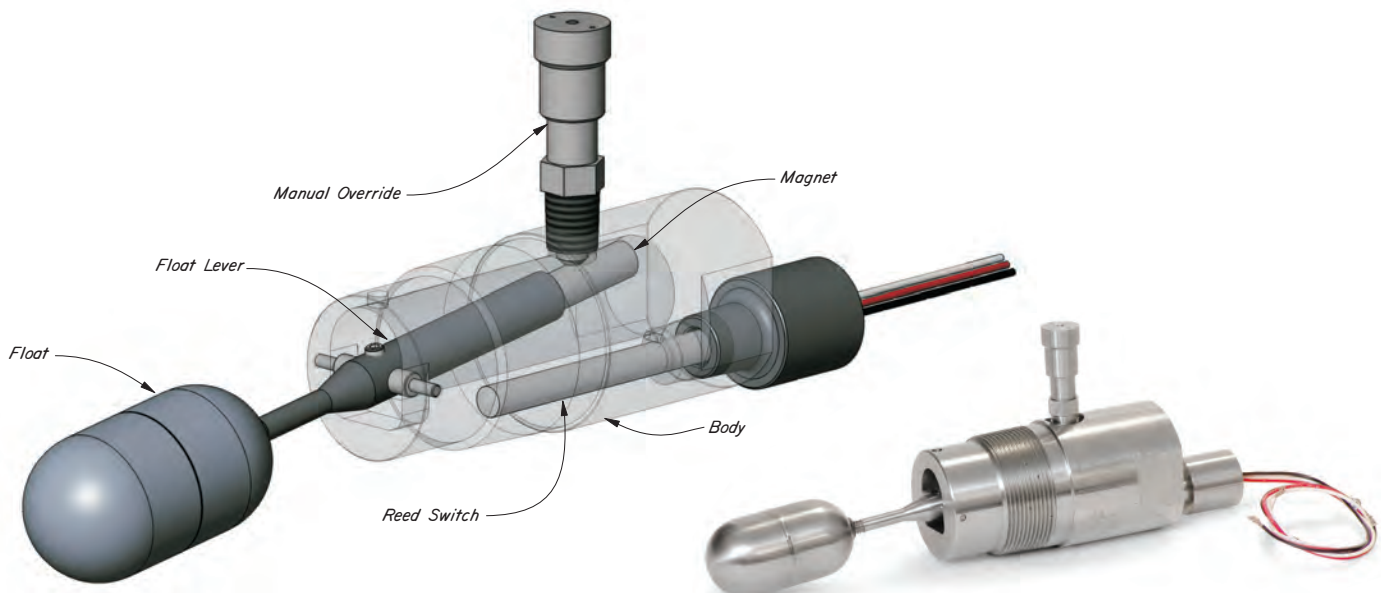
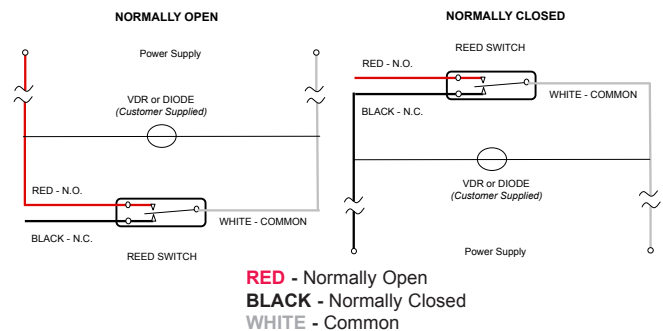
The FLOAT is counterbalanced by the FLOAT LEVER. As the liquid level increases the FLOAT is lifted. A MAGNET in the FLOAT LEVER moves downward and closer to the REED SWITCH which is located in the enclosure in the BODY. This closes the REED SWITCH. As the liquid level decreases the FLOAT moves downward, moving the MAGNET away from the REED SWITCH, causing it to open.

The optional MANUAL OVERRIDE allows the operator to manually activate the FLOAT LEVER to test the switch and the devices it controls.

#### WIRING INSTRUCTIONS:

Do not exceed the amperage and voltage for the switch. Switch contacts may experience damage in applications using relays, motors, etc. where a power surge or voltage spike may occur during relay engagement or motor startups. For these conditions a shunt path for over-voltage should be installed.

- For **DC** applications:  
use an **(1N4001)** or similar diode wired in parallel as shown.
- For **AC** applications:  
use a 110 VAC Varistor (**Digi-Key BC1408-ND**) or similar wired in parallel as shown.

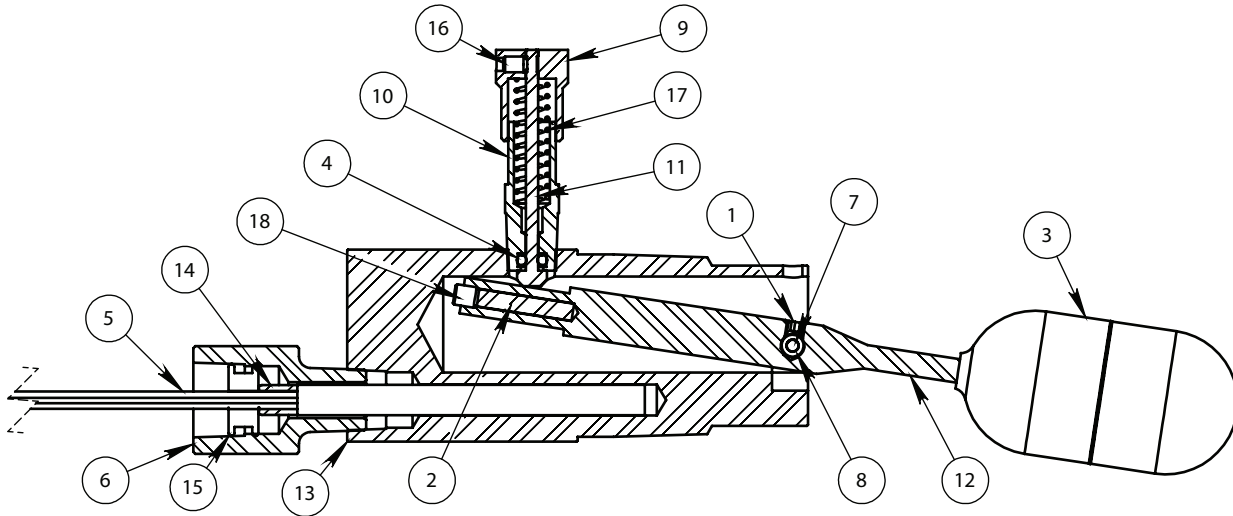


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# FLOAT OPERATED LEVEL CONTROLLER



ELEC. LEVEL SWITCH (HORIZ.) WITH MANUAL OVERRIDE  
STEEL



ITEM #	PART #	COMMON PARTS	QTY.
1	2446	SET SCREW	1
2	3206	MAGNET	1
4	5410V	O-RING VITON	1
5	5413	SWITCH CARTRIDGE	1
5	5413R	SWITCH CARTRIDGE	1
6	5414	CONDUIT ADAPTOR	1
8	5416	LEVER SPACER	2
9	5417	PUSH CAP	1
10	5418	OVERRIDE FITTING	1
11	5419	STEM	1
12	5420	FLOAT LEVER	1
14	5423	GROMMET INSERT	1
15	5424	GROMMET	1
16	5426	SET SCREW	1
17	5429	SPRING	1
18	5593	SET SCREW	1

ITEM #	PART #	BODIES	QTY.
13	5434	2 IN NPT	1
13	5425	1 1/2 IN NPT	1

ITEM #	PART #	LEVER PINS	QTY.
7	5415	LEVER PIN 1 1/2" BODY	1
7	5432	LEVER PIN 2" BODY	1

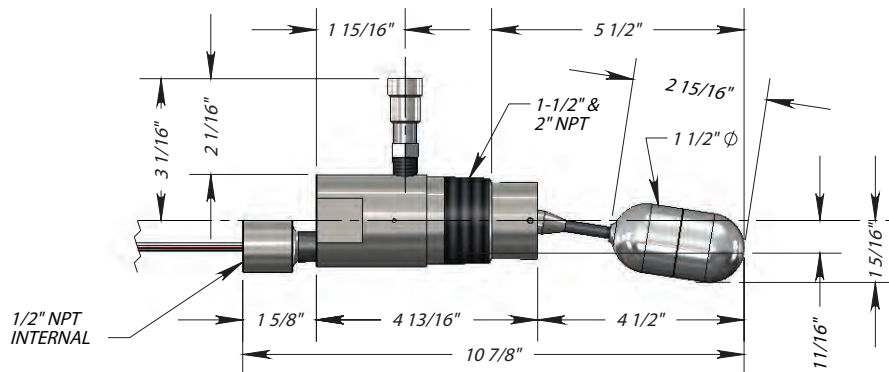
PART #	EXTERNAL FLOAT CAGES	QTY.
5522	1 1/2 IN	1
5523	2 IN	1

PART #	ACCESSORIES	QTY.
5418	M/O ASSEMBLY	1
5587A	PULL ASSEMBLY w/20' CABLE	1
5594	ANNULUS PLUG	1

ITEM #	PART #	FLOATS	QTY.
3	3216	316 SS	1
3	5431	POLY	1

FLOAT EXTENSIONS			
EXTENSION LENGTH	EXTENSION	SYNTACTIC FLOAT	EXTENSION ADAPTER
3 INCH	6980S6	7026	6989
6 INCH	6992S6	7026	6989

## DIMENSIONS



### LEVEL CONTROLLER AVAILABLE:

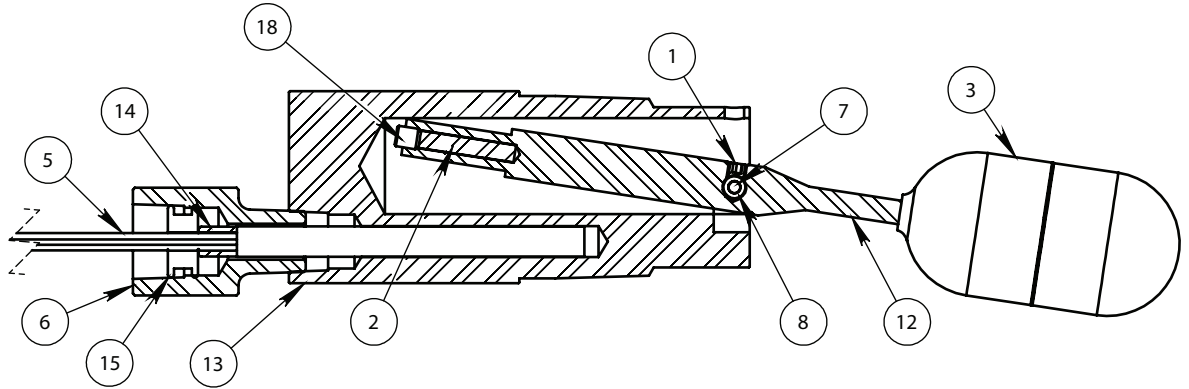
CAT. NO.	BODY TYPE	PILOT	MAX W.P.
CEB2	1 1/2" NPT	1200 SLS SS6 FLOAT M/O	2000
CEB2PP	1 1/2" NPT	1200 POLY FLOAT M/O	2000
CEB3	1 1/2" NPT	1200 SLS SS6 FLOAT M/O W/CABLE	2000
CEB3PP	1 1/2" NPT	1200 POLY FLOAT M/O W/CABLE	2000
CEC2	2" NPT	2200 SLS SS6 FLOAT M/O	2000
CEC2PP	2" NPT	2200 POLY FLOAT M/O	2000
CEC3	2" NPT	2200 SLS SS6 FLOAT M/O W/CABLE	2000
CEC3PP	2" NPT	2200 POLY FLOAT M/O W/CABLE	2000

Float cage available see page C1:90.1 & C1:90.2

### LOW POWER LEVEL CONTROLLER AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.
CEB2LPW	1 1/2" NPT	1200 SLS LOW PWR SS6 FLOAT M/O	2000
CEB2LPWPP	1 1/2" NPT	1200 LOW PWR POLY FLOAT M/O	2000
CEB3LPW	1 1/2" NPT	1200 SLS LOW PWR SS6 FLOAT M/O W/CABLE	2000
CEB3LPWPP	1 1/2" NPT	1200 LOW PWR POLY FLOAT M/O W/CABLE	2000
CEC2LPW	2" NPT	2200 SLS LOW PWR SS6 FLOAT M/O	2000
CEC2LPWPP	2" NPT	2200 LOW PWR POLY FLOAT M/O	2000
CEC3LPW	2" NPT	2200 SLS LOW PWR SS6 FLOAT M/O W/CABLE	2000
CEC3LPWPP	2" NPT	2200 LOW PWR POLY FLOAT M/O W/CABLE	2000

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ITEM #	PART #	COMMON PARTS	QTY.
1	2446	SET SCREW	1
2	3206	MAGNET	1
5	5413	SWITCH CARTRIDGE	1
5	5413R	SWITCH CARTRIDGE	1
6	5414	CONDUIT ADAPTOR	1
8	5416	LEVER SPACER	2
12	5420	FLOT LEVER	1
14	5423	GROMMET INSERT	1
15	5424	GROMMET	1
18	5593	SET SCREW	1

ITEM #	PART #	FLOATS	QTY.
3	3216	316 SS	1
3	5431	POLY	1

ITEM #	PART #	BODIES	QTY.
13	5434	2 IN NPT	1
13	5425	1 1/2 IN NPT	1

ITEM #	PART #	LEVER PINS	QTY.
7	5415	LEVER PIN 1 1/2" BODY	1
7	5432	LEVER PIN 2" BODY	1

	PART #	EXTERNAL FLOAT CAGES	QTY.
	5522	1 1/2 IN	1
	5523	2 IN	1

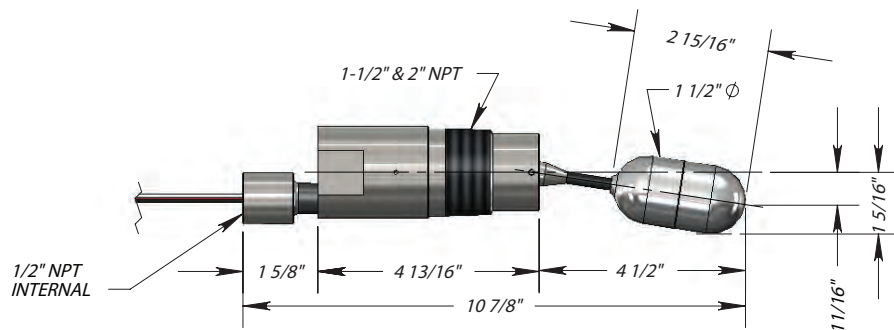
  

	PART #	ACCESSORIES	QTY.
	5418	M/O ASSEMBLY	1
	5587A	PULL ASSEMBLY w/20' CABLE	1
	5594	ANNULUS PLUG	1

FLOAT EXTENSIONS			
EXTENSION LENGTH	EXTENSION	SYNTACTIC FLOAT	EXTENSION ADAPTER
3 INCH	6980S6	7026	6989
6 INCH	6992S6	7026	6989

### DIMENSIONS



### LEVEL CONTROLLER AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.
CEB1	1 1/2" NPT	1200 SLS SS6 FLOAT	2000
CEB1PP	1 1/2" NPT	1500 POLY FLOAT	5000
CEC1	2" NPT	2200 SLS SS6 FLOAT	2000
CEC1PP	2" NPT	2500 POLY FLOAT	5000

### LOW POWER LEVEL CONTROLLER AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.
CEB1LPW	1 1/2" NPT	1200 SLS LOW PWR SS6 FLOAT	2000
CEB1LPWPP	1 1/2" NPT	1500 LOW PWR POLY FLOAT	5000
CEC1LPW	2" NPT	2200 SLS LOW PWR SS6 FLOAT	2000
CEC1LPWPP	2" NPT	2500 LOW PWR POLY FLOAT	5000

Float cage available see page C1:90.1 & C1:90.2

Kimray is an ISO 9001- certified manufacturer.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATION:

Liquid level controller for oil and gas separators, water knock-outs, gas scrubbers and accumulators.

#### FEATURES:

- Rated for 2000 psi working pressure
- Push-button Dump Valve Override Standard
- Float Operates in 0.5 Specific Gravity
- Designed for Harsh Gas Compressor Scrubber Applications
- NACE MR0175 Process Standard
- Snap Acting / Non-bleed

#### FLOW RATE:

420 SCFH @ 30psig

#### SUPPLY PRESSURE:

15-75 psig

#### TEMP. RANGE:

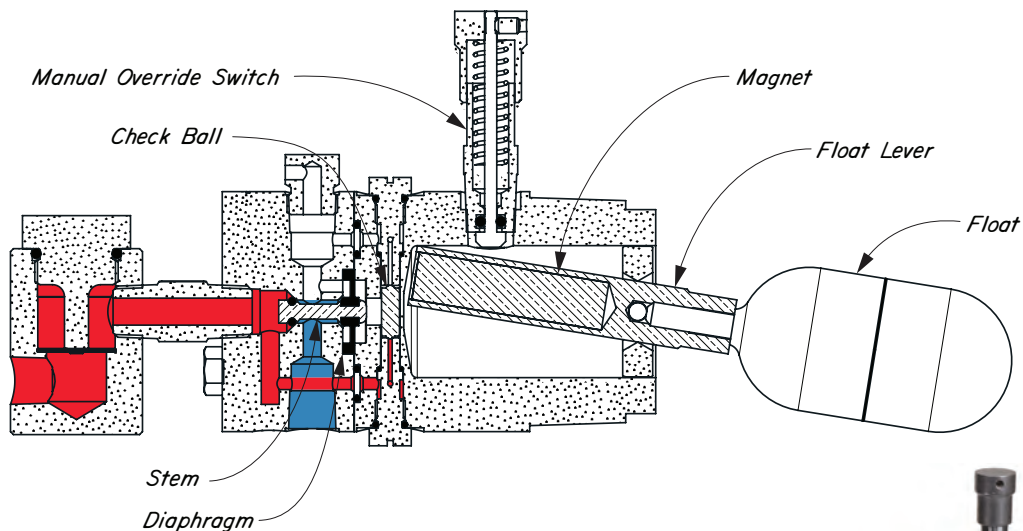
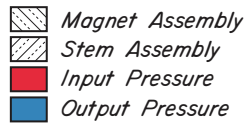
-20°F to +350°F

#### OPERATION:

The FLOAT is counterbalanced by the FLOAT LEVER. As the liquid level increases the FLOAT is lifted. A MAGNET in the FLOAT LEVER opposes the CHECK BALL inside the body. As the FLOAT LEVER moves downward the CHECK BALL moves upward. This opens the lower CHECK VALVE SEAT. As the lower seat opens, pressure is introduced to the back of the VALVE DIAPHRAGM. This moves the VALVE STEM and allows gas to flow through the valve.

As the liquid level decreases the FLOAT moves downward, moving the MAGNET upward and forcing the CHECK BALL down. This allows the pressure on the back of the DIAPHRAGM to vent and the STEM to close.

The MANUAL OVER RIDE allows the operator to manually activate the FLOAT LEVER to test the valve.

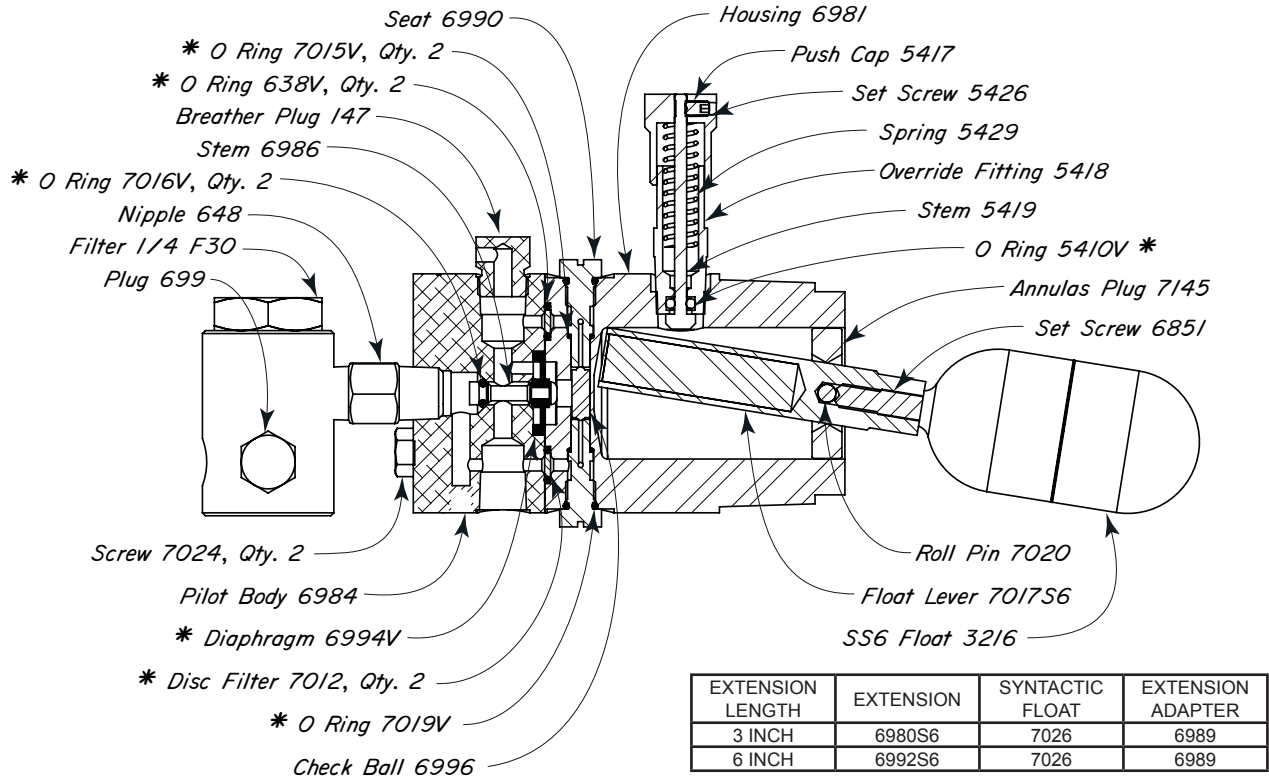


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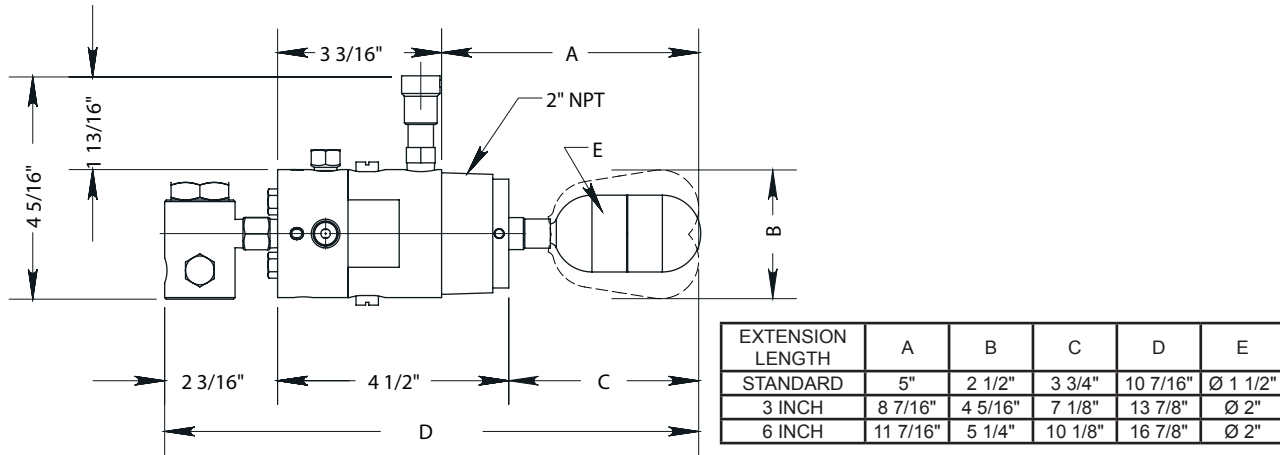
# FLOAT OPERATED LEVEL CONTROLLER



## PNEUMATIC LEVEL SWITCH STEEL



### DIMENSIONS



### LEVEL CONTROLLER AVAILABLE:

CAT. NO.	BODY TYPE	PILOT	MAX W.P.	KIT
CUA	2" NPT	2200 PLS SS6 FLOAT	2000	RZX
CUAL3	2" NPT	2200 PLS W/3" EXT FLOAT	2000	RZX
CUAL6	2" NPT	2200 PLS W/6" EXT FLOAT	2000	RZX

### NOTES:

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

Float cage available see page C1:90.3

All openings are tapped 1/4" N.P.T.

### Related Publications:

- PB0009 - Product Bulletin
- IM0002 - Installation & Maintenance

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Snap action liquid level controller for oil and gas separators, water knockouts, gas scrubbers and accumulators.

Liquid interface control in fluids of .15 minimum differential specific gravities. Teflon float requires .23 minimum differential gravity. Maximum gravity of lighter liquid .85.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3 and E4 for diaphragm operated motor valves.

#### FEATURES:

- Intermittent bleed pilot
- Direct or indirect action
- Solid, horizontal or vertical float
- Counterbalance spring (no adjustment required)
- Low friction WAGGLE ARM
- Built-in snubber
- Single adjustment for level of interface control
- Field serviceable for throttle service
- Sensitivity adjustment
- Built-in signal amplifier

#### SUPPLY PRESSURE:

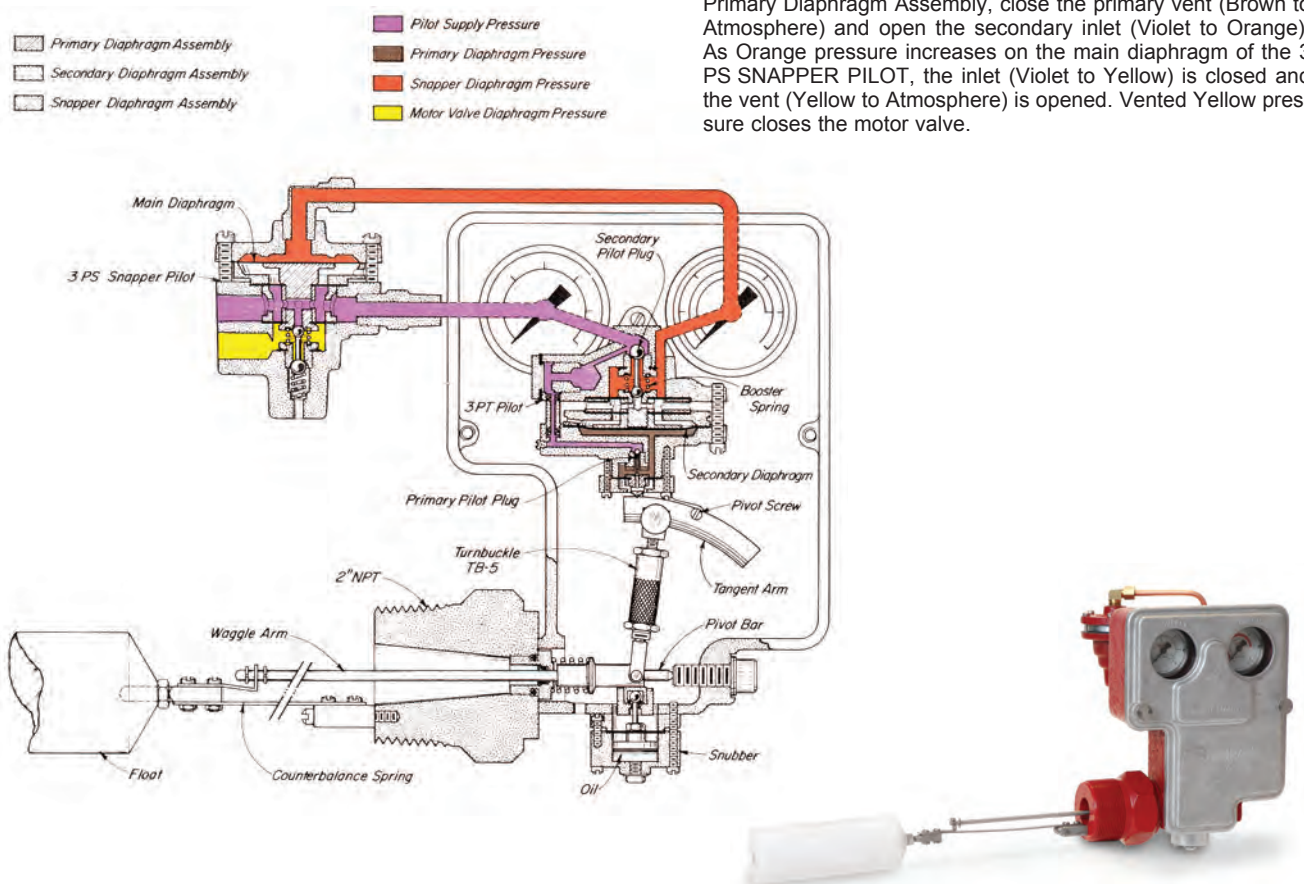
5 to 30 psig

#### OPERATION:

The PFS Pilot consists of a FLOAT for monitoring the displaced liquid, a SPRING for counterbalancing the weight of the FLOAT, a WAGGLE ARM to transmit FLOAT movement, a pilot case which contains a 3 PT 30 psig PILOT, adjustable TURNBUCKLE and a TANGENT ARM for setting the pilot sensitivity or proportional band. To provide snap action, a 3 PS SNAPPER PILOT is mounted on the back of the pilot case.

The color cross section of the pilot is shown arranged for SNAP SERVICE to operate a Pressure Opening Motor Valve. As vessel liquid rises to partially submerge the FLOAT. The displaced volume of liquid causes the COUNTERBALANCE SPRING to exert an upward force at the float end of the WAGGLE ARM. The resulting downward movement of the TURNBUCKLE moves the TANGENT ARM away from the Primary Diaphragm Assembly, closing the primary inlet (Violet to Brown) and opening the primary vent (Brown to Atmosphere). As Brown pressure decreases on the SECONDARY DIAPHRAGM, the Secondary Diaphragm Assembly moves downward to close the secondary inlet (Violet to Orange) and open the secondary vent (Orange to Atmosphere). A balance is maintained between Brown pressure acting on the SECONDARY DIAPHRAGM and the opposing force, Orange pressure plus the BOOSTER SPRING. Decreasing Orange pressure on the main diaphragm of the 3 PS SNAPPER PILOT permits the Snapper Diaphragm Assembly to snap upward, closing the vent (Yellow to Atmosphere) and opening the inlet (Violet to Yellow). See section Y, for operation of the 3 PS PILOT. Yellow pressure opens the motor valve.

As the vessel liquid lowers, the FLOAT forces the COUNTERBALANCE SPRING downward. The WAGGLE ARM transmits the action through the linkage to raise the Primary Diaphragm Assembly, close the primary vent (Brown to Atmosphere) and open the secondary inlet (Violet to Orange). As Orange pressure increases on the main diaphragm of the 3 PS SNAPPER PILOT, the inlet (Violet to Yellow) is closed and the vent (Yellow to Atmosphere) is opened. Vented Yellow pressure closes the motor valve.

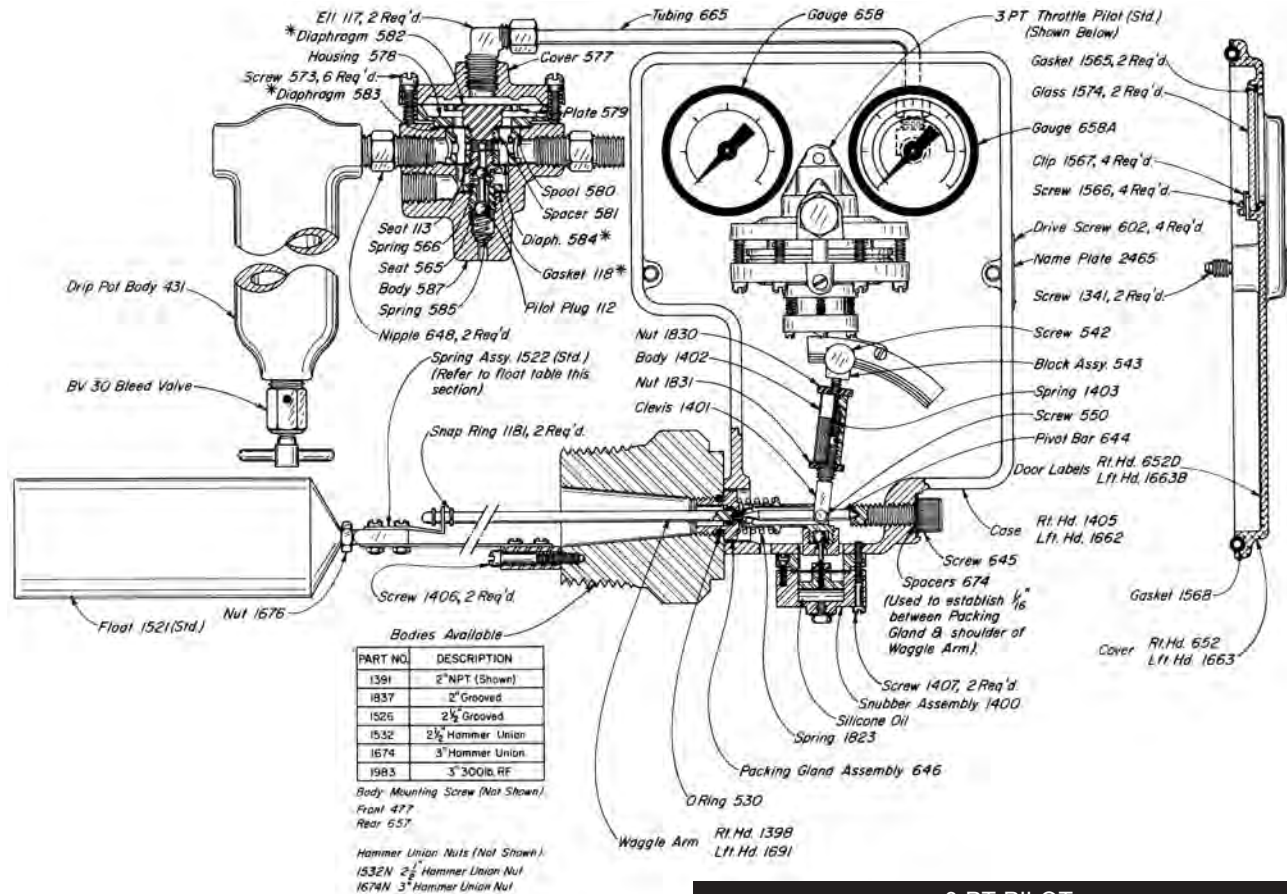


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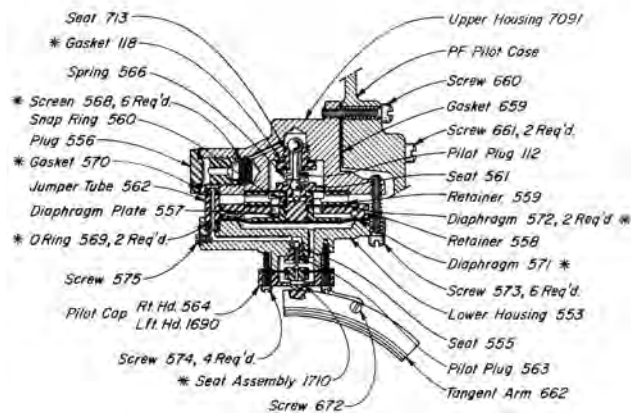
# FLOAT OPERATED LEVEL CONTROLLER



## PFS PILOT STEEL



### 3 PT PILOT



### SNAP SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CFB	2" NPT	2" NPT PFS RH	4000
CFD	2" NPT	2" NPT PFS LH	4000
CFH	2" GRVD.	2" GR PFS RH	2000
CFI	2 1/2" GRVD.	2 1/2" GR PFS RH	2000
CFJ	2 1/2" H.U.	2 1/2" HU PFS RH	2000
CFL	3" H.U.	3" HU PFS RH	3000
CFM	3" H.U.	3" HU PFS LH	3000
CFT	3" 300#RF	3" 300#RF PFS RH	500

All standard PF's have a Cat No. For more information concerning bodies and floats available refer to Table of Contents.

### NOTES:

These are recommended spare parts for PFS Pilot; 530, 644, 646, 658, spring assembly 1393 or 1522, waggle arm 1398 or 1691.

These are recommended spare parts and are stocked as repair kits. See page C1:70.1.

FLOATS: Horizontal floats are standard. Vertical float hanger is available at extra cost, order part number 1394V. Teflon float 1541 is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F. Delrin floats (standard) are applicable for all oil field fluids.

Kimray is an ISO 9001- certified manufacturer.



#### APPLICATIONS:

Throttle action liquid level controller for oil and gas separators, water knockouts, gas scrubbers and accumulators.

Liquid interface control in fluids of .15 minimum differential specific gravities. Teflon float requires .23 minimum differential gravity. Maximum gravity of the lighter liquid .85.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3 and E4 for diaphragm operated motor valves.

#### FEATURES:

- Intermittent bleed pilot
- Direct or indirect action
- Solid, horizontal or vertical float
- Counterbalance spring (no adjustment required)
- Low friction WAGGLE ARM
- Built-in snubber
- Single adjustment for level of interface control
- Field serviceable for snap service by adding a 3 PS Pilot (not furnished with PFT Pilot)
- Sensitivity adjustment
- Level spread adjustment
- Built-in signal amplifier

#### SUPPLY PRESSURE:

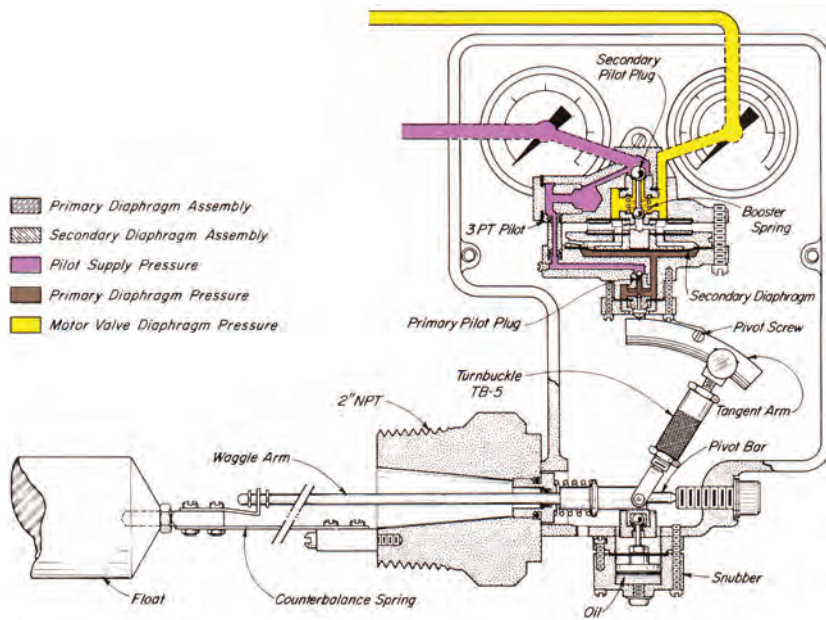
5 to 30 psig

#### OPERATION:

The PFT Pilot consists of a FLOAT for monitoring the displaced liquid, a SPRING for counterbalancing the weight of the FLOAT, a WAGGLE ARM to transmit FLOAT movement, a pilot case which contains a 3 PT 30 psig PILOT, adjustable TURNBUCKLE and a TANGENT ARM for setting the pilot sensitivity or proportional band.

The color cross section of the pilot is shown arranged to operate a Pressure Opening Motor Valve. Vessel liquid rises to partially submerge the FLOAT. The displaced volume of liquid causes the COUNTERBALANCE SPRING to exert an upward force at the FLOAT end of the WAGGLE ARM. The resulting downward movement of the TURNBUCKLE moves the TANGENT ARM toward the Primary Diaphragm Assembly, opening the primary inlet (Violet to Brown) and closing the primary vent (Brown to Atmosphere). As Brown pressure decreases on the SECONDARY DIAPHRAGM, the Secondary Diaphragm Assembly moves upward to open the secondary inlet (Violet to Yellow) and close the secondary vent (Yellow to Atmosphere). Yellow pressure opens the motor valve.

As the vessel liquid lowers, the FLOAT forces the COUNTERBALANCE SPRING downward. The WAGGLE ARM transmits this action through the linkage to lower the Primary Diaphragm Assembly, open the primary vent (Brown to Atmosphere) and close the secondary inlet (Violet to Yellow). Zero pressure allows the motor valve to close.

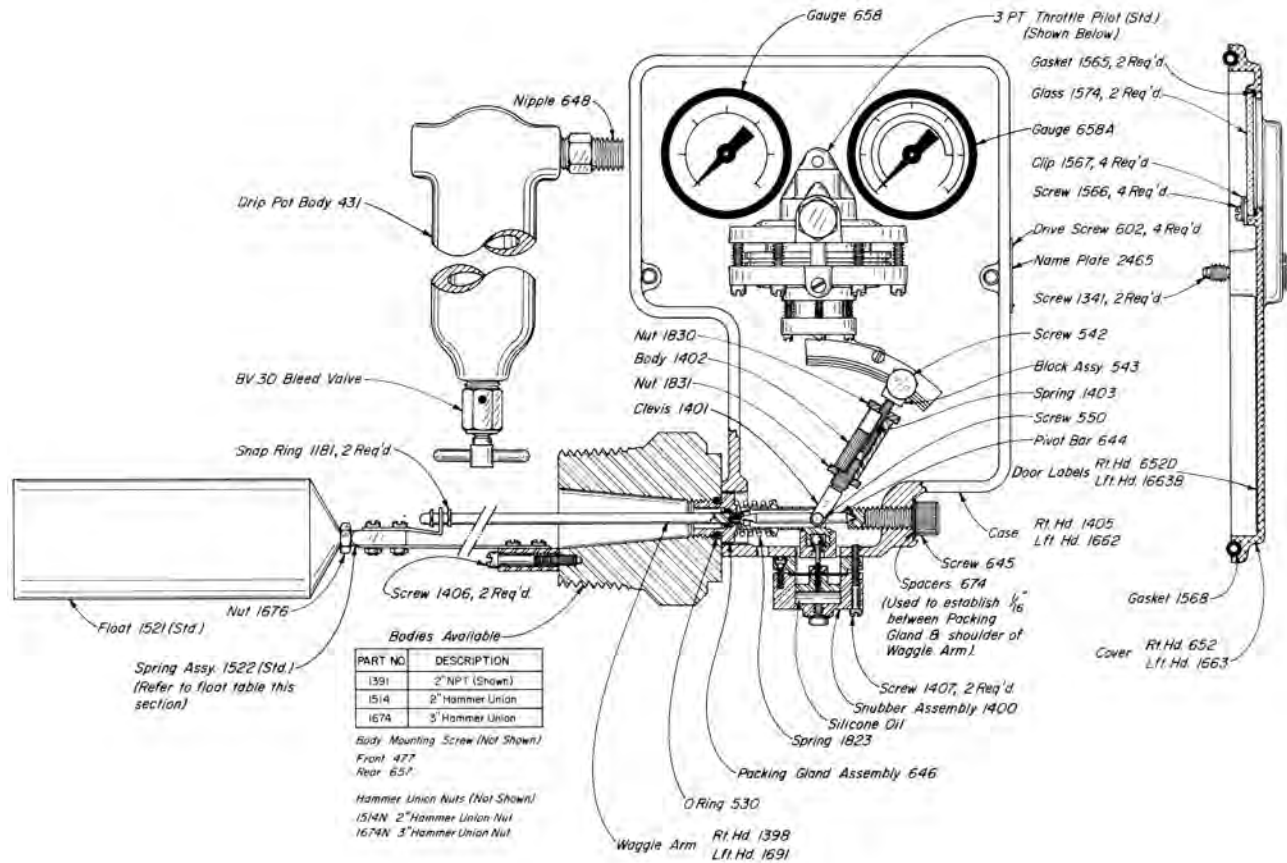


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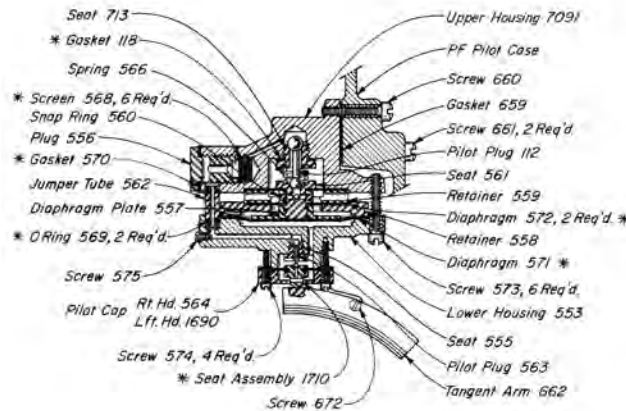
# FLOAT OPERATED LEVEL CONTROLLER



## PFT PILOT STEEL



### 3 PT PILOT



### THROTTLE SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CFA	2" NPT	2" NPT PFT RH	4000
CFC	2" NPT	2" NPT PFT LH	4000
CFF	2" H.U.	2" HU PFT RH	2000
CFG	2" H.U.	2" HU PFT LH	2000
CFK	3" H.U.	3" HU PFT RH	3000
CFR	3" H.U.	3" HU PFT LH	3000

NOTE: All standard PF's have a Cat No. For more information concerning bodies and floats available refer to Table of Contents.

### NOTES:

Recommended spare parts for PFS Pilot; 530, 644, 646, 658, spring assembly 1393 or 1522, waggle arm 1398 or 1691.

These are recommended spare parts and are stocked as repair kits. See page C1:70.1.

A PFT Pilot can be modified for snap service with the addition of a 3 PS Pilot.

FLOATS: Horizontal floats are standard. Vertical float hanger is available at extra cost, order part number 1394V. Teflon float 1541 is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F. Delrin floats (standard) are applicable for all oil field fluids.

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Snap action liquid level controller, less sensitive than PFS Pilot for oil and gas separators, water knockouts, gas scrubbers and accumulators.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3 and E4 for diaphragm operated motor valves.

#### FEATURES:

- Intermittent bleed pilot
- Stable in turbulent flow
- Direct or indirect action
- Solid, horizontal or vertical float
- Counterbalance spring (no adjustment required)
- Low friction WAGGLE ARM
- Built-in snubber
- Sensitivity adjustment
- Level spread adjustment

#### SUPPLY PRESSURE:

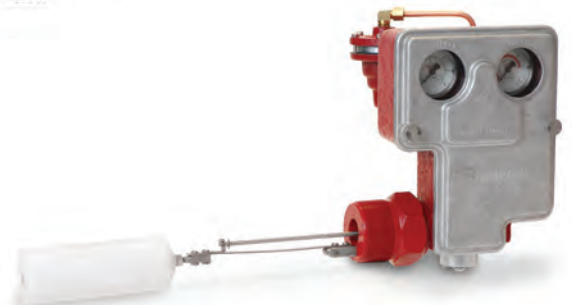
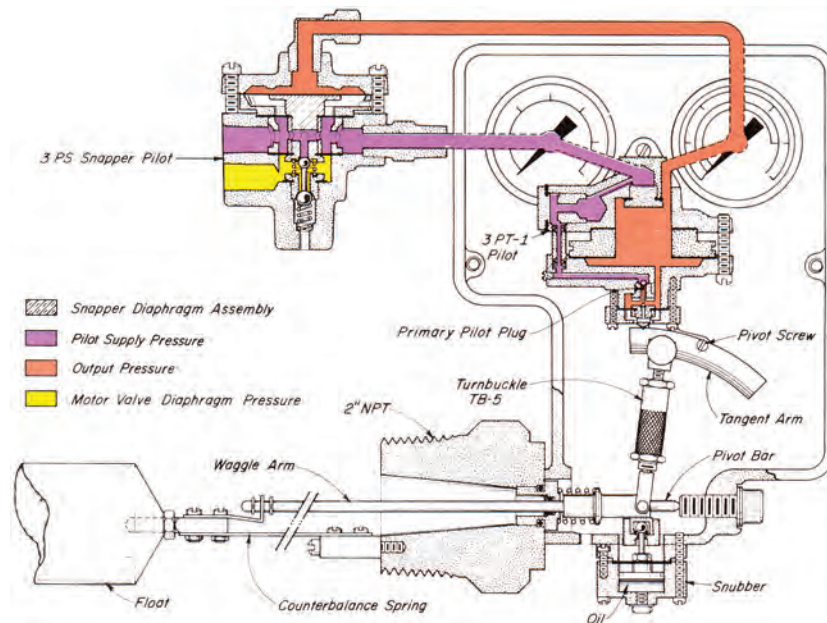
5 to 30 psig

#### OPERATION:

The PFS-1 Pilot consists of a FLOAT for monitoring the displaced liquid, a SPRING for counterbalancing the weight of the FLOAT, a WAGGLE ARM to transmit FLOAT movement, a pilot case which contains a 3PT-1 30 psig PILOT, adjustable TURNBUCKLE and a TANGENT ARM for setting the pilot sensitivity of proportional band. To provide snap action, a 3 PS SNAPPER PILOT is mounted on the back of the pilot case.

The color cross section of the pilot is shown arranged for SNAP SERVICE to operate a Pressure Opening Motor Valve. Vessel liquid rises to partially submerge the FLOAT. The displaced volume of liquid causes the COUNTERBALANCE SPRING to exert an upward force at the float end of the WAGGLE ARM. The resulting downward movement of the TURNBUCKLE moves the TANGENT ARM away from the Primary Diaphragm Assembly, closing the primary inlet (Violet to Orange) and opening the primary vent (Orange to Atmosphere). Decreasing Orange pressure on the main diaphragm of the 3 PS SNAPPER PILOT permits the Snapper Diaphragm Assembly to Snap upward, closing the vent (Yellow to Atmosphere) and opening the inlet (Violet to Yellow). See section Y, for operation of the 3 PS PILOT. Yellow pressure opens the motor valve.

As the vessel liquid lowers, the FLOAT forces the COUNTERBALANCE SPRING downward. The WAGGLE ARM transmits this action through the linkage to raise the Primary Diaphragm Assembly, close the primary vent (Orange to Atmosphere). As Orange pressure increases on the main diaphragm of the 3 PS SNAPPER PILOT, the inlet (Violet to Yellow) is closed and the vent (Yellow to Atmosphere) is opened. Vented Yellow pressure closes the motor valve.

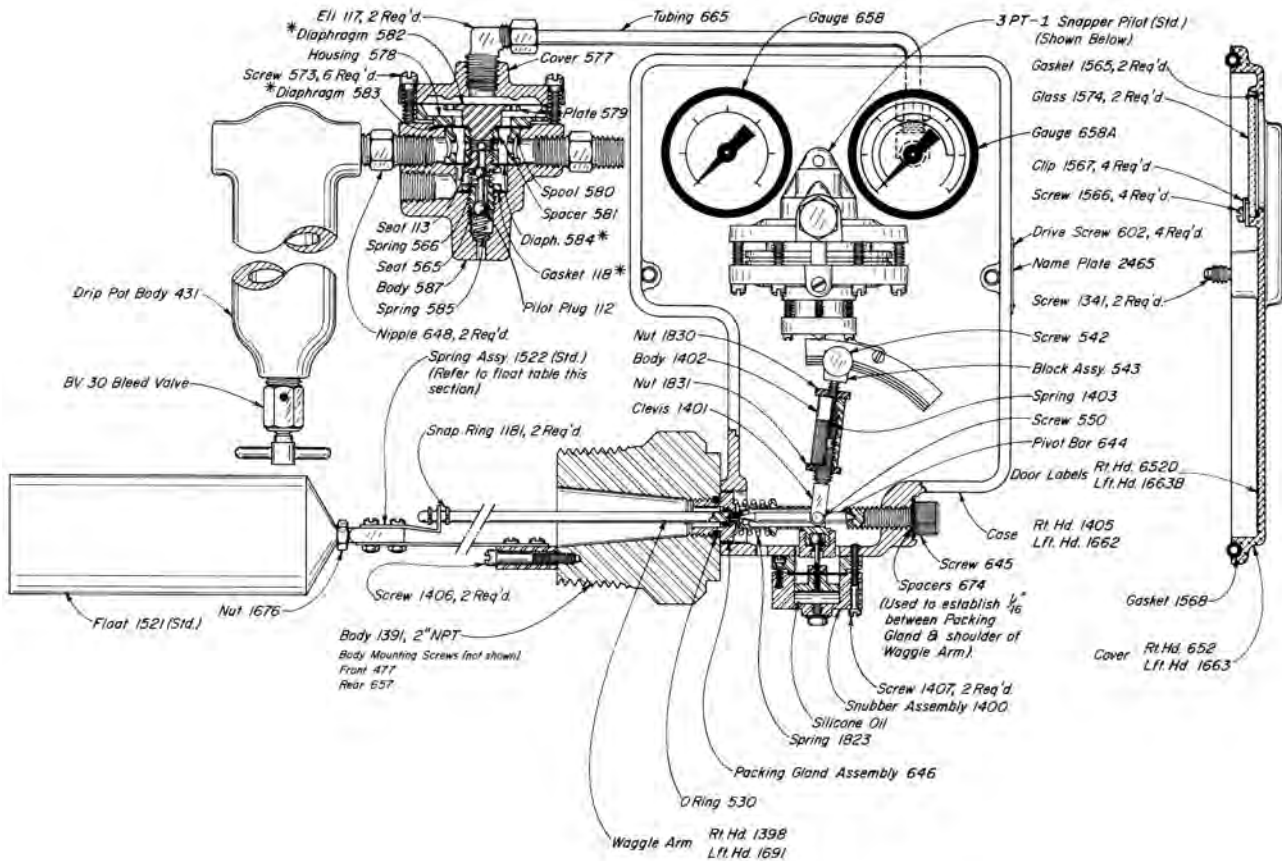


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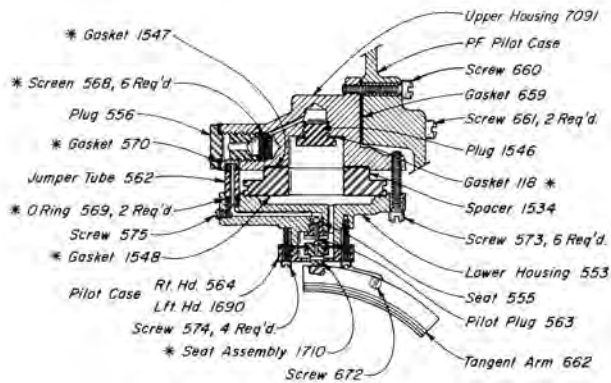
# FLOAT OPERATED LEVEL CONTROLLER



## PFS-1 PILOT STEEL



### 3 PT-1 PILOT



### SNAP SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CFP	2" NPT	2" NPT PFS RH w/3PT-1	4000
CFQ	2" NPT	2" NPT PFS LH w/3PT-1	4000

NOTE: All standard PF's have a Cat No. For more information concerning bodies and floats available refer to Table of Contents.

### NOTES:

These are recommended spare parts for PFS-1 Pilot; 530, 644, 646, 658, spring assembly 1393 or 1522, waggle arm 1398 or 1691.

These are recommended spare parts and are stocked as repair kits. See page C1:70.1.

FLOATS: Horizontal floats are standard. Vertical float hanger is available at extra cost, order part number 1394V. Teflon float 1541 is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F. Delrin floats (standard) are applicable for all oil field fluids.

Kimray is an ISO 9001- certified manufacturer.

#### INSTALLATION:

The PFS/T Pilot is installed on the vessel at the desired liquid or interface level. Supply gas and Diaphragm Pressure connections are located on 3 PS Pilot for snap service, or on the back of the PF Pilot case for throttle service, 1/4" NPT female.

#### SETTING PILOT ACTION:

The combination of the type of service, Snap or Throttle and the TYPE of MOTOR VALVE, Pressure Opening or Pressure Closing, determines the location of the turnbuckle attachment to the tangent arm as follows.

SERVICE	MOTOR VALVE	LOCATION
SNAP	Pressure Closing	Direct
	Pressure Opening	Indirect
THROTTLE	Pressure Closing	Indirect
	Pressure Opening	Direct

See Location of Tangent Arm Pivot

#### SNAP CONTROL: (no liquid contacting float)

**PRESSURE OPENING MOTOR VALVE:** Adjust turnbuckle to produce 20 to 30 psig pressure on diaphragm gauge.

**PRESSURE CLOSING MOTOR VALVE:** Adjust turnbuckle to produce 2 or 3 psig pressure on diaphragm gauge then turn 1/2 revolution in direction to release pressure.

#### THROTTLING CONTROL: (no liquid contacting float)

**PRESSURE OPENING MOTOR VALVE:** Adjust turnbuckle to produce 2 to 3 psig pressure on diaphragm gauge.

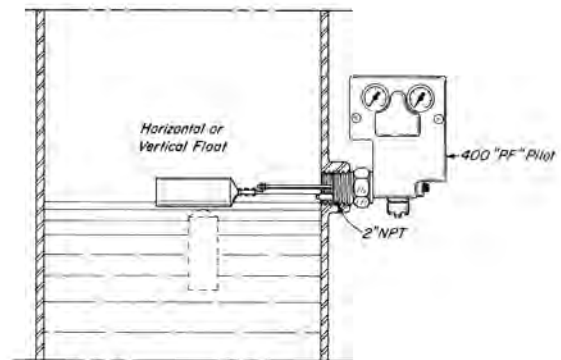
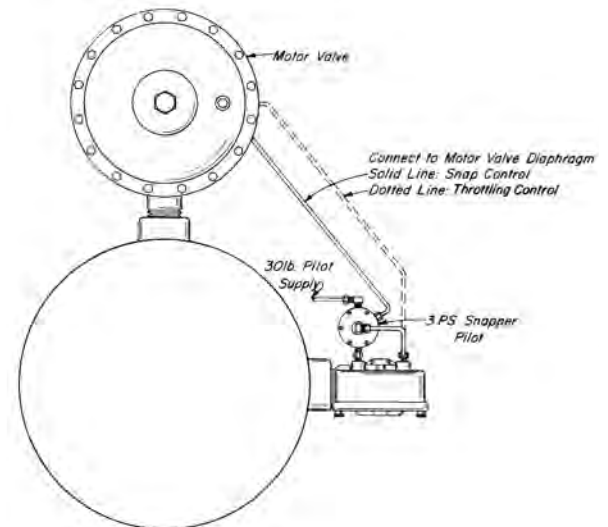
**PRESSURE CLOSING MOTOR VALVE:** Adjust turnbuckle to produce 20 or 30 psig pressure on diaphragm gauge then turn 1/2 revolution in direction to release pressure.

#### INTERFACE CONTROL:

Allow the float to be completely submerged in the lighter liquid. The heavier liquid must be below the float. With the float submerged make adjustments as described for snap or throttle control.

Contact KIMRAY, Inc. for interface control in liquids with less than .15 differential specific gravities. Maximum specific gravity of lighter liquid .85.

#### TYPICAL INSTALLATION



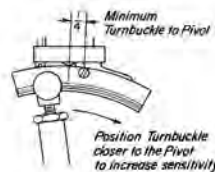
NOTE: Direct action refers to liquid level in relation to output gauge of 3 PT Pilot. High level, high output indirect action is opposite.

Adding a 3 PS pilot to the PFT series, will send the opposite pressure of the gauge to the motor valve.

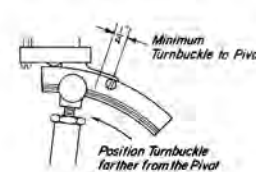
#### LOCATION OF TANGENT ARM PIVOT



1. For minimum spread of level.
2. For maximum spread of level.



PIVOT POSITION 1

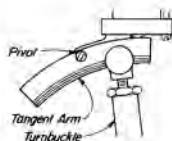


PIVOT POSITION 2

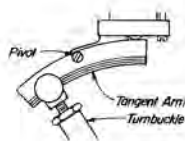
#### CONNECTION OF TANGENT ARM

##### LEFT HAND PILOT

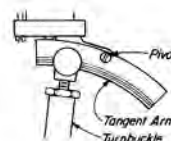
##### RIGHT HAND PILOT



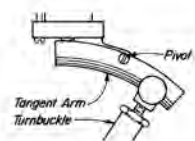
INDIRECT



DIRECT



INDIRECT



DIRECT

**NOTES:**



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#### APPLICATIONS:

Snap action, high-low, on-off, liquid level controller for oil and gas separators, water knockouts, gas scrubbers and accumulators.

Liquid interface control in fluids of .15 minimum, differential specific gravities. Teflon float requires .23 minimum differential gravity. Maximum gravity of lighter liquid .85.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3, and E4 for diaphragm operated motor valves.

#### FEATURES:

- Split float control
- Intermittent bleed pilot
- Direct or indirect action
- Counterbalance spring (no adjustment required)
- Low friction WAGGLE ARM
- Built in snubber
- Single adjustment for level or interface control
- Sensitivity adjustment
- Level spread adjustment

#### SUPPLY PRESSURE:

5 to 30 psig

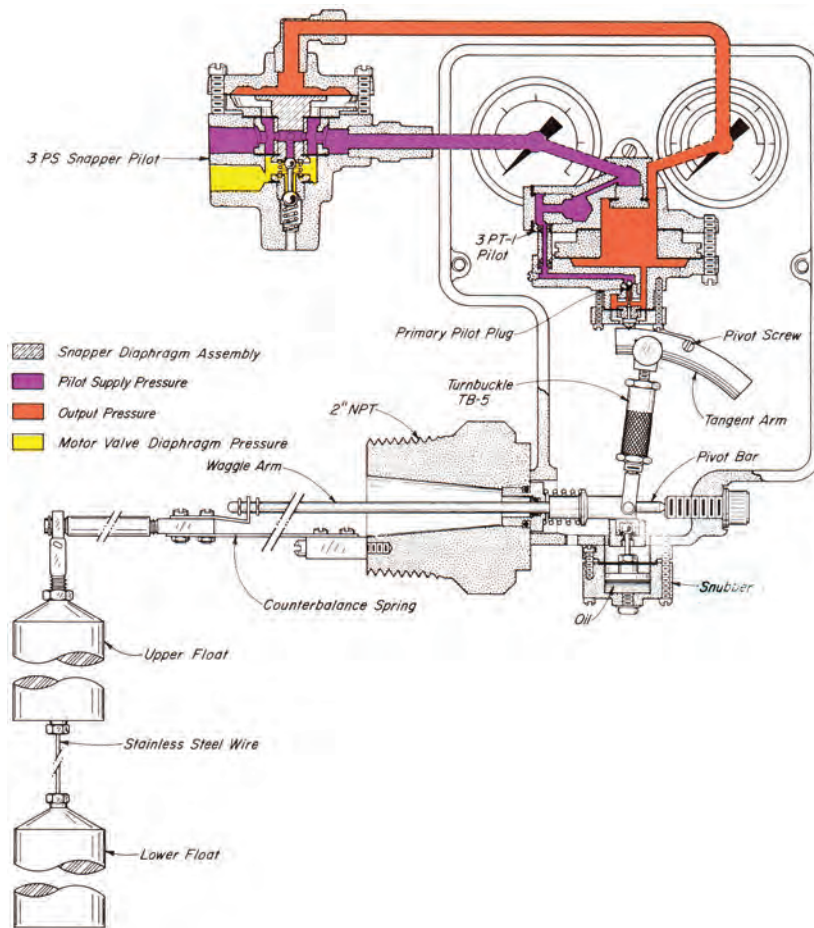
#### OPERATION:

The PFM Pilot consists of one each UPPER and LOWER (split), displacement type, FLOATS, a length (10 feet standard) of STAINLESS WIRE to vary the distance between floats and therefore the change in liquid level per each dumping cycle, a SPRING to counterbalance float weight, a WAGGLE ARM to transmit float movement, a pilot case containing a 3 PT-1 PILOT, level adjusting TURNBUCKLE and a 3 PS PILOT mounted on the back of the pilot case.

The colored cross section of the pilot is shown arranged to operate a PRESSURE OPENING motor valve. Pilot action can be reversed to operate a PRESSURE CLOSING motor valve. Pilot action can be reversed to operate a PRESSURE CLOSING motor valve by simply sliding the TURNBUCKLE on the TANGENT ARM to the right hand side of the PIVOT SCREW.

As shown, when vessel liquid rises to completely cover the LOWER FLOAT, Output Pressure (Orange) will decrease to between 4 and 5 psig. The PFM Pilot is insensitive to any liquid level changes between the UPPER and LOWER FLOAT. As the liquid level rises on the UPPER FLOAT, the remaining Output Pressure (Orange) will be vented. This permits the Snapper Diaphragm Assembly to snap "on", closing the vent (Yellow to Atmosphere) and open the inlet (Violet to Yellow), sending Motor Valve Diaphragm Pressure (Yellow) to the pressure opening motor valve.

With the valve now open, the liquid level will start dropping. As the level drops below the UPPER FLOAT, Output Pressure (Orange) will increase to between 4 and 5 psig. There will be no change in Output Pressure (Orange) as the level moves between the UPPER and LOWER FLOAT. As the LOWER FLOAT is uncovered, Output Pressure (Orange) will increase to approximately 8 psig at which time the Snapper Diaphragm Assembly will snap "off", closing the inlet (Violet to Yellow) and opening the vent (Yellow to Atmosphere). This exhausts Motor Valve Diaphragm Pressure (Yellow) allowing the motor valve to close and the liquid level will again start rising to repeat the cycle.

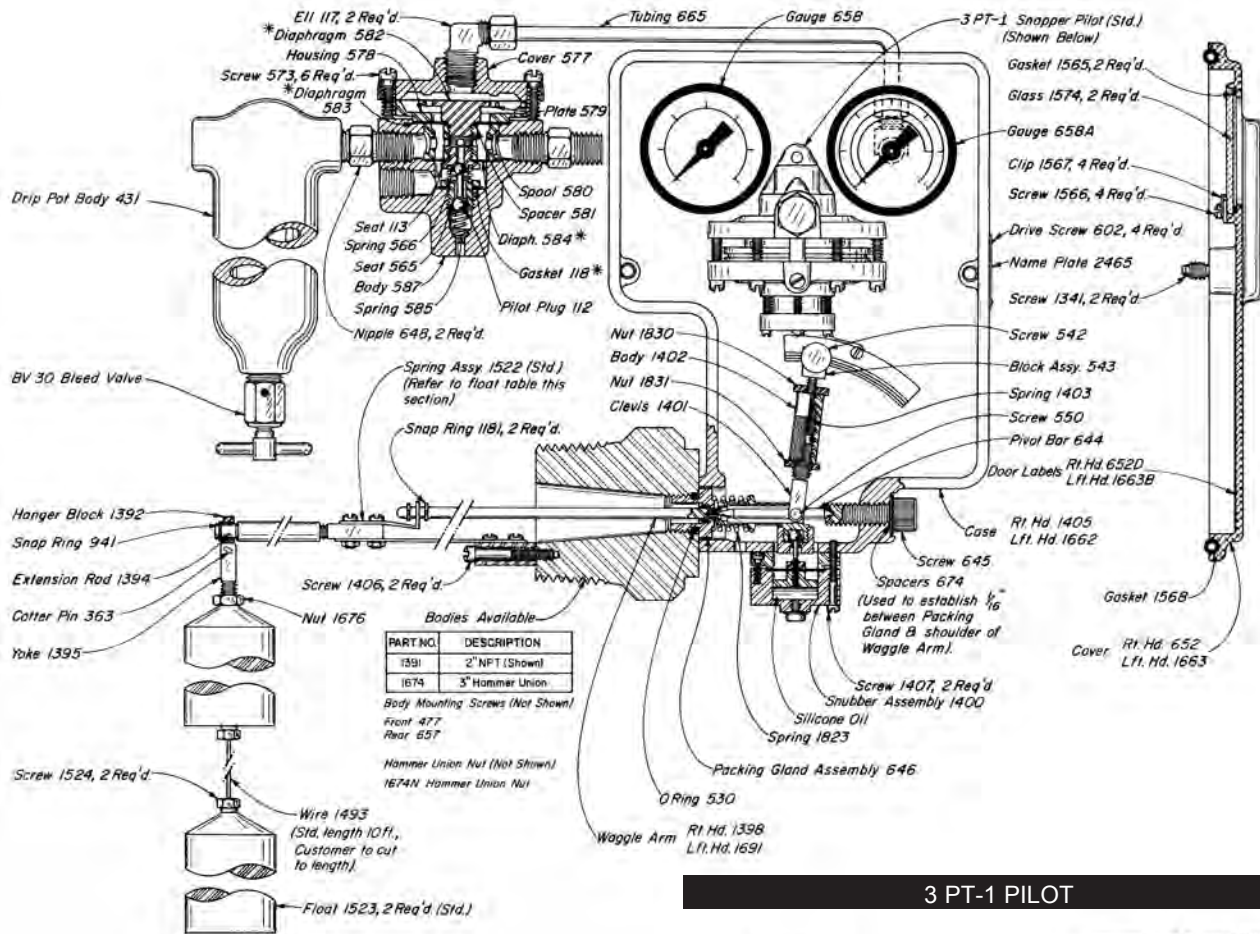


Kimray is an ISO 9001- certified manufacturer.

# FLOAT OPERATED LEVEL CONTROLLER



## PFM PILOT STEEL



### SNAP SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CFN	2" NPT	2" NPT PFM RH	4000
CFO	2" NPT	2" NPT PFM LH	4000
CFS	3" H.U.	3" HU PFM RH	3000

NOTE: All standard PF's have a Cat. No. For more information concerning bodies and floats available refer to Table of Contents.

### NOTES:

These are recommended spare parts for PFM Pilot; 530, 644,646,658, spring assembly 1393 or 1522, waggle arm 1398 or 1691.

These are recommended spare parts and are stocked as repair kits. See page C1:70.1.

FLOATS: Horizontal floats are standard. Vertical float hanger is available at extra cost, order part number 1394V. Teflon float 1541 is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F. Delrin floats (standard) are applicable for all oil field fluids.



#### INSTALLATION:

The PFM Pilot is installed on the vessel at the maximum desired liquid or interface level. Supply gas and Diaphragm Pressure connections are located on the 3 PS Pilot mounted on the back of the Pilot case, 1/4" NPT female.

#### SETTING PILOT ACTION:

The PFM Pilot can be set for either direct or indirect action by the location of the TURNBUCKLE on the TANGENT ARM. Direct action, Output Gauge Pressure to 3 PS is high with liquid level. Indirect action, Output Gauge Pressure to 3 PS is low with high liquid level. See Location of Tangent Arm Pivot.

#### INDIRECT ACTION:

With no liquid on either float, adjust the TURNBUCKLE so that Output Pressure equals Supply Pressure. To increase Output Pressure, rotate body of TURNBUCKLE to the right and vice versa. As controlled liquid rises on the LOWER FLOAT, Output Pressure will start decreasing. Readjust TURNBUCKLE to maintain full Output Pressure until LOWER FLOAT is completely covered with controlled liquid. With the LOWER FLOAT submerged but no controlled liquid touching the UPPER FLOAT, slowly rotate the TURNBUCKLE BODY to the left until Output Pressure reads 4 to 5 psig.

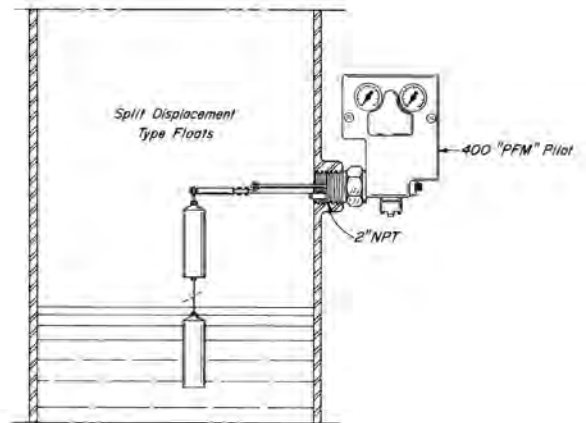
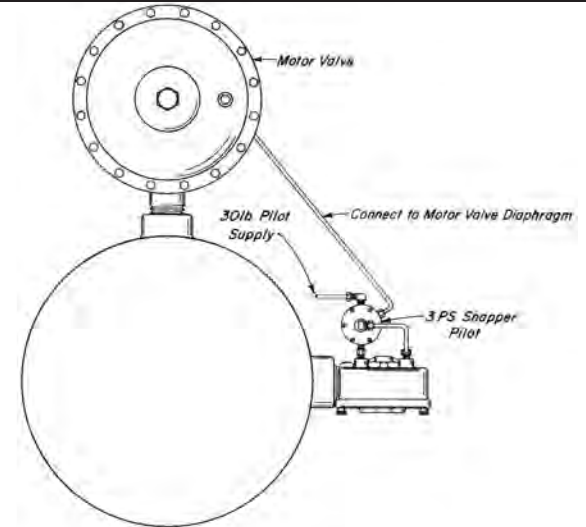
After the pilot has been adjusted to satisfaction, tighten the jam nuts on each end of the TURNBUCKLE.

#### DIRECT ACTION:

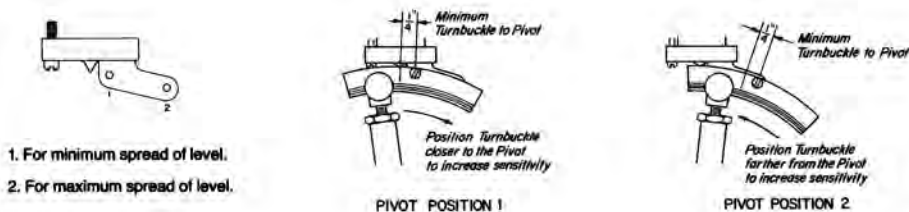
With no liquid on either float, adjust the TURNBUCKLE so that Output Pressure is zero. To decrease Output Pressure, rotate the body of the TURNBUCKLE to the right and vice versa. As controlled liquid rises on the LOWER FLOAT, Output Pressure will start increasing. Readjust the TURNBUCKLE to maintain zero Output Pressure until the LOWER FLOAT is completely covered with controlled liquid. With the LOWER FLOAT submerged but no controlled liquid touching the UPPER FLOAT, slowly rotate the TURNBUCKLE to the left until Output Pressure reads 4 to 5 psig.

After the pilot has been adjusted to satisfaction, tighten the jam nuts on each end of the TURNBUCKLE.

#### TYPICAL INSTALLATION

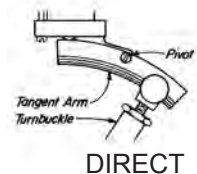
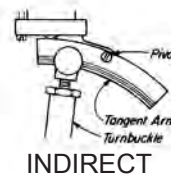
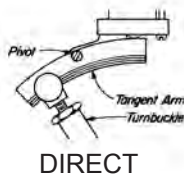


#### LOCATION OF TANGENT ARM PIVOT



#### LEFT HAND PILOT

#### RIGHT HAND PILOT



**NOTES:**



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#### APPLICATIONS:

Snap action liquid level controller, less sensitive than PFS or PFT Pilot, for oil and gas separators, water knockouts, gas scrubbers and accumulators.

As a throttle pilot for liquid interface control in fluids of .15 minimum differential specific gravities. Teflon floats requires .23 minimum differential gravity. Maximum gravity of lighter liquid .85.

Operates any diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3 and E4 for diaphragm operated motor valves.

#### FEATURES:

- Intermittent bleed pilot
- Direct or indirect action
- Solid, horizontal or vertical float
- Counterbalance spring (no adjustment required)
- Low friction WAGGLE ARM
- Built-in snubber
- Single adjustment for level of interface control
- Field serviceable for throttle service
- Sensitivity adjustment
- Level spread adjustment
- Compact case design

#### SUPPLY PRESSURE:

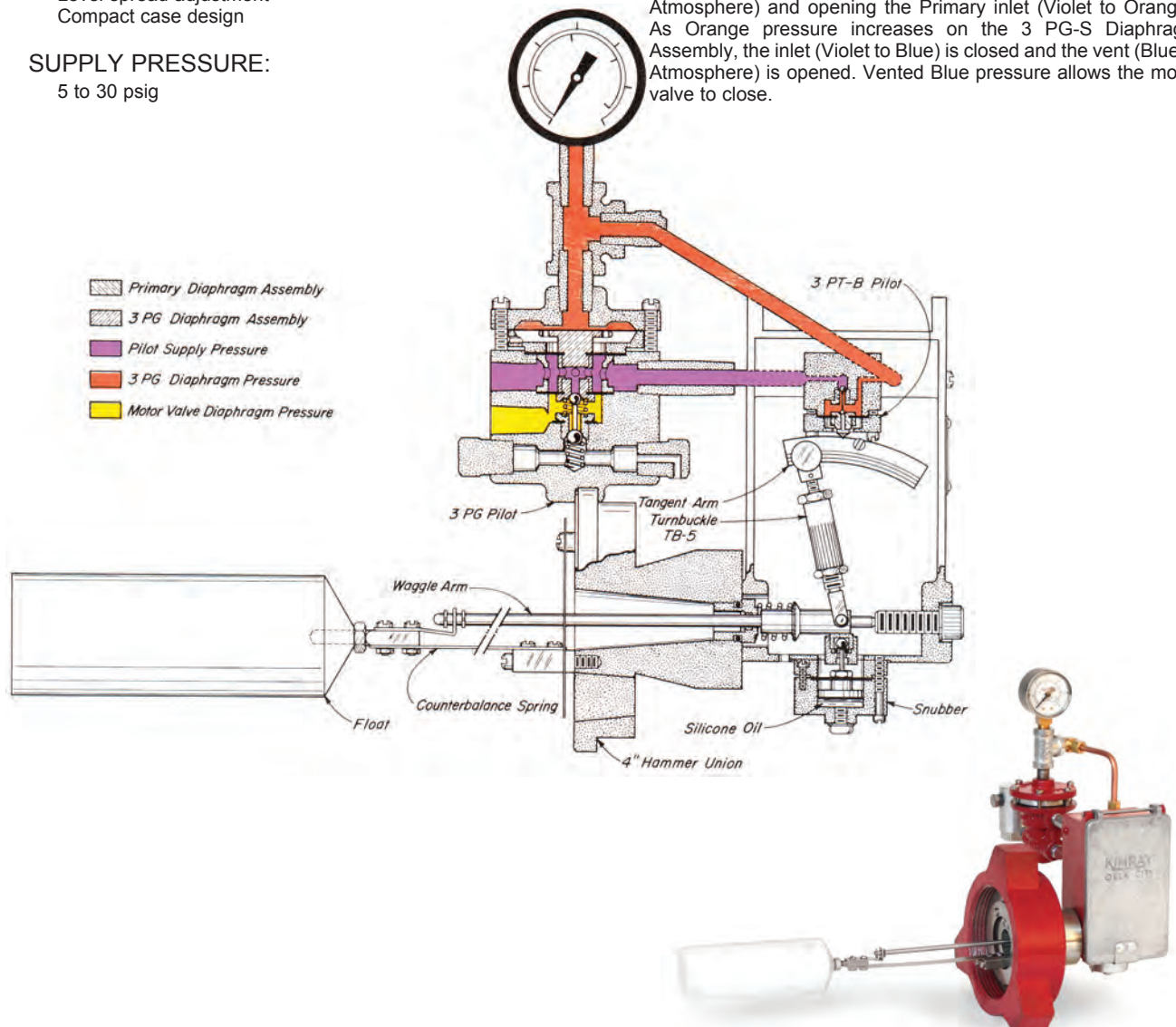
5 to 30 psig

#### OPERATION:

The PFB Pilot consists of a FLOAT monitoring the displaced liquid, a SPRING for counterbalancing the weight of the FLOAT, a WAGGLE ARM to transmit the action of the FLOAT, a PILOT CASE which contains a 3 PT-B 30 psig adjustable TURNBUCKLE and a TANGENT ARM for setting the pilot sensitivity of proportional band. To provide snap action, a 3 PS Pilot is mounted on the back of the pilot case.

The colored cross section of the pilot is shown arranged to operate a Pressure Opening Motor Valve. Vessel liquid rises to partially submerge the FLOAT. The displaced volume of the liquid causes the COUNTERBALANCE SPRING to exert an upward force on the internal end of the WAGGLE ARM, transmitted through the TURNBUCKLE which moves the TANGENT ARM away from the Primary Diaphragm Assembly, closing the Primary inlet (Violet to Orange) and opening the Primary vent (Orange to Atmosphere). As Orange pressure decrease on the 3 PG-S Diaphragm Assembly, the diaphragm assembly snaps upward, closing the vent (Blue to Atmosphere) and opening the inlet (Violet to Blue). Blue pressure opens the motor valve.

As the vessel liquid lowers, the FLOAT forces the COUNTERBALANCE SPRING downward. The WAGGLE ARM transmits this motion through the linkage to raise the Primary Diaphragm Assembly, closing the Primary vent (Orange to Atmosphere) and opening the Primary inlet (Violet to Orange). As Orange pressure increases on the 3 PG-S Diaphragm Assembly, the inlet (Violet to Blue) is closed and the vent (Blue to Atmosphere) is opened. Vented Blue pressure allows the motor valve to close.

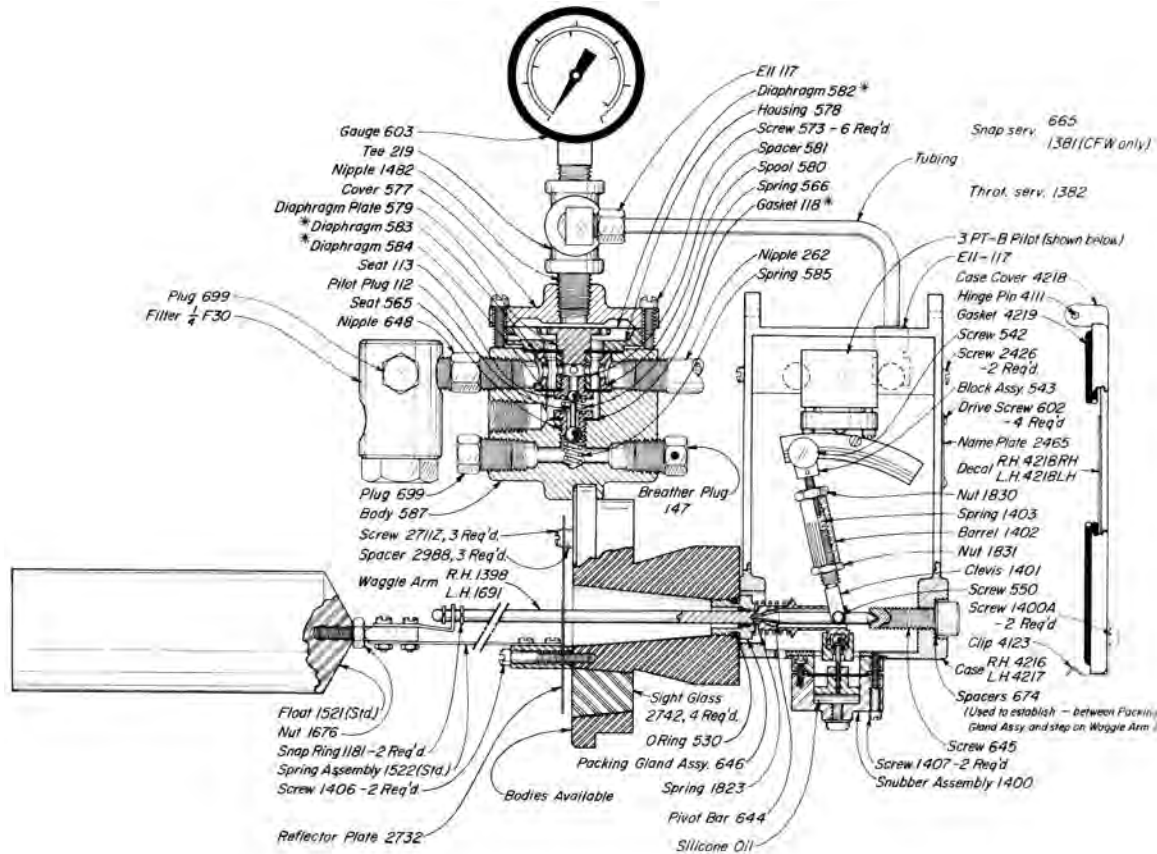


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# FLOAT OPERATED LEVEL CONTROLLER



PFB PILOT  
CAST IRON



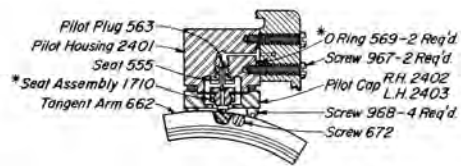
Part No.	Description
1391	2" NPT
1514	2" H.U. without Sightglass
2730A	4" H.U. with Sightglass
2942	4" H.U. without Sightglass
2944A	5" H.U. with Sightglass

Not Shown:

- 4" Hammer Union Nut 2734
- 5" Hammer Union Nut 2736
- O Ring for 4" H.U. 2745
- O Ring for 5" H.U. 1177

Body Mounting Screws (not shown)  
Front 477  
Rear 78

## 3 PT-B PILOT



## SNAP SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CES	2" NPT	2" NPT PFBS RH	4000
CET	2" NPT	2" NPT PFBS LH	4000
CFU	4" HU	4" HU 150# PFBS RH wo/SG	1500
CFW	4" HU	4" HU 100# PFBS RH w/SG	1000
CFX	4" HU	4" HU 100# PFBS LH w/SG	1000
CFY	5" HU	5" HU 100# PFBS RH w/SG	1000
CFZ	5" HU	5" HU 100# PFBS LH w/SG	1000

All standard PF's have a Cat No. For more information concerning bodies and floats available refer to Table of Contents.

WELDNECKS: Weldnecks are available, refer to section C2 for ordering.

FLOATS: Horizontal floats are standard. Vertical float hanger is available at extra cost, order part number 1394V. Teflon float 1541 is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F. Delrin floats (standard) are applicable for all oil field fluids.

C1:30.2  
Issued 1/13

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## THROTTLE SERVICE PILOTS AVAILABLE:

CAT. NO.	SIZE TYPE	PILOT	MAX W.P.
CEN	2" HU	2" HU PFBT RH	2000
CEQ	2" NPT	2" NPT PFBT RH	4000
CER	2" NPT	2" NPT PFBT LH	4000
CEU	4" HU	4" HU 150# PFBT RH wo/SG	1500
CEW	4" HU	4" HU 100# PFBT RH w/SG	1000
CEX	4" HU	4" HU 100# PFBT LH w/SG	1000
CEY	5" HU	5" HU 100# PFBT RH w/SG	1000
CEZ	5" HU	5" HU 100# PFBT LH w/SG	1000

These are recommended spare parts for PFB Pilot; 530, 644, 646, 658, spring assembly 1393 or 1522, waggie arm 1398 or 1691.

These are recommended spare parts and are stocked as repair kits. See page C1:70.1.

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Current Revision:  
Change Logo

#### INSTALLATION:

The PFB Pilot is installed on the vessel at the desired liquid or interface level. Supply gas and Diaphragm signal pressure connections are located on the 3 PG Pilot, ¼" NPT female

#### SETTING PILOT FOR LIQUID LEVEL CONTROL:

The combination of the 3 PG and the TYPE of MOTOR VALVE, Pressure Opening or Pressure Closing, determines the location of the turnbuckle attachment to the tangent arm as follows.

SERVICE	MOTOR VALVE	LOCATION
SNAP	Pressure Closing	Direct
	Pressure Opening	Indirect

See location of Tangent Arm Pivot

#### SNAP CONTROL: (no liquid contacting float)

**PRESSURE OPENING MOTOR VALVE:** Adjust turnbuckle to produce 20 to 30 psig pressure on diaphragm gauge.

**PRESSURE CLOSING MOTOR VALVE:** Adjust turnbuckle to produce 2 or 3 psig pressure on diaphragm gauge then turn ½ revolution in direction to release pressure.

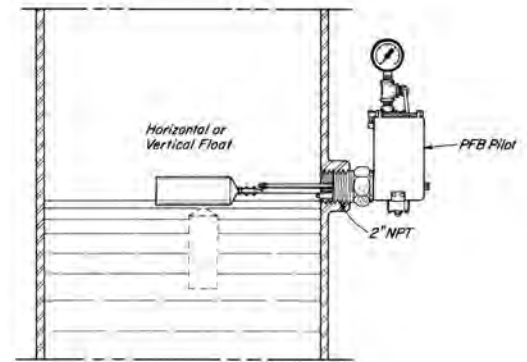
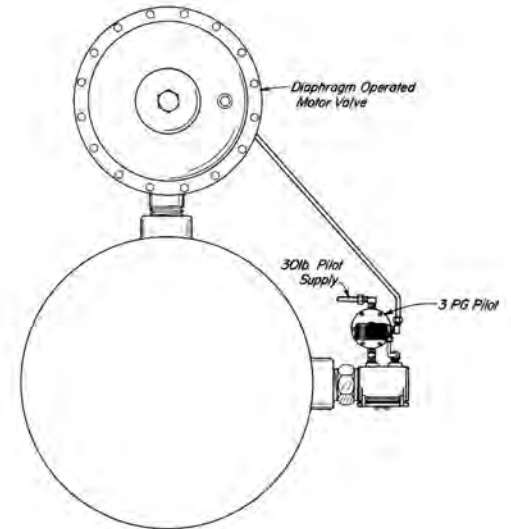
#### INTERFACE CONTROL:

A 3 PG Pilot must be installed in direct throttle mode. Allow the float to be completely submerged in the lighter liquid. The heavier liquid must be below the float. With the float submerged make adjustments as described for snap control.

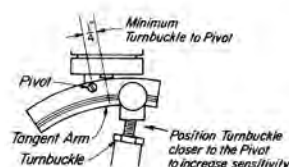
Do not attempt to use for interface control in liquids with less than .15 differential specific gravities. Maximum specific gravity of lighter liquid .85.

For additional sensitivity, a 3 PG Pilot may installed in direct throttle mode, refer to Section Y for operation.

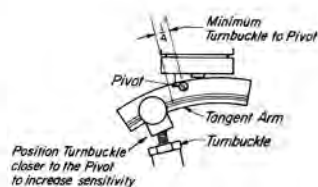
#### TYPICAL INSTALLATION



#### LOCATION OF TANGENT ARM PIVOT CONNECTION TO TANGENT ARM LEFT HAND PILOT

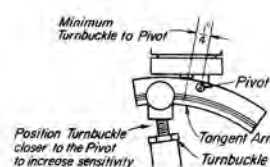


INDIRECT

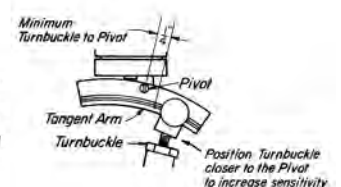


DIRECT

#### RIGHT HAND PILOT



INDIRECT



DIRECT

**NOTES:**



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#### APPLICATIONS:

Liquid level controller for oil and gas separators, water knock-outs, gas scrubbers and accumulators.

Operates any pressure opening diaphragm motor valve requiring not more than 30 psig diaphragm pressure. See sections E1, E2, E3 and E4 for diaphragm operated motor valves.

#### FEATURES:

- Intermittent bleed pilot
- Simple installation
- Easy to use
- Polyethylene displacement float
- .65 Specific Gravity or higher
- No adjustment required

#### SUPPLY PRESSURE:

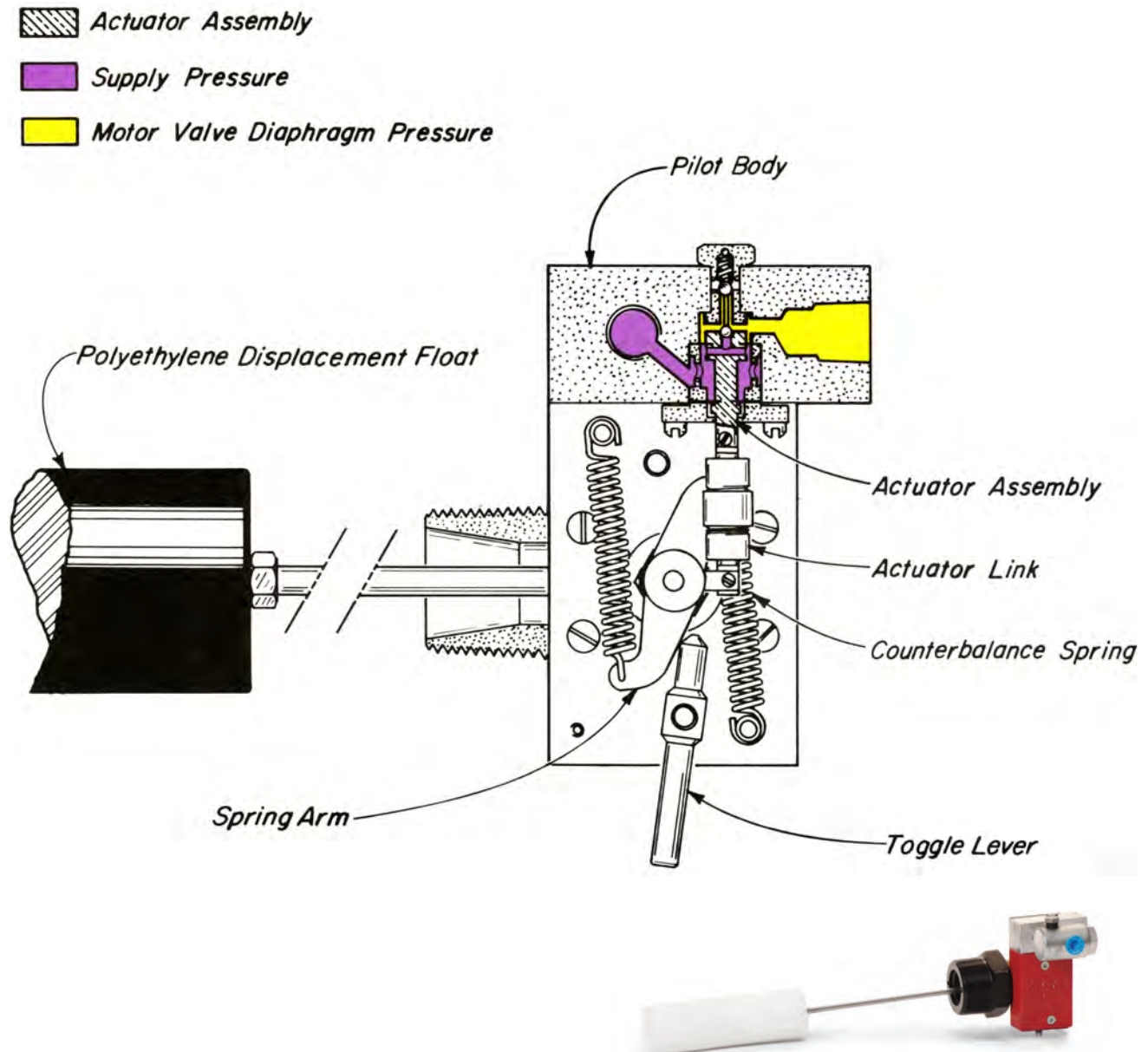
30 psig maximum

#### OPERATION:

The ULC Pilot consists of a DISPLACEMENT FLOAT for monitoring the liquid level, a trunnion and shaft to transmit float movement, and a pilot case which contains a PILOT BODY, SPRING ARM and ACTUATOR ASSEMBLY.

As the liquid level rises, the displaced volume of liquid plus the force of the COUNTERBALANCE SPRING lifts the FLOAT, rotating the trunnion and SPRING ARM in a clockwise direction. This draws the ACTUATOR ASSEMBLY downward, closing the vent (Yellow to Atmosphere) and opening the inlet (Violet to Yellow). Yellow pressure opens the motor valve.

As the liquid level lowers, the weight of the FLOAT forces the trunnion and SPRING ARM in a counter-clockwise direction. This pushes the ACTUATOR upward, closing the inlet (Violet to Yellow) and opening the vent (Yellow to Atmosphere). Vented yellow pressure allows the motor valve to close.

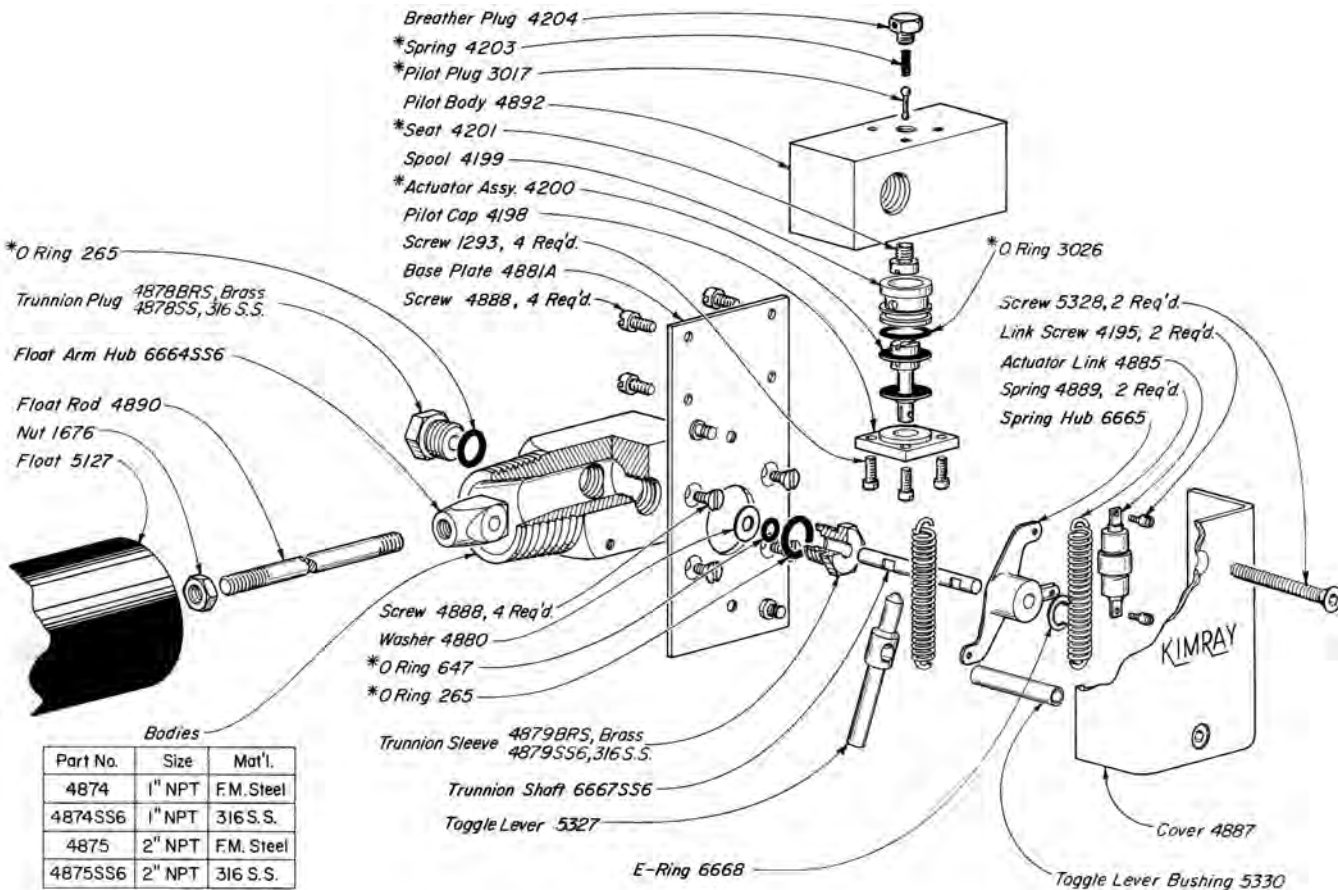


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# FLOAT OPERATED LEVEL CONTROLLER



UNIVERSAL LEVEL CONTROL  
BRASS, F.M. STEEL & STAINLESS STEEL



Parts for pilots available with pipe vent not shown are Breather plug 147, Screw 1293 (4) required, Pilot Body 4892PV, Breather plug 4893.

## PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	REPAIR KIT
CMB	1" NPT ULC F.M. STL	1500	RSL
CMC	1" NPT ULC STAINLESS STL	1500	RSL
CMD	2" NPT ULC F.M. STL	1500	RSL
CME	2" NPT ULC STAINLESS STL	1500	RSL

## PILOTS with PIPE VENT AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	REPAIR KIT
CMG	1" NPT ULC F.M. STL w/PV	1500	RSL
CMH	1" NPT ULC S.S. STL w/PV	1500	RSL
CMJ	2" NPT ULC F.M. STL w/PV	1500	RSL
CMK	2" NPT ULC S.S. STL w/PV	1500	RSL

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

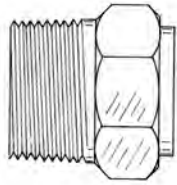
## PILOTS ACCESSORIES AVAILABLE:

PART NO.	DESCRIPTION
6001	4" Hammer Union Adapter for 1" NPT Pilot

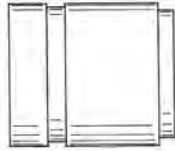
Kimray is an ISO 9001- certified manufacturer.



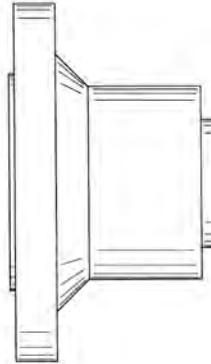
2" NPT (STD)



GROOVED



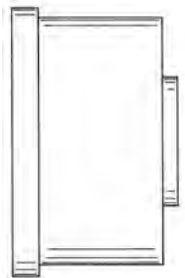
RF FLANGED



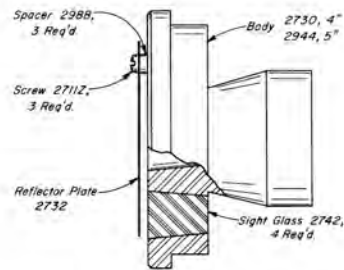
RTJ FLANGED



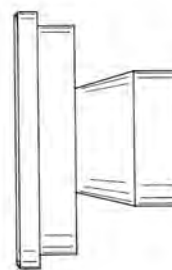
HAMMER UNION



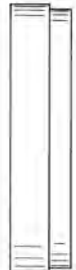
HAMMER UNION  
(w/Sight Glass)



HAMMER UNION  
(w/o Sight Glass)



ADAPTER



PART NO.	BODY	MAX. W.P. @ 100° F
1391	2" NPT PF	4000
1391SS6	2" NPT PF SS6	4000
1514	2" H.U. PF	4000
1837	2" GRV. PF	2000
1982	2" 150 RF PF	285
1836	2" 300 RF PF	740
1763	2" 600 RF PF	1480
1944	2" 900 RF PF	2220
2443	2" 150 RTJ PF	285
2444	2" 300 RTJ PF	740
2117	2" 600 RTJ PF	1480
1758	2" 1500 RTJ PF	3705
1532	2 1/2" H.U. PF	2000
1526	2 1/2" GRV. PF	2000
2252	2 1/2" 300 RF PF	740
1973	2 1/2" 600 RF PF	1480
2253	2 1/2" 600 RF PF	1480
1674	3" H.U. PF	3000
2447	3" GRV. PF	2000

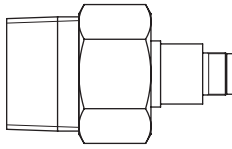
PART NO.	BODY	MAX. W.P. @ 100° F
1972	3" 150 RF PF	285
1983	3" 300 RF PF	740
1817	3" 600 RF PF	1480
2005	3" 900 RF PF	2220
2448	3" 1500 RF PF	3705
2125	3" 600 RTJ PF	1480
2134	3" 900 RTJ PF	2220
2113	4" GRV. PF	2000
1902	4" 150 RF PF	285
1900	4" 300 RF PF	740
1818	4" 600 RF PF	1480
2107	4" 600 RTJ PF	1480
2730A	4" H.U. w/SG	1000
2942	4" H.U. w/o SG	1500
2174	4" GRV. x 2" NPT ADAP.	2000
2944A	5" H.U. w/SG	1500
4082	5" H.U. w/o SG	1500
2234	6" GRV. x 2" NPT ADAP.	2000
4368A	6" H.U. w/SG	1500

# FLOAT OPERATED LEVEL CONTROLLER

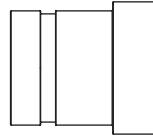
GEN II SIDE MOUNT BODIES AVAILABLE



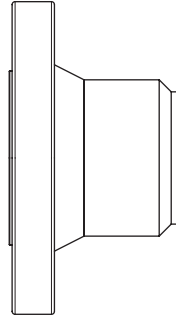
**2" NPT (STD)**



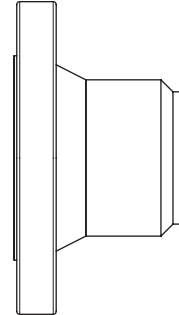
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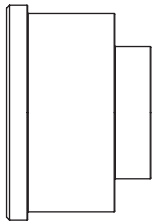
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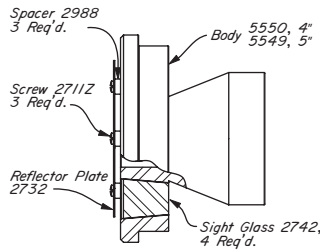
**RTJ FLANGED**



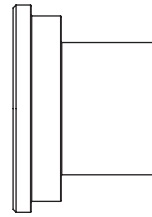
**HAMMER UNION**



**HAMMER UNION  
(w/Sight Glass)**



**HAMMER UNION  
(w/o Sight Glass)**



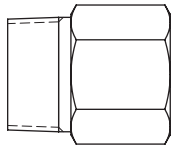
**ADAPTER**



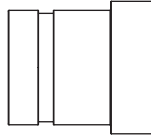
PART NO.	BODY	MAX. W.P. @ 100° F
5528	2" NPT GEN II	4000
5528S6	2" NPT GEN II SS6	4000
5548	2" GRV. GEN II	2000
5562	2" 150 RF GEN II	285
5563	2" 300 RF GEN II	740
5564	2" 600 RF GEN II	1480
5565	2" 900 RF GEN II	2220
5566	2" 150 RTJ GEN II	285
5567	2" 300 RTJ GEN II	740
5568	2" 600 RTJ GEN II	1480
5569	2" 1500 RTJ GEN II	3705
5570	3" 150 RF GEN II	285
5555	3" 300 RF GEN II	740
5571	3" 600 RF GEN II	1480
5572	3" 900 RF GEN II	2220

PART NO.	BODY	MAX. W.P. @ 100° F
6414	3" 1500 RF GEN II	3705
5573	3" 600 RTJ GEN II	1480
5574	3" 900 RTJ GEN II	2220
5558	3" H.U. w/o SG GEN II UN	3000
5575	4" 150 RF GEN II	285
5576	4" 300 RF GEN II	740
5577	4" 600 RF GEN II	1480
5578	4" 600 RTJ GEN II	1480
5579	4" 1500 RF GEN II	3705
5550A	4" H.U. w/SG	1000
5551	4" H.U. w/o SG	1500
2174	4" GRV. X 2" NPT ADAPTER	2000
5549A	5" H.U. w/SG GEN II UN	1000
5552	5" H.U. w/o SG GEN II UN	1500
5580	6" 1500 RF GEN II	3705

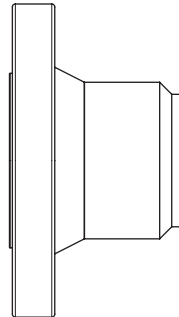
**2" NPT (STD)**



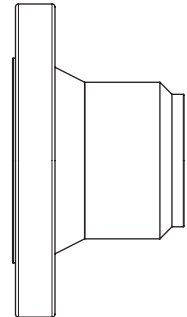
**GROOVED**



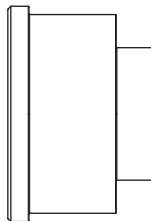
**RF FLANGED**



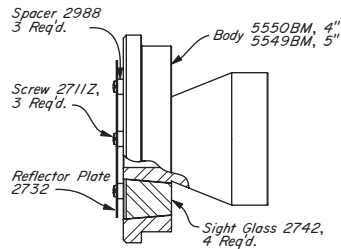
**RTJ FLANGED**



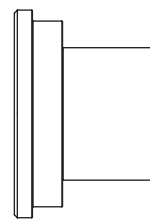
**HAMMER UNION**



**HAMMER UNION  
(w/Sight Glass)**



**HAMMER UNION  
(w/o Sight Glass)**



**ADAPTER**



PART NO.	BODY	MAX. W.P. @ 100° F
6559	2" NPT GEN II	4000
6559SS6	2" NPT GEN II SS6	4000
5548	2" GRV. GEN II	2000
5562BM	2" 150 RF GEN II	285
5563BM	2" 300 RF GEN II	740
5564BM	2" 600 RF GEN II	1480
5565BM	2" 900 RF GEN II	2220
5566BM	2" 150 RTJ GEN II	285
5567BM	2" 300 RTJ GEN II	740
5568BM	2" 600 RTJ GEN II	1480
5569BM	2" 1500 RTJ GEN II	3705
5570BM	3" 150 RF GEN II	285
5555BM	3" 300 RF GEN II	740
5571BM	3" 600 RF GEN II	1480
5572BM	3" 900 RF GEN II	2220

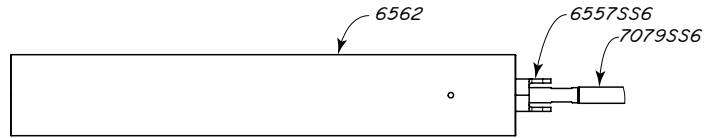
PART NO.	BODY	MAX. W.P. @ 100° F
6414BM	3" 1500 RF GEN II	3705
5573BM	3" 600 RTJ GEN II	1480
5574BM	3" 900 RTJ GEN II	2220
5558BM	3" H.U. w/o SG GEN II UN	3000
5575BM	4" 150 RF GEN II	285
5576BM	4" 300 RF GEN II	740
5577BM	4" 600 RF GEN II	1480
5578BM	4" 600 RTJ GEN II	1480
5579BM	4" 1500 RF GEN II	3705
5550ABM	4" H.U. w/SG	1000
5551BM	4" H.U. w/o SG	1500
2174	4" GRV. X 2" NPT ADAPTER	2000
5549ABM	5" H.U. w/SG GEN II UN	1000
5552BM	5" H.U. w/o SG GEN II UN	1500
5580BM	6" 1500 RF GEN II	3705

**NOTES:**

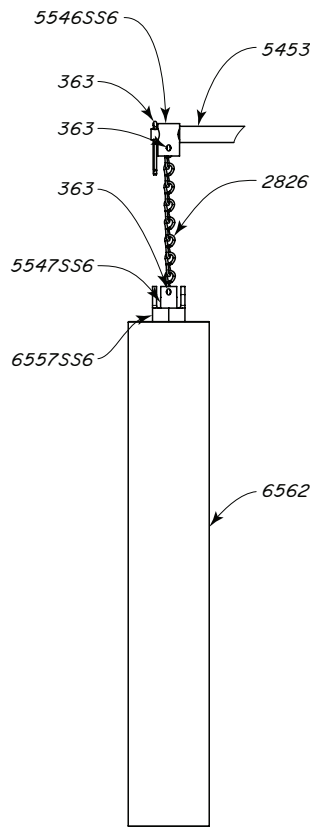
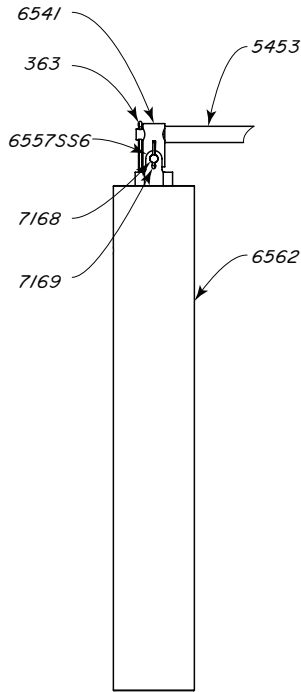


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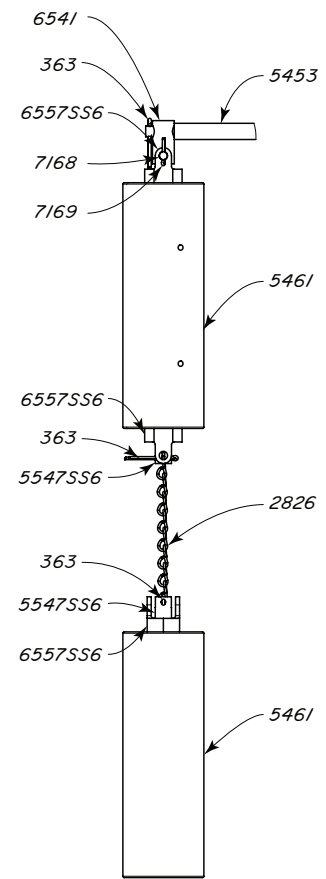
#### HORIZONTAL (STD.)



#### VERTICAL



#### SPLIT FLOAT



DISPLACERS									EXTENSION RODS			SPRING ASSEMBLIES
DISPLACER NO.	SIZE	FLOAT WEIGHT	MAX TEMP	SPRING		MAX PSI	MIN. SP. GR.	MATERIAL	EXTENSION NO.	LENGTH	POSITION	POSITION
				BACK	SIDE							
6562	1 7/8" x 12" LG	1lb 15oz	180°F	6547	5467	4000	>0.20	PVC	CMUL6	6"	Horz	6547L
6611	1 7/8" x 20" LG	3lb 5oz	180°F	6547L		4000	>0.15	PVC	CMUL12	12"	Horz	6547L
6606	3" x 12" LG	4lb 5oz	180°F	6547L	5557	4000	>0.1	PVC	CMUL18	18"	Horz	6547L
6971	2 1/2" x 12" LG	3lb 0.5oz	180°F	6547	5467	4000	>0.15	PVC	CMOL6	6"	Horz	5557
5461SS6	1 3/4" x 12" LG	1lb 15oz	500°F	6547	5467	2000	>0.20	316SS	CMOL12	12"	Horz	5557
									CMOL18	18"	Horz	5557
									6507	1 3/4"	Horz	N/A
									5453S	1 1/2"	Vertical	N/A

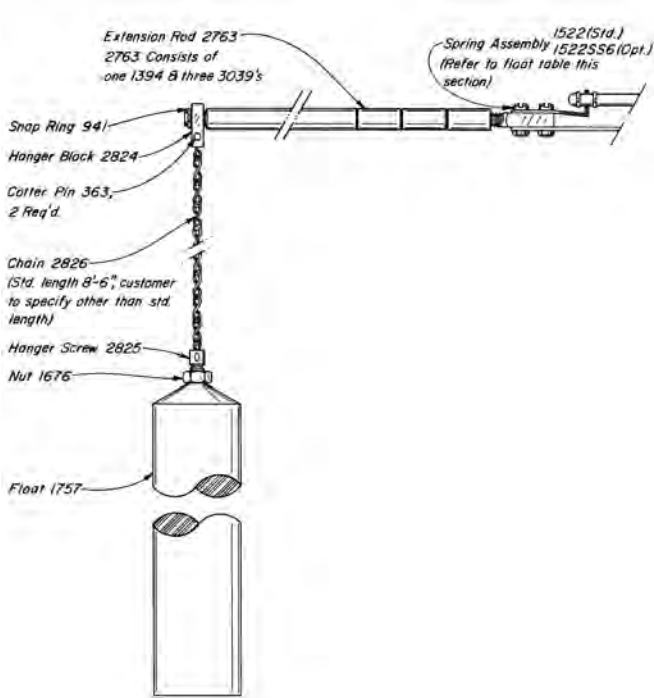
\* Part 2826 chain comes in 8 foot length

# FLOAT OPERATED LEVEL CONTROLLER

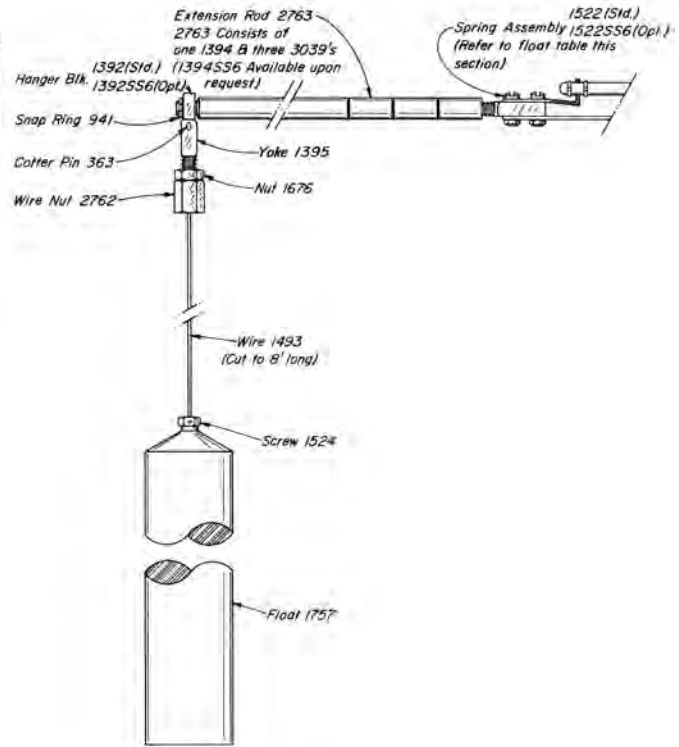
## PF FLOAT ASSEMBLIES



### CHAIN ASSEMBLY



### WIRE ASSEMBLY



FLOATS			EXTENSION RODS			SPRING ASSEMBLIES
FLOAT NO.	SIZE	MATERIAL	EXTENSION NO.	LENGTH	POSITION	POSITION
1521	2" Ø x 5-21/32" LG.	DELRIN	1394V	3"	VERTICAL	1522
			1394V	7"	VERTICAL	1393
1521SS6	2" Ø x 5-21/32" LG.	316SS	1394VSS6	3"	VERTICAL	1522SS6
1541	1-5/8" Ø x 5-21/32" LG.	TEFLON	1394V	3"	VERTICAL	1522
			1563V	7"	VERTICAL	1393
1560	1-7/8" Ø x 6-23/64" LG.	DELRIN	1394V	3"	VERTICAL	1522
			1563V	7"	VERTICAL	1393
1569	1-3/4" Ø x 7-1/4" LG.	DELRIN	1394V	3"	VERTICAL	1522
			1563V	7"	VERTICAL	1393
1664	1-1/4" Ø x 14" LG.	ALUMINUM	1563V	7"	VERTICAL	1393
1693	1-3/4" Ø x 7-1/4" LG.	ALUMINUM	1563V	7"	VERTICAL	1393
1694	1-1/2" Ø x 9-7/8" LG.	DELRIN	1394V	3"	VERTICAL	1522
			1563V	7"	VERTICAL	1393
1757	1-1/2" Ø x 6-11/16" LG.	DELRIN	1394V	3"	VERTICAL	1522
			2395V	9"	VERTICAL	1393
			1756V	9"	HORIZONTAL	1393
1857	1-1/4" Ø x 14" LG.	DELRIN	1394V	3"	VERTICAL	1522
			1563V	7"	VERTICAL	1393
1397	2" Ø x 5-21/32" LG.	ALUMINUM	1394V	3"	VERTICAL	1393
2229	2" Ø x 13-1/2" LG.	DELRIN	1394V	3"	VERTICAL	1522
2230	1-7/8" Ø x 5-1/4" LG.	DELRIN	1394V	3"	VERTICAL	1522
2231	1-3/4" Ø x 17" LG.	DELRIN	1394V	3"	VERTICAL	1522

Delrin floats (standard) are applicable for all normal oil field fluids.

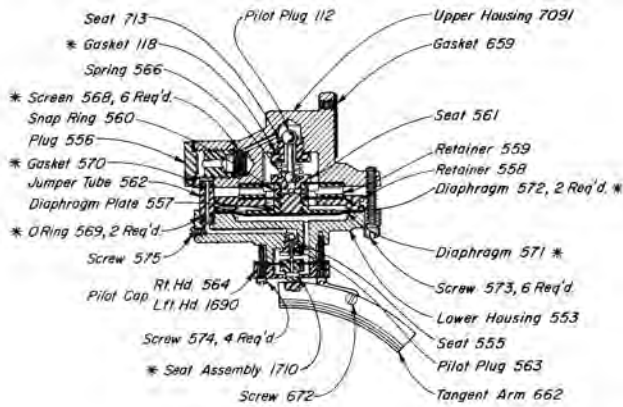
Teflon float, Part No. 1541 (optional) is recommended for applications involving strong acids, alkalis or operating temperatures above 200°F.

Aluminum floats (optional) are applicable where high temperatures or where Mono Ethanol Amine gases exist.

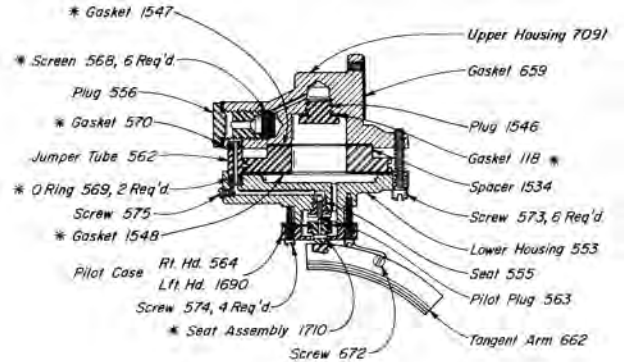
Part No. 2386, a 6" extension rod and Part No. 2407, a 3" extension rod can also be used with the floats and spring assemblies listed above.

CONTROL PILOTS AVAILABLE  
CAST IRON, STEEL, & 316 SS

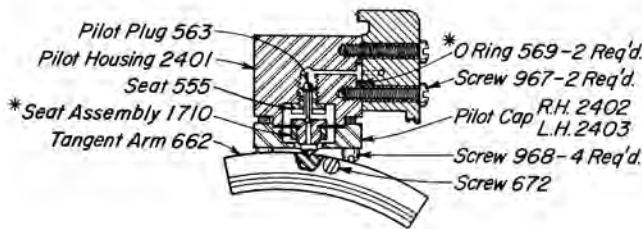
### 3 PT PILOT CAST IRON



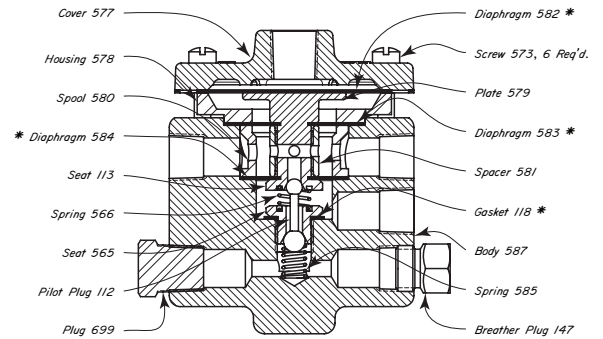
### 3 PT-1 PILOT CAST IRON



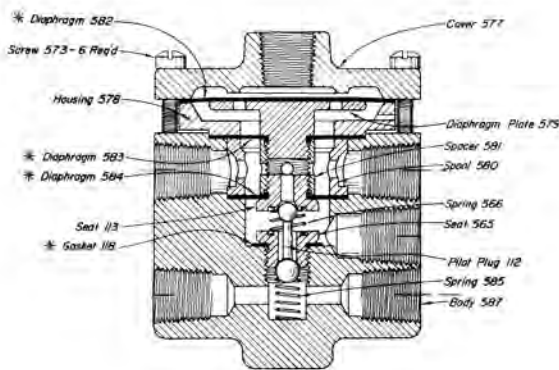
### \*\* 3 PT-B PILOT STEEL



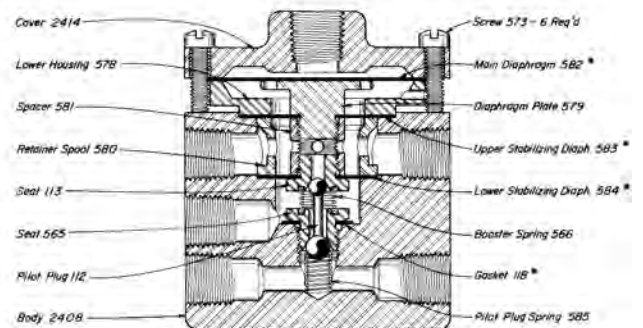
### 3 PS PILOT CAST IRON



### 3 PG PILOT CAST IRON



### \*\* 3 PG-S PILOT STEEL



### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	KIT
YBI	3 PT RH	30	RMR
YBJ	3 PT LH	30	RMR
YBK	3 PT-1 RH	30	RMT
YBL	3 PT-1 LH	30	RMT
YBN	3 PT-B RH	30	RMU
YBNSS6	3 PT-B RH-SS6	30	RMU
YBO	3 PT-B LH	30	RMU
YAG	3 PS	30	RMA
YAE	3 PG	30	RMA
YAE1	3 PG-S	30	RMA

### NOTES:

\*These are recommended spare parts that are stocked as repair kits.

\*\*These Pilots are also available in 316 SS for more information contact your nearest Kimray Distributor or KIMRAY, Inc.

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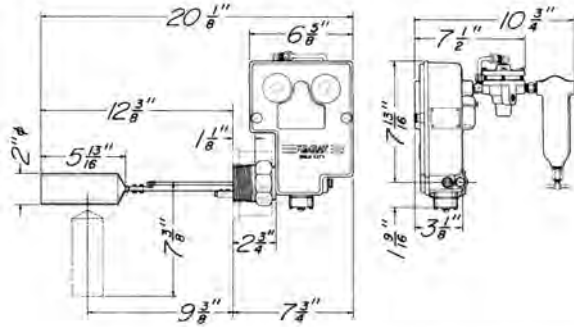
**NOTES:**



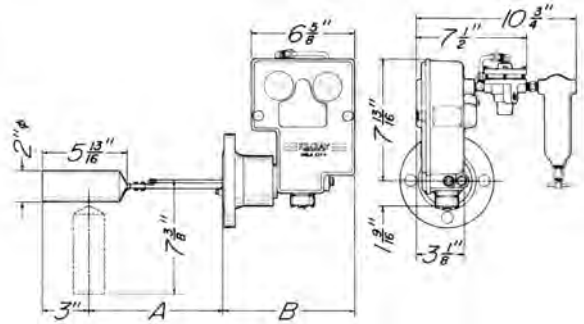
Kimray is an ISO 9001- certified manufacturer.



PFS/PFS-1 (2" NPT & H.U. Bodies)

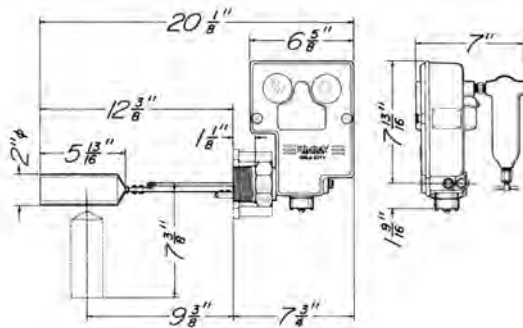


PFS/PFS-1 (Hanged Bodies)

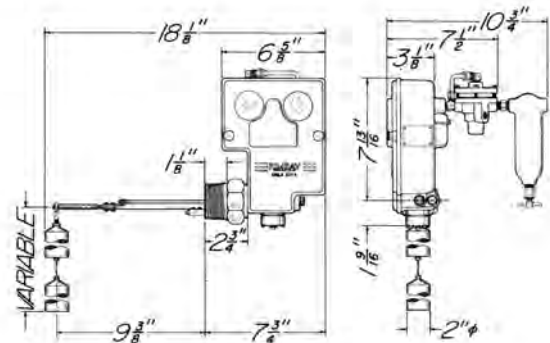


FLANGED BODY DIMENSIONS - INCHES											
A.N.S.I. Pressure Rating											
FLANGES		150#		300#		600#		900#		1500#	
Type	Size	A	B	A	B	A	B	A	B	A	B
Raised Face	2"	8 5/8	8 1/2	8 1/2	8 5/8	8 1/8	9	7 5/8	9 1/2	7 5/8	9 1/2
	2 1/2"	8 1/2	8 5/8	8 3/8	8 3/4	8	9 1/8	7 1/2	9 5/8	7 1/2	9 5/8
	3"	8 7/16	8 11/16	8 1/4	8 7/8	7 7/8	9 1/4	7 5/8	9 1/2		
	4"	8 7/16	8 11/16	8 1/8	9	7 5/8	9 1/2				
Ring Joint	2"	8 7/16	8 11/16	8 1/4	8 7/8	8 1/16	9 1/16	7 9/16	9 5/16	7 9/16	9 5/16
	2 1/2"	8 5/16	8 13/16	8 1/8	9	7 15/16	9 3/16	7 7/16	9 11/16	7 7/16	9 11/16
	3"	8 1/4	8 7/8	8	9 1/8	7 13/16	9 5/16	7 9/16	9 9/16		
	4"	8 1/4	8 7/8	7 7/8	9 1/4	7 9/16	9 9/16				

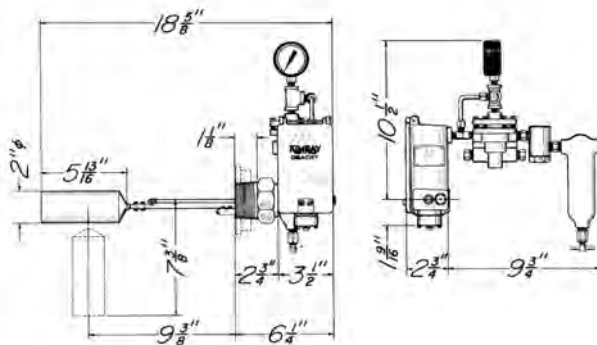
PFT (2" NPT & H.U. Bodies)



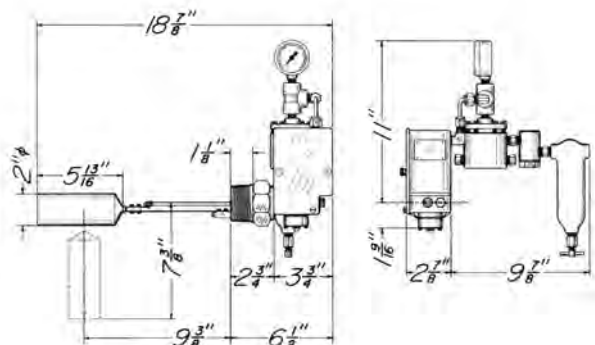
PFM (2" NPT Body)



PFB (2" NPT & H.U. Bodies)

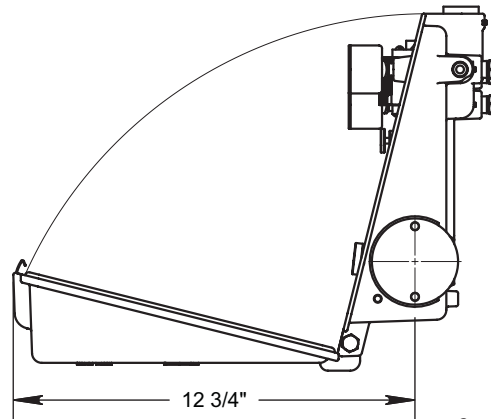
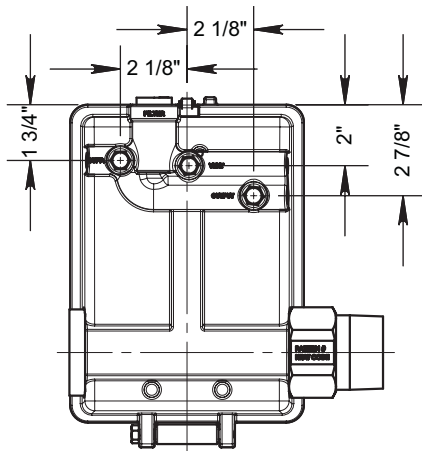
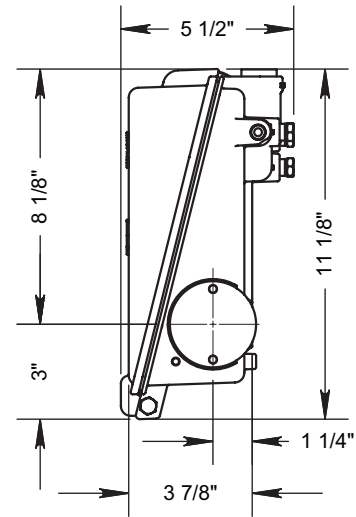
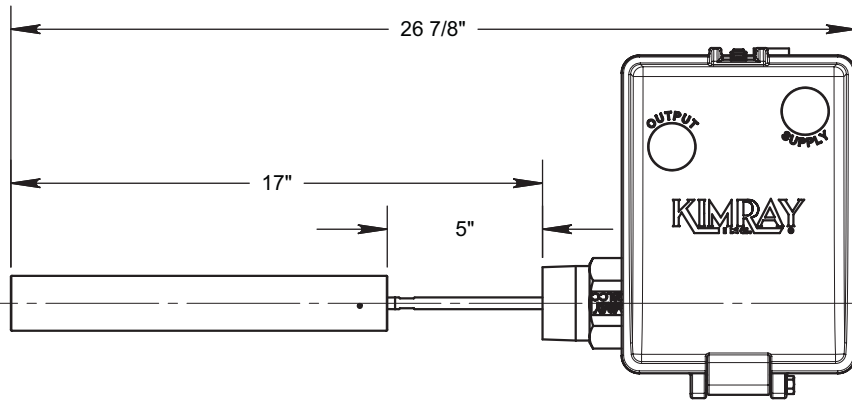
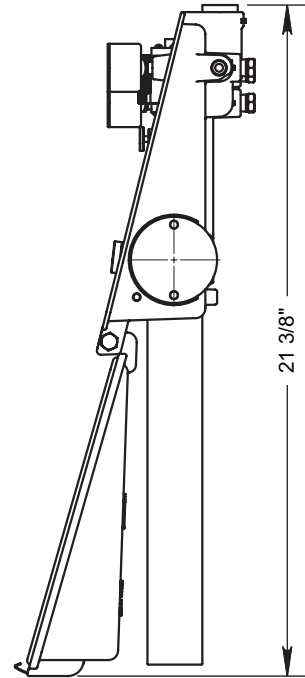
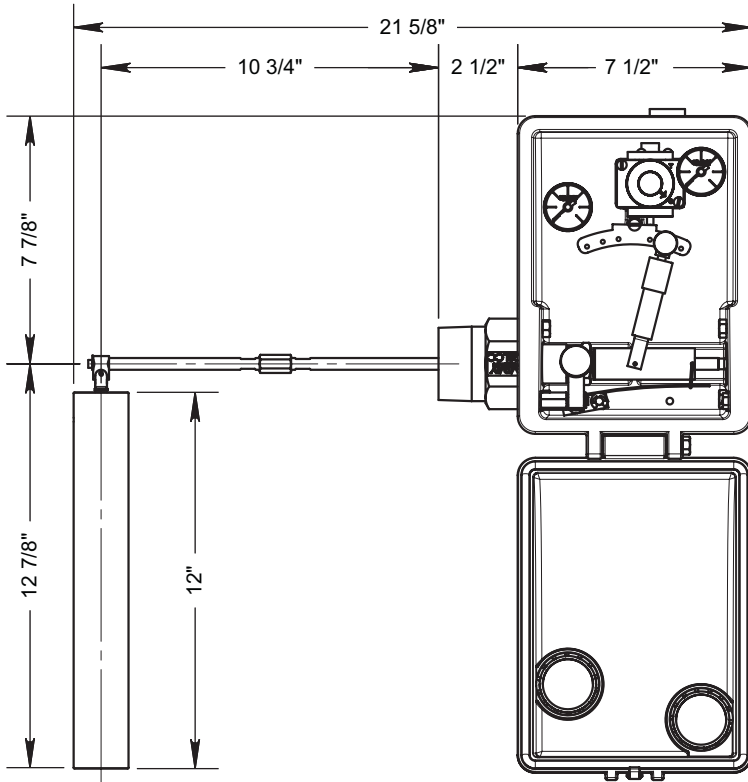


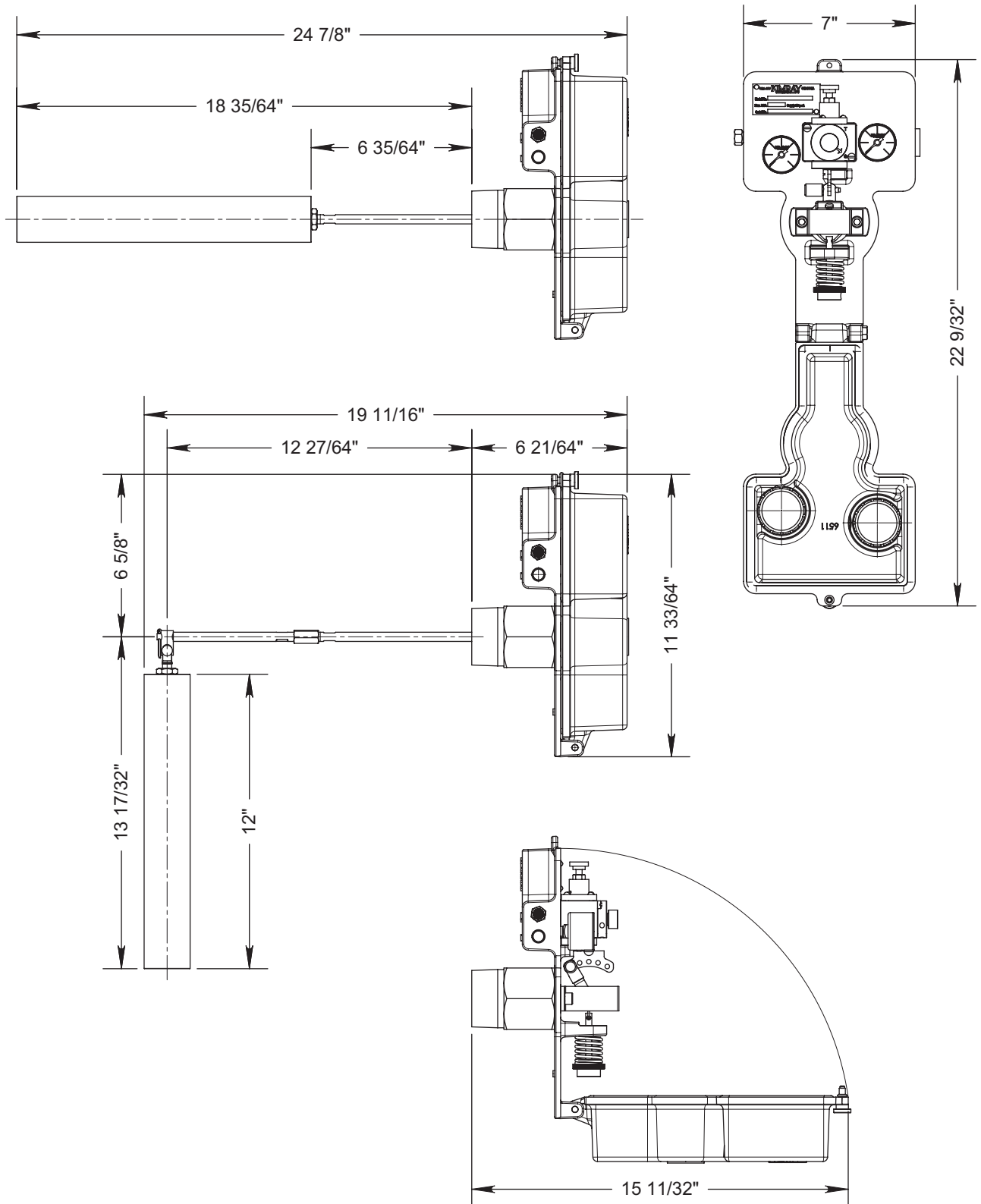
PFB-S (2" NPT Body)



# FLOAT OPERATED LEVEL CONTROLLER

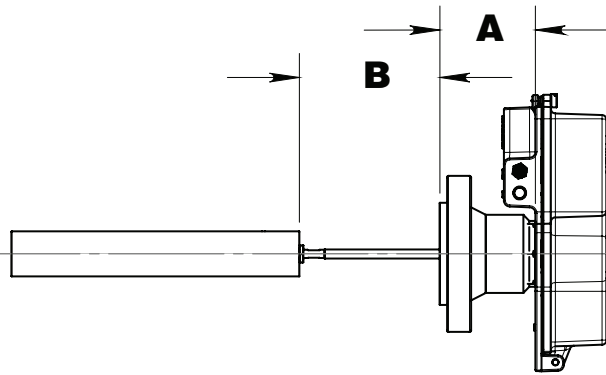
## GEN II DIMENSIONS



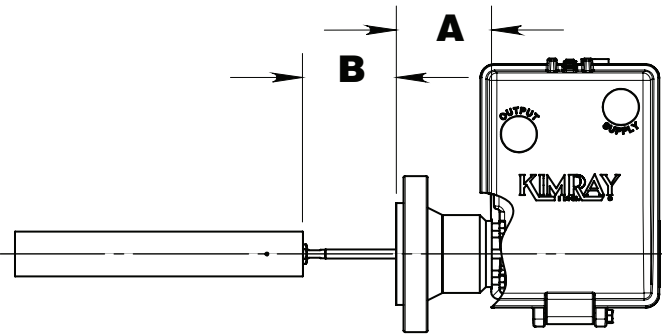


# FLOAT OPERATED LEVEL CONTROLLER

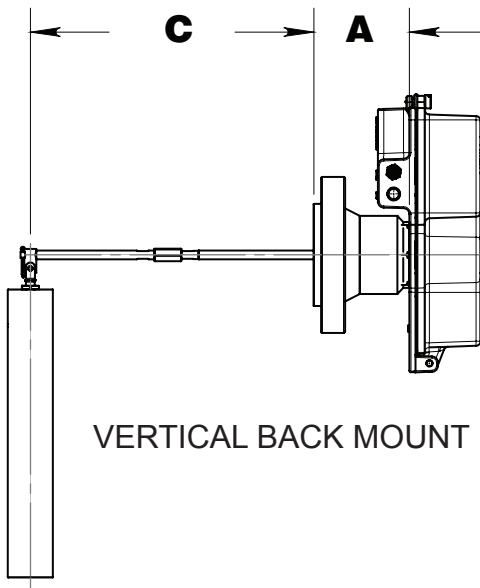
## GEN II FLANGE DIMENSIONS



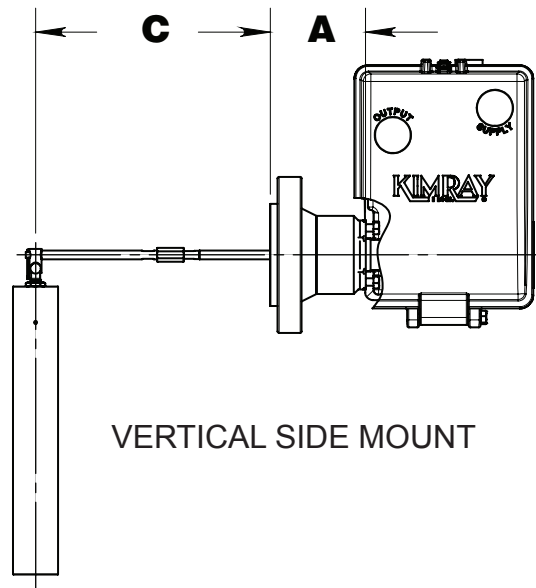
HORIZONTAL BACK MOUNT



HORIZONTAL SIDE MOUNT



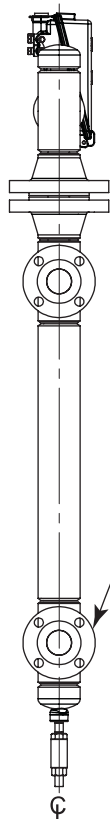
VERTICAL BACK MOUNT



VERTICAL SIDE MOUNT

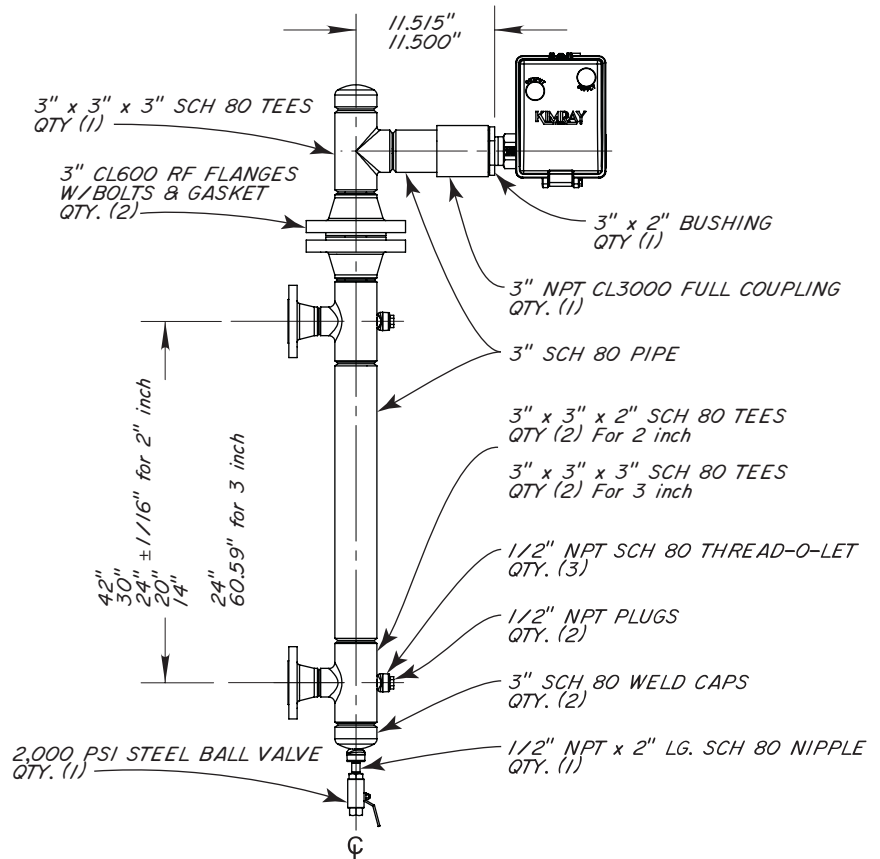
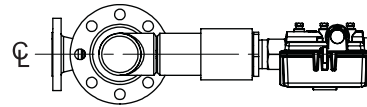
FLANGES		150#			300#			600#			900#			1500#			
TYPE	SIZE	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
SIDE MOUNT	Raised Face	2"	3 27/64	4 15/32	10 11/32	3 5/8	4 17/64	10 9/64	3 59/64	3 31/32	9 27/32	4 27/64	3 15/32	9 11/32			
		3"	3 27/64	4 15/32	10 11/32	3 51/64	4 3/32	9 31/32	4 11/64	3 23/32	9 19/32	4 13/16	3 5/64	8 61/64	6 19/64	1 19/32	7 15/32
		4"	3 39/64	4 9/32	10 5/32	3 59/64	3 31/32	9 27/32	4 27/64	3 15/32	9 11/32				5 3/4	2 9/64	8 1/64
		6"													6 1/8	1 49/64	7 41/64
	Ring Joint	2"	3 43/64	4 7/32	10 3/32	3 9/16	4 21/64	10 13/64	3 63/64	3 57/64	9 49/64				4 11/64	3 23/32	9 19/32
		3"							3 59/64	3 31/32	9 27/32	4 31/64	3 13/32	9 9/32			
4"								4 31/64	3 13/32	9 9/32							
BACK MOUNT	Raised Face	2"	3 27/64	4 15/32	10 11/32	3 5/8	4 17/64	10 9/64	3 59/64	3 31/32	9 27/32	4 27/64	3 15/32	9 11/32			
		3"	3 27/64	4 15/32	10 11/32	3 51/64	4 3/32	9 31/32	4 11/64	3 23/32	9 19/32	4 13/16	3 5/64	8 61/64	6 19/64	1 19/32	7 15/32
		4"	3 39/64	4 9/32	10 5/32	3 59/64	3 31/32	9 27/32	4 27/64	3 15/32	9 11/32				5 3/4	2 9/64	8 1/64
		6"													6 1/8	1 49/64	7 41/64
	Ring Joint	2"	3 43/64	4 7/32	10 3/32	3 9/16	4 21/64	10 13/64	3 63/64	3 57/64	9 49/64				4 11/64	3 23/32	9 19/32
		3"							3 59/64	3 31/32	9 27/32	4 31/64	3 13/32	9 9/32			
4"								4 31/64	3 13/32	9 9/32							

LEVEL CONTROLLER IS SOLD SEPARATE,  
NOT A PART OF FLOAT CAGE.



WELDNECK FLANGES  
QTY. (2):

2" CL150 RF  
or  
2" CL300 RF  
or  
2" CL600 RF  
or  
2" CL600 RTJ  
or  
3" CL150 RF  
or  
3" CL300 RF  
or  
3" CL600 RF  
or  
3" CL600 RTJ



### VERTICAL EXTERNAL FLOAT CAGES AVAILABLE:

CATALOG CODE	CENTER TO CENTER	LINE SIZE	FLANGE TYPE
CQA150RF	14"	2"	CL150 RF
CQA300RF	14"	2"	CL300 RF
CQA600RF	14"	2"	CL600 RF
CQA600RTJ	14"	2"	CL600 RTJ
CQB150RF	20"	2"	CL150 RF
CQB300RF	20"	2"	CL300 RF
CQB600RF	20"	2"	CL600 RF
CQB600RTJ	20"	2"	CL600 RTJ
CQC150RF	24"	2"	CL150 RF
CQC300RF	24"	2"	CL300 RF
CQC600RF	24"	2"	CL600 RF
CQC600RTJ	24"	2"	CL600 RTJ
CQD150RF	30"	2"	CL150 RF
CQD300RF	30"	2"	CL300 RF
CQD600RF	30"	2"	CL600 RF
CQD600RTJ	30"	2"	CL600 RTJ
CQD900RF	30"	2"	CL900 RF
CQE150RF	42"	2"	CL150 RF
CQE300RF	42"	2"	CL300 RF
CQE600RF	42"	2"	CL600 RF
CQE600RTJ	42"	2"	CL600 RTJ
CQIMOD1	60.59"	3"	CL150 RF
CQIMOD2	42"	3"	CL150 RF
CQIMOD3	15"	3"	CL900 RTJ

### NOTES:

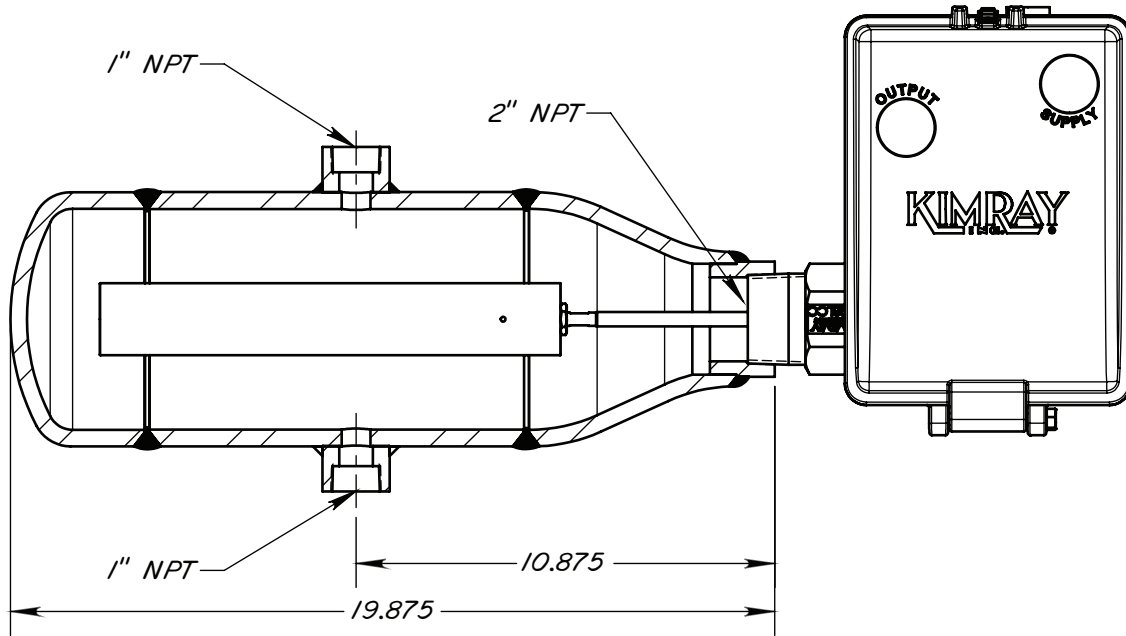
- MAXIMUM WORKING PRESSURE PER FLANGE CLASS
- OPERATING TEMPERATURE -20° - 200° F
- HYDROSTATIC TEST PER ASME SECTION VIII DIV. 1
- CONFORMS TO ASME SECTION VIII, U
- SAND BLAST & PRIMED

Kimray is an ISO 9001- certified manufacturer.

# HORIZONTAL EXTERNAL FLOAT CAGE



GEN II  
STEEL



LEVEL CONTROLLER IS SOLD SEPARATELY

DESIGNED FOR BOTH SIDEMOUNT AND  
BACKMOUNT MODELS

## HORIZONTAL EXTERNAL FLOAT CAGES AVAILABLE:

CAT. NO.	DESCRIPTION	MAX W.P.
6411	HORIZONTAL FLOAT CAGE	1500psig

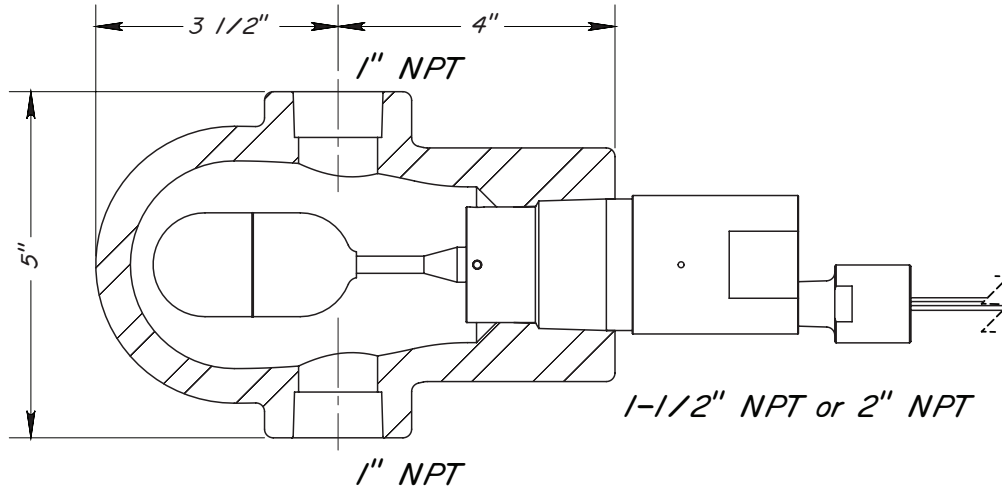
## NOTES:

MAXIMUM WORKING PRESSURE 1500 PSI  
HYDROSTATIC TEST PRESSURE 2250 PSI

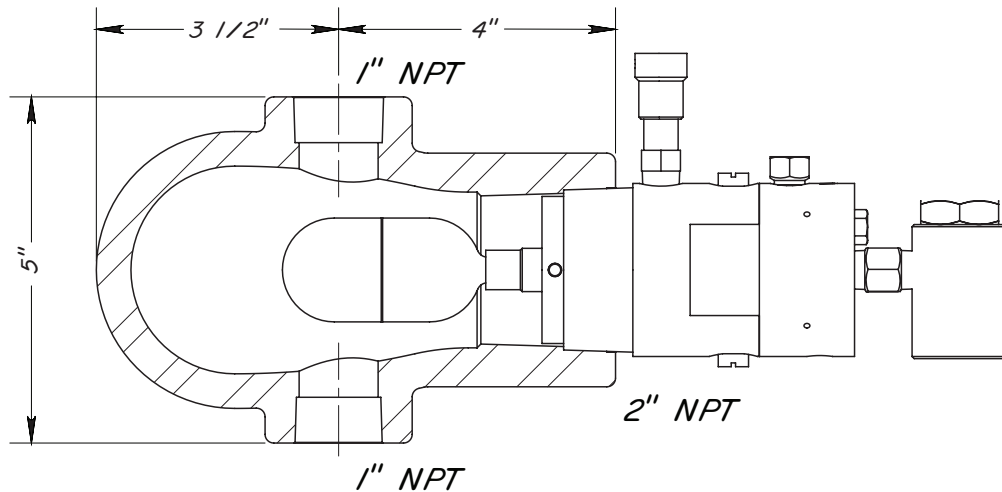
MADE FROM 6" SCH. 80 XHY PIPE

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### ELECTRONIC



### PNEUMATIC



### SNAP SERVICE PILOTS AVAILABLE:

CAT. NO.	SWITCH CONNECTION	DESCRIPTION	MAX W.P.
5522	1 1/2" NPT	ELECTRONIC FLOAT CAGE	3750 psig
5523	2" NPT	ELECTRONIC FLOAT CAGE	3750 psig
5523CUA	2" NPT	PNEUMATIC FLOAT CAGE	3750 psig

### NOTES:

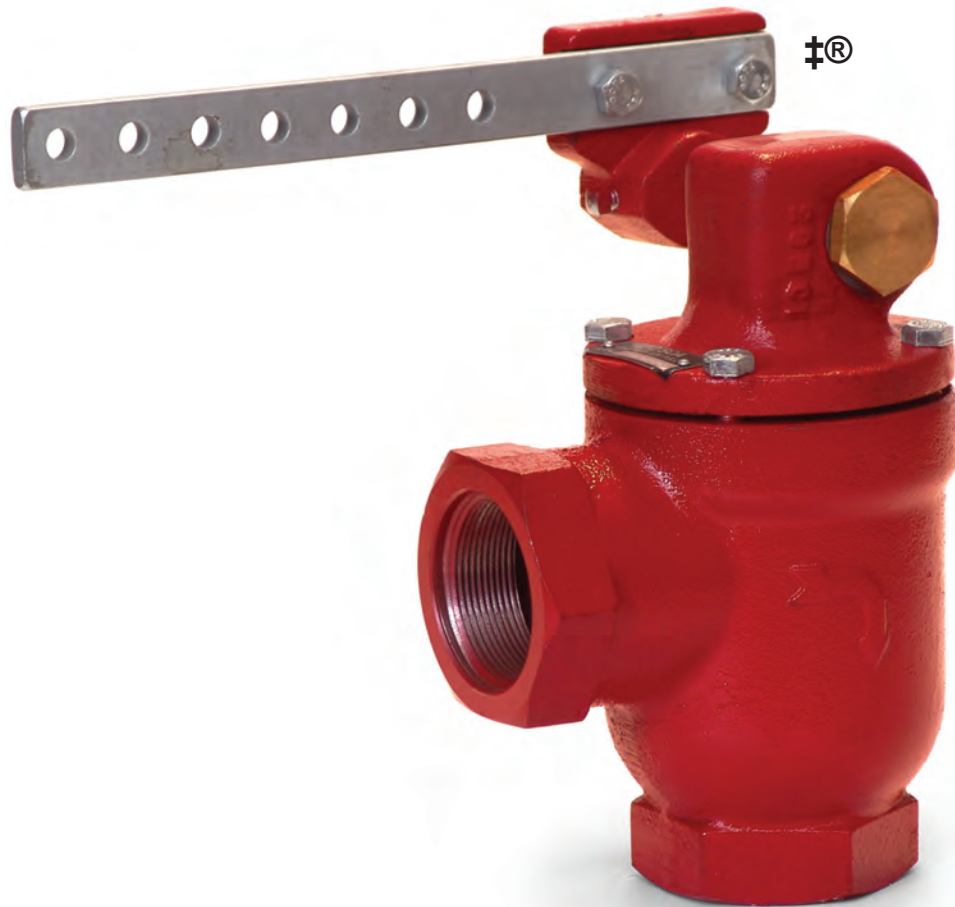
**NOTES:**



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# LEVEL CONTROLS MECHANICALLY OPERATED



‡®

SECTION C2

# KIMRAY INC.®

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.  
® Copyright 1992, KIMRAY, Inc.

#### DIAPHRAGM BALANCED OIL VALVE

##### APPLICATIONS:

Used as oil or water dump valves on separators, treaters, knockouts, and other similar liquid accumulators.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Cast Iron	2,3,4 & 6	125 psig Max.	Pg. 10.1	Pg. 10.2
Ductile	2	250 psig Max.	Pg. 10.1	Pg. 10.3
Ductile	3,4 & 6	125 psig Max.	Pg. 10.1	Pg. 10.3
Steel	2	250 psig Max.	Pg. 10.1	Pg. 10.4
Steel	3,4 & 6	125 psig Max.	Pg. 10.1	Pg. 10.4
All Steel	2	250 psig Max.	Pg. 10.1	Pg. 10.5
All Steel	3,4 & 6	125 psig Max.	Pg. 10.1	Pg. 10.5
316 SS	2	250 psig Max.	Pg. 10.1	Pg. 10.5
316 SS	3,4 & 6	125 psig Max.	Pg. 10.1	Pg. 10.5
Installation .....				Pg. 10.3

#### PISTON BALANCED OIL VALVE

##### APPLICATIONS:

Used as oil or water dump valves on separators, treaters, knockouts, and other similar liquid accumulators where higher pressures or corrosive conditions may occur.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Ductile	2	500 psig Max.	Pg. 20.1	Pg. 20.2
Ductile	2,3 & 4	250 psig Max.	Pg. 20.1	Pg. 20.2
Steel	2,3 & 4	285 psig Max.	Pg. 20.1	Pg. 20.3
Installation .....				Pg. 20.1
			Piston Balanced Throttling	
Ductile	2	500 psig Max.	Pg. 25.1	Pg. 25.2

#### FLOW CAPACITIES

Liquid Capacity Table Pg. 30.1

#### MECHANICAL PILOT

##### APPLICATIONS:

Oil and gas separators, water knockouts, and similar equipment where a mechanical to pneumatic interface is required to operate motor valves.

Material	Operating Pressure	Description of Operation	Parts List
Cast Iron	30 psig Max.	Pg. 40.1	Pg. 40.2
Installation .....			Pg. 40.2

#### BI-STABLE MECHANICAL PILOT

##### APPLICATIONS:

Oil and gas separators, knockouts, treaters and similar equipment where it is necessary to convert a mechanical dump into a wide span, snap, pneumatic signal.

Material	Operating Pressure	Description of Operation	Parts List
Cast Iron	30 psig Max.	Pg. 50.1	Pg. 50.2
Installation .....			Pg. 50.2

#### FLOAT COVERS AND TRUNNION ASSEMBLIES

##### APPLICATIONS:

Oil and gas separators, water knockouts, horizontal emulsion treaters and similar equipment.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Ductile	6,8 & 10	125 psig Max.	Pg. 60.1	Pg. 60.1

#### HAMMER UNION TRUNNION ASSEMBLIES

##### APPLICATIONS:

Oil and gas separators, freewater knockouts (FWKO), horizontal emulsion treaters and similar equipment.

Material	Operating Pressure	Stem Type	Float Nose	Parts List
Ductile	250 psig Max.	Single	Standard	Pg. 70.1

#### TRUNNION ASSEMBLY

##### APPLICATIONS:

Oil and gas separators, freewater knockouts (FWKO), horizontal emulsion treaters and similar equipment.

Material	Operating Pressure	Parts List
Ductile	250 psig Max	Pg. 80.1
Ductile	250 psig Max	Pg. 80.2
Steel	500 psig Max	Pg. 80.3

#### HAMMER UNION CLOSURES

##### APPLICATIONS:

As access openings for pressure vessels.

Material	Operating Pressure	Parts List
Steel	500 psig to 1500 psig	Pg. 90.1

#### CAGE & HARD SEAT

##### APPLICATIONS:

For use in erosive environment.  
Removable Seats Available ..... Pg. 100.1

#### DIMENSIONS

Mechanical Oil Valve Dimensions ..... Pg. 110.1  
Trunnion Assembly Dimensions ..... Pg. 110.2

#### ORDERING INFORMATION

To order a standard Oil Valve, Trunnion, Pilot or Weldneck, refer to Valves Available chart on each parts reference page.

Determine which valve is needed and order by "Cat. No."

To order an Oil Valve, Trunnion, Pilot or Weldneck with material or features not listed in "Valves Available" chart, contact the KIMRAY, Inc. Authorized Distributor in your area.

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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

#### APPLICATIONS:




As oil or water dump valves on separators, treaters, knock-outs, and other similar accumulators.

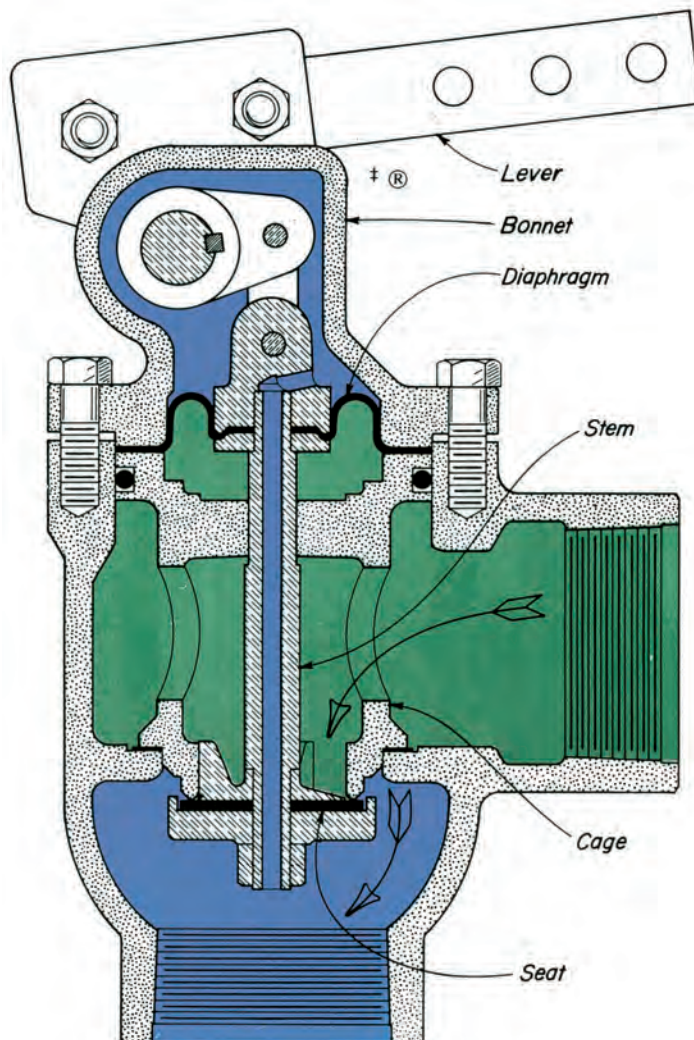
#### FEATURES:

- Balanced, single soft seat
- Teflon packed, rotary stuffing box
- All internal parts easily be removed with valve in line

#### OPERATION:

The Oil Valve is mechanically operated through a LEVER by a Float in a separator or other vessel to which the valve is connected. The STEM AND SEAT ASSEMBLY is driven through a crank by the LEVER. The area of the DIAPHRAGM is the same as the area of the SEAT so that Separator Fluid Pressure (Green) acting down on the SEAT is cancelled by the upward force of the pressure on the DIAPHRAGM. Downstream Pressure (Blue) is communicated through the hollow STEM to the top side of the DIAPHRAGM. Downstream Pressure (Blue) acting up on the SEAT is cancelled by the downward force of the same pressure on the top side of the DIAPHRAGM. The valve can be operated easily by float since it is unaffected by Separator Fluid Pressure (Green) or Downstream Pressure (Blue). The entire STEM AND SEAT ASSEMBLY with the CAGE can be withdrawn from the valve as a unit by removing the BONNET screws.

-  Stem and Seat Assembly
-  Separator Fluid Pressure
-  Downstream Pressure

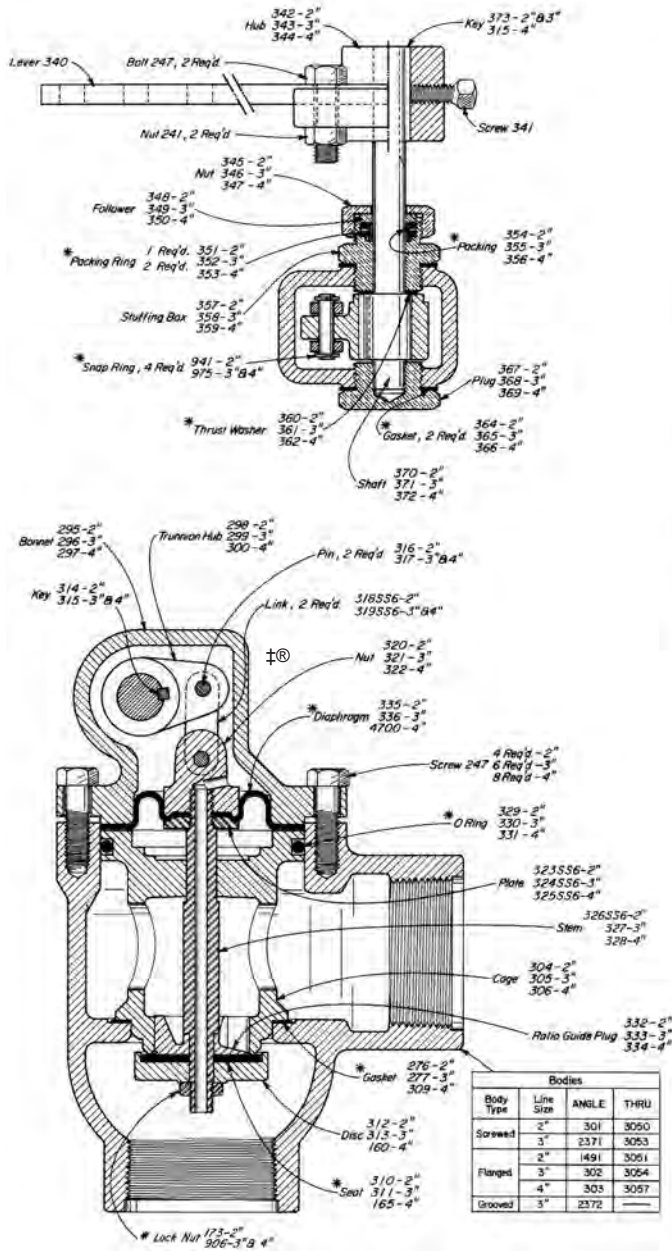


Kimray is an ISO 9001- certified manufacturer.

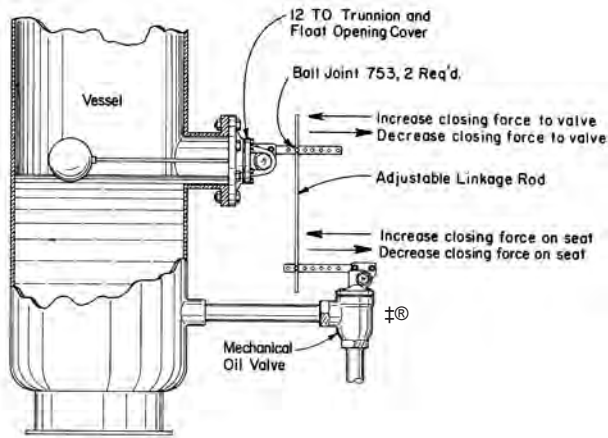
# MECHANICAL OIL VALVES



## DIAPHRAGM BALANCED CAST IRON



### MECHANICAL DUMP INSTALLATION



### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CAA	2" SCRD.	212 SOA	125	175	REA
CAB	2" FLGD. <sup>a</sup>	212 FOA	125	175	REA
CAC	3" SCRD.	312 SOA	125	175	REB
CAD	3" GRVD.	312 GOA	125	175	REB
CAE	3" FLGD. <sup>a</sup>	312 FOA	125	175	REB
CAF	4" FLGD. <sup>a</sup>	412 FOA	125	175	REC

### THRU VALVES AVAILABLE:

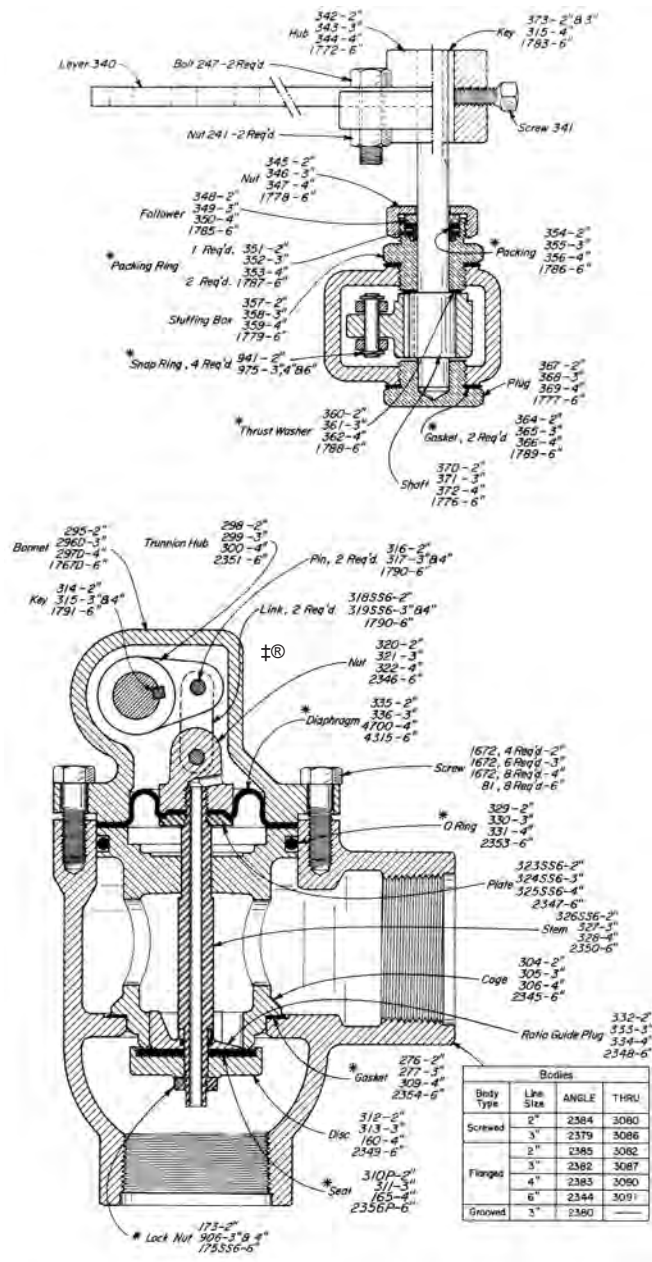
CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CGA	2" SCRD.	212 SOT	125	175	REA
CGB	2" FLGD. <sup>a</sup>	212 FOT	125	175	REA
CGC	3" SCRD.	312 SOT	125	175	REB
CGE	3" FLGD. <sup>a</sup>	312 FOT	125	175	REB
CGF	4" FLGD. <sup>a</sup>	412 FOT	125	175	REC

<sup>a</sup>Companion flanges, nuts, bolts, and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

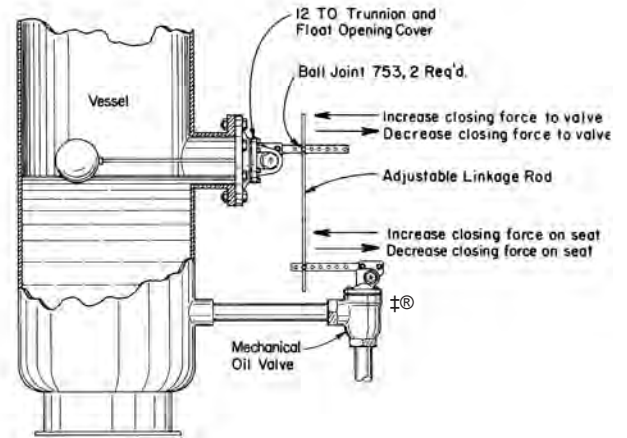
\*These are recommended spare parts and are stocked as repair kits.

For dimensions refer to Table of Contents.

Kimray is an ISO 9001- certified manufacturer.



### MECHANICAL DUMP INSTALLATION



#### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CBA	2" SCR.D.	225 SOA-D	250	300	RTJ
CBB	2" FLGD.	225 FOA-D	250	250	RTJ
CBC	3" SCR.D.	312 SOA-D	125	250	RTK
CBD	3" GRVD.	312 GOA-D	125	250	RTK
CBE	3" FLGD.	312 FOA-D	125	250	RTK
CBF	4" FLGD.	412 FOA-D	125	250	RTL
CBG	6" FLGD.	612 FOA-D	125	250	RTM

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CHA	2" SCR.D.	225 SOT-D	250	300	RTJ
CHB	2" FLGD.	225 FOT-D	250	250	RTJ
CHC	3" SCR.D.	312 SOT-D	125	250	RTK
CHE	3" FLGD.	312 FOT-D	125	250	RTK
CHF	4" FLGD.	412 FOT-D	125	250	RTL
CHG	6" FLGD.	612 FOT-D	125	250	RTM

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

For dimensions refer to Table of Contents.

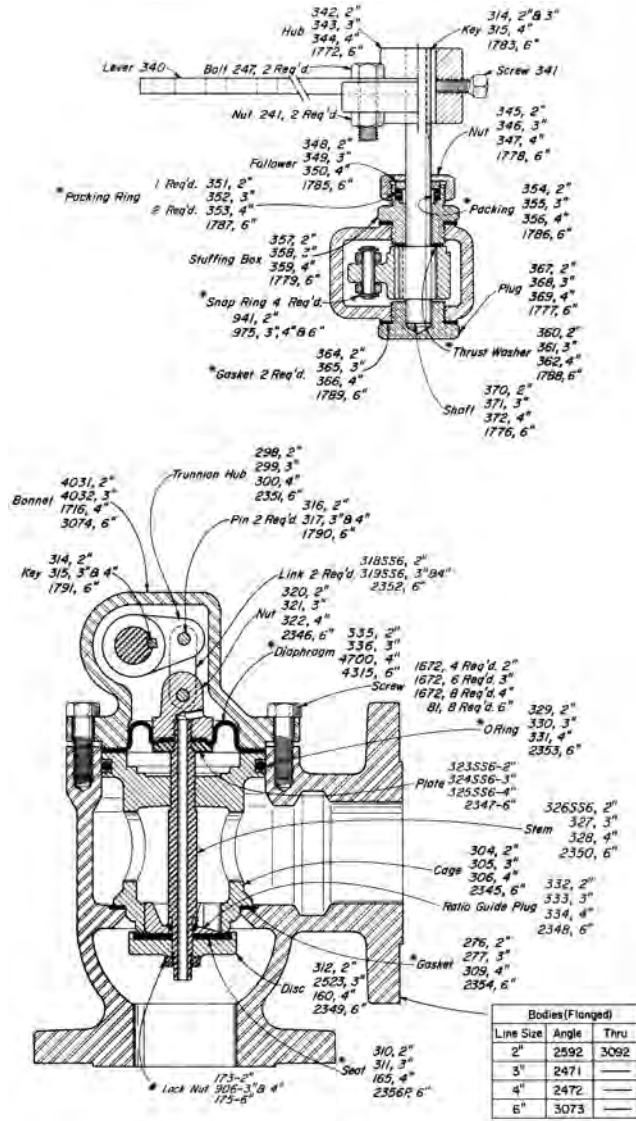
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# MECHANICAL OIL VALVES

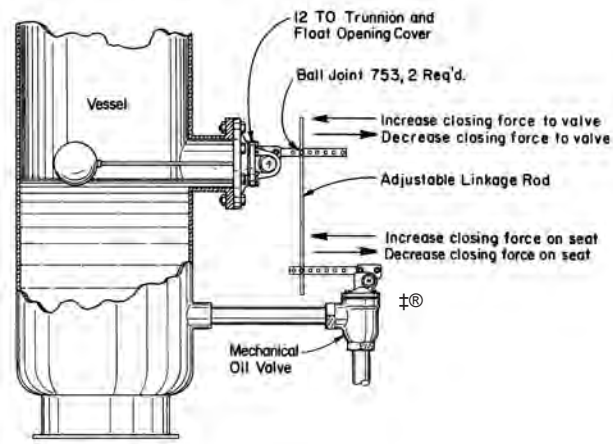


## DIAPHRAGM BALANCED STEEL

NOTE: This valve contains Ductile & Cast Iron wetted parts & Brass Packing Material.



## MECHANICAL DUMP INSTALLATION



### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

## ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	OPER. VALVE	PRES.	MAX W.P.	KIT
CBM	2" FLGD.	225 FOA-S	250	285	REA
CBP	3" FLGD.	312 FOA-S	125	285	REB
CBQ	4" FLGD.	412 FOA-S	125	285	REC
CBR	6" FLGD.	612 FOA-S	125	285	RED

## THRU VALVES AVAILABLE:

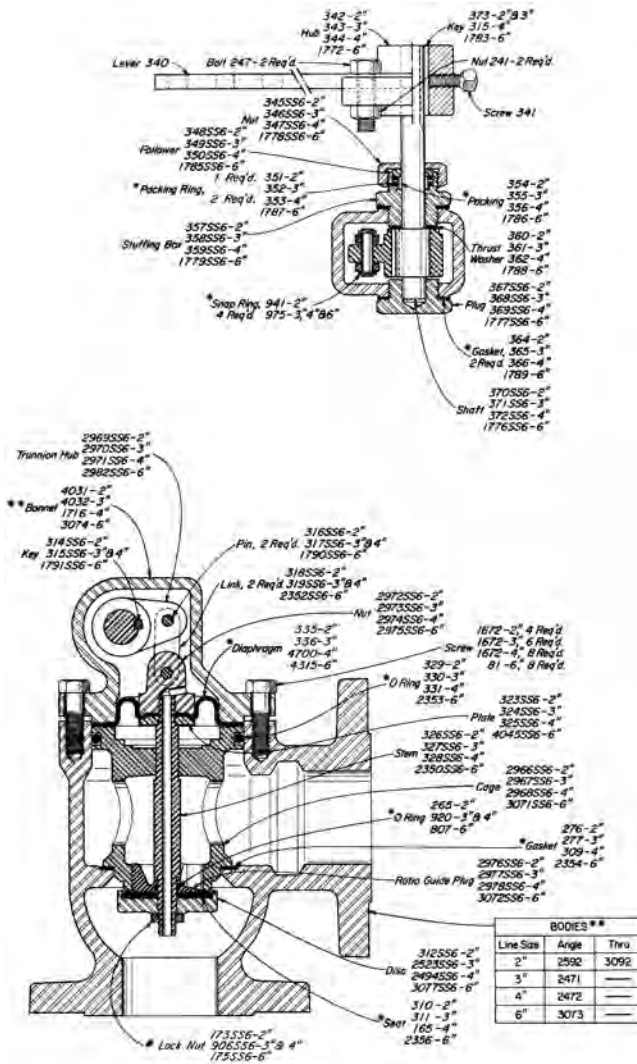
CAT. NO.	SIZE TYPE	OPER. VALVE	PRES.	MAX W.P.	KIT
CHM	2" FLGD.	225 FOT-S	250	285	REA

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

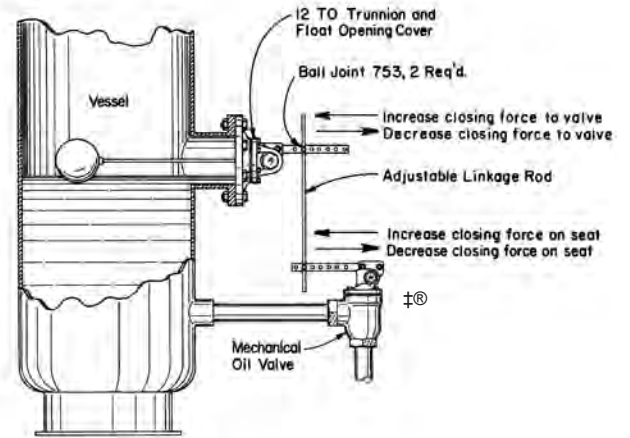
For dimensions refer to Table of Contents.



DIAPHRAGM BALANCED  
ALL STEEL, STAINLESS STEEL



### MECHANICAL DUMP INSTALLATION



#### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
<b>ALL STEEL:</b>					
CJM	2" FLGD.	225 FOA-STL	250	285	REA
CJN	3" FLGD.	312 FOA-STL	125	285	REB
CJO	4" FLGD.	412 FOA-STL	125	285	REC
CJP	6" FLGD.	612 FOA-STL	125	285	RED

### ALL 316 STAINLESS STEEL:

CJA	2" FLGD.	225 FOA-SS6	250	275	REA
CJB	3" FLGD.	312 FOA-SS6	125	275	REB
CJC	4" FLGD.	412 FOA-SS6	125	275	REC
CJD	6" FLGD.	612 FOA-SS6	125	275	RED

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CJQ	2" FLGD.	225 FOT-STL	250	285	REA

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

For dimensions refer to Table of Contents.

\*\*These cast steel parts are available in cast 316 stainless steel.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATION:




Used as oil or water dump valves on separators, treaters, knockouts, and other similar liquid accumulators where higher pressures may occur.

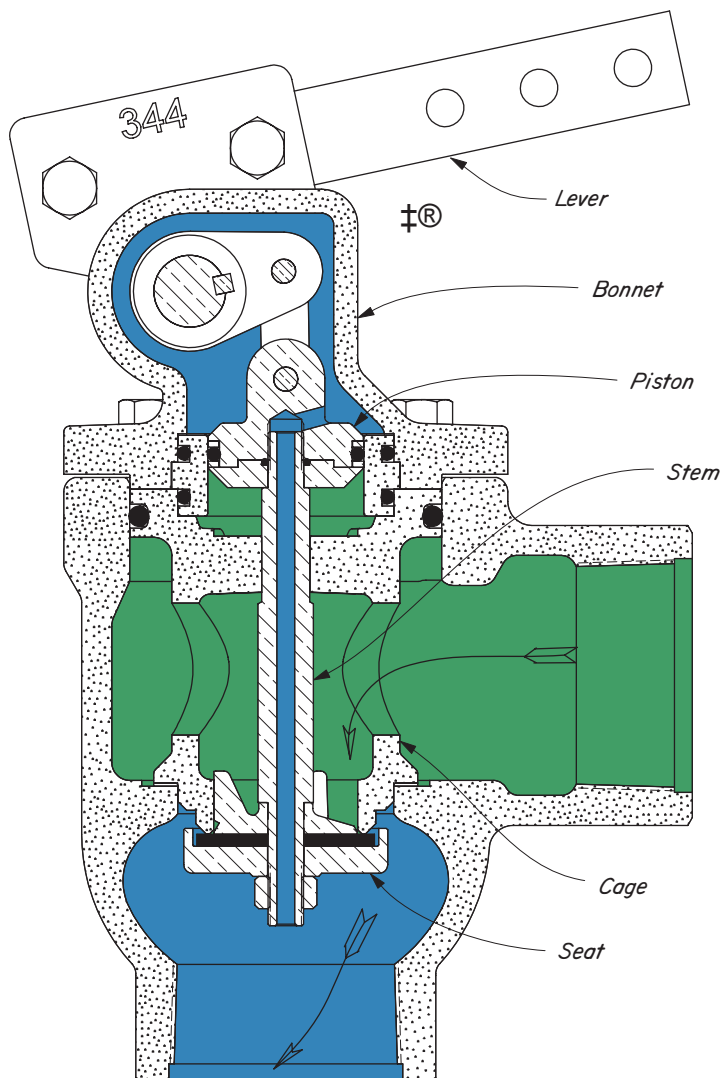
#### FEATURES:

- Balanced, single soft seat
- Teflon packed, rotary stuffing box
- All internal parts easily be removed with valve in line

#### OPERATION:

The Oil Valve is mechanically operated through a LEVER by a Float in a separator or other vessel to which the valve is connected. The STEM AND SEAT ASSEMBLY is driven through a crank by the LEVER. The area of the PISTON is the same as the area of the SEAT so that Separator Fluid Pressure (Green) acting down on the SEAT is cancelled by the upward force of the pressure on the PISTON. Downstream Pressure (Blue) is communicated through the hollow STEM to the top side of the PISTON. Downstream Pressure (Blue) acting up on the SEAT is cancelled by the downward force of the same pressure on the top side of the PISTON. The valve can be operated easily by float since it is unaffected by Separator Fluid Pressure (Green) or Downstream Pressure (Blue). The entire STEM AND SEAT ASSEMBLY with the CAGE can be withdrawn from the valve as a unit by removing the BONNET screws.

-  Stem and Seat Assembly
-  Separator Fluid Pressure
-  Downstream Pressure



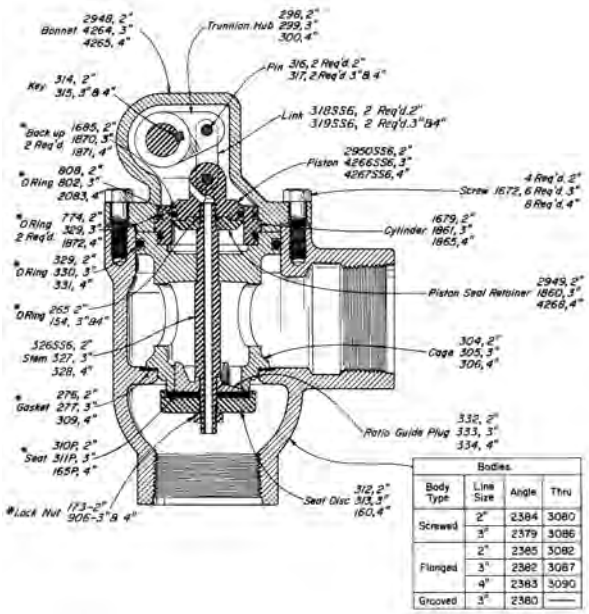
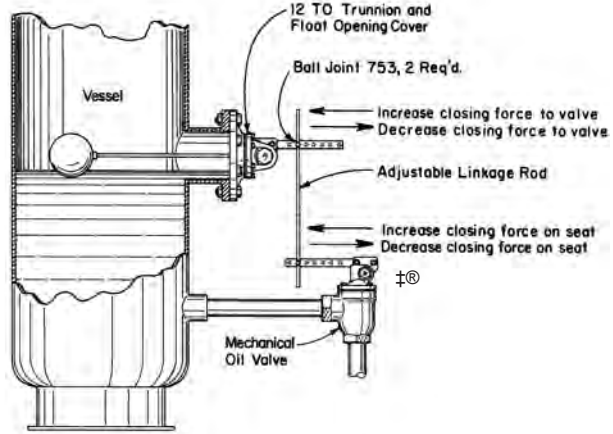
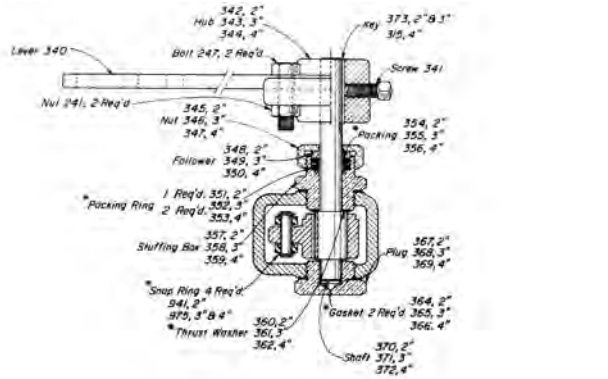
Kimray is an ISO 9001- certified manufacturer.

# MECHANICAL OIL VALVES



## PISTON BALANCED DUCTILE IRON

### MECHANICAL DUMP INSTALLATION



#### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CAP	2" SCRD.	250 SOA PB-D	500	500	RNA
CAQ	2" FLGD.	225 FOA PB-D	250	250	RNA
CAS	3" SCRD.	325 SOA PB-D	250	250	RNB
CAT	3" FLGD.	318 FOA PB-D	250	250	RNB
CAU	3" GRVD.	325 GOA PB-D	250	250	RNB
CAX	4" FLGD.	418 FOA PB-D	250	250	RNC

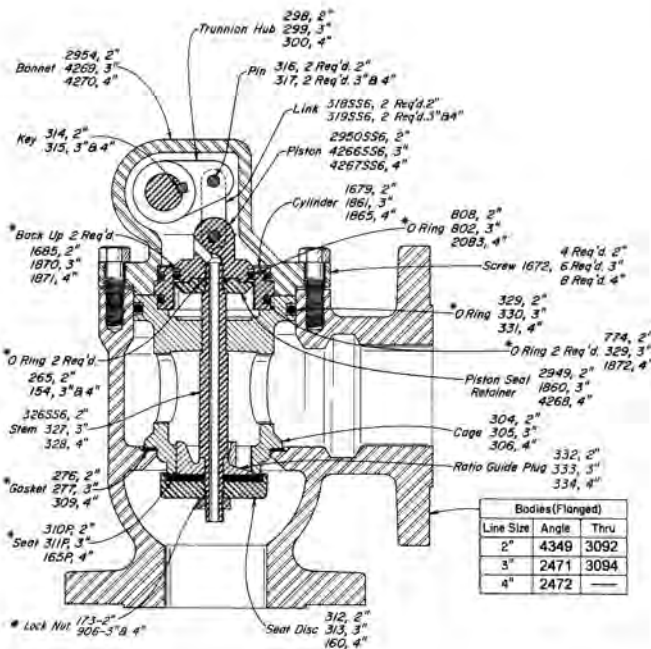
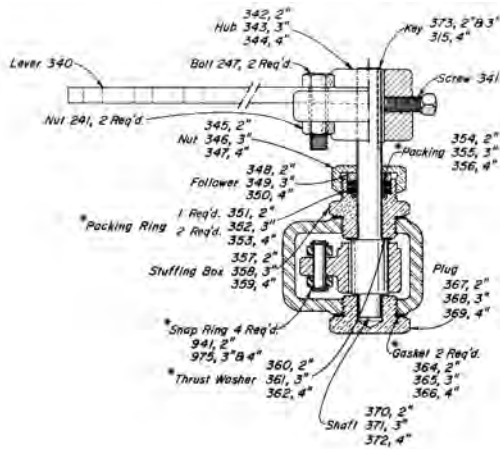
### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CGP	2" SCRD.	250 SOT PB-D	500	500	RNA
CGQ	2" FLGD.	225 FOT PB-D	250	250	RNA
CGS	3" SCRD.	325 SOT PB-D	250	250	RNB
CGT	3" FLGD.	318 FOT PB-D	250	250	RNB
CGX	4" FLGD.	418 FOT PB-D	250	250	RNC

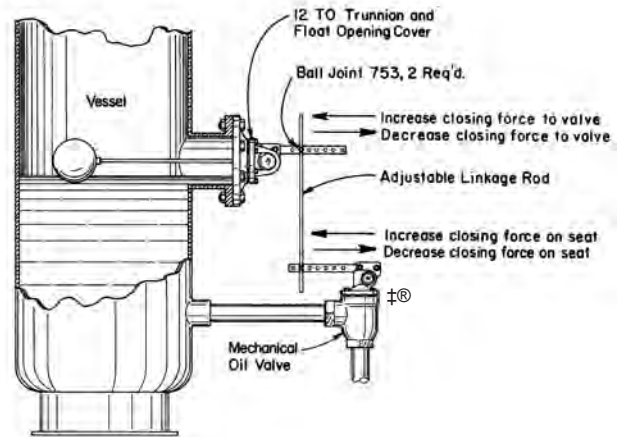
\*These are recommended spare parts and are stocked as repair kits.

For dimensions refer to Table of Contents.

Kimray is an ISO 9001- certified manufacturer.



#### MECHANICAL DUMP INSTALLATION



#### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.

NOTE: This valve contains Ductile & Cast Iron wetted parts & Brass packing material.

#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CAR	2" FLGD.	228 FOA PB-S	285	285	RNA
CAW	3" FLGD.	327 FOA PB-S	285	285	RNB
CAY	4" FLGD.	427 FOA PB-S	285	285	RNC

For dimensions refer to Table of Contents.

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CGR	2" FLGD.	228 FOT PB-S	285	285	RNA
CAH	3" FLGD.	327 FOT PB-S	285	285	RNB

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

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:




As oil or water dump valves on separators, treaters, knock-outs, and other similar accumulators. Designed for high pressure erosive service.

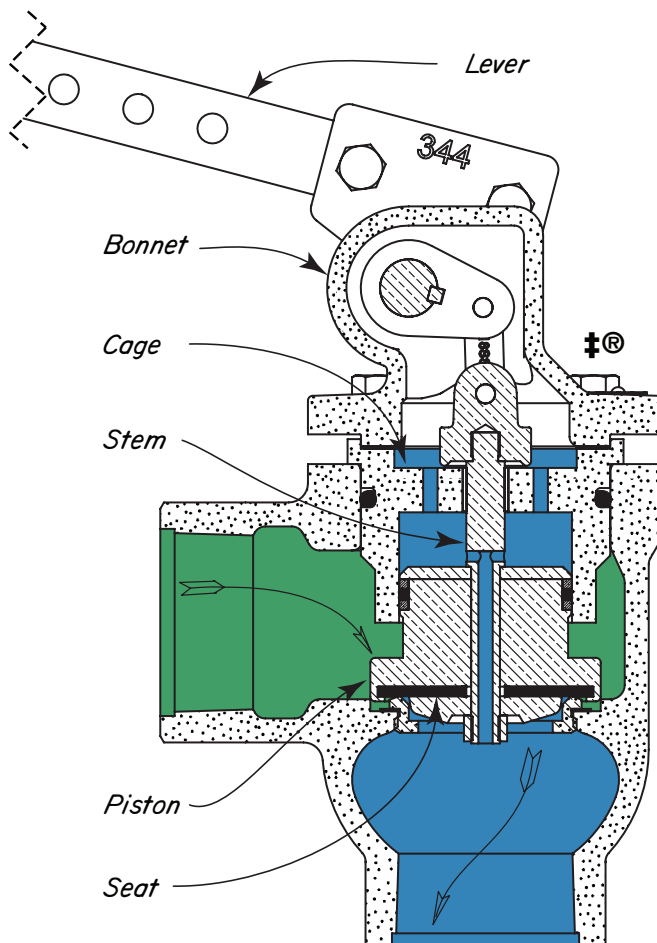
#### FEATURES:

- Class VI shut off
- Teflon packed, rotary stuffing box
- All internal parts can easily be removed with valve in line

#### OPERATION:

The Oil Valve is mechanically operated through a LEVER by a float in a separator or other vessel to which the valve is connected. The PISTON ASSEMBLY is driven through a cylinder by the lever assembly. When the lever assembly is lowered, the piston rises off the seat allowing the oil or water in the accumulator to flow thru the valve. The soft seat is attached to the piston assembly and is lifted out of the flow stream when the valve is open. This allows erosive material to bypass the seating surface. When the lever assembly is raised the piston and soft seat come in contact with the hard removable seating insert that is screwed into the valve body and results in class VI shut off. The entire PISTON ASSEMBLY with the cylinder can be withdrawn from the valve as a unit by removing the bonnet screws.

-  Stem and Seat Assembly
-  Separator Fluid Pressure
-  Downstream Pressure



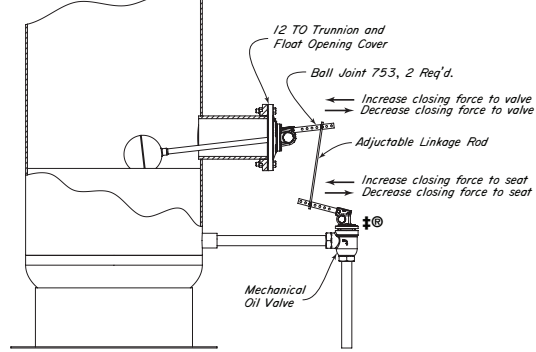
Kimray is an ISO 9001- certified manufacturer.

# MECHANICAL OIL VALVES



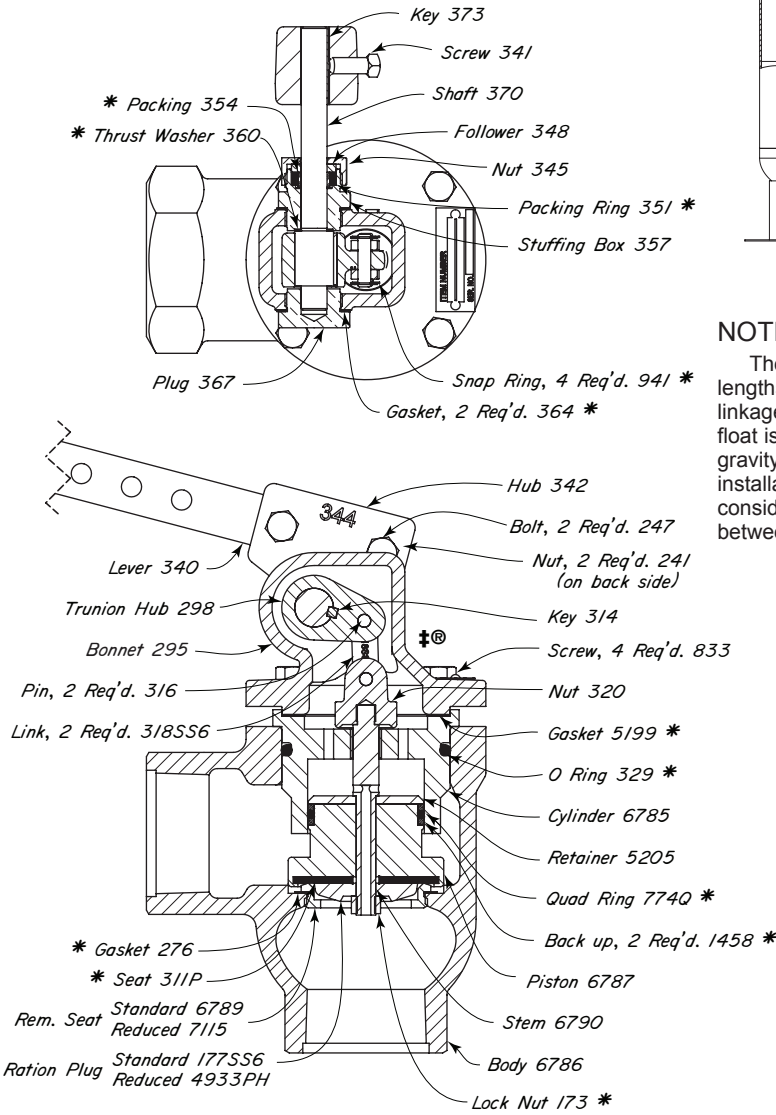
## PISTON BALANCED THROTTLING DUCTILE IRON

### MECHANICAL DUMP INSTALLATION



#### NOTE:

The Customer is responsible for specifying linkage arm lengths and proper installation of float trunnions, valves and linkage assemblies. The total resulting force generated by the float is a function of the size and density of the float, the specific gravity of the fluid, the lever arm positions and angles and proper installation of the equipment. These criteria at least should be considered when specifying and installing linkage assemblies between vessels and valves.



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	OPER. PRES.	MAX W.P.	KIT
CAZ	2" SCRD.	250 SOA-D	500	500	RUV
CAZ5	2" SCRD.	250 SOA-D-5	500	500	RUV

### NOTES:

For dimensions refer to Table of Contents.

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

Kimray is an ISO 9001- certified manufacturer.



CAPACITY - Bbls. Water/Day, Steady Flow

Press. Drop Across Valve p.s.i.	VALVE SIZE - INCHES			
	2	3	4	6
1	800	1,500	2,400	9,500
2	1,150	2,100	3,400	13,450
3	1,400	2,600	4,150	16,450
4	1,600	3,000	4,800	19,000
5	1,800	3,350	5,350	21,250
10	2,550	4,750	7,600	30,050
15	3,100	5,800	9,300	36,800
20	3,600	6,700	10,750	42,500
30	4,400	8,200	13,150	52,000
40	5,100	9,500	15,200	60,050
50	5,700	10,600	16,950	67,150
60	6,250	11,600	18,600	73,550
70	6,750	12,550	20,100	79,450
80	7,200	13,400	21,450	84,950
90	7,650	14,200	22,750	90,100
100	8,050	15,000	24,000	94,950
120	8,850	16,400	26,300	104,050
140	9,550	17,750	28,400	112,350
160	10,200	18,950	30,350	120,150
180	10,800	20,100	32,200	127,400
200	11,400	21,200	33,950	134,300
220	11,950	22,200	35,600	140,850
240	12,500	23,200	37,200	147,150
260	13,000	24,150	38,700	153,150
280	13,500	25,050	40,150	158,900
300	13,950	25,950	41,550	164,500
325	14,500	27,000	43,250	171,200
350	15,050	28,050	44,900	177,700
375	15,600	29,000	46,500	183,900
400	16,100	29,950	48,000	189,950

For gravity correction, multiply the above figures by  $\frac{1}{\sqrt{G}}$   
 Where "G" is the specific gravity of the flowing liquid.

NOTE: Flow rates are for steady flow conditions over a 24 hour period. Corrections should be made to deal with intermittent flow conditions.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

### APPLICATIONS:

On oil and gas separators, water knockouts and similar equipment where motor valves are required.

### FEATURES:

- Direct float operated.
- Snap or throttle action
- Field reversible
- Controls any motor valve requiring up to 30 psig diaphragm pressure.

### SUPPLY PRESSURE:

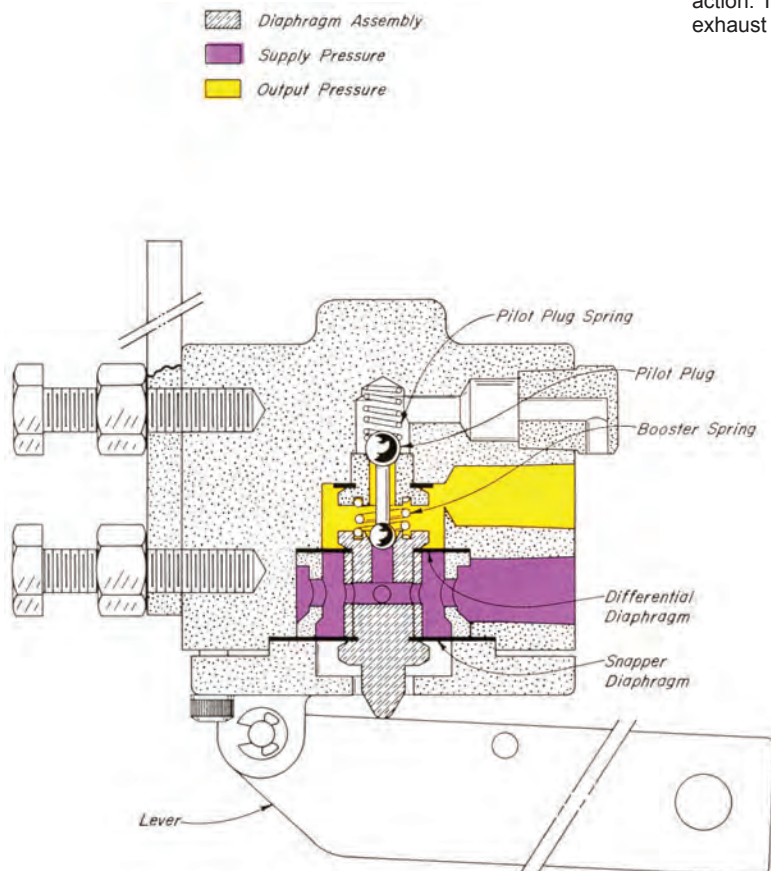
5 to 30 psig

### OPERATION:

Assume the Diaphragm Assembly is held in an up position by an outside float arm connected to the pilot LEVER with a turnbuckle. Such an arrangement is shown in the 3 PM installation photograph, lower right-hand corner. The BOOSTER SPRING together with Supply Pressure (Violet), acting on the difference in areas of the SNAPPER and DIFFERENTIAL DIAPHRAGMS, forces the Diaphragm Assembly against the LEVER. With a downward movement of the LEVER the upper seat, which is the pressure vent (Yellow to Atmosphere), closes first. The PILOT PLUG SPRING holds the upper ball against its seat while a further downward movement of the LEVER opens the Supply Pressure inlet (Violet to Yellow). As Output Pressure (Yellow) increases, pressure across the DIFFERENTIAL DIAPHRAGM is reduced, loading the DIAPHRAGM ASSEMBLY in a down direction. The accelerated downward movement of the DIAPHRAGM ASSEMBLY produces a sudden opening of the Supply Pressure inlet (Violet to Yellow).

In order to reverse the above action, the upward force of the LEVER on the Diaphragm Assembly must be greater than the force of the BOOSTER SPRING plus Supply Pressure (Violet) acting on the full area of the SNAPPER DIAPHRAGM. As the Diaphragm Assembly moves up, the Supply Pressure inlet is closed first. The PILOT PLUG SPRING holds the lower ball against its seat while a further upward movement of the LEVER opens the pressure vent (Yellow to Atmosphere). Decreasing Output Pressure (Yellow) accelerates the upward movement of the Diaphragm Assembly to produce a sudden opening of the pressure vent. The sudden changes in Output Pressure (Yellow) caused by movements of the LEVER, snap actuates any motor valve to which it is connected.

For throttling Service, connect Supply Pressure (Violet) to opening marked "THROT" on the pilot body. This will require changing the pivot on the LEVER or reversing the motor valve action. The supply gas connection for snap service becomes the exhaust for throttling service.



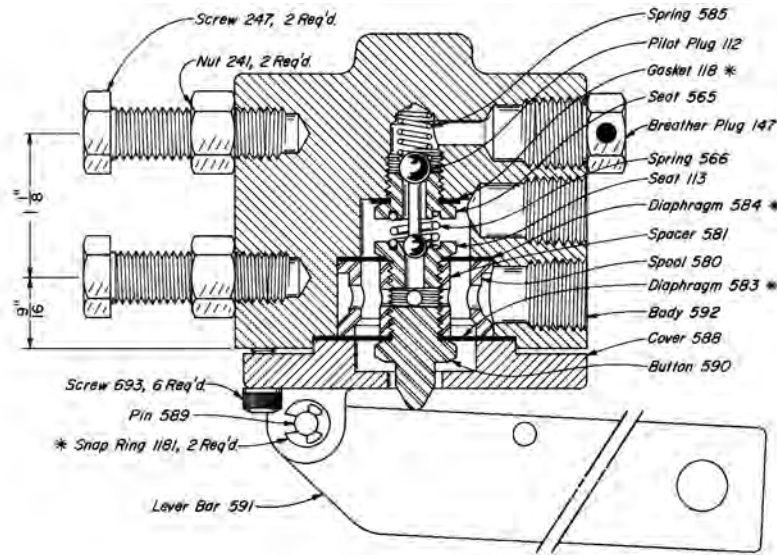
Float operated, 3 PM Pilot mounted on Kimray 8" Float Opening Cover.

Kimray is an ISO 9001- certified manufacturer.

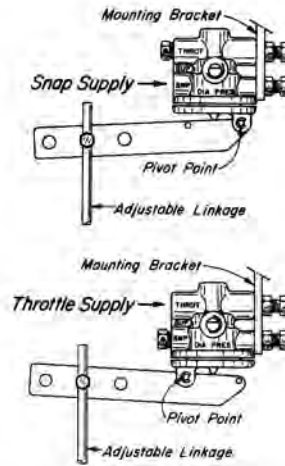
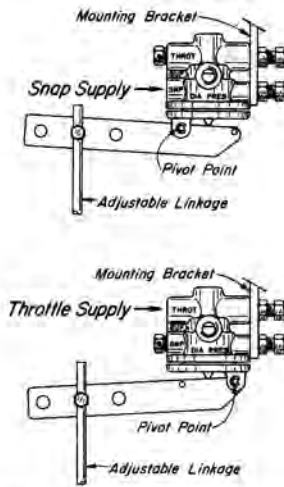
# MECHANICAL PILOT



3 PM  
CAST IRON



## MECHANICAL PILOT INSTALLATION



ROD MOVEMENT	OUTPUT
Up	Supply Pressure
Down	Vented

ROD MOVEMENT	OUTPUT
Up	Vented
Down	Supply Pressure

### PILOTS AVAILABLE:

CAT. NO.	PILOT	OPER. PRES.	MAX W.P.	REPAIR KIT
CDA	3 PM	30	30	RMN

### MOUNTING BRACKETS AVAILABLE: Order separately

FLOAT OPENING	MOUNTING BRACKET
612 TOB	903
812 TOB	904
1012 TOB	681
50 TOB-D	3035
25 TOB-D	3035
8" HUTA	3035
26 WA/26DM	1856

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

Kimray is an ISO 9001- certified manufacturer.

### APPLICATIONS:

Oil and gas separators, knockouts, treaters and similar equipment where it is necessary to convert a mechanical dump into a wide span, snap, pneumatic signal.

### FEATURES:

- Snap action
- Direct or indirect
- Intermittent bleed pilot

### SUPPLY PRESSURE:

20-30 psig

### OUTPUT PRESSURE:

0 psig or Supply

### OPERATION:

Assume that when the Supply Pressure (Violet) is applied, Ball 1 is seated, Ball 2 is off the seat and Output is zero.

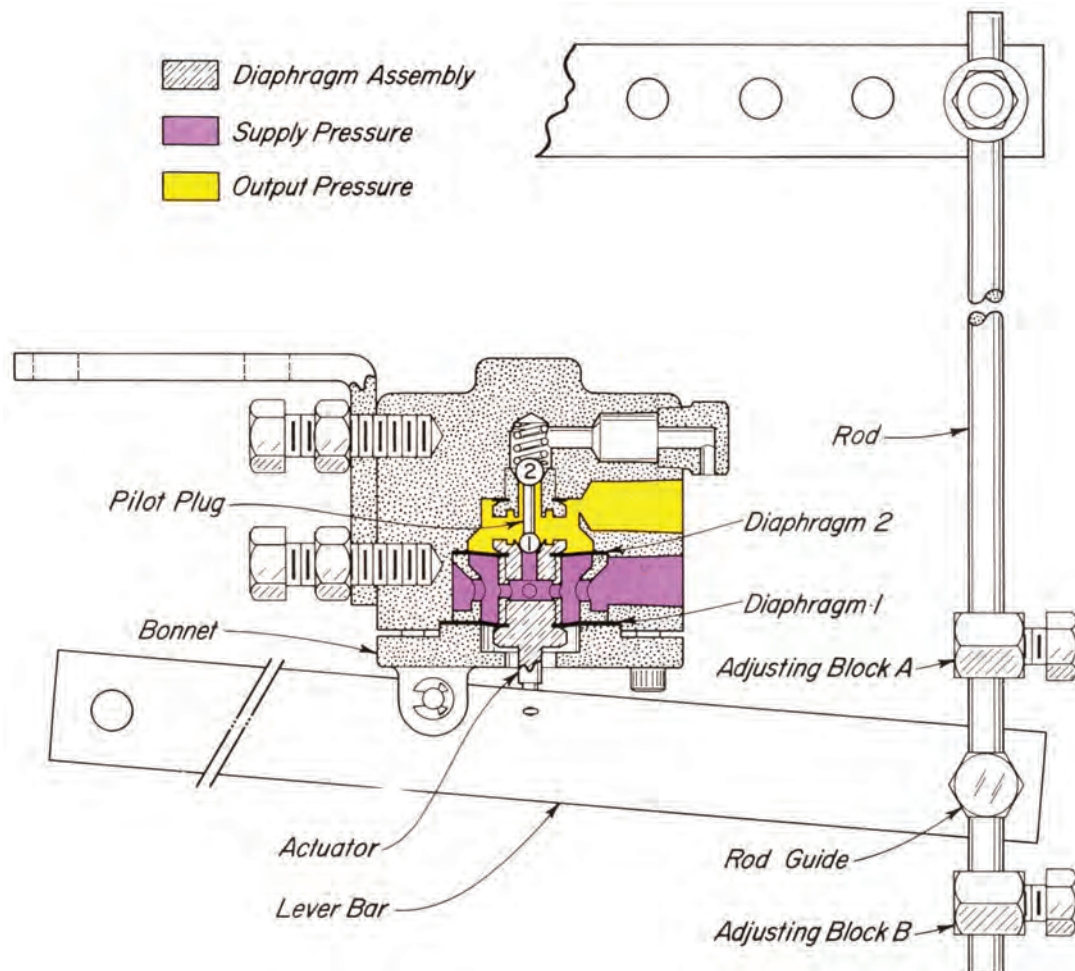
Adjusting Block B is against the Rod Guide.

Output Pressure (Yellow) is vented to atmosphere. Since Diaphragm 2 is larger than Diaphragm 1, the Diaphragm Assembly is held in the up position and the Output Pressure remains vented. When the Rod moves downward and the Adjusting Block A contacts the Rod Guide, the Diaphragm Assembly is forced downward via the Actuator, closing the upper SEAT, Ball 2 and opening the lower SEAT, Ball 1. This causes the Output Signal to rise rapidly and when it equalizes with the Supply (Violet), this pressure holds the Diaphragm Assembly in the downward position.

The Output Signal (Yellow) will remain at Supply Pressure until the force on the Actuator is reversed. When the Rod moves upward and Adjusting Block B contacts the Rod Guide, the Output Signal is again vented to atmosphere.

This operation described above is for connection in the indirect mode; that is, when the Rod moves in an upward direction, the Output Signal is vented. When the Rod moves in a downward direction, the Output Signal is Supply Pressure.

The entire operation can be reversed by rotating the bonnet on the pilot 180 degrees and moving the Rod Guide to the opposite end of the Lever Bar. In this mode, a downward movement of the Rod causes the Output to be vented and an upward movement causes the Output to be Supply Pressure.

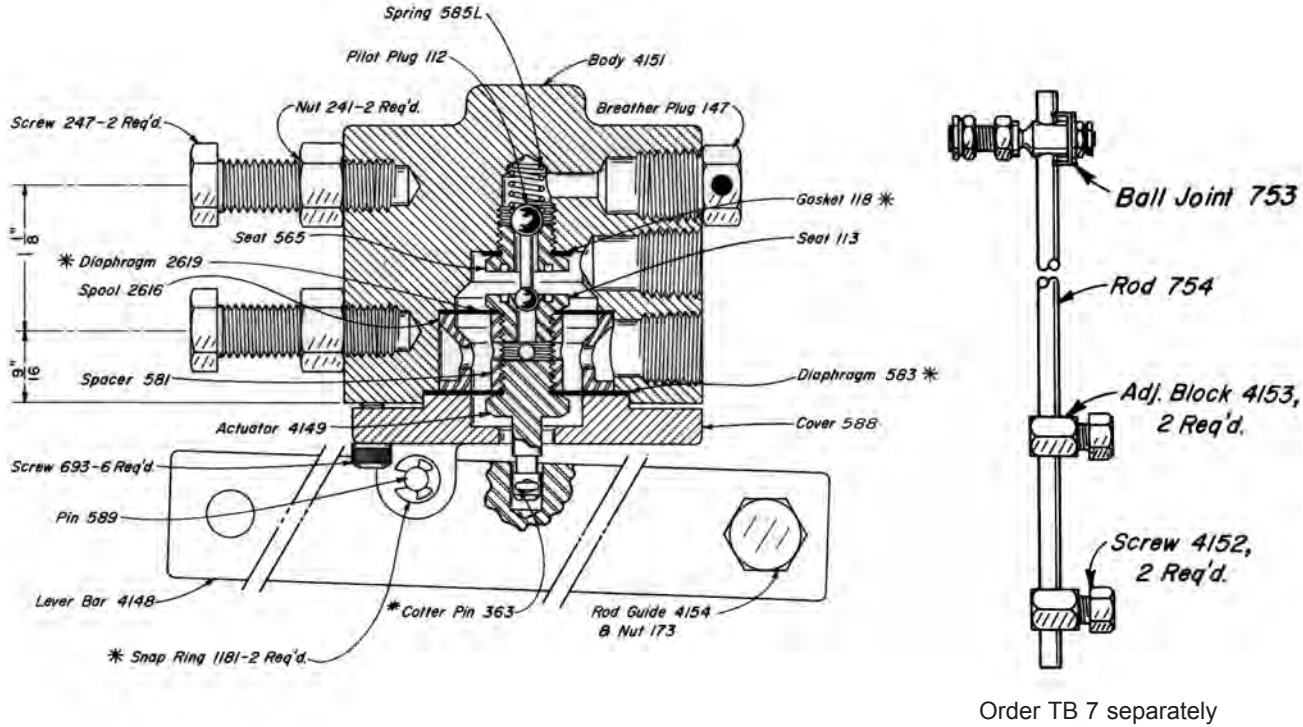


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# MECHANICAL PILOT



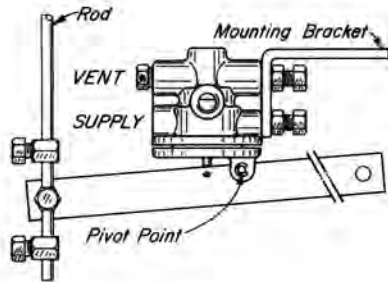
BI - STABLE  
CAST IRON



Order TB 7 separately

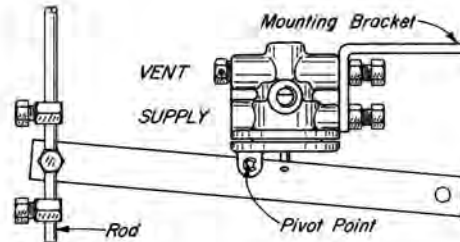
## MECHANICAL PILOT INSTALLATION

### INDIRECT



ROD MOVEMENT	OUTPUT
Up	Vented
Down	Supply Pressure

### DIRECT



ROD MOVEMENT	OUTPUT
Up	Supply Pressure
Down	Vented

### PILOTS AVAILABLE:

CAT. NO.	PILOT	OPER. PRES.	MAX W.P.	REPAIR KIT
CDB	3 PMB	30	30	RMK

### TURNBUCKLE AVAILABLE:

CAT. NO.	TURNBUCKLE
YTE	TB 7

Mounting Brackets for 3 PMB pilots are available to fit KIMRAY Float Operated Controls. Use 1856 for 26 SWA/26 DM, 3035 for 25 TOB Trunnion, 903 for 6" Float Opening Cover, 904 for 8" Cover, and 681 for 10" Cover.

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

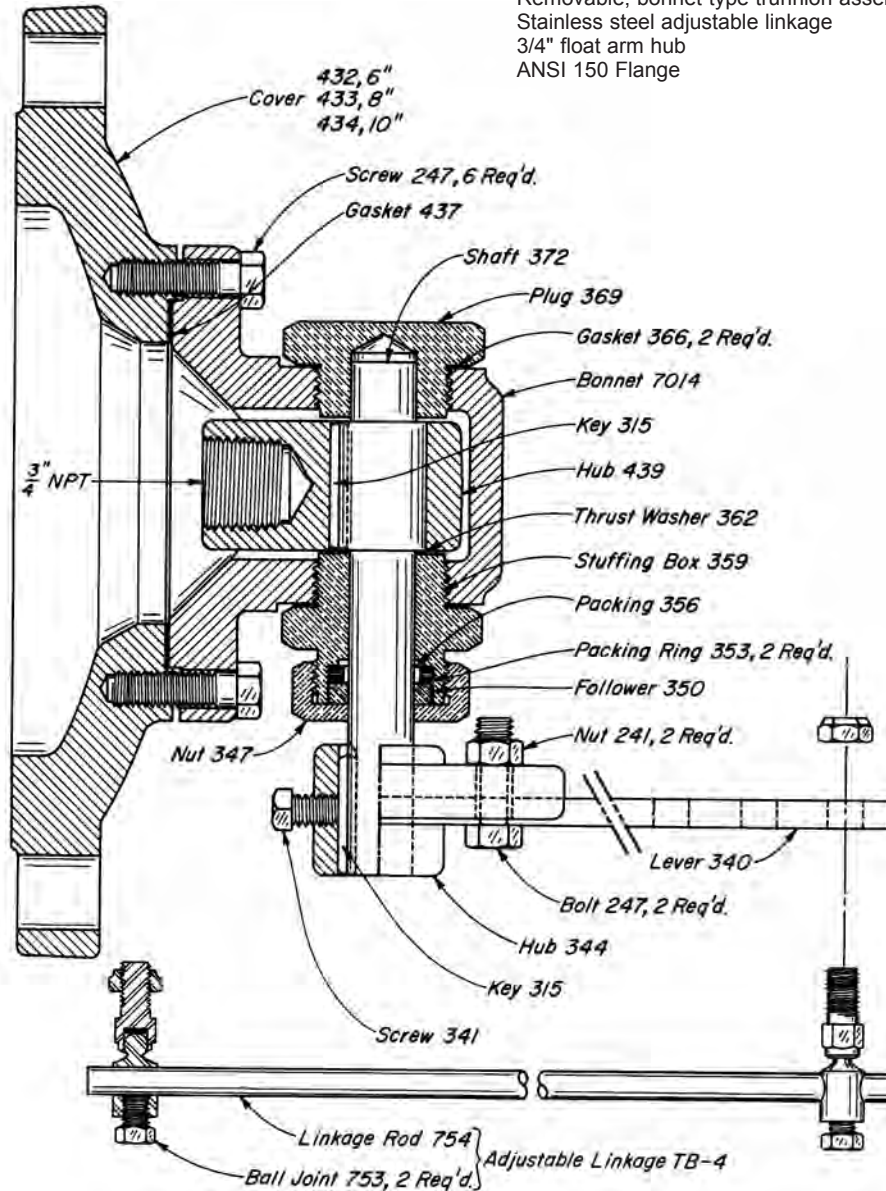
Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Used to monitor liquid levels in oil and water separators, water knockouts, horizontal emulsion treaters and similar equipment.

#### FEATURES:

- Teflon packed rotary stuffing box
- 303 Stainless steel shaft
- Removable, bonnet type trunnion assembly
- Stainless steel adjustable linkage
- 3/4" float arm hub
- ANSI 150 Flange



#### TRUNNION ASSEMBLIES AVAILABLE:

CAT. NO.	SIZE	COVER and TRUNNION	OPER. PRES.	MAX W.P.
CCA	6"	612 TO-D	250	250
CCB	8"	812 TO-D	250	250
CCC	10"	1012 TO-D	250	250

NOTE: Longer Lever Bars are available, 16", 20", 24", 30" & 36". Specify 340 and length desired, example: 340L16.

#### COVER BOLT SETS AVAILABLE:

CAT. NO.	FLOAT OPENING
YCA	612 TO
YCB	812 TO
YCC	1012 TO

\*Gasket, bolts and nuts are included in these sets.

For dimensions refer to Table of Contents:

**NOTES:**



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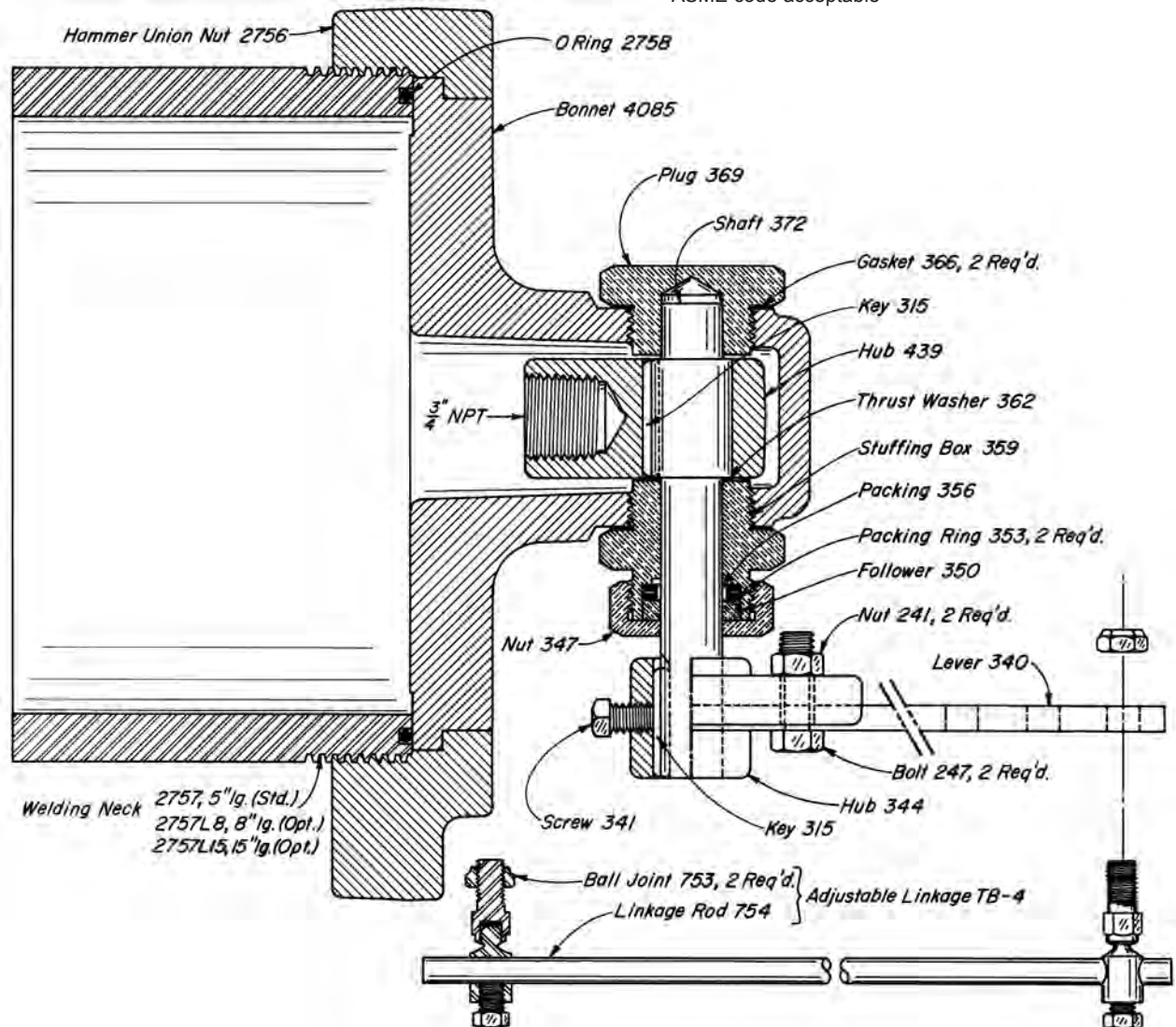


#### APPLICATIONS:

Used on oil and gas separators, freewater knockouts (FWKO), horizontal emulsion treaters and similar equipment where a float is desired to monitor fluid level.

#### FEATURES:

- 500 psig W.P.
- SA 106 Grade B pipe
- 8" pipe x 5" long weldneck
- 8" ACME thread hammer union
- Rotary type stuffing box with leakless, low friction packing
- 303 stainless steel shaft
- Removable bonnet type trunnion
- Uses 7" x 12" melon type float
- 3/4" N.P.T. float arm hub
- ASME code acceptable



#### HAMMER UNION TRUNNION AVAILABLE:

CAT. NO.	TRUNNION ASSEMBLY	OPER. PRES.	MAX W.P.
CCT	850 HUTA	500	500

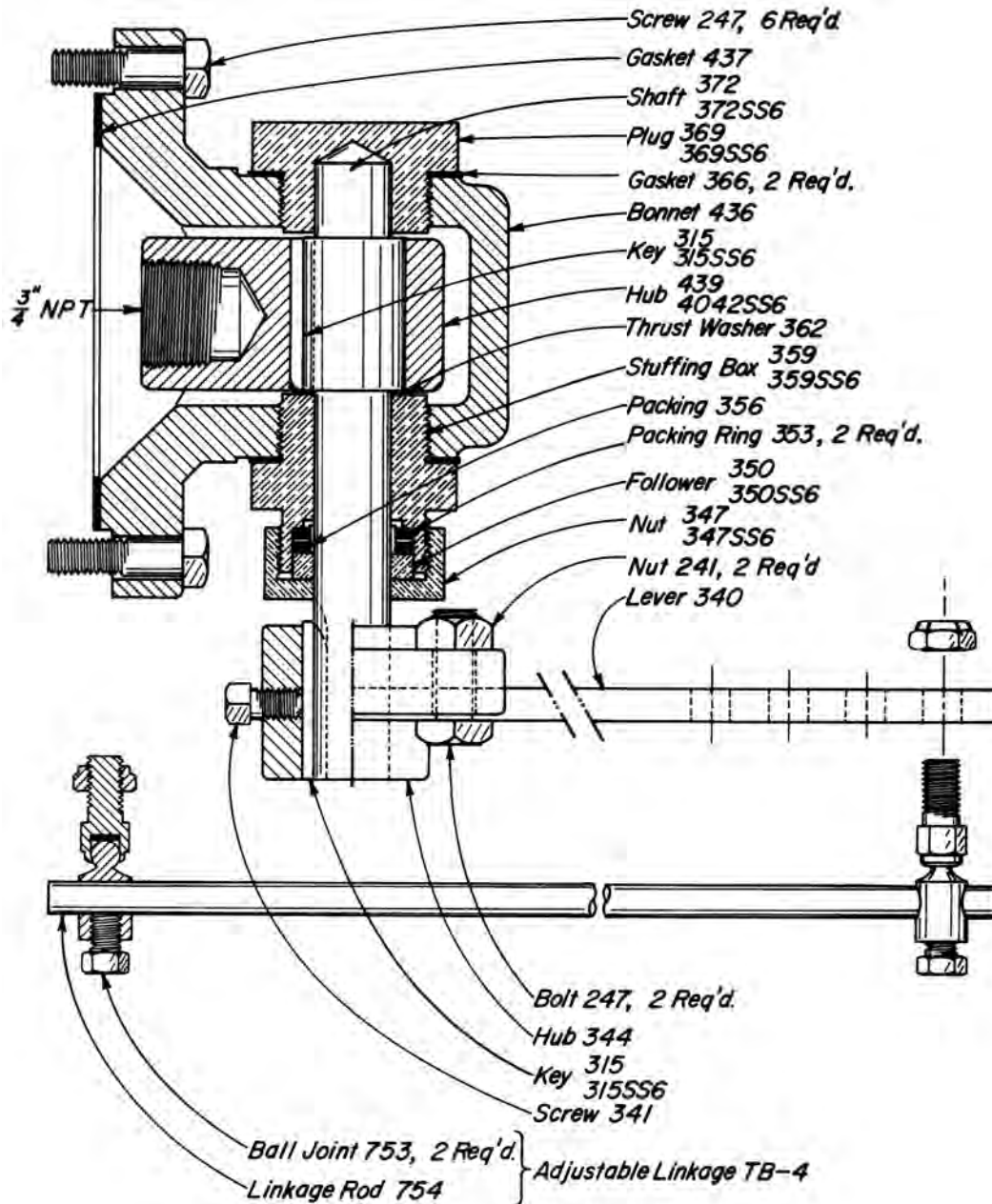
#### NOTES:

For dimensions refer to Table of Contents:

**NOTES:**



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### TRUNNION ASSEMBLIES AVAILABLE:

CAT. NO.	TRUNNION ASSEMBLY	OPER. PRESS.	MAX W.P.
CCF	25 TOB-D	500	500
CCFS6	25 TOB-D-SS6	500	500

### NOTES:

Adapter Plate is available for welding applications, order Part No. 705, 6" OD x 1" Thick.

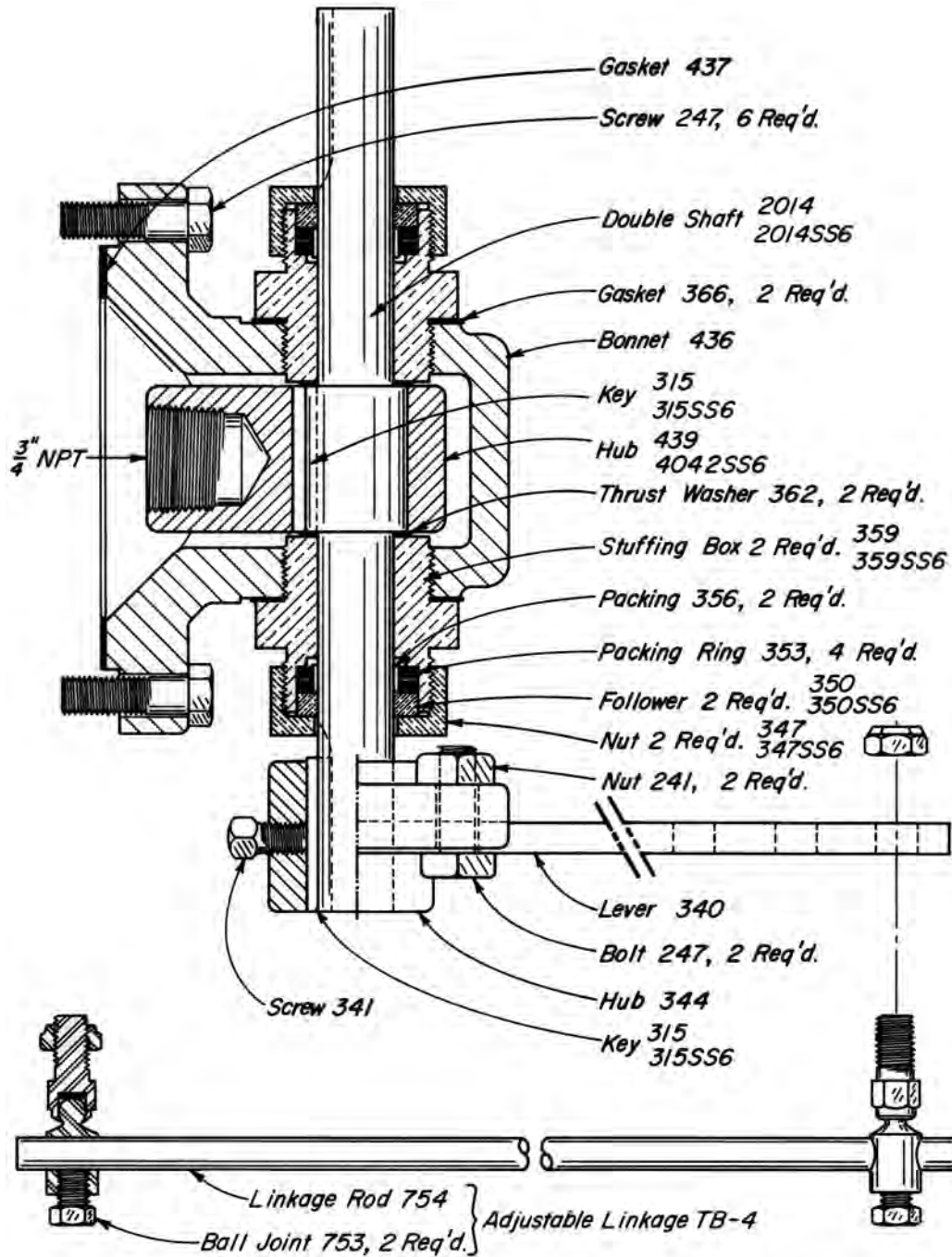
Float Covers and Hammer Union Covers are available, refer to Table of Contents.

For dimensions refer to Table of Contents:

# TRUNNION ASSEMBLY



TRUNNION  
DUCTILE IRON & 316 STAINLESS STEEL

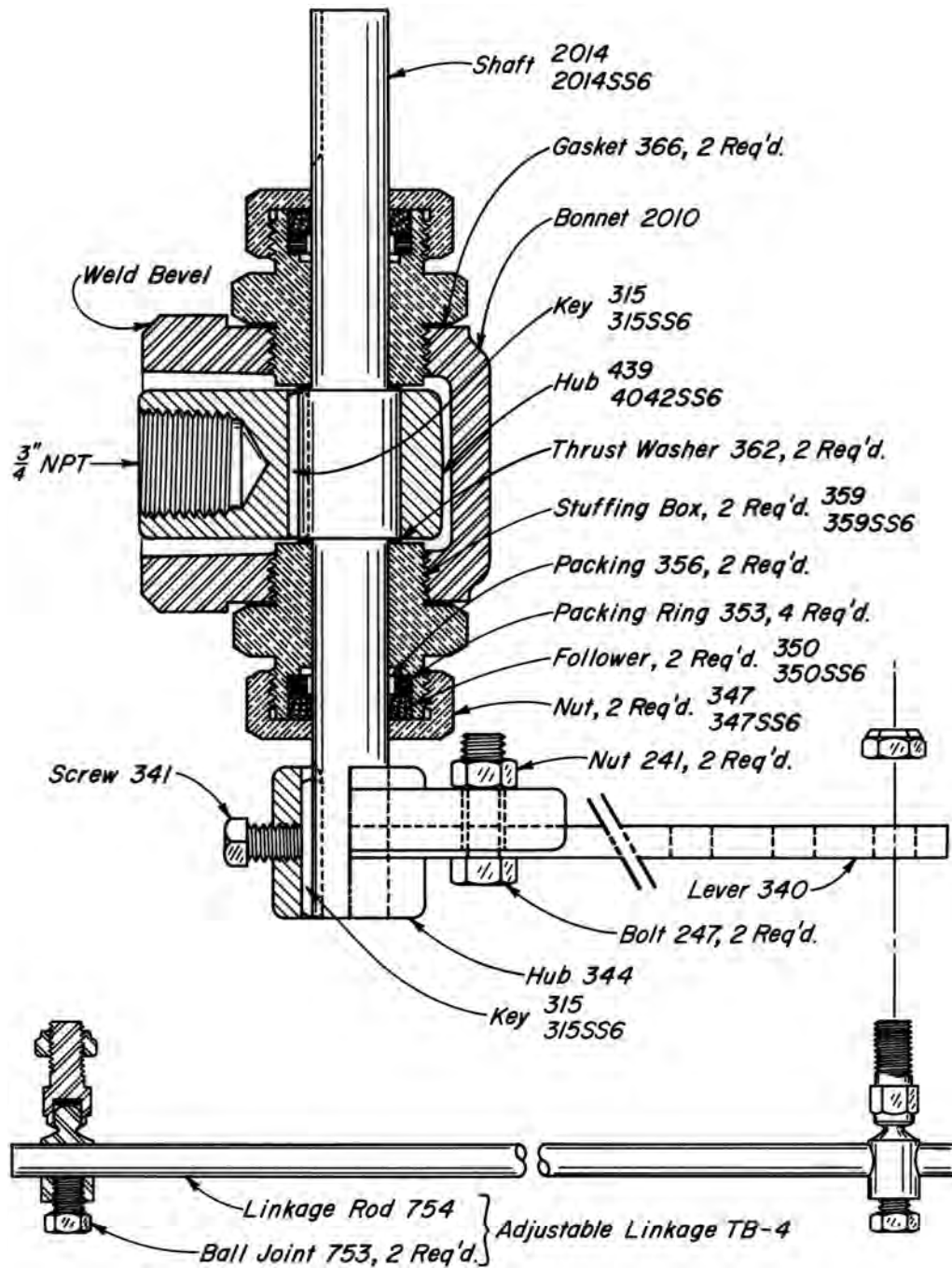


**TRUNNION ASSEMBLIES AVAILABLE:**

CAT. NO.	TRUNNION ASSEMBLY	OPER. PRESS.	MAX W.P.
CCH	50 TOB-D	500	500
CCHS6	50 TOB-D-SS6	500	500

**NOTES:**

For dimensions refer to Table of Contents:



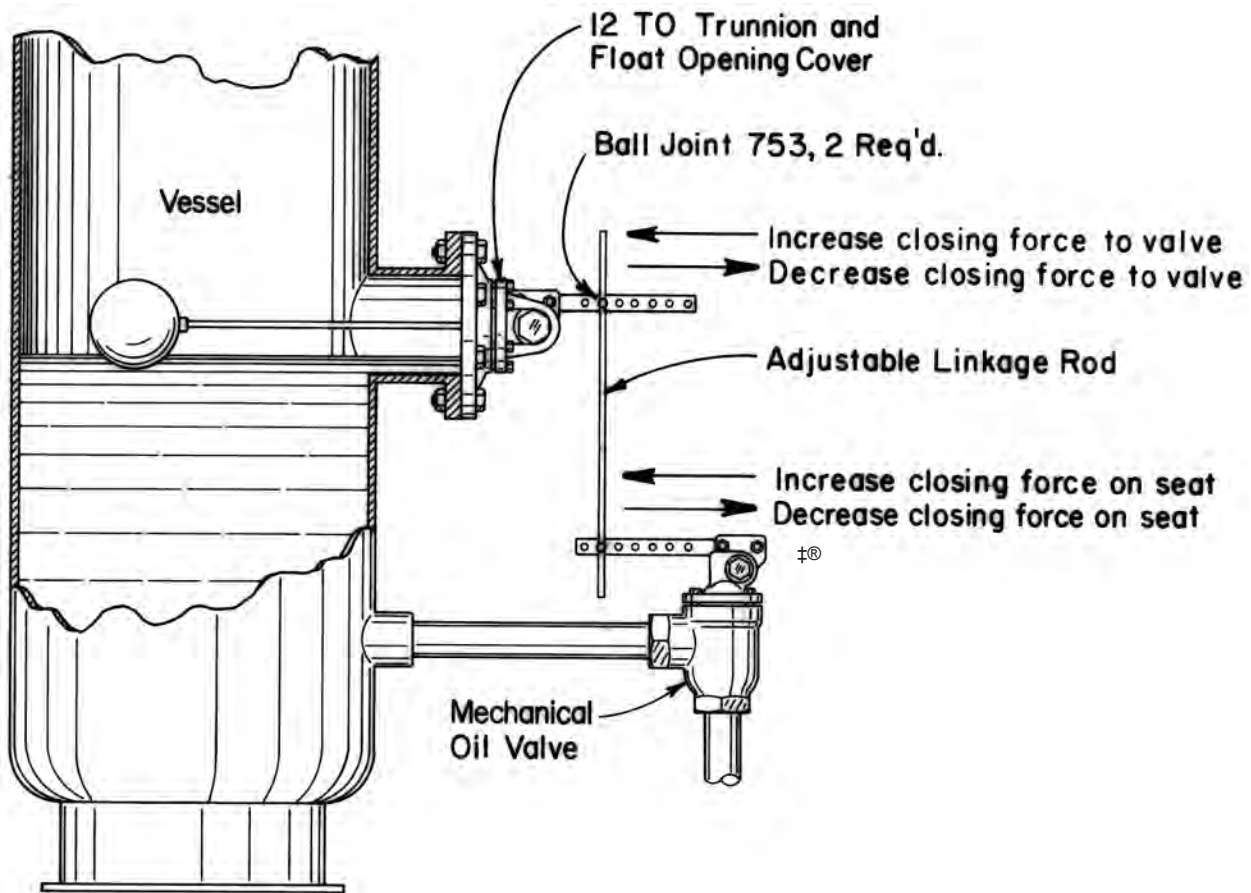
### TRUNNION ASSEMBLIES AVAILABLE:

CAT. NO.	TRUNNION ASSEMBLY	OPER. PRESS.	MAX W.P.
CCG	50 TOB-S	500	500
CCGS6	50 TOB-SS6	500	500

### NOTES:

For dimensions refer to Table of Contents:

MECHANICAL DUMP INSTALLATION

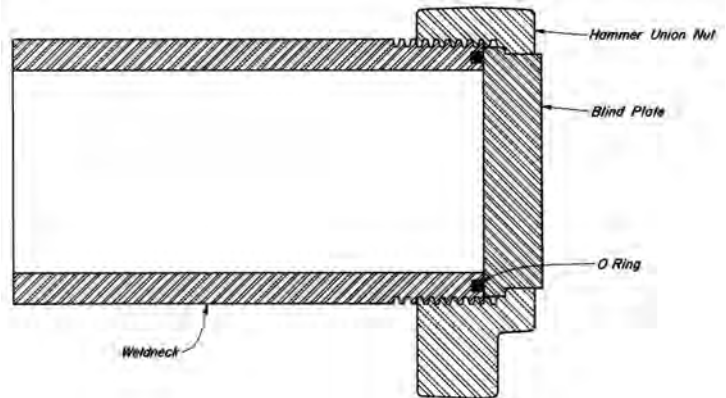


#### APPLICATIONS:

Used as an access opening for pressure vessels.

#### FEATURES:

- SA-106 Grade B or C pipe
- Heat specifications available for coding purposes
- Standard ACME thread on pipe and Hammer Union Nut for easy access
- O Ring seal (Nitrile)
- Other weldneck lengths available on request



Kimray is an ISO 9001- certified manufacturer.

#### HAMMER UNION CLOSURES WITH STANDARD ACME THREADS

Cat No.	Valve	Pipe Size	Max. W.P.	Weldneck	Pipe Desc.	O Ring	Blind Plate	Thickness	H.U. Nut
CCI	450	4"	500	4237	4" Sch 80, 5"	4238	6653	1"	2734
CCJL4	4150HUC	4"	1,500	4119L4	4" Sch 160, 4"	2745	2735	1"	2734
CCJL5	4150HUC	4"	1,500	4119L5	4" Sch 160, 5"	2745	2735	1"	2734
CCJL6	4150HUC	4"	1,500	4119L6	4" Sch 160, 6"	2745	2735	1"	2734
CCJL8	4150HUC	4"	1,500	4119L8	4" Sch 160, 8"	2745	2735	1"	2734
CCJL10	4150HUC	4"	1,500	4119L10	4" Sch 160, 10"	2745	2735	1"	2734
CCLL8	5150HUC	5"	1,500	2737L8	5" Sch 160, 8"	1177	2738	1 1/4"	2736
CCLL6	5150HUC	5"	1,500	4120	5" Sch 160, 6"	1177	2738	1 1/4"	2736
CCML6	6100HUC	6"	1,000	2760L6	6" Sch 160, 6"	2764	6654	1 1/4"	2759
CCML8	6100HUC	6"	1,000	2760L8	6" Sch 160, 8"	2764	6654	1 1/4"	2759
CCML10	6100HUC	6"	1,000	2760L10	6" Sch 160, 10"	2764	6654	1 1/4"	2759
CCRL6	6150HUC	6"	1,500	2760L6	6" Sch 160, 6"	2764	2761	1 1/4"	4532
CCRL8	6150HUC	6"	1,500	2760L8	6" Sch 160, 8"	2764	2761	1 1/4"	4532
CCRL10	6150HUC	6"	1,500	2760L10	6" Sch 160, 10"	2764	2761	1 1/4"	4532
CCNL5	8100HUC	8"	1,000	2757L5	8" Sch 100, 5"	2758	2927	1 1/4"	2756
CCNL8	8100HUC	8"	1,000	2757L8	8" Sch 100, 8"	2758	2927	1 1/4"	2756
CDQL5	8150HUC	8"	1,500	2757L5	8" Sch 100, 5"	2758	2928	1 1/2"	3040
CDQL8	8150HUC	8"	1,500	2757L8	8" Sch 100, 8"	2758	2928	1 1/2"	3040
CDQL12	8150HUC	8"	1,500	2757L12	8" Sch 100, 12"	2758	2928	1 1/2"	3040
CDQL15	8150HUC	8"	1,500	2757L15	8" Sch 100, 15"	2758	2928	1 1/2"	3040
CDRL5	8150HUC	8"	1,500	6410L5	8" Sch 120, 5"	2758	2928	1 1/2"	3040
CDRL8	8150HUC	8"	1,500	6410L8	8" Sch 120, 8"	2758	2928	1 1/2"	3040
CDRL12	8150HUC	8"	1,500	6410L12	8" Sch 120, 12"	2758	2928	1 1/2"	3040

#### HAMMER UNION CLOSURES WITH UNIFIED THREADS

Cat No.	Valve	Pipe Size	Max. W.P.	Weldneck	Pipe Desc.	O Ring	Blind Plate	Thickness	H.U. Nut
CDKL8	4150HUC	4"	1,500	4119L8	4" Sch 160, 8"	2745	2735	1"	2901

#### BLIND PLATES AVAILABLE

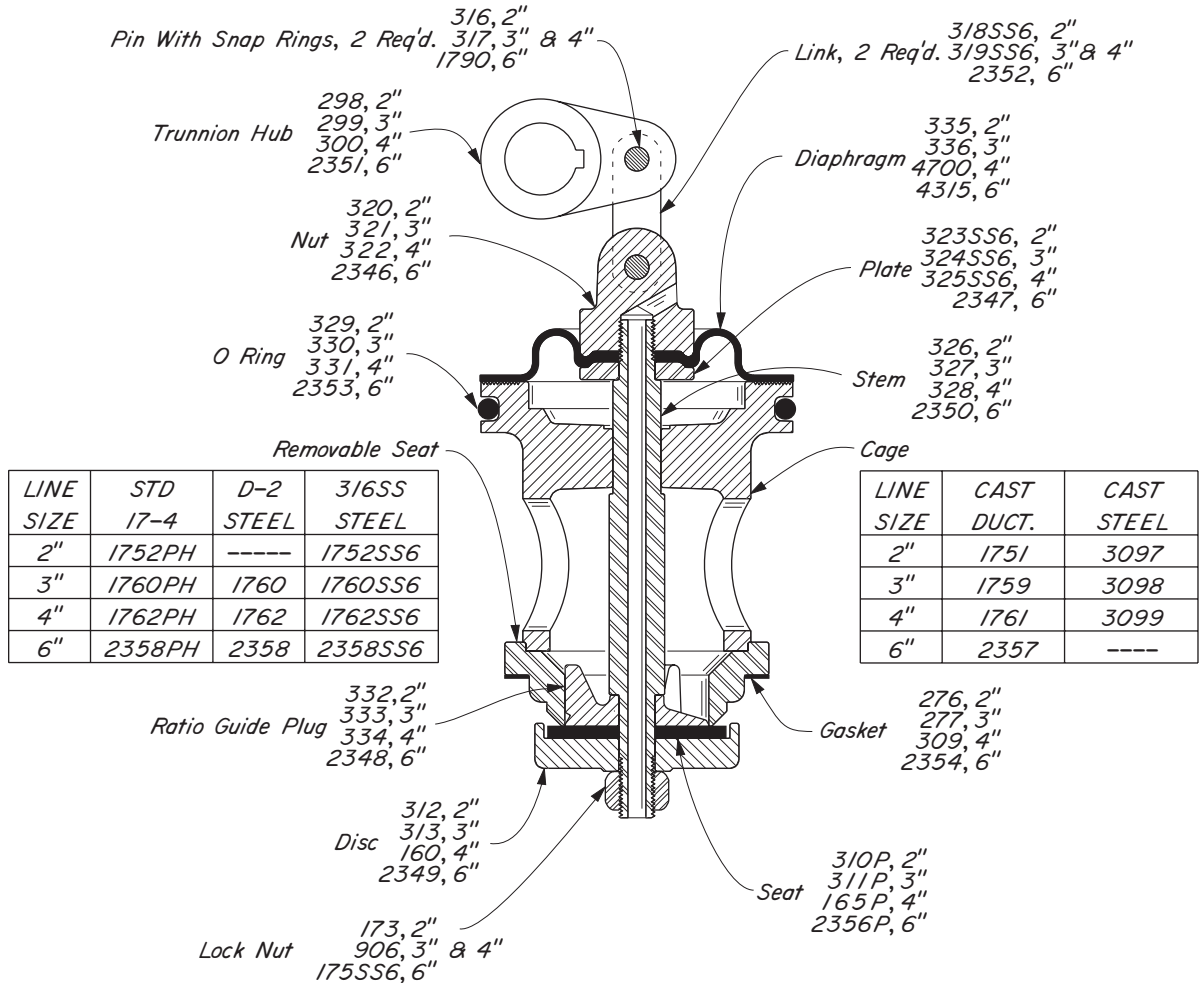
Blind Plate	Pipe Size	Max. W.P.	Thickness	Contains
4295	4"	1,500	1"	2" NPT
4347	4"	1,500	1"	1/2" NPT
5173	4"	1,500	1"	1" NPT
5176	3"	1,500	1"	Yale Union 2" NPT
5435	4"	1,500	1"	9/16"-18 thd
6001	4"	1,500	1"	1" NPT
6653	4"	500	1"	Plate
6889	5"	1,500	1 1/4"	2" NPT
7071	6"	1500	1 1/4"	2" NPT
5089	8"	1,500	1 5/8"	2" NPT
6939	8"	1,000	1 1/4"	2" NPT

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.





#### ASSEMBLIES AVAILABLE:

CAT. NO.	TYPE	VALVE	OPER. PRESS.	MAX W.P.
CBS1	2"	212 S/FOA	125	175
CBT1	3"	312 S/FOA	125	175
CBU1	4"	412 S/FOA	125	175
CBV1	6"	612 FOA	125	175

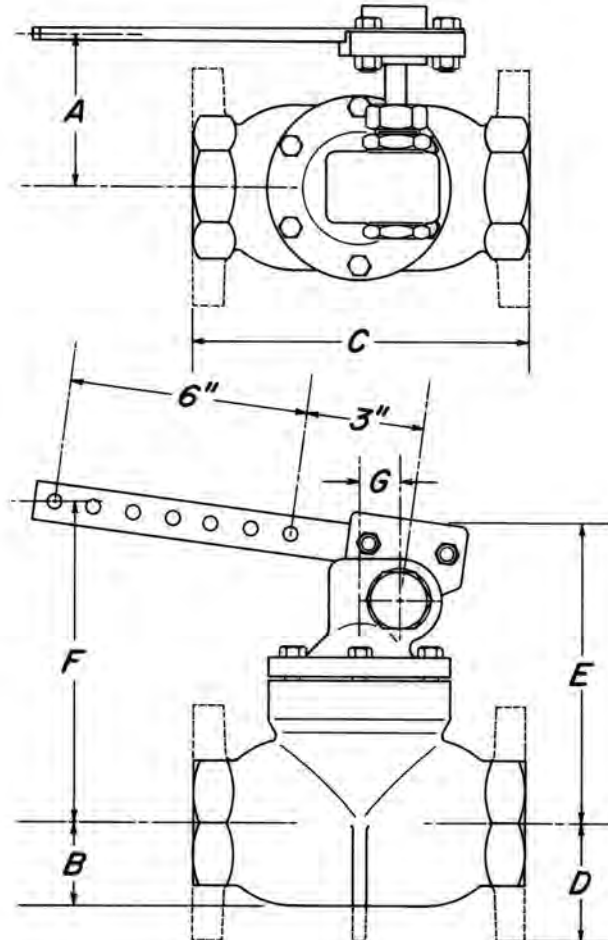
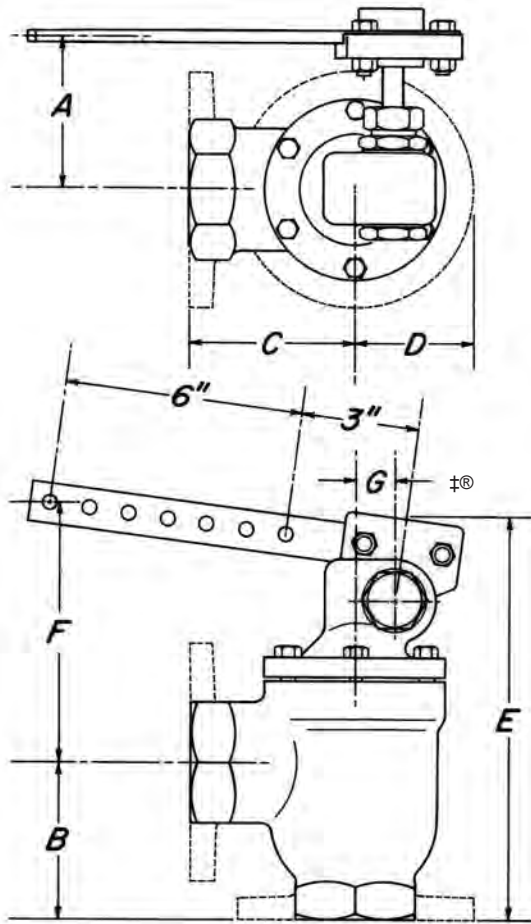
#### NOTES:

NOTE: To order valve with removable seat, specify valve model, then add "with removable seat."

**NOTES:**



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#### ANGLE BODY DIMENSIONS

VALVE	A	B	C	D	E	F	G
2" SOA-D	3 3/4"	4 3/16"	4 3/16"	-----	10 1/2"	7 3/16"	1"
2" FOA-D	3 3/4"	4 1/4"	4 1/4"	3"	10 1/2"	7 1/8"	1"
2" FOA-S	3 3/4"	4 5/16"	4 5/16"	3"	10 1/2"	7"	1"
3" S/GOA-D	3 3/4"	6 1/8"	5 1/2"	-----	13 7/8"	8 5/8"	1 3/8"
3" FOA-D/S	3 3/4"	5 1/2"	5 1/2"	3 3/4"	13 1/4"	8 5/8"	1 3/8"
4" FOA-D/S	3 3/4"	6 1/2"	6 1/2"	4 1/2"	14 15/16"	9 5/16"	1 3/8"
6" FOA-D	4"	10 1/4"	7 3/4"	5 1/2"	21 1/4"	1 17/8"	1 5/8"
6" FOA-S	4"	10 1/4"	7 3/4"	5 1/2"	21 5/16"	12 3/16"	1 5/8"

#### THRU BODY DIMENSIONS

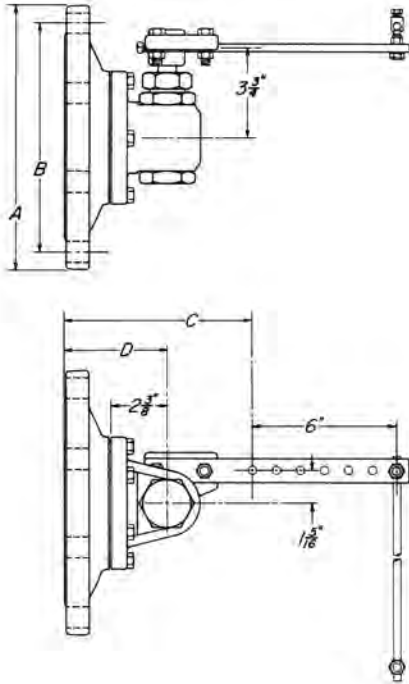
VALVE	A	B	C	D	E	F	G
2" SOT-D	3 3/4"	2 1/8"	8 1/2"	-----	9 3/4"	8 1/2"	1"
2" FOT-D	3 3/4"	3 1/16"	9"	3 1/16"	10 3/4"	8 9/16"	1"
2" FOT-S	3 3/4"	3 1/16"	9 1/8"	3 1/16"	10 3/4"	8 9/16"	1"
3" SOT-D	3 3/4"	2 15/16"	12"	-----	12 5/16"	10 1/4"	1 3/8"
3" FOT-D	3 3/4"	3 3/4"	12 3/16"	3 3/4"	13 1/4"	10 3/8"	1 3/8"
4" FOT-D	3 3/4"	4 1/2"	15 1/8"	4 1/2"	15 5/16"	11 11/16"	1 3/8"
6" FOT-D	4"	4 7/8"	22"	5 1/2"	11 5/16"	12 3/16"	1 5/8"

# TRUNNION ASSEMBLY

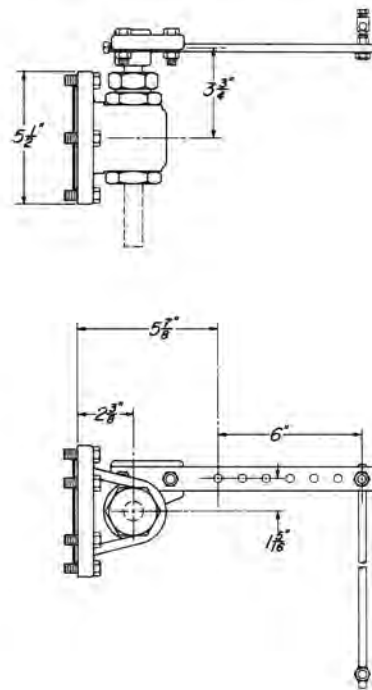
## DIMENSIONS



612, 812 & 1012 TO-D



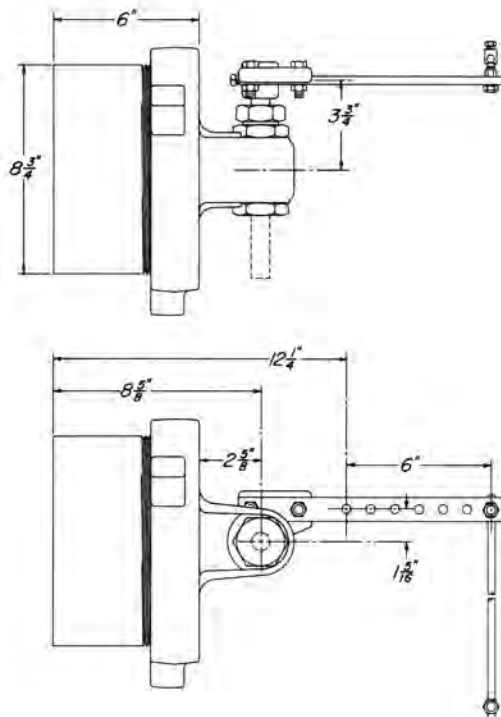
25 TOB



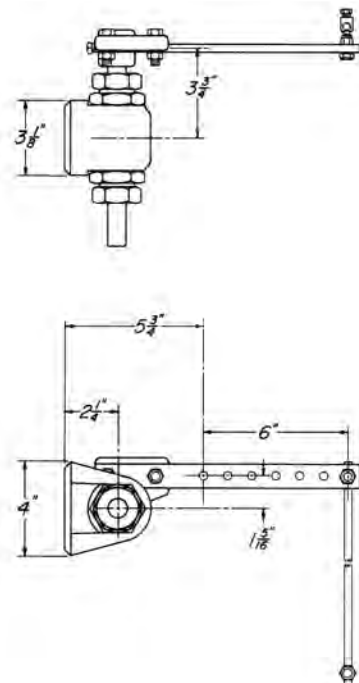
SIZE	NUMBER	A	B	C	D	No. Size of Bolts
6	612 TO	11	9 1/2	7 1/4	4 1/4	8 - 3/4 x 3 1/2
8	812 TO	13 1/2	11 3/4	7 1/4	4 1/4	8 - 3/4 x 3 1/2
10	1012 TO	16	14 1/4	7 1/2	4 1/2	12 - 7/8 x 3 1/2

All dimensions are in inches.

HUTA



50 TOB-S



# TREATER or SALT WATER DISPOSAL W Series



# KIMRAY

INC.®

SECTION D

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.  
® Copyright 1992, KIMRAY, Inc.

#### TREATER VALVE

##### APPLICATION:

As oil or water valve for emulsion treaters, water knockouts and gunbarrels. Can be used for pressure, atmospheric, or vacuum operation. Ideal for discharging salt water to disposal systems.

Material	Operating Pressure	Description of Operation	Parts List
Cast Iron	2"-125 psig Max.	Pg. 10.1	Pg. 10.3
Cast Iron	3",4",6"-60 psig Max.	Pg. 10.1	Pg. 10.3
Ductile	125 psig Max.	Pg. 10.1	Pg. 10.4
Steel	125 psig Max.	Pg. 10.1	Pg. 10.5

#### REMOVABLE HARD SEAT ASSEMBLY

2" & 3"	Pg. 10.6
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#### DIAPHRAGM MOTOR VALVE

##### APPLICATION:

Diaphragm motor for Mechanical Dump Valve

Material	Operating Pressure	Parts List
Cast Iron	125 psig Max.	Pg. 20.1

#### DIMENSIONS & INSTALLATIONS

Treater Valves	10.2
Diaphragm Motor Valve	20.2

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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



#### APPLICATIONS:

As oil or water valve for emulsion treaters, water knockouts and gunbarrels. Can be used for pressure, atmospheric, or vacuum operation. Ideal for discharging salt water to disposal systems.

#### FEATURES:

- Single soft seat for tight shut off
- Balanced against upstream pressure
- Balanced against downstream pressure or vacuum
- Standard weight and lever holds approx. 4' liquid head
- Weights may be added to increase liquid head
- Can be manually opened and closed
- Sample tap on inlet connection
- Rotary stuffing box with leakless, low friction TEFLON packing
- All interior parts can be removed without taking valve out of line
- Prevents air from entering salt water disposal system piping

#### OPERATION:

The inlet of the valve is connected to the water siphon leg or oil discharge line from an emulsion treater or water knockout. Vessel Gas Pressure (Red) is connected to the UPPER HOUSING to balance the Gas Pressure under the MAIN DIAPHRAGM.





The effective area of the BALANCING DIAPHRAGM is the same as the effective area of the SEAT. Pressure or vacuum acting on either side of the BALANCING DIAPHRAGM will cancel the pressure or vacuum acting on the SEAT. This balancing feature prevents the slamming open and closed prevalent in unbalanced single seat construction.

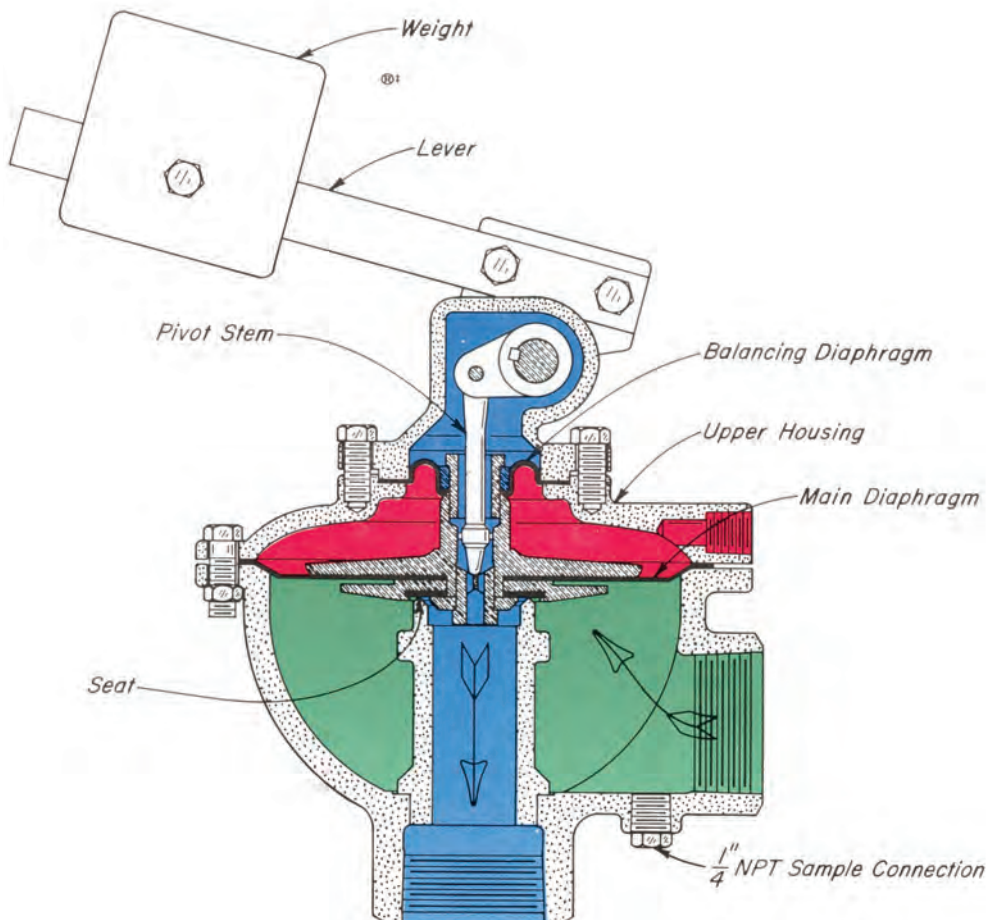
The Vessel Gas Pressure (Red) with the UPPER HOUSING acts upwardly on the BALANCING DIAPHRAGM to cancel the downward pressure on the single SEAT. Downstream Pressure Vacuum (Blue) acting on the SEAT is communicated to the top side of BALANCING DIAPHRAGM. This cancels any downstream pressure or vacuum effect on the valve operation.

The force to hold the SEAT closed is applied by a WEIGHT and LEVER through a rotary TEFLON packed stuffing box to a PIVOT STEM which pushes down on the Diaphragm Assembly.

When the liquid rises in the discharge piping of the vessel above the set level, it lifts the Diaphragm Assembly against the WEIGHT load to open the valve. As liquid is discharged to lower the level, the WEIGHT closes the valve.

Liquid level may be adjusted up to approximately four feet by moving the WEIGHT on the LEVER. Additional weights may be added if a higher level is desired.

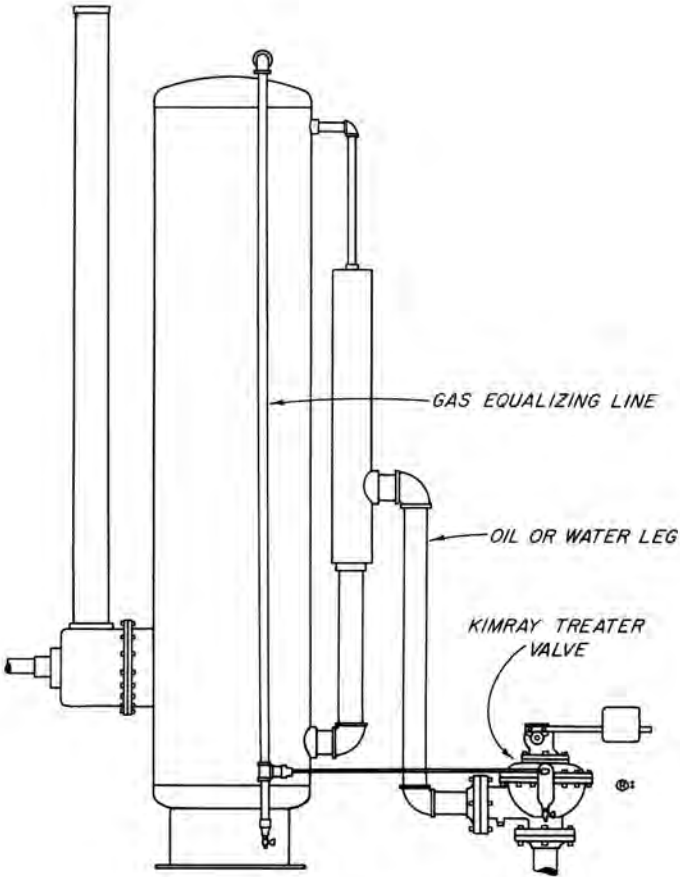
-  Diaphragm Assembly
-  Vessel Gas Pressure
-  Downstream Pressure or Vacuum
-  Gas Pressure Plus Liquid Head



Kimray is an ISO 9001- certified manufacturer.

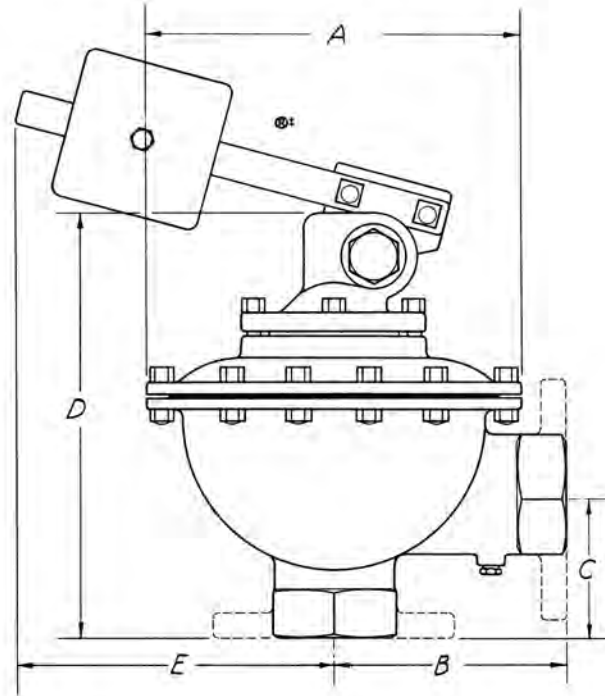
**TREATER VALVE  
INSTALLATION AND DIMENSIONS**

**INSTALLATION**



NOTE: Do not connect gas equalizing line to gas vent line, burner manifold, or downstream of mist extractor.

**DIMENSIONS**



**CAPACITY - Bbls. Water/ Day, Steady Flow**

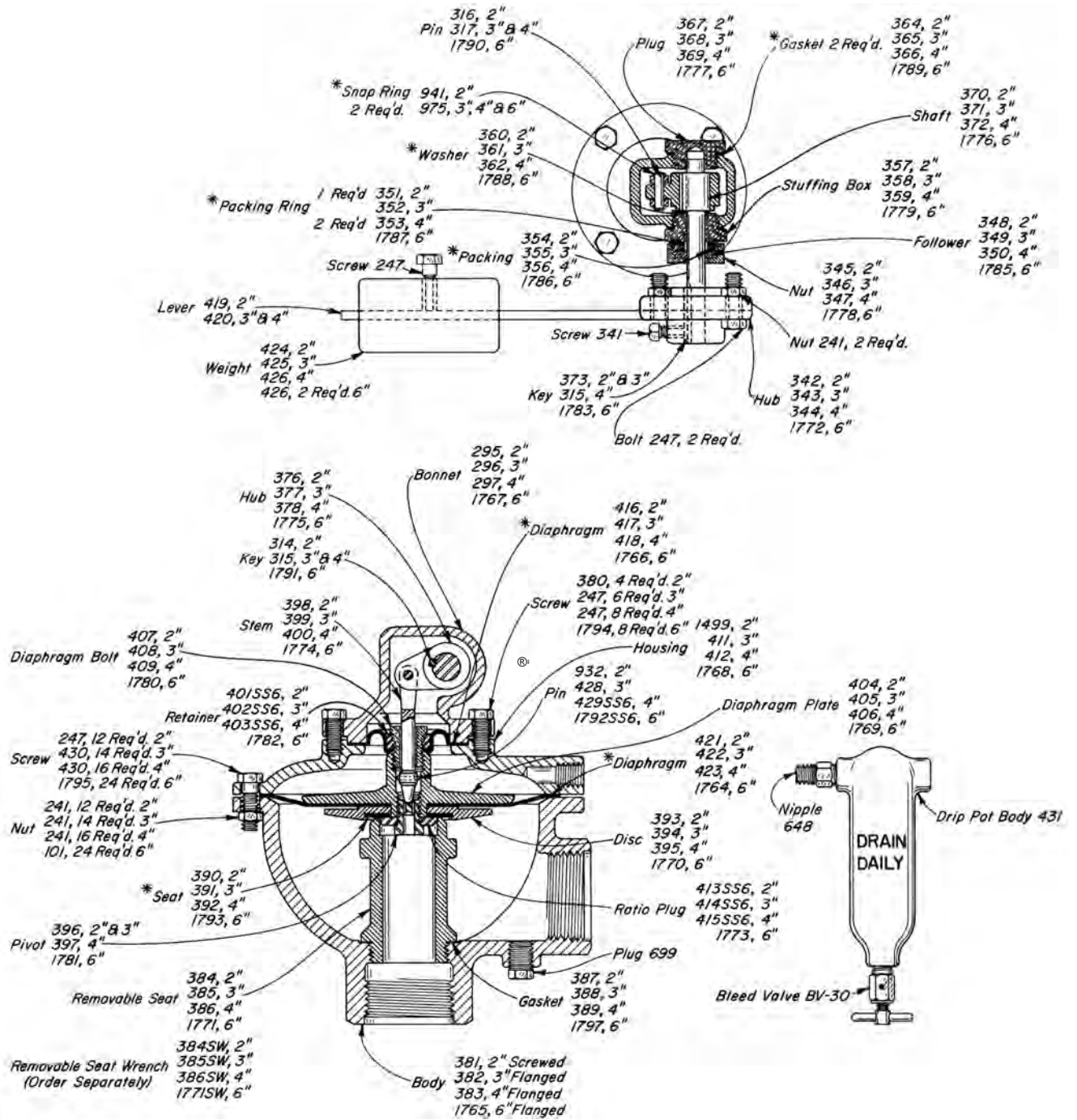
Press. Drop Across Valve	Valve Size - Inches			
	2	3	4	6
1	1,250	3,200	5,950	12,750
2	1,800	4,500	8,450	18,000
3	2,200	5,500	10,300	22,000
4	2,500	6,400	11,900	25,500
5	2,800	7,350	13,300	27,500
10	4,000	10,100	18,900	40,500
15	4,900	12,400	23,100	49,500
20	5,700	14,300	26,800	57,000
30	6,950	17,600	32,800	81,000
50	8,900	22,600	42,200	90,500
60	9,850	24,800	46,200	99,000
75	11,900	—	56,000	—

**DIMENSIONS - INCHES**

Valve No.	A	B	C	D	E
26 SWA	9 <sup>3</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	10 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>
27 FWA-D	9 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	10 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>
27 FWA-S	9 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	10 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>
36 FWA	11 <sup>3</sup> / <sub>4</sub>	8	4 <sup>1</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	13
37 FWA-D	11 <sup>3</sup> / <sub>4</sub>	8	4 <sup>1</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	13
46 FWA	13	9	4 <sup>3</sup> / <sub>4</sub>	14 <sup>5</sup> / <sub>8</sub>	13
47 FWA-D	13	9	4 <sup>3</sup> / <sub>4</sub>	14 <sup>5</sup> / <sub>8</sub>	13
47 FWA-S	13	9	4 <sup>3</sup> / <sub>4</sub>	14 <sup>5</sup> / <sub>8</sub>	13
66 FWA	18 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>	21 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>2</sub>

For gravity correction multiply values obtained from chart by  $\sqrt{\frac{1}{G}}$  Where "G" is specific gravity of flowing liquid.

### TREATER VALVE CAST IRON



#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
DAA	2" SCRD.	26 SWA	125	REL
DAC	3" FLGD.**	36 FWA	60	REM
DAD	4" FLGD.**	46 FWA	60	REN
DAE	6" FLGD.**	66 FWA	60	REP

\*\*Companion flanges, nuts, bolts and gaskets are furnished, at extra cost only when specified.

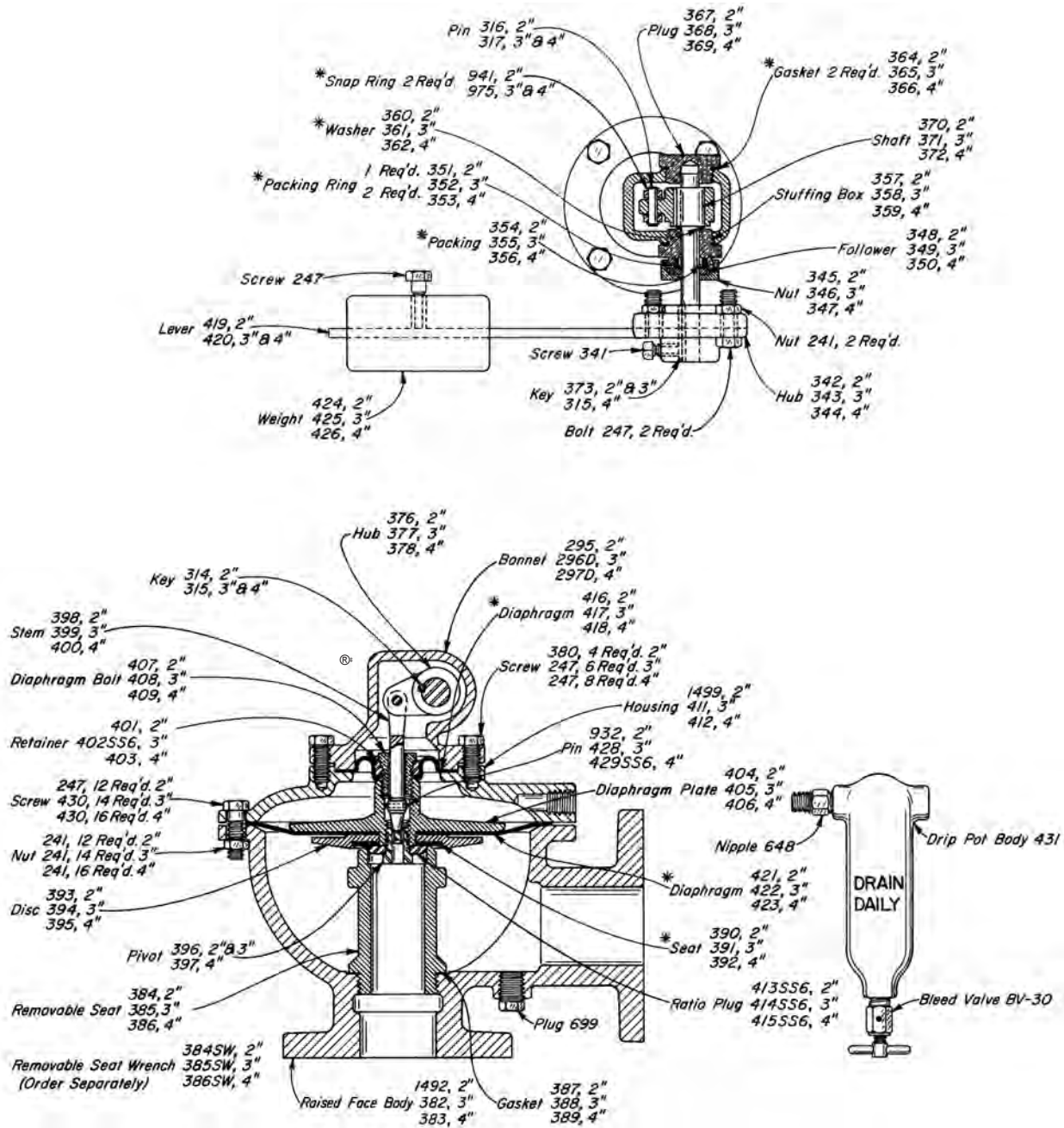
#### NOTES:

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

Lever Bars for higher liquid head are available 419L and 420L.

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TREATER VALVE  
DUCTILE IRON



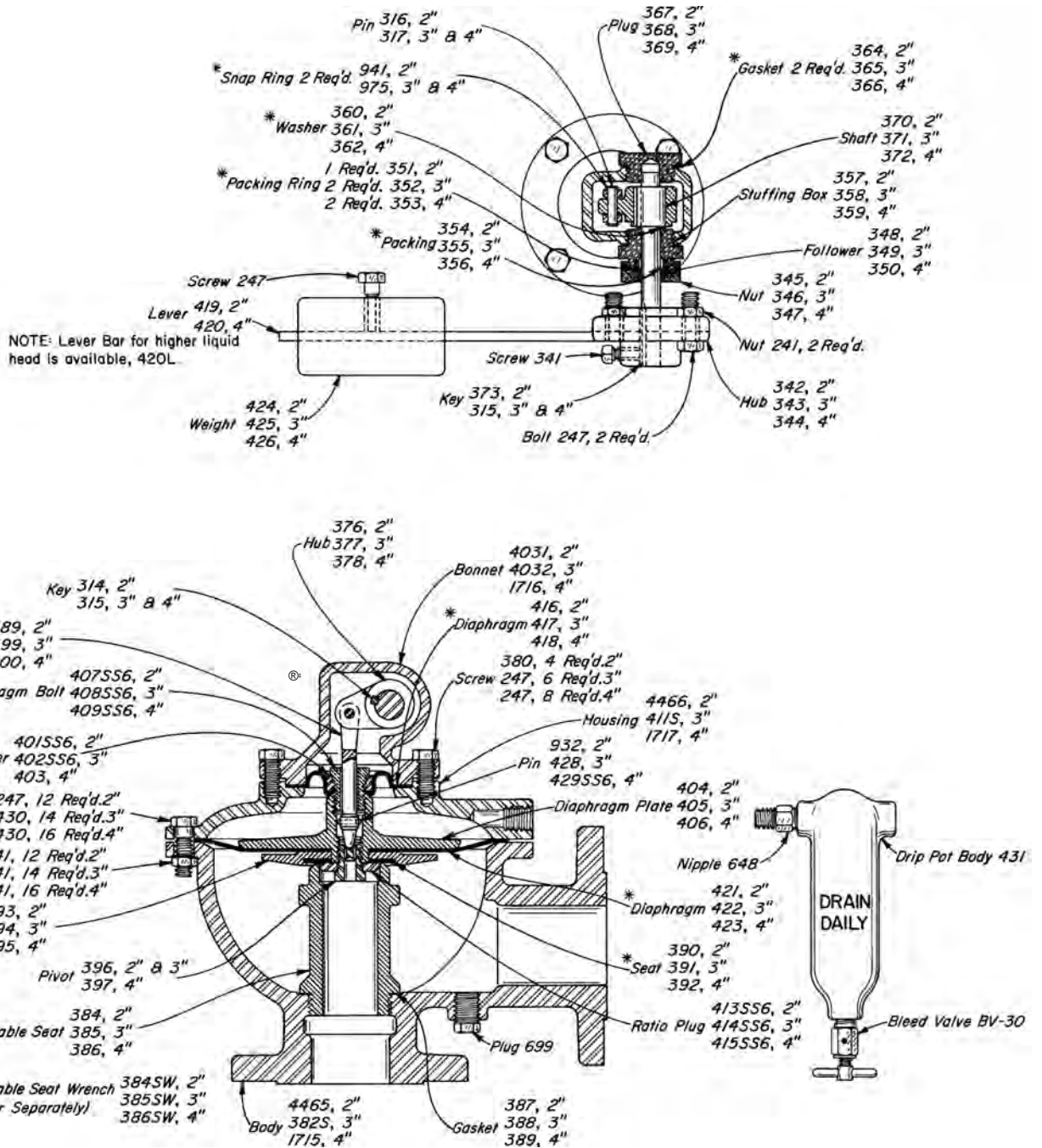
ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
DAB	2" FLGD.**	27 FWA-D	125	REL
DAG	3" FLGD.**	37 FWA-D	125	REM
DAH	4" FLGD.**	47 FWA-D	125	REN

\*\*Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

NOTES:

\*These parts are recommended spare parts and are stocked as repair kits.  
Lever Bars for higher liquid head are available 419L and 420L.



#### ANGLE VALVES AVAILABLE:

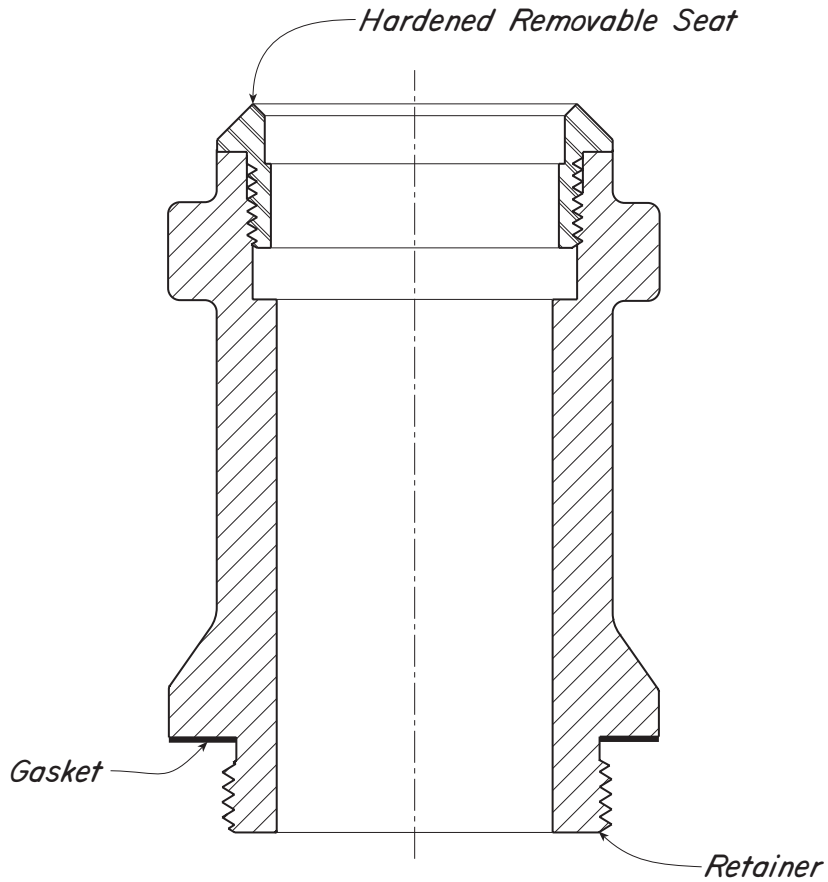
CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
DAI	2" FLGD.**	27 FWA-S	125	REL
DAJ	3" FLGD.**	37 FWA-S	125	REM
DAF	4" FLGD.**	47 FWA-S	125	REN

\*\*Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

#### NOTES:

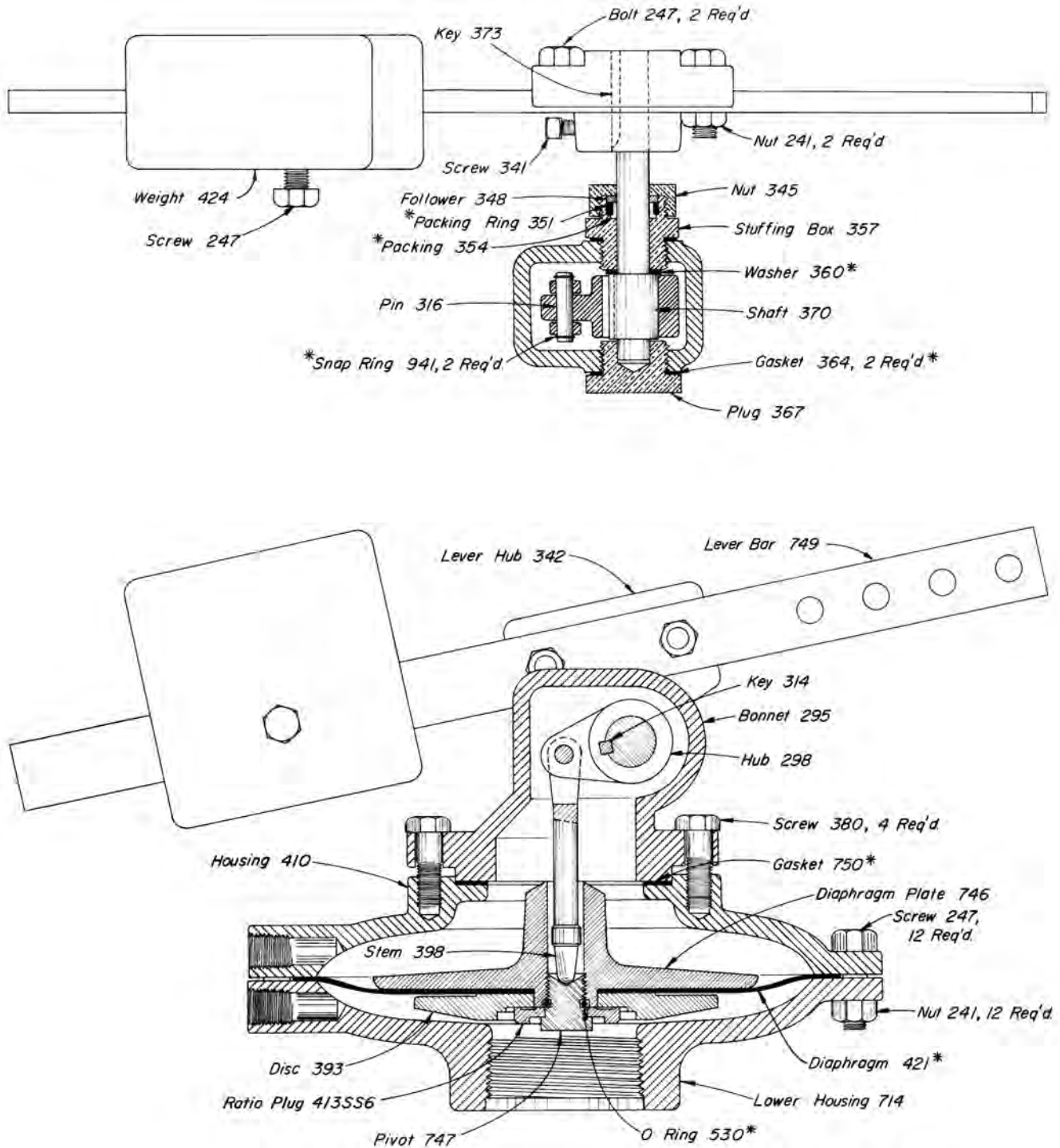
\*These are recommended spare parts and are stocked as repair kits.

Kimray is an ISO 9001- certified manufacturer.



**SEATS AVAILABLE:**

LINE SIZE	SEAT	RETAINER	GASKET
2"	384HA	384HB	387
3"	385PH	385HB	388
3"	385ASS6	385HB	388



#### VALVES AVAILABLE:

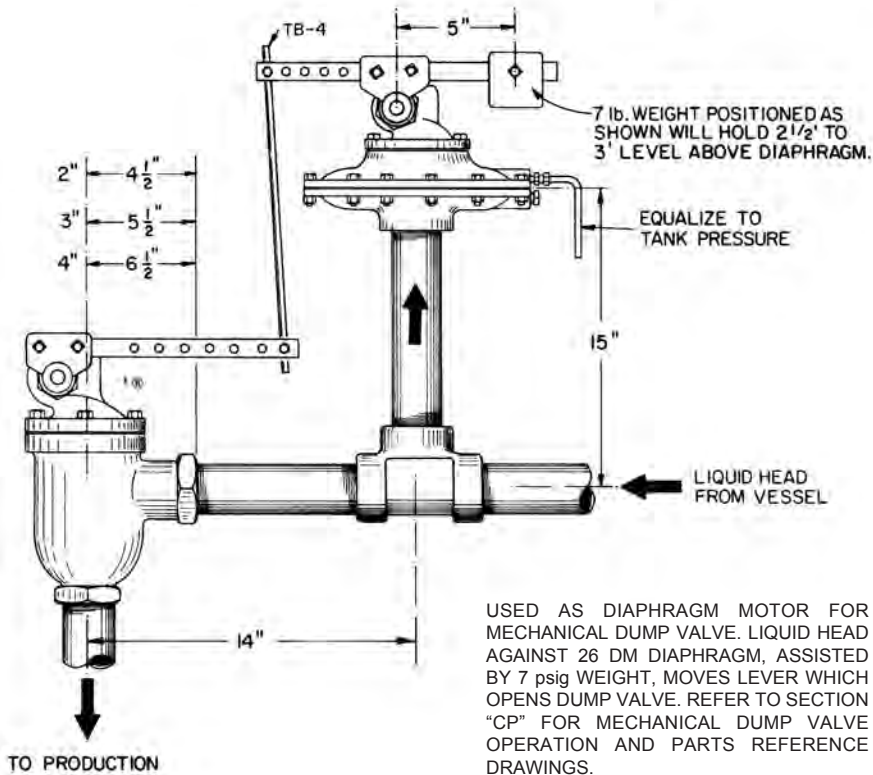
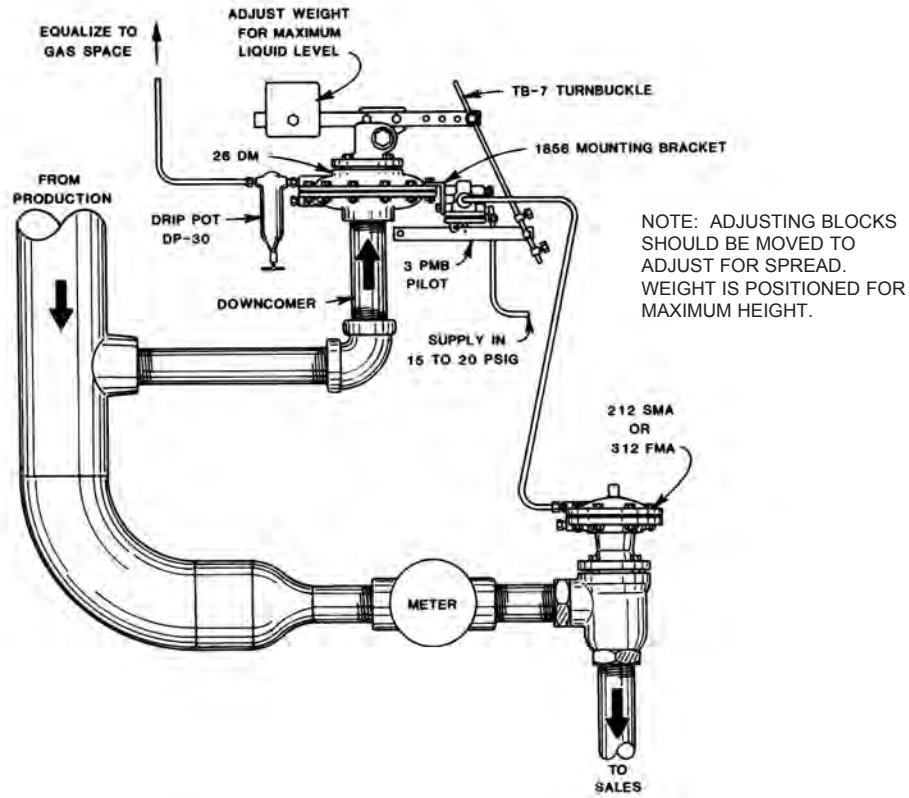
CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
DMA	2" SCRD.	26 DM	125	REW

#### NOTES:

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

DIAPHRAGM MOTOR VALVE  
INSTALLATIONS

TYPICAL DIAPHRAGM MOTOR VALVE INSTALLATIONS





# HIGH PRESSURE MOTOR VALVES



# KIMRAY

INC. ®

SECTION E1

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.  
® Copyright 1992, KIMRAY, Inc.

#### 1" & 2" HPMV

##### APPLICATION:

For discharge of liquid or gas from vessels, separators, treaters, knockouts, and similar liquid accumulators.

For Back Pressure or Pressure Reducing applications with pressure pilots.

Material	Line Size	Design Pressure	Topworks & Inner Valves	Parts List
Steel	1"	4000 psig Max.	Pg. 10.1	Pg. 10.2
Steel	2"	4000 psig Max.	Pg. 10.1	Pg. 10.3

CONVERSION INSTRUCTIONS:  
PO to PC AND PC to POPg.10.4

#### 2", 3", 4", 6" & 8" HPMV PB

##### APPLICATION:

For discharge of liquid or gas from vessels, separators, treaters, knockouts, and similar liquid accumulators.

For Back Pressure or Pressure Reducing applications with pressure pilots.

Material	Line Size	Design Pressure	Topworks & Inner Valves	Parts List
Steel	2"	4000 psig Max.	Pg. 15.1	Pg. 15.2
Steel	3"	1500 psig Max.	Pg. 15.1	Pg. 15.3
Steel	4"	1500 psig Max.	Pg. 15.1	Pg. 15.4
Steel	6"	1500 psig Max.	Pg. 15.1	Pg. 15.5
Steel	8"	1480 psig Max.	Pg. 15.1	Pg. 15.6

#### 1" & 2" -65 TOPWORKS

##### APPLICATION:

Allows a wider spring adjustment range for discharge of liquid or gas from vessels, separators, treaters, knockouts, and similar liquid accumulators.

Allows a finer control when used with Back Pressure and Pressure Reducing Controllers.

Used as an operator on 1" HPMV or 1" SMS.

Material	Line Size	Design Pressure	Topworks	Parts List
Steel	1"	4000 psig Max.	Pg. 20.1	Pg. 20.2
Steel	2"	4000 psig Max.	Pg. 20.1	Pg. 20.2

#### 23 MVP MANUAL VALVE POSITIONER

##### APPLICATION:

Used on 2" HPMV's.

For opening valves manually when supply gas is not available.

For closing valves manually when there is pressure on the diaphragm.

For limiting valve stem travel in the opening or closed direction.

Material	Operating Pressure	Topworks Description	Parts List
Ductile	30 psig Max.	Pg. 30.1	Pg. 30.2
Steel	30 psig Max.	Pg. 30.1	Pg. 30.2

#### 1" & 2" PVP PNEUMATIC VALVE POSITIONER

##### APPLICATION:

Used as an operator on the KIMRAY 2" HPMV where valve opening must be set independent of the pressure drop across the valve orifice.

Use for linear positioning of the inner valve of a KIMRAY 2" HPMV where the signal is a pressure.

Material	Operating Pressure	Topworks Description	Parts List
Ductile	35 to 45 psig Max.	Pg. 40.1	Pg. 40.2
Steel	35 to 45 psig Max.	Pg. 40.1	Pg. 40.2

#### 23EPVP ELECTRO-PNEUMATIC VALVE POSITIONER

##### APPLICATION:

Used on 2" HPMV's for field automation where electrical signals are used to position valve for on-off or precision flow control.

Material	Supply Pressure	Control Voltage	Description of Operation	Parts List
Ductile	30 psig Max.	±8 to 12 VDC	Pg. 45.1	Pg. 45.2

#### ELECTRO-PNEUMATIC CONTROLLER

##### APPLICATION:

Convert 12 Volt DC signal from relay or computer to a pneumatic signal for actuating a valve positioner

Material	Supply Pressure	Control Voltage	Description of Operation	Parts List
Aluminum	15, 30 & 100 psig	12 VDC	Pg. 45.3	Pg. 45.4

#### 1" & 2" MV METERING VALVE

##### APPLICATION:

This valve can be used to meter or control flow of liquids and/or gases on meter runs, flow lines or may be used as a choke under low pressure drop conditions where freezing is not a problem.

Used anytime a reference control point is required in 64<sup>ths</sup> of an inch opening.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Steel	1"	4000 psig Max.	Pg. 50.1	Pg. 50.2
Steel	2"	4000 psig Max.	Pg. 50.1	Pg. 50.3

#### 1" & 2" MV PB METERING VALVE

##### APPLICATION:

This valve can be used to meter or control flow of liquids and/or gases on meter runs, flow lines or may be used as a choke under low pressure drop conditions where freezing is not a problem.

Used anytime a reference control point is required in 64<sup>ths</sup> of an inch opening.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Steel	2"	4000 psig Max.	Pg. 55.1	Pg. 55.2
Steel	3"	4000 psig Max.	Pg. 55.1	Pg. 55.3

### 1" SMS NON-FREEZE DUMP VALVE

#### APPLICATION:

For discharge of liquid from vessels where freezing may occur due to high pressure drop

Material	Operating Pressure	Topworks Description	Parts List
Steel	4000 psig Max.	Pg. 60.1	Pg. 60.2

### INNER VALVE TRIM

1" Valves .....	Pg. 90.1
2" Valves .....	Pg. 90.1

### SOFT SEATS

1" Valves .....	Pg. 90.2
2" Valves .....	Pg. 90.2

### 1" -65 SMS NON-FREEZE DUMP VALVE

#### APPLICATION:

Allows a wider spring adjustment range for the discharge of liquid from vessels where freezing may occur due to high pressure drop.

Material	Operating Pressure	Topworks Description	Parts List
Steel	4000 psig Max.	Pg. 60.1	Pg. 60.3

### DIMENSIONS

1" Valves .....	Pg. 100.1
2" Valves .....	Pg. 100.2
2", 3", 4" & 6" HPMV PB Valves .....	Pg. 100.3

### FLOW CAPACITIES

Gas Capacity Chart .....	Pg. 70.1
Liquid Capacity Chart .....	Pg. 70.2

### OTHER APPLICATIONS

#### APPLICATION:

#### BULLETIN NUMBER

SOLENOID VALVE	E184249
MICRO WITCH	E184250
EQUAL PERCENTAGE TRIM	E184251
PRESSURE DIFFERENTIAL CONTROLLER	E184254
HIGH PRESSURE CONTROLLER	E184255
HIGH/LOW SHUT-IN VALVE CONTROLLER	E187105
HIGH PRESSURE PRESSURE REDUCING REGULATORS:	
300 psig Regulator	E184257
1500 psig Regulator	E188306
HIGH PRESSURE BACK PRESSURE REGULATOR	E188307
Descriptions of Other Applications	Pg. 110.1

### STUFFING BOX ASSEMBLIES

#### APPLICATION:

For use in KIMRAY HPMV's. Each assembly has its own specific uses for the valve it was designed for.

Material	Line Size	Stuffing Box assembly	Parts List
Steel	1"	1" HPMV	Pg. 80.1
Steel	1"	1" HPMV w/Nut	Pg. 80.1
Steel	1"	1" SMS	Pg. 80.1
Steel	2"	2" HPMV	Pg. 80.1
Steel	2"	2" HPMV w/Nut	Pg. 80.1

### ORDER INFORMATION

To order a standard High Pressure Motor Valve, refer to Valves Available chart on each parts reference page. Determine which HPMV is needed and order by "Cat. No."

High Pressure Motor Valves are available with steel yoke and bonnet. Several springs are available for different diaphragm pressures. Stuffing box assemblies, seats, stems and valve bodies are available in 316 stainless steel. Inner valves can be machined from a wide selection of materials. Flanged and socket weld bodies available. And all bodies are available with 1/4" NPT tapped holes upstream and down stream.

To order High Pressure Motor Valves with materials or features not listed in "Valves available" chart, contact the KIMRAY, Inc. Authorized Distributor in your area. For a listing of Authorized Distributors, refer to the back cover sheet of this section.

**AFLAS**® is a trade mark of Asahi Glass Co

TEMPERATURE:  
+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum  
fluids, Sea Water

**HSN (HNBR)**

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

APPLICATION:  
Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

FLUID / GAS:  
Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

**TEFLON (T)**

TEMPERATURE:  
-40° to +400° F  
-20° to +204° C

APPLICATION:  
Chemically Inert Elastomer Best in static Do not use at  
low temps

FLUID / GAS:  
Almost All Chemicals

**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 (CO<sub>2</sub>), Propane, Gasoline,  
Diesel, Fuel Oil Systems

DO NOT USE WITH:  
Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol,  
Amines, Sodium hydroxide solutions

**EP (EPDM)**

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 (P)**

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

APPLICATION:  
High abrasion resistance Seats, Diaphragms

FLUID / GAS:  
Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane,  
butane, fuel, mineral oil and grease

**POLYACRYLATE (H)**

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

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

For discharge of liquid or gas from vessels, separators, treaters, knockouts and other similar liquid accumulators.

For back pressure or pressure reducing applications with pressure pilots.

#### FEATURES:

- Compact design
- O Ring sealed seat
- Valve travel indicator
- Field reversible topworks
- Teflon packed stuffing box

#### TOPWORKS:

Standard topworks have an effective diaphragm area of approximately 30 square inches for 1" and 65 square inches for 2" motor valves.

Unless otherwise specified, all HPMV's will be furnished with ductile topworks, steel topworks available. Specify when ordering.

#### SPRINGS:

The 1"HPMV springs are available for diaphragm pressures of 10, 20, and 30 psig.

The 2"HPMV springs are available for diaphragm pressures of 15, 20, and 30 psig.

Unless otherwise specified, all 1" HPMV's with 1/2" INNER VALVES get 30 psig spring others get 20 psig. spring, all 2" HPMV's will be furnished with springs as follows 2000 psig. W.P. valves, 20 lb. springs and 4000 psig. W.P. valves, 30 lb. springs.

Top Adjusting Screw may be adjusted to vary the spring tension slightly; this affects pressure required to actuate valve.

#### STEM TRAVEL:

- 1" HPMV - 1/2" maximum
- 2" HPMV - 3/4" maximum

#### ACTUATOR WORKING PRESSURE:

- 10-30 psig normal (see spring ranges)
- 45 psig maximum

#### WORKING PRESSURE:

- 1" HPMV - 4000 psig
- 2" HPMV - 2000 & 4000 psig

#### TEMPERATURE RANGE:

-20° to 500°F

#### INNER VALVE SIZES:

- 1" HPMV - 1/8", 3/16", 1/4", 3/8", & 1/2"
- 2" HPMV - 1/4", 3/8", 1/2", 3/4" & 1"
- 2" HPMV - 7/16", 5/8" & 7/8"

#### CAPACITIES:

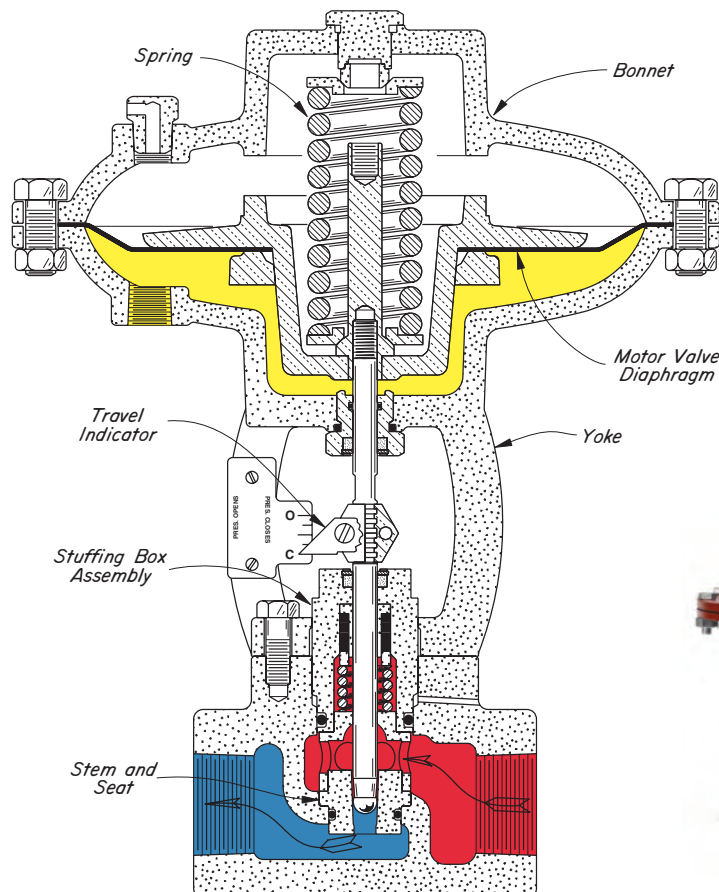
Refer to the Table of Contents

#### INNER VALVE SPECIFICATIONS:

The 1" HPMV standard valve plugs consists of a carbide ball rigidly connected to a 303 stainless steel stem. Standard seats are made of heat treated tool steel.

The 2" HPMV standard valve plugs for 1/2" and smaller consist of a carbide ball rigidly connected to a 303 stainless steel stem. Standard valve plugs for 3/4" and 1" consist of a hardened high chrome alloy ball rigidly connected to a 303 stainless steel stem. Standard seats are made of heat treated tool steel.

Inner valves can be made from a wide selection of materials. Specify when ordering.

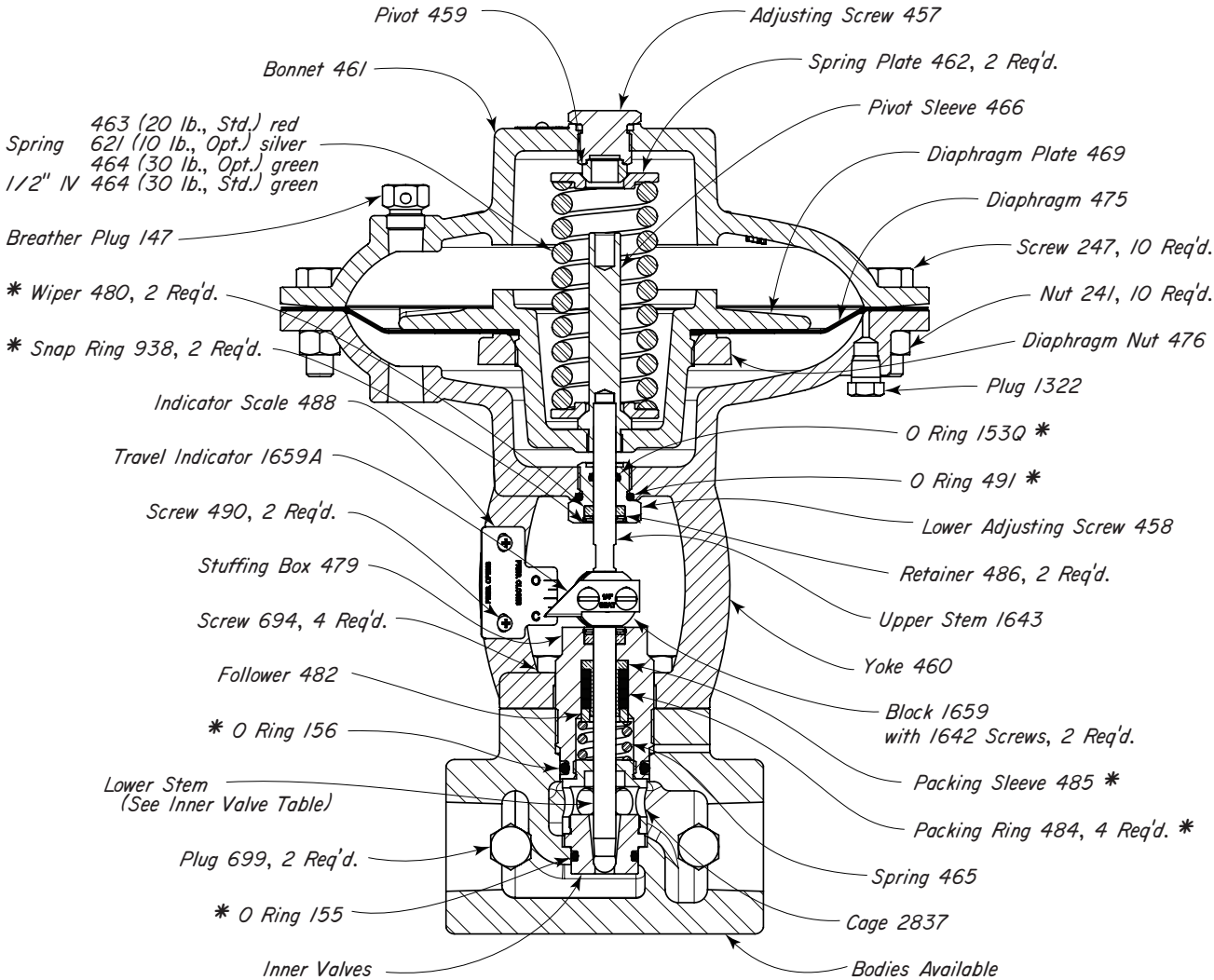


Kimray is an ISO 9001- certified manufacturer.

# HIGH PRESSURE MOTOR VALVES



## 1 HPMV STEEL BODY DUCTILE TOPWORKS



SEAT SIZE	STANDARD SEATS D-2 TOOL STEEL
	TRIM SET NO.
1/8"	T2842
3/16"	T2841
1/4"	T2840
3/8"	T2838
1/2"	T2839

Seat Removal Tool 3032  
(Available at extra cost)

BODY TYPE	SCREWED	
	BODY	W.P
THRU	452	4000 psig
ANGLE	453	4000 psig

### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EAE	1/8"	1400 SMT PO 1/8 IV	4000	RFA
EAF	3/16"	1400 SMT PO 3/16 IV	4000	RFA
EAG	1/4"	1400 SMT PO 1/4 IV	4000	RFA
EAH	3/8"	1400 SMT PO 3/8 IV	4000	RFA
EAI	1/2"	1400 SMT PO 1/2 IV	4000	RFA

NOTE: All standard HPMV's have a Cat No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

### ANGLE VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EAA	1/4"	1400 SMA PO 1/4 IV	4000	RFA
EAB	3/8"	1400 SMA PO 3/8 IV	4000	RFA
EAC	1/2"	1400 SMA PO 1/2 IV	4000	RFA

For dimensions refer to Table of Contents. Flanged dimensions available on request.

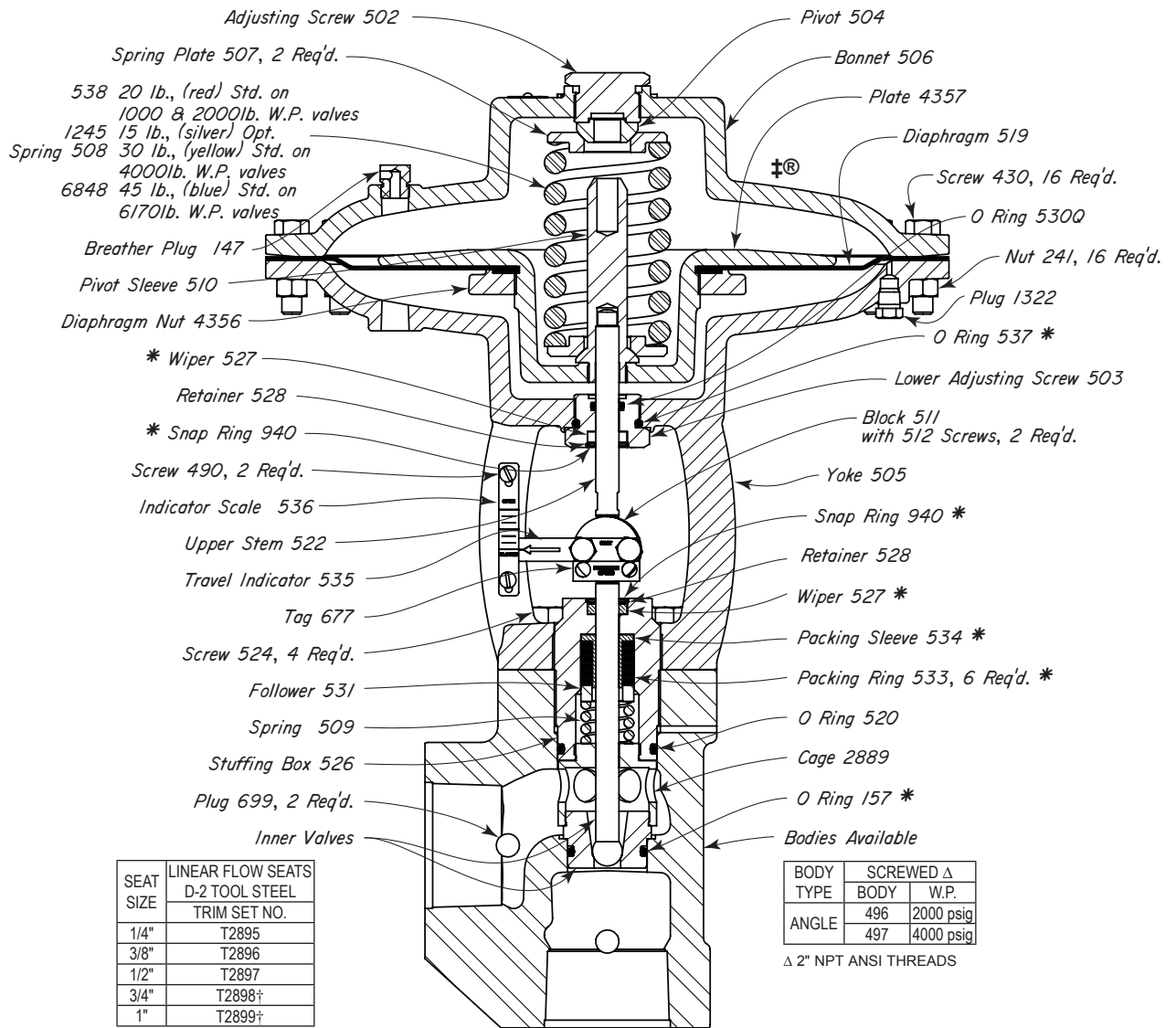
\*These are recommended spare parts and are stocked as repair kits.

Snap and Equal Percentage trim sets available see page E1:90.1

For more code options see Product Bulletin PB0002

Kimray is an ISO 9001- certified manufacturer.





Seat Removal Tool 3033  
(Available at extra cost)  
† CHROME ALLOY BALL ON STEM  
(All other stems use carbide balls)

#### ANGLE VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
ECK	1/2"	2200 SMA PO	2000	RFE
ECL	3/4"	2200 SMA PO	2000	RFE
ECM	1"	2200 SMA P	2000	RFE
ETB	1/2"	2400 SMA PO	4000	RFE
ECQ	3/4"	2400 SMA PO	4000	RFE
ECU	1"	2400 SMA PO	4000	RFE

#### NOTES:

All standard HPMV's have a Cat No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

For dimensions refer to Table of Contents. Flanged dimensions available on request.

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

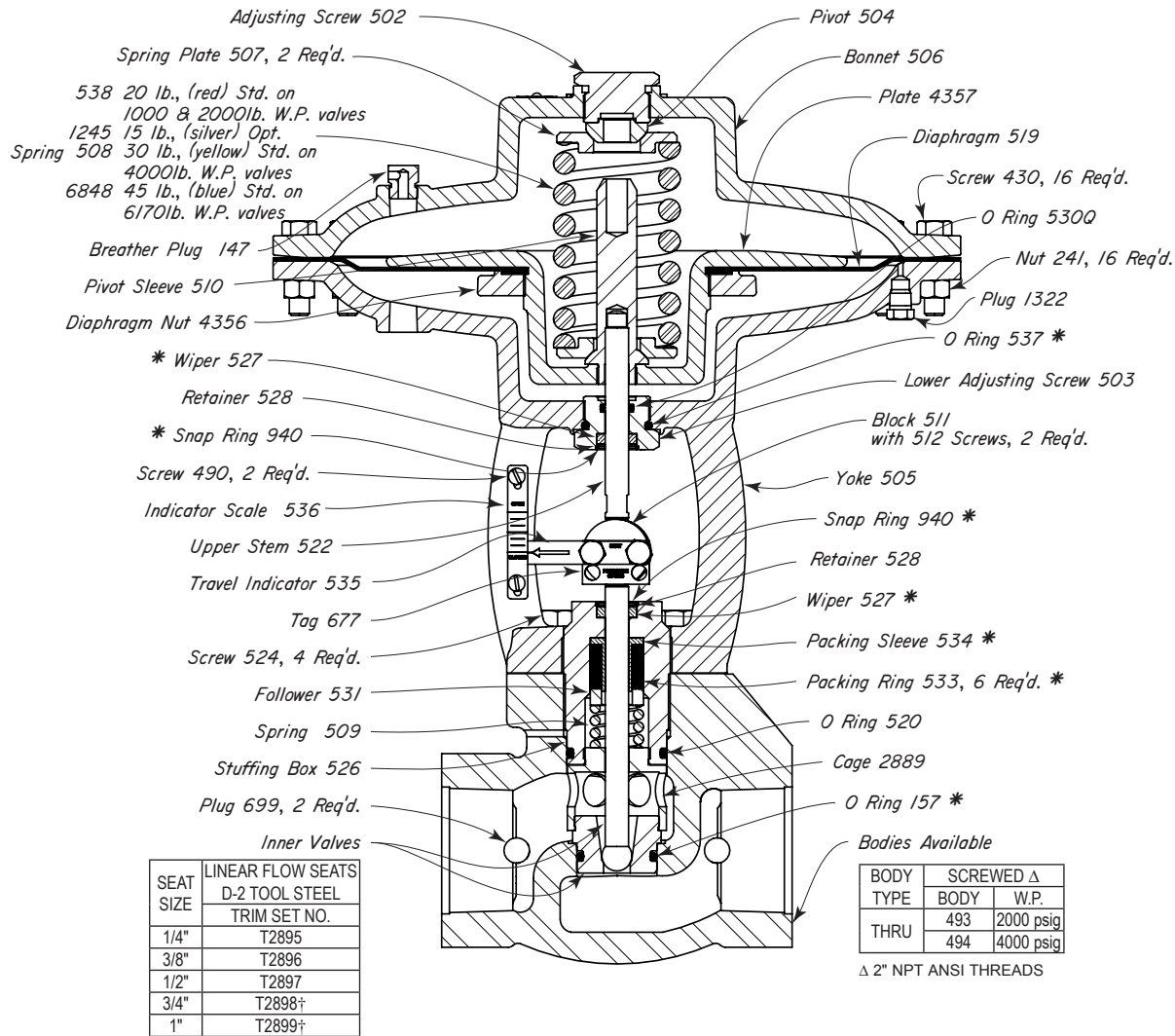
Snap and Equal Percentage trim sets available see page E1:90.1

For more code options see Product Bulletin PB0002

# HIGH PRESSURE MOTOR VALVES



## 2 SMT HPMV STEEL BODY DUCTILE TOPWORKS



Seat Removal Tool 3033  
(Available at extra cost)  
† CHROME ALLOY BALL ON STEM  
(All other stems use carbide balls)

### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
ECN	1/2"	2200 SMT PO	2000	RFE
ECO	3/4"	2200 SMT PO	2000	RFE
ECP	1"	2200 SMT PO	2000	RFE
ECR	1/2"	2400 SMT PO	4000	RFE
ECS	3/4"	2400 SMT PO	4000	RFE
ECT	1"	2400 SMT PO	4000	RFE

### NOTES:

All standard HPMV's have a Cat No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

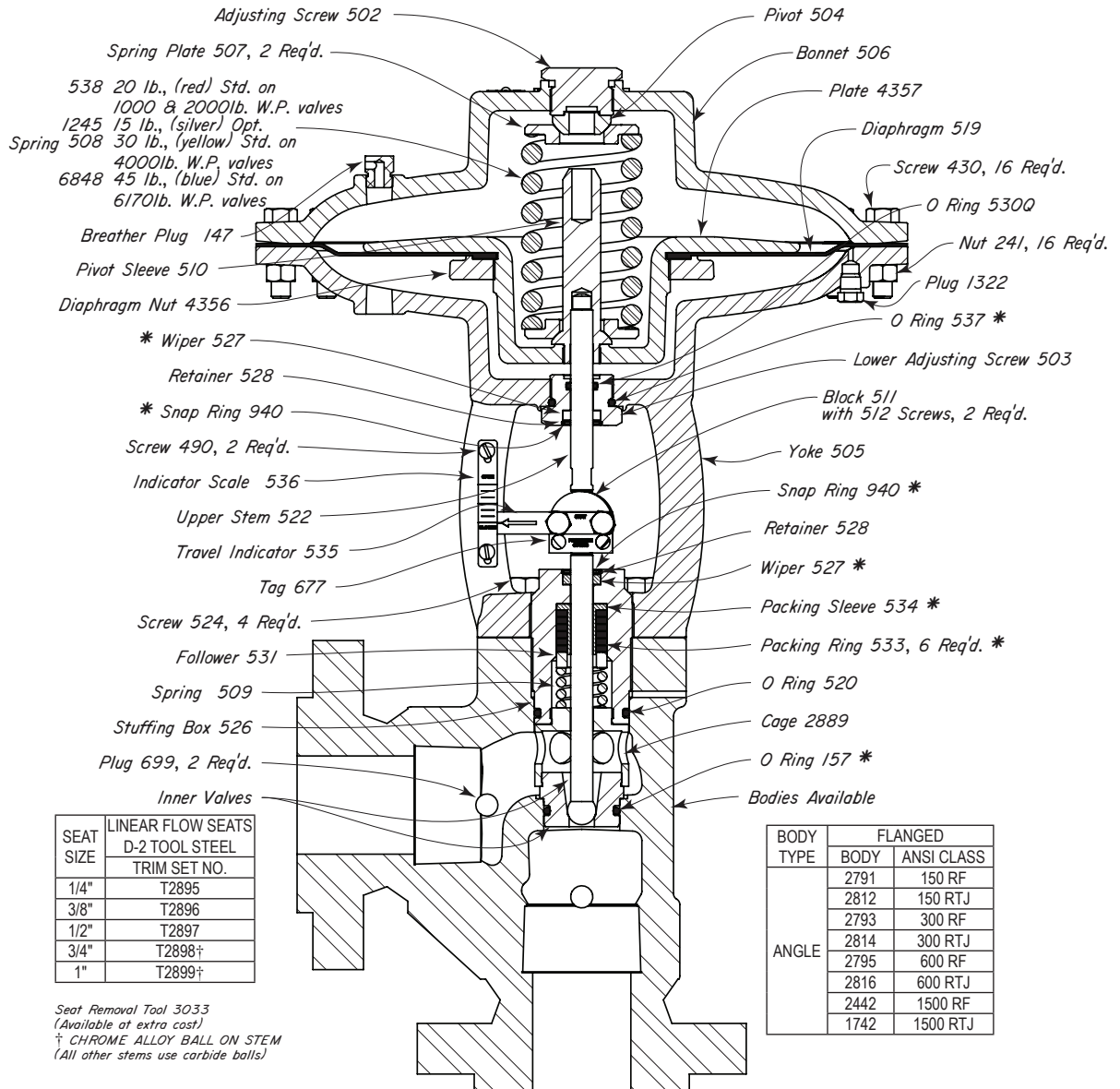
For dimensions refer to Table of Contents. Flanged dimensions available on request.

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

Snap and Equal Percentage trim sets available see page E1:90.1

For more code options see Product Bulletin PB0002

Kimray is an ISO 9001- certified manufacturer.



#### ANGLE VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EPS	1/4"	2" FMA 150RF PO	285	RFE
EPT	3/8"	2" FMA 150RF PO	285	RFE
EPW	1/2"	2" FMA 150RF PO	285	RFE
EPX	3/4"	2" FMA 150RF PO	285	RFE
EPY	1"	2" FMA 150RF PO	285	RFE
EZF	1/4"	2" FMA 300RF PO	740	RFE
EZG	3/8"	2" FMA 300RF PO	740	RFE
EZH	1/2"	2" FMA 300RF PO	740	RFE
EZI	3/4"	2" FMA 300RF PO	740	RFE
EDT	1"	2" FMA 300RF PO	740	RFE
MFO	1/4"	2" FMA 600RF PO	1480	RFE
MGK	3/8"	2" FMA 600RF PO	1480	RFE
MCO	1/2"	2" FMA 600RF PO	1480	RFE
MBT	3/4"	2" FMA 600RF PO	1480	RFE
EVM	1"	2" FMA 600RF PO	1480	RFE

#### NOTES:

All standard HPMV's have a Cat No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

For dimensions refer to Table of Contents. Flanged dimensions available on request.

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

Snap and Equal Percentage trim sets available see page E1:90.1

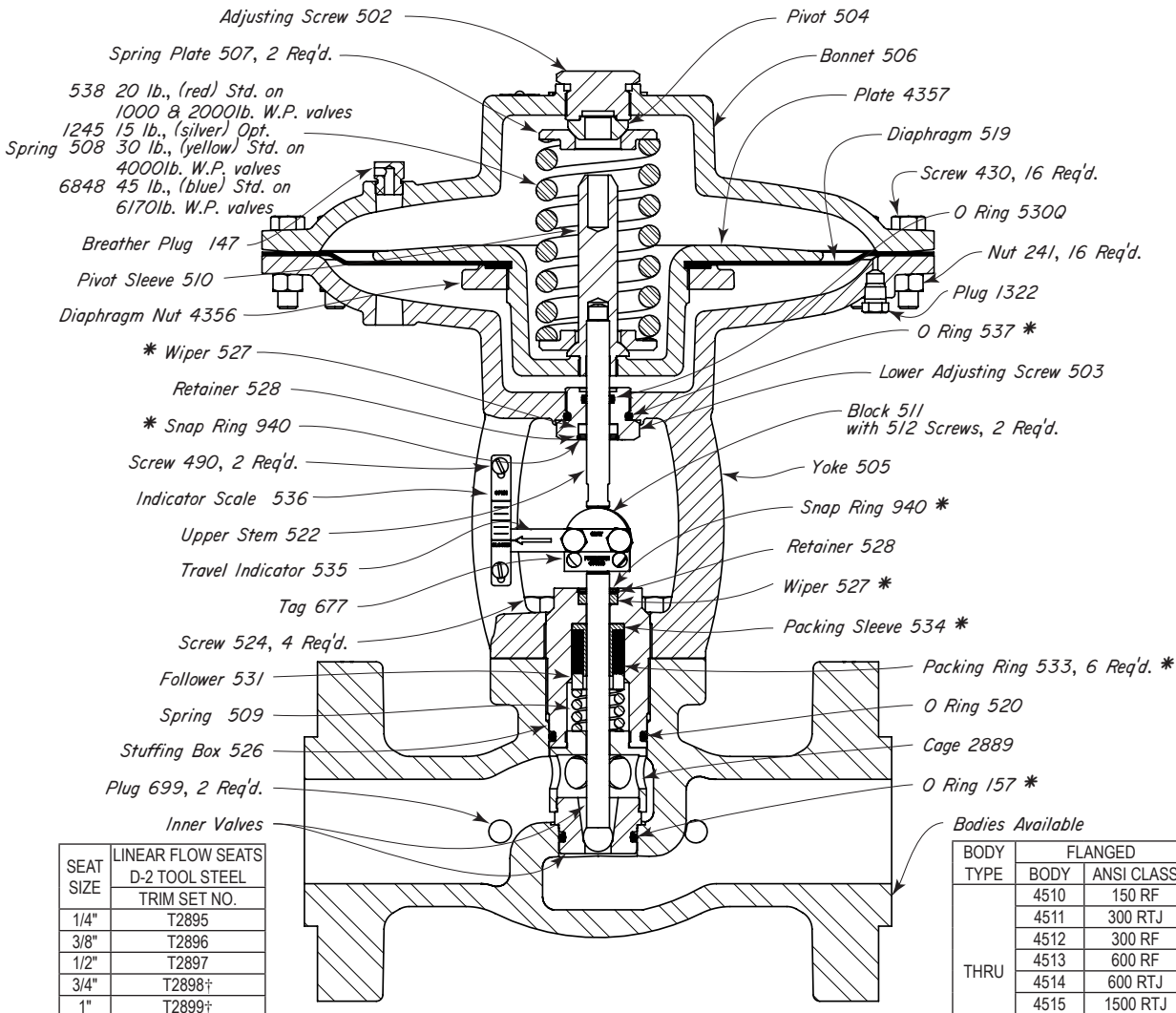
For more code options see Product Bulletin PB0002

Kimray is an ISO 9001- certified manufacturer.

# HIGH PRESSURE MOTOR VALVES



## 2 FMT HPMV STEEL BODY DUCTILE TOPWORKS



Seat Removal Tool 3033  
 (Available at extra cost)  
 † CHROME ALLOY BALL ON STEM  
 (All other stems use carbide balls)

Δ 2" NPT ANSI THREADS

### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EHR	1/4"	2" FMT 150RF PO	285	RFA
EHS	3/8"	2" FMT 150RF PO	285	RFA
EHT	1/2"	2" FMT 150RF PO	285	RFA
EHU	3/4"	2" FMT 150RF PO	285	RFA
EHV	1"	2" FMT 150RF PO	285	RFA
EPA	1/4"	2" FMT 300RF PO	740	RFA
EPB	3/8"	2" FMT 300RF PO	740	RFA
EPC	1/2"	2" FMT 300RF PO	740	RFA
EPD	3/4"	2" FMT 300RF PO	740	RFA
EPE	1"	2" FMT 300RF PO	740	RFA
EPJ	1/4"	2" FMT 600RF PO	1480	RFA
EDP	3/8"	2" FMT 600RF PO	1480	RFA
EIE	1/2"	2" FMT 600RF PO	1480	RFA
EGO	3/4"	2" FMT 600RF PO	1480	RFA
EGP	1"	2" FMT 600RF PO	1480	RFA
EPK	1/4"	2" FMT 1500RF PO	3705	RFA
EPM	3/8"	2" FMT 1500RF PO	3705	RFA

### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EPN	1/2"	2" FMT 1500RF PO	3705	RFA
EGQ	3/4"	2" FMT 1500RF PO	3705	RFA
EGR	1"	2" FMT 1500RF PO	3705	RFA

All standard HPMV's have a Cat No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

For dimensions refer to Table of Contents. Flanged dimensions available on request.

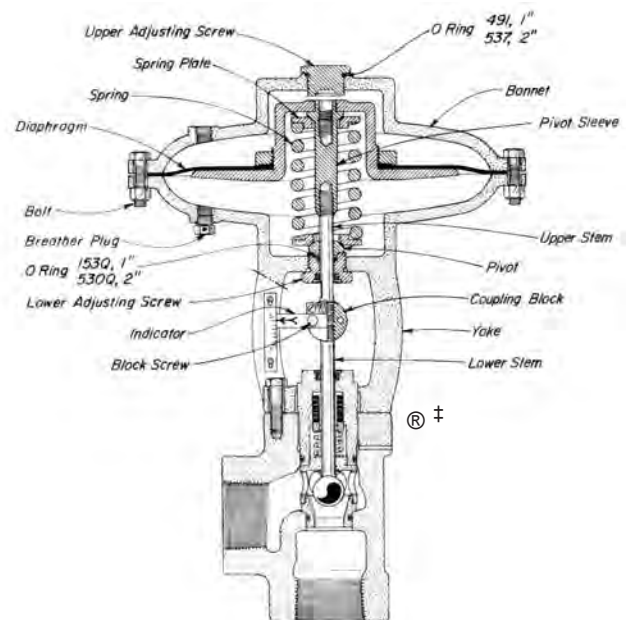
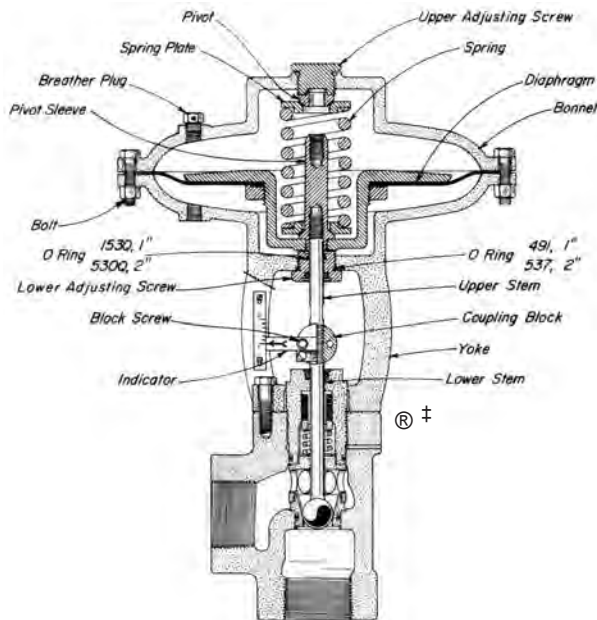
\*These are recommended spare parts and are stocked as repair kits.

Snap and Equal Percentage trim sets available see page E1:90.1

For more code options see Product Bulletin PB0002

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#### CONVERSION INSTRUCTIONS



#### PRESSURE CLOSING to PRESSURE OPENING:

Remove BLOCK SCREWS, TRAVEL INDICATOR and COUPLING BLOCK. Remove UPPER ADJUSTING SCREW, BOLTS, and BONNET. Lift out Diaphragm Assembly (Crosshatched). Remove SPRING, SPRING PLATES and PIVOT. Remove LOWER ADJUSTING SCREW. Remove O RINGS, 491 - 1", 537 - 2", from UPPER ADJUSTING SCREW, and inserting in grooves provided in the LOWER ADJUSTING SCREW. Unscrew UPPER STEM and insert in opposite end of PIVOT SLEEVE.

Replace LOWER ADJUSTING SCREW and tighten against YOKE. O RING 491 - 1", 537 - 2", provides the necessary pressure seal. Invert Diaphragm Assembly and replace. Care should be taken when threading the UPPER STEM through the LOWER ADJUSTING SCREW so as not to damage O RING, 153Q - 1", 530Q - 2". Replace SPRING with a SPRING PLATE in each end. UPPER ADJUSTING SCREW opening Thread UPPER ADJUSTING SCREW into BONNET until contact is made with the PIVOT, then tighten two turns. The UPPER ADJUSTING SCREW now becomes the SPRING adjustment. With BLOCK SCREWS through INDICATOR, replace COUPLING BLOCK matching match marks. Move BREATHER PLUG to BONNET (upper Diaphragm Housing). Connect Diaphragm Pressure from PILOT to YOKE (Lower Diaphragm Housing).

#### PRESSURE OPENING to PRESSURE CLOSING:

Remove BLOCK SCREWS, TRAVEL INDICATOR and COUPLING BLOCK. Remove UPPER ADJUSTING SCREW, BOLTS, and BONNET. Lift out Diaphragm Assembly (Crosshatched). Remove SPRING, SPRING PLATES and PIVOT. Rotate Diaphragm Assembly when pulling UPPER STEM through LOWER ADJUSTING SCREW so as not to damage O RING, 153Q - 1", and 530Q - 2".

Remove LOWER ADJUSTING SCREW. Remove O RINGS, 491 - 1", 537 - 2", from LOWER ADJUSTING SCREW and insert in grooves provided in UPPER ADJUSTING SCREW. Replace UPPER ADJUSTING SCREW in BONNET and tighten. O RING, 491 - 1", 537 - 2", provides the necessary pressure seal. Unscrew UPPER STEM and replace in opposite end of PIVOT SLEEVE.

Using COUPLING BLOCK, pull LOWER STEM up to open position. Thread LOWER ADJUSTING SCREW in YOKE until end is flush with inside surface of YOKE. Set PIVOT on top of LOWER ADJUSTING SCREW with the beveled surface up. Replace SPRING with a SPRING PLATE in each end.

Invert Diaphragm Assembly from its original position and replace. Be sure UPPER STEM and LOWER STEM meet. With BLOCK SCREWS through INDICATOR, replace COUPLING BLOCK matching match marks. Replace BONNET and BOLTS and INDICATOR is in "Open" position, then tighten one turn. Move BREATHER PLUG to YOKE (Lower Diaphragm Housing). Connect Diaphragm Pressure from PILOT to BONNET (Upper Diaphragm Housing).

**NOTES:**



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#### APPLICATIONS:

For discharge of liquid or gas from vessels, separators, treaters, knockouts and other similar liquid accumulators.

For back pressure or pressure reducing applications with pressure pilots.

#### FEATURES:





- Compact design
- Soft seat with metal to metal backup
- Valve travel indicator
- Field reversible topworks
- Teflon packed stuffing box
- Bubble tight shut-off
- Piston balanced seat assembly

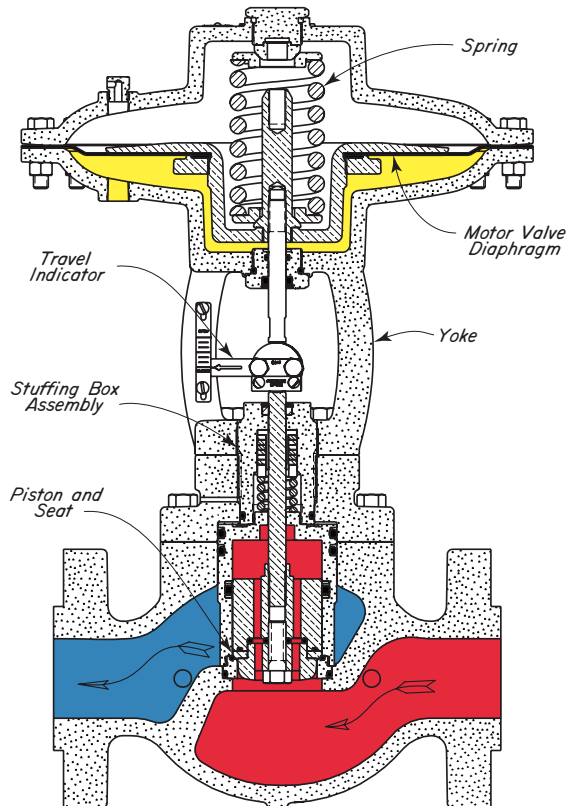
#### TOPWORKS:

Unless otherwise specified, all HPMV's will be furnished with ductile topworks, steel topworks available for 2". Specify when ordering.

#### Effective diaphragm area:

- 2" HPMV PB - 65 square inches
- 3" HPMV PB - 100 square inches
- 4" HPMV PB - 100 square inches
- 6" HPMV PB - 120 square inches
- 8" HPMV PB - 120 square inches
- 10" HPMV PB - 120 square inches

-  Motor Valve Diaphragm Assembly
-  Motor Valve Diaphragm Pressure
-  Upstream Pressure
-  Downstream Pressure



#### SPRINGS:

HPMV springs are available for diaphragm pressures of 15, 20, and 30 psig in the 2" valve and 30 psig in the 3" and 4" valve.

Unless otherwise specified, all PISTON BALANCED HPMV's will be furnished with 30 lb. springs.

Top Adjusting Screw may be adjusted to vary the spring tension slightly; this affects pressure required to actuate valve.

#### STEM TRAVEL:

- 2" HPMV PB - 3/4" nominal
- 3" HPMV PB - 1 3/8" nominal
- 4" HPMV PB - 1 3/4" nominal
- 6" HPMV PB - 2 1/2" nominal
- 8" HPMV PB - 2 1/2" nominal
- 10" HPMV PB - 2 1/2" nominal

#### ACTUATOR WORKING PRESSURE:

- 15-30 psig normal (see spring ranges)
- 45 psig maximum

#### WORKING PRESSURE:

- 2" HPMV PB - 1500, 4000 psig
- 3" HPMV PB - 1500 psig
- 4" HPMV PB - 1500 psig
- 6" HPMV PB - 1500 psig
- 8" HPMV PB - 1500 psig
- 10" HPMV PB - 1500 psig

#### INNER VALVE SIZES:

- 2" HPMV PB - 1 1/2" Equal Percentage 28.6 Cv
- 2" Equal Percentage 57 Cv
- 3" HPMV PB - 2" Equal Percentage 52.6 Cv
- 3" Equal Percentage 107 Cv
- 4" HPMV PB - 4 3/8" Equal Percentage 222 Cv
- 6" HPMV PB - 6 3/4" Equal Percentage 450 Cv
- 8" HPMV PB - 8 1/2" Equal Percentage 453-810 Cv
- 10" HPMV PB - 8 1/2" Equal Percentage 655-1091 Cv

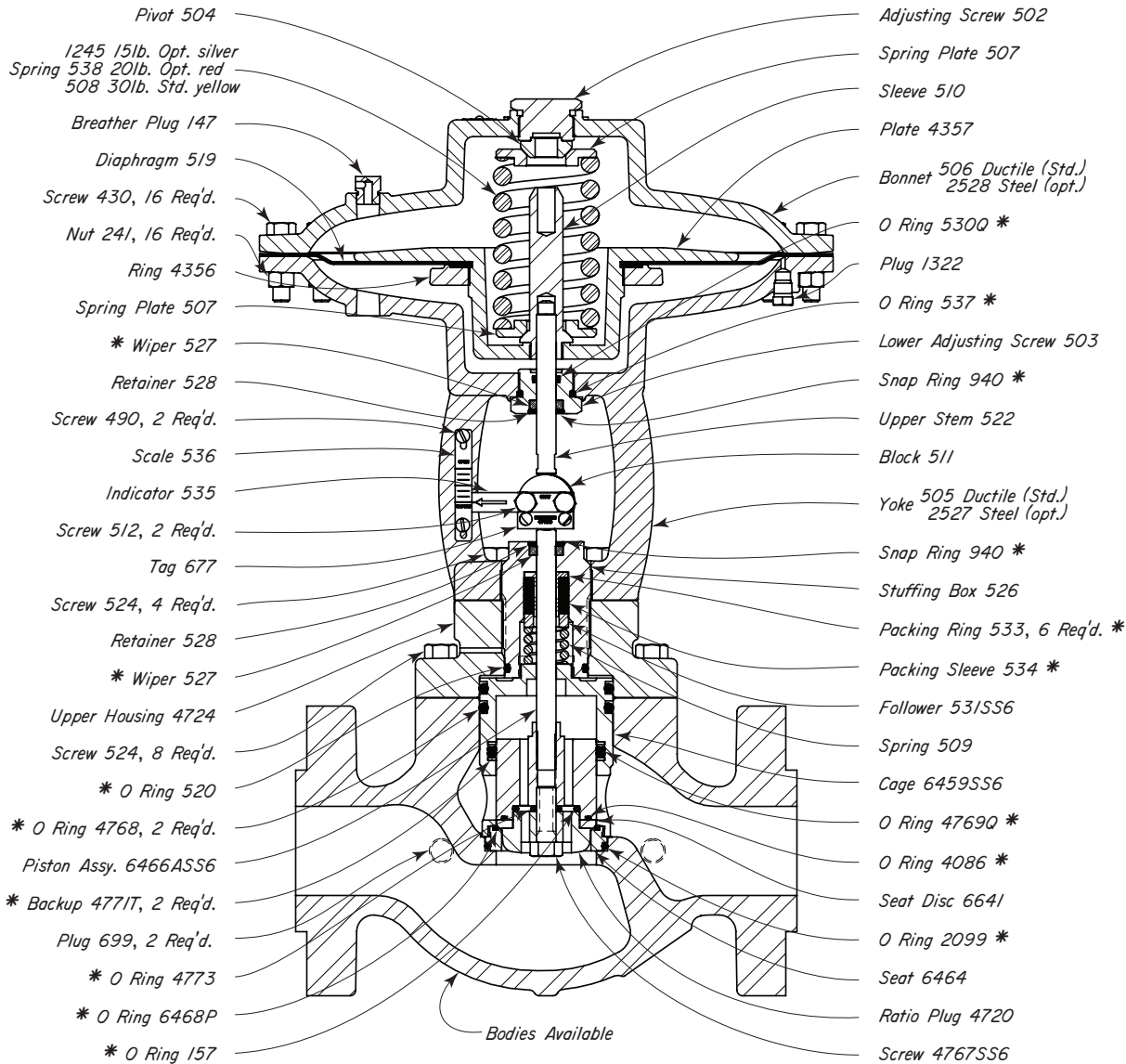
#### STANDARD TRIM SPECIFICATIONS:

- 316 stainless steel cage
- D-2 tool steel valve plug assembly
- D-2 tool steel seat
- Polyurethane seal with Metal-to-Metal back-up
- (Other material available on request)



Kimray is an ISO 9001- certified manufacturer.

## PISTON BALANCED 2" STEEL BODY DUCTILE TOPWORKS



BODY TYPE	SCREWED ‡			FLANGED		
	SIZE	BODY	W.P.	SIZE	BODY	ANSI CLASS
THRU	2"	4813	1500 psig	2"	4712	600 RF
	2"	4764	4000 psig	2"	4713	600 RTJ
				2"	4714	1500 RF
				2"	4715	1500 RTJ
				3"	4871	600 RF
				3"	4872	600 RTJ

‡ 2" NPT ANSI THREADS

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
EFG	2" SCR.D.	2150 SMT PB 2 IV	1500	RUR
EFH	2" SCR.D.	2400 SMT PB 2 IV	4000	RUR
EFI	2" FLGD.	2150 FMT PB 600 RF- 2 IV	1480	RUR
EFJ	2" FLGD.	2150 FMT PB 600 RTJ- 2 IV	1480	RUR
EFK	2" FLGD.	2150 FMT PB 1500 RF- 2 IV	3705	RUR
EFL	2" FLGD.	2150 FMT PB 1500 RTJ- 2 IV	3705	RUR
EFM	3" FLGD.	3150 FMT PB 600 RF- 2 IV	1480	RUR
EFO	3" FLGD.	3150 FMT PB 600 RTJ- 2 IV	1480	RUR

\*For working pressure vs. working temperature see ASME B16.34;  
 For flanges & flanged fittings see ASME B16.5.

### NOTES:

All standard HPMV's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

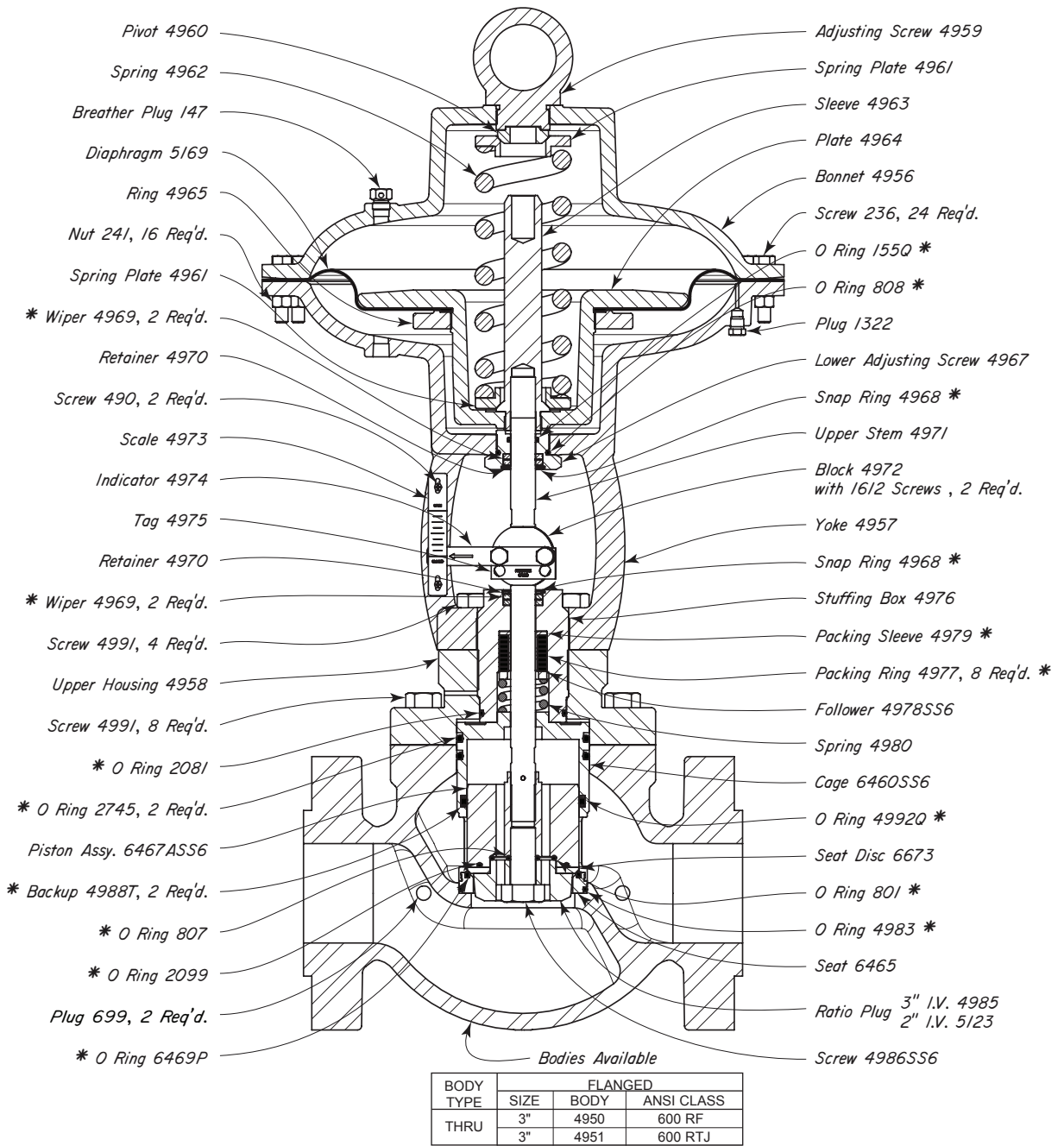
Dimensions refer to E1:100.3  
 For BOTTOM WORKS only refer to Bulletin No. E105357  
 For TOP WORKS only refer to Bulletin No. E106025

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

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### PISTON BALANCED 3" STEEL BODY DUCTILE TOPWORKS



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
EFU	3" FLGD.	3150 FMT PB 600 RF- 3 IV	1480	RUT
EFV	3" FLGD.	3150 FMT PB 600 RTJ- 3 IV	1480	RUT
EZU	3" FLGD.	3150 FMT PB 600 RF- 2 IV	1480	RUT

\*For working pressure vs. working temperature see ASME B16.34;  
For flanges & flanged fittings see ASME B16.5.

#### NOTES:

All standard HPMV's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

Dimensions refer to E1:100.3

For BOTTOM WORKS only refer to Bulletin No. E105356

For TOP WORKS only refer to Bulletin No. E106003

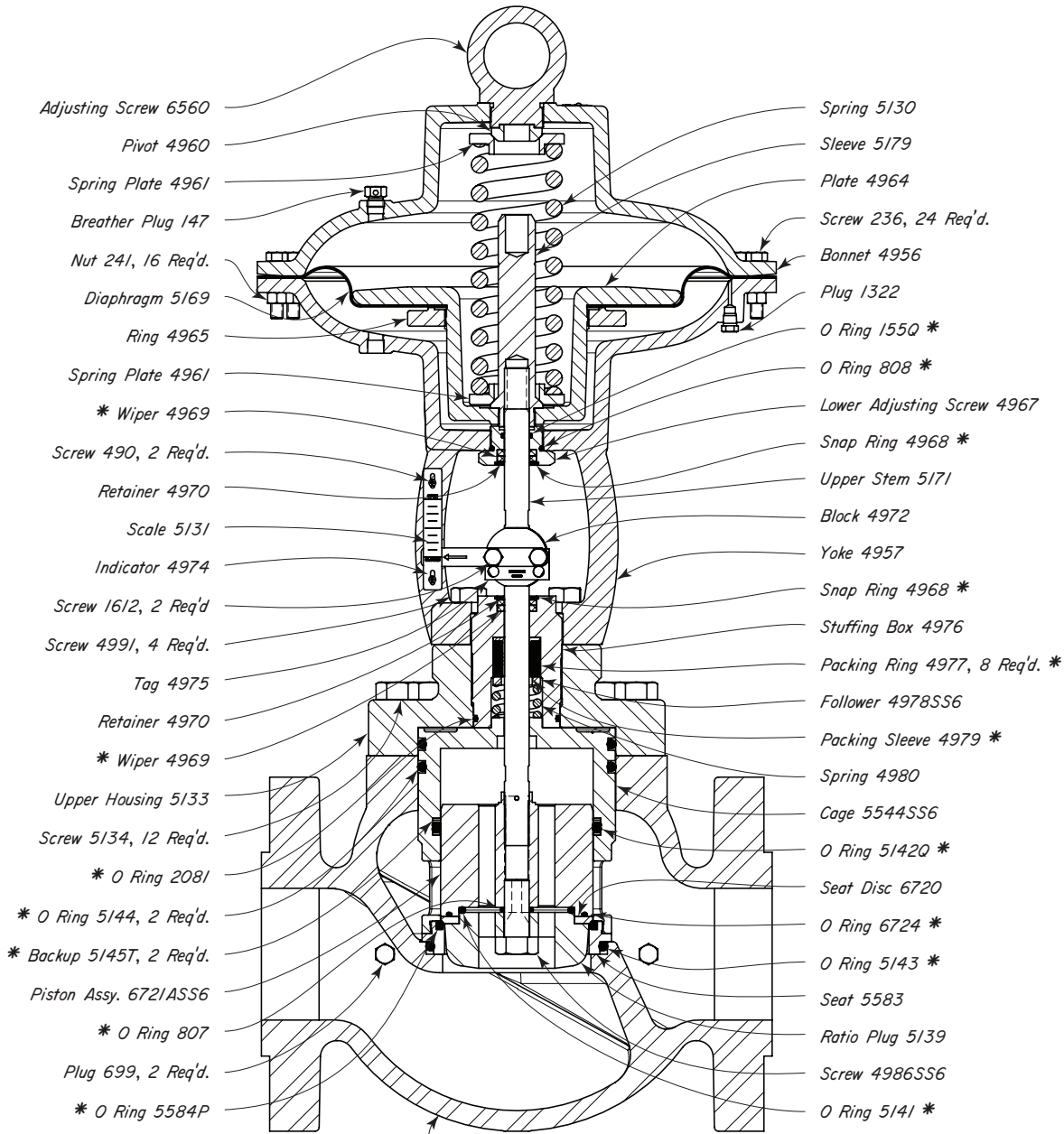
\*These are recommended spare parts and are stocked as repair kits.

Kimray is an ISO 9001- certified manufacturer.

# HIGH PRESSURE MOTOR VALVES



PISTON BALANCED  
4" STEEL BODY DUCTILE TOPWORKS



- Adjusting Screw 6560
- Pivot 4960
- Spring Plate 4961
- Breather Plug 147
- Nut 241, 16 Req'd.
- Diaphragm 5169
- Ring 4965
- Spring Plate 4961
- \* Wiper 4969
- Screw 490, 2 Req'd.
- Retainer 4970
- Scale 5131
- Indicator 4974
- Screw 1612, 2 Req'd
- Screw 4991, 4 Req'd.
- Tag 4975
- Retainer 4970
- \* Wiper 4969
- Upper Housing 5133
- Screw 5134, 12 Req'd.
- \* O Ring 2081
- \* O Ring 5144, 2 Req'd.
- \* Backup 5145T, 2 Req'd.
- Piston Assy. 6721ASS6
- \* O Ring 807
- Plug 699, 2 Req'd.
- \* O Ring 5584P

- Spring 5130
- Sleeve 5179
- Plate 4964
- Screw 236, 24 Req'd.
- Bonnet 4956
- Plug 1322
- O Ring 155Q \*
- O Ring 808 \*
- Lower Adjusting Screw 4967
- Snap Ring 4968 \*
- Upper Stem 5171
- Block 4972
- Yoke 4957
- Snap Ring 4968 \*
- Stuffing Box 4976
- Packing Ring 4977, 8 Req'd. \*
- Follower 4978SS6
- Packing Sleeve 4979 \*
- Spring 4980
- Cage 5544SS6
- O Ring 5142Q \*
- Seat Disc 6720
- O Ring 6724 \*
- O Ring 5143 \*
- Seat 5583
- Ratio Plug 5139
- Screw 4986SS6
- O Ring 5141 \*

Bodies Available

BODY TYPE	SIZE	FLANGED	
		BODY	ANSI CLASS
THRU	4"	5146	600 RF

**THRU VALVES AVAILABLE:**

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
EGU	4" FLGD.	4150 FMT PB 600 RF- 4 IV	1480	RUU

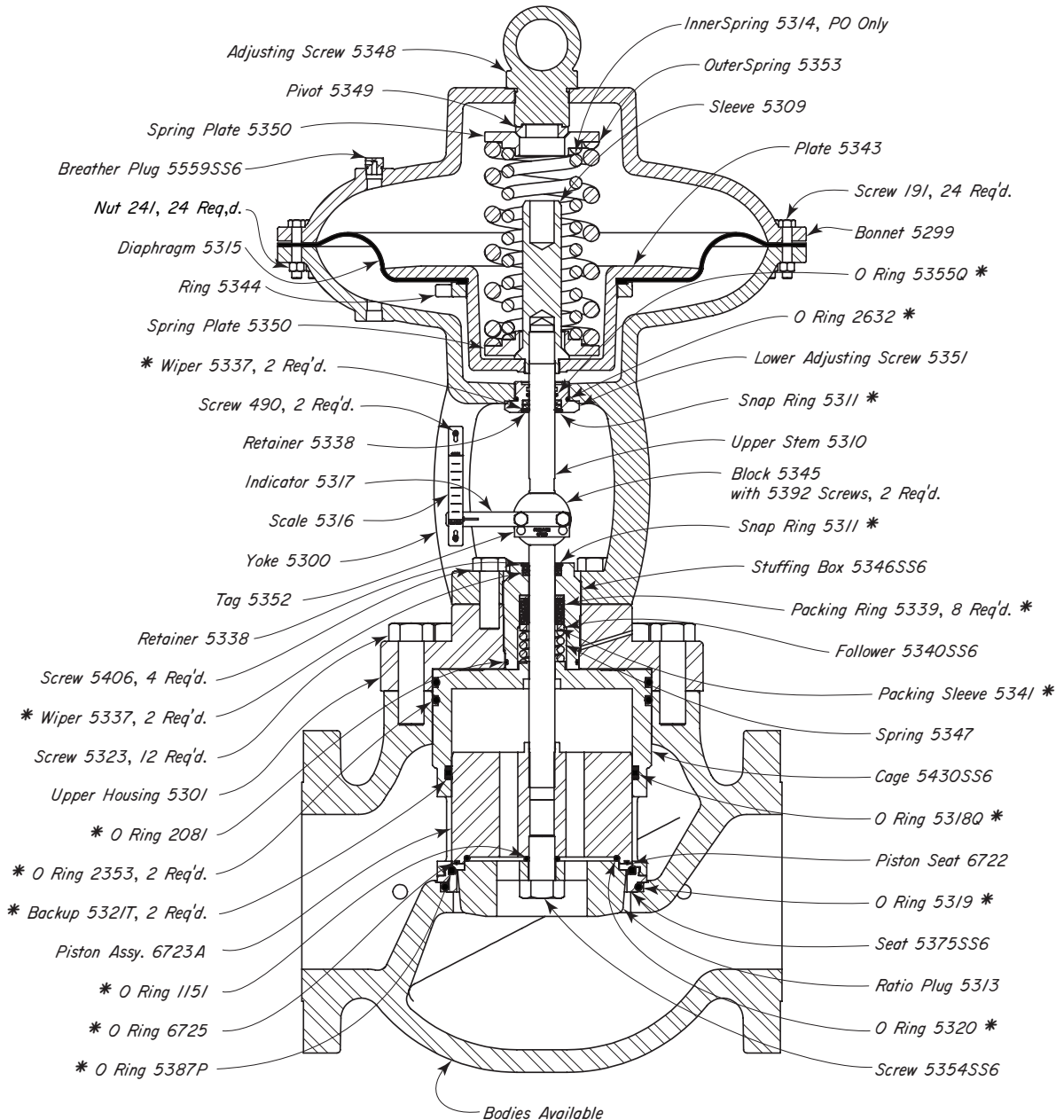
\*For working pressure vs. working temperature see ASME B16.34;  
For flanges & flanged fittings see ASME B16.5.

**NOTES:**

All standard HPMV's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering. Dimensions refer to E1:100.3  
For BOTTOM WORKS only refer to Bulletin No. E105354  
For TOP WORKS only refer to Bulletin No. E106003

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

Kimray is an ISO 9001- certified manufacturer.



Bodies Available

BODY	FLANGED	
	BODY	CLASS
THRU	5302	300 RF
	5322	600 RF

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
EIA	6" FLGD.	6150 FMT PB 300 RF= 6 IV	740	RWD
EIB	6" FLGD.	6150 FMT PB 600 RF= 6 IV	1480	RWD

\*For working pressure vs. working temperature see ASME B16.34;  
For flanges & flanged fittings see ASME B16.5.

#### NOTES:

NOTE: All standard HPMV's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering. Dimensions refer to E1:100.3

For BOTTOM WORKS only refer to Bulletin No. E105355  
For TOP WORKS only refer to Bulletin No. E106024

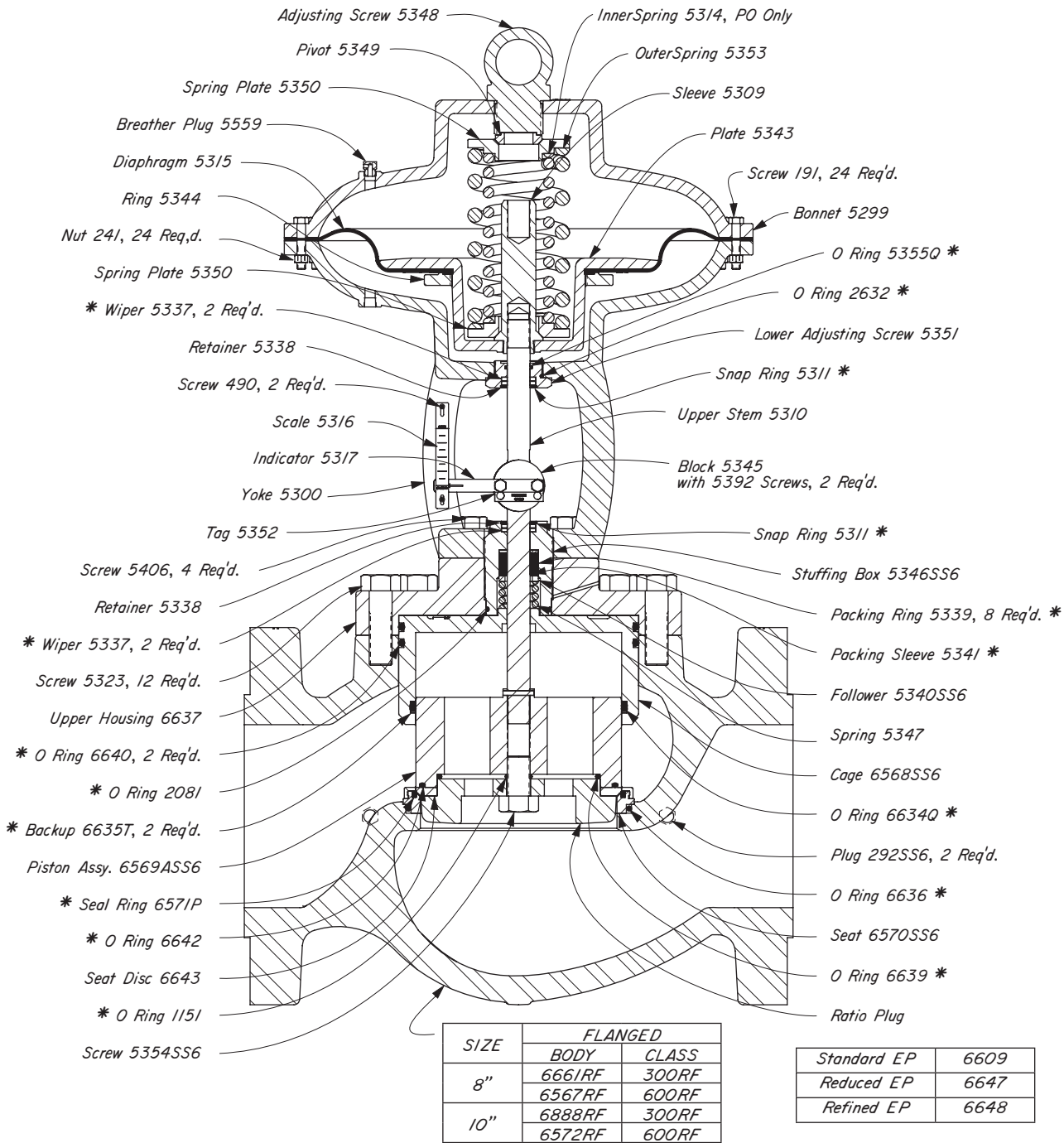
\*These are recommended spare parts and are stocked as repair kits.

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# HIGH PRESSURE MOTOR VALVES



## PISTON BALANCED 8" & 10" STEEL BODY DUCTILE TOPWORKS



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	KIT
EIM	8" FLGD.	8150 FMT PB 600 RF <sup>a</sup> 8 IV	1480	RWF
EIN	8" FLGD.	8150 FMT PB 300 RF <sup>a</sup> 8 IV	740	RWF
EIT	10" FLGD.	10150 FMT PB 600 RF <sup>a</sup> 8 IV	1480	RWF
EIX	10" FLGD.	10150 FMT PB 300 RF <sup>a</sup> 8 IV	740	RWF

### NOTES:

NOTE: All standard HPMV's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

Dimensions refer to E1:100.3

\*These are recommended spare parts and are stocked as repair kits. To order repair kit, specify "8" HPMV PB Repair Kit, RWF"

<sup>a</sup>For working pressure vs. working temperature see ASME B16.34;  
For flanges & flanged fittings see ASME B16.5.

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Allows a wider spring adjustment range for discharge of liquid or gas from vessels, separators, treaters, knockouts and similar liquid accumulators.

Allows a finer control when used with back pressure and pressure reducing controllers.

Used as an operator on 1" HPMV, 2" HPMV or 1" SMS.

#### FEATURES:

- All steel
- Compact design
- Valve travel indicator
- Adjustable Topworks

#### TOPWORKS:

-65 Topworks have an effective diaphragm area of approximately 65 square inches.

#### SPRINGS:

-65 Topworks are furnished with a spring designed for 10 to 30 psig diaphragm pressure.

Top Adjusting Screw may be adjusted to vary the spring tension slightly; this affects pressure required to actuate valve.

#### STEM TRAVEL:

3/4" maximum

#### ACTUATOR WORKING PRESSURE:

25 psig normal

45 psig maximum

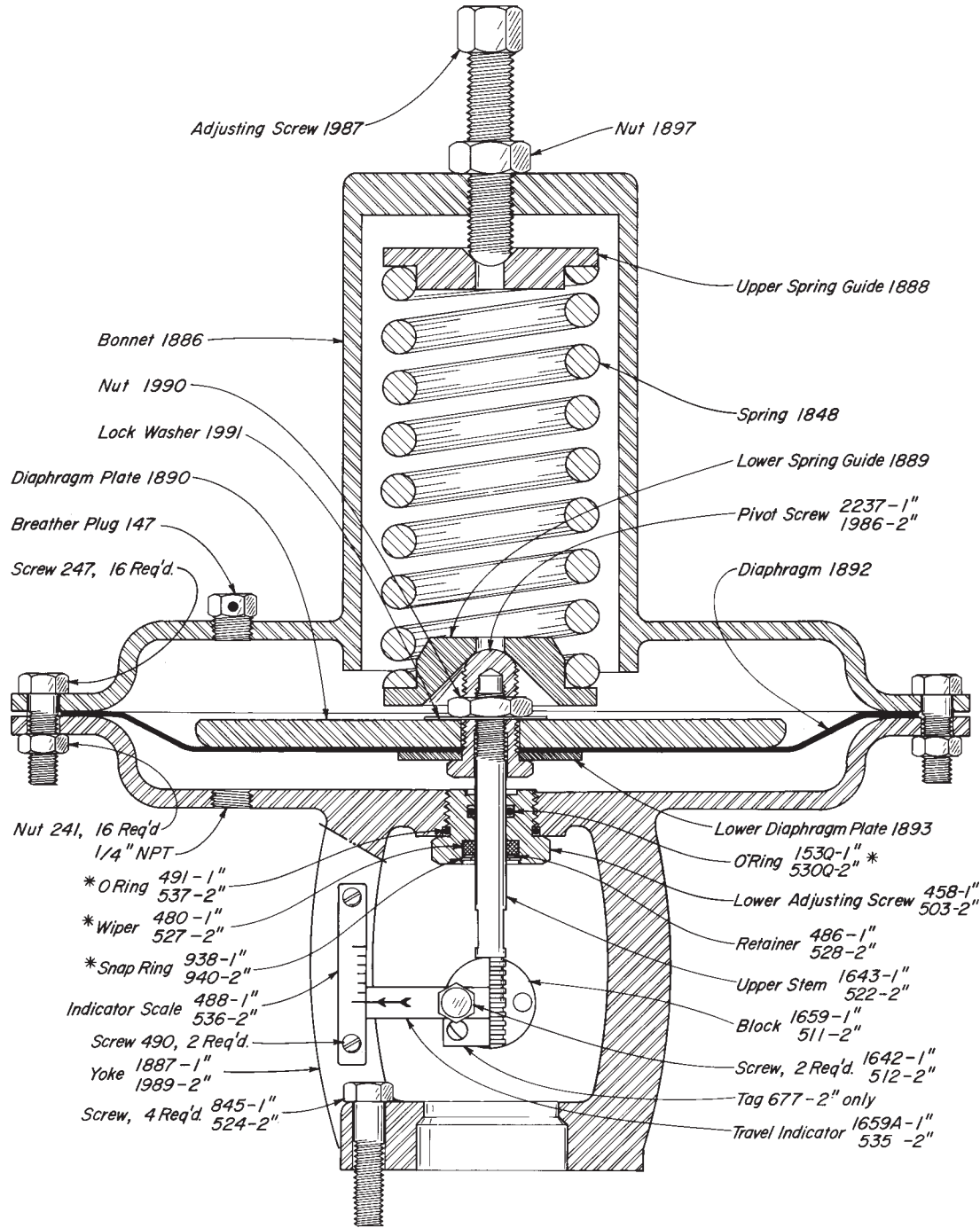


Kimray is an ISO 9001- certified manufacturer.

# HIGH PRESSURE MOTOR VALVES



1" & 2" -65 TOPWORKS  
STEEL



## THRU VALVES AVAILABLE:

CAT. NO.	LINE SIZE	TOPWORKS	OPER. PRES.	MAX W.P.	KIT
EAU	1"	1" -65 TOPWORKS	30	45	RHV
EBW	2"	2" -65 TOPWORKS	30	45	RHW

## NOTES:

For dimensions, refer to Table of Contents.

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

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

- Used on 2" HPMV's.
- For closing valves manually when supply is not available.
- For closing valves manually when there is pressure on the diaphragm.
- For limiting valve stem travel in the opened or closed direction.

#### FEATURES:

- Compact design
- Valve travel indicator
- Adjustable Topworks
- Sealed bearings

#### TOPWORKS:

- MVP's are furnished with a spring designed for 30 psig diaphragm pressure.

#### STEM TRAVEL:

- 3/4" maximum

#### ACTUATOR WORKING PRESSURE:

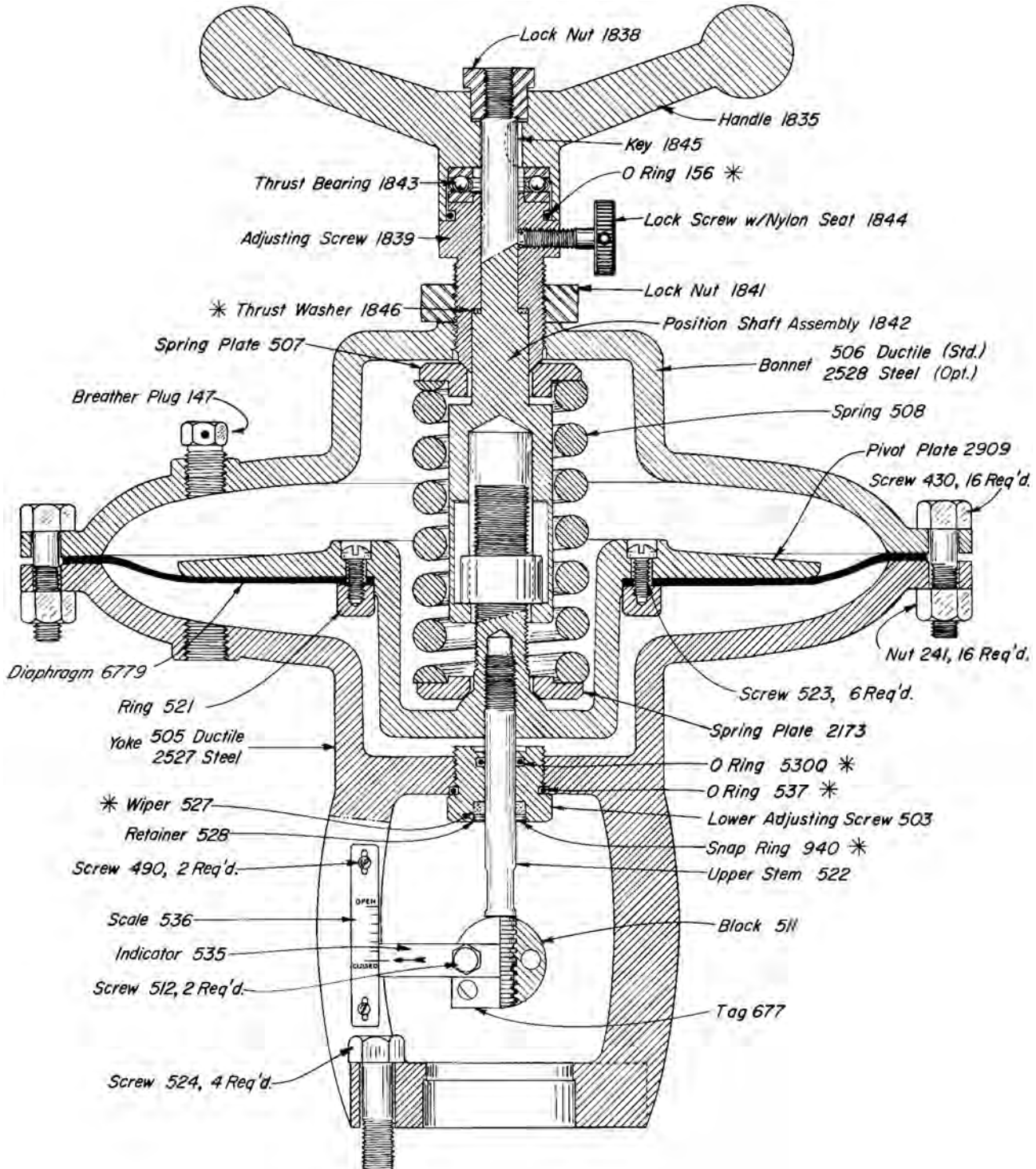
- 30 psig normal
- 45 psig maximum



# HIGH PRESSURE MOTOR VALVES



## MANUAL VALVE POSITIONER DUCTILE & STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	LINE SIZE	TOPWORKS	OPER. PRES.	MAX W.P.	KIT
EBX	2"	2" MVP	30	45	RFH
EBO	2"	2" MVP-S	30	45	RFH

### NOTES:

For dimensions, refer to Table of Contents.

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

Kimray is an ISO 9001- certified manufacturer.



#### APPLICATIONS:

Used as an operator on KIMRAY HPMV's where valve opening must be set independent of the pressure drop across the valve orifice.

Use for linear positioning of the inner valve of KIMRAY HPMV's where the positioning signal is a pressure.

#### FEATURES:

- Linear Stem movement in response to Sense line Pressure
- Maintains stem position through changes in force on stem
- Simple construction, no adjustments required
- Rapid response
- Insensitive to Supply Pressure changes
- Standard HPMV Topworks can be easily converted to Pneumatic Valve Positioner

#### SUPPLY PRESSURE:

35 to 45 psig

#### SENSE LINE PRESSURE:

3 to 17 psig with 20 lb. spring (Std.)  
5 to 23 psig with 30 lb. spring (Opt.)

#### STEM TRAVEL:

3/4" maximum

#### OPERATION:

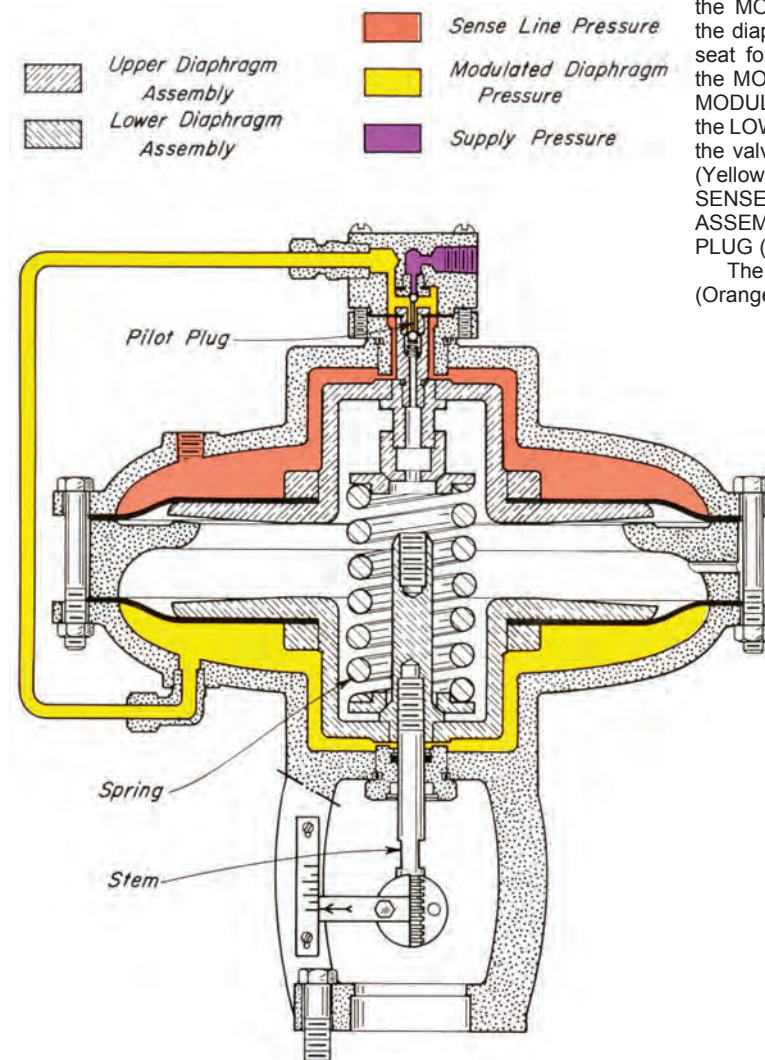
The UPPER DIAPHRAGM ASSEMBLY and the LOWER DIAPHRAGM AND STEM ASSEMBLY (Crosshatched) are the only moving units in the Valve Positioner. The PILOT PLUG consists of two stainless balls rigidly connected together. The upper seat for the PILOT PLUG is the SUPPLY PRESSURE inlet to the MODULATED DIAPHRAGM PRESSURE (Violet to Yellow). The lower seat for the PILOT PLUG is the MODULATED DIAPHRAGM PRESSURE vent (Yellow to Atmosphere).

The SPRING separates the UPPER DIAPHRAGM PLATE and the LOWER DIAPHRAGM PLATE. It is opposed on the top by the SENSE LINE PRESSURE (Orange) and on the under side by the MODULATED DIAPHRAGM PRESSURE (Yellow).

Assume the SENSE LINE PRESSURE (Orange) is increased. This forces the UPPER DIAPHRAGM ASSEMBLY downward and the upper seat for the PILOT PLUG (Violet to Yellow) is opened. This allows SUPPLY PRESSURE (Violet to Yellow) to provide a MODULATED DIAPHRAGM PRESSURE (Yellow) under the LOWER DIAPHRAGM ASSEMBLY. As the MODULATED DIAPHRAGM PRESSURE (Yellow) increases the SPRING is compressed and the movement of the LOWER DIAPHRAGM ASSEMBLY opens the valve. When the MODULATED DIAPHRAGM PRESSURE (Yellow) has increased enough to both open the valve and offset the SENSE LINE PRESSURE (Orange) the UPPER DIAPHRAGM ASSEMBLY is forced upward until the upper seat of the PILOT PLUG (Violet to Yellow) is closed.

When the SENSE LINE PRESSURE (Orange) is decreased the MODULATED DIAPHRAGM PRESSURE (Yellow) forces the diaphragm assemblies to move upward and open the lower seat for the PILOT PLUG (Yellow to Atmosphere) and vents the MODULATED DIAPHRAGM PRESSURE (Yellow). As the MODULATED DIAPHRAGM PRESSURE (Yellow) decreases the LOWER DIAPHRAGM ASSEMBLY moves downward closing the valve. When the MODULATED DIAPHRAGM PRESSURE (Yellow) has decreased enough to compensate for the reduced SENSE LINE PRESSURE (Orange) the UPPER DIAPHRAGM ASSEMBLY is forced downward until the lower seat of the PILOT PLUG (Yellow to Atmosphere) is closed.

The unique action of both the SENSE LINE PRESSURE (Orange) and the MODULATED DIAPHRAGM PRESSURE (Yellow) opposing the SPRING causes the valve positioner to produce a linear response to the SENSE LINE PRESSURE. This POSITION/SENSE LINE PRESSURE response characteristic is linear without regard for the force on the valve stem within the operating limits of the positioner.

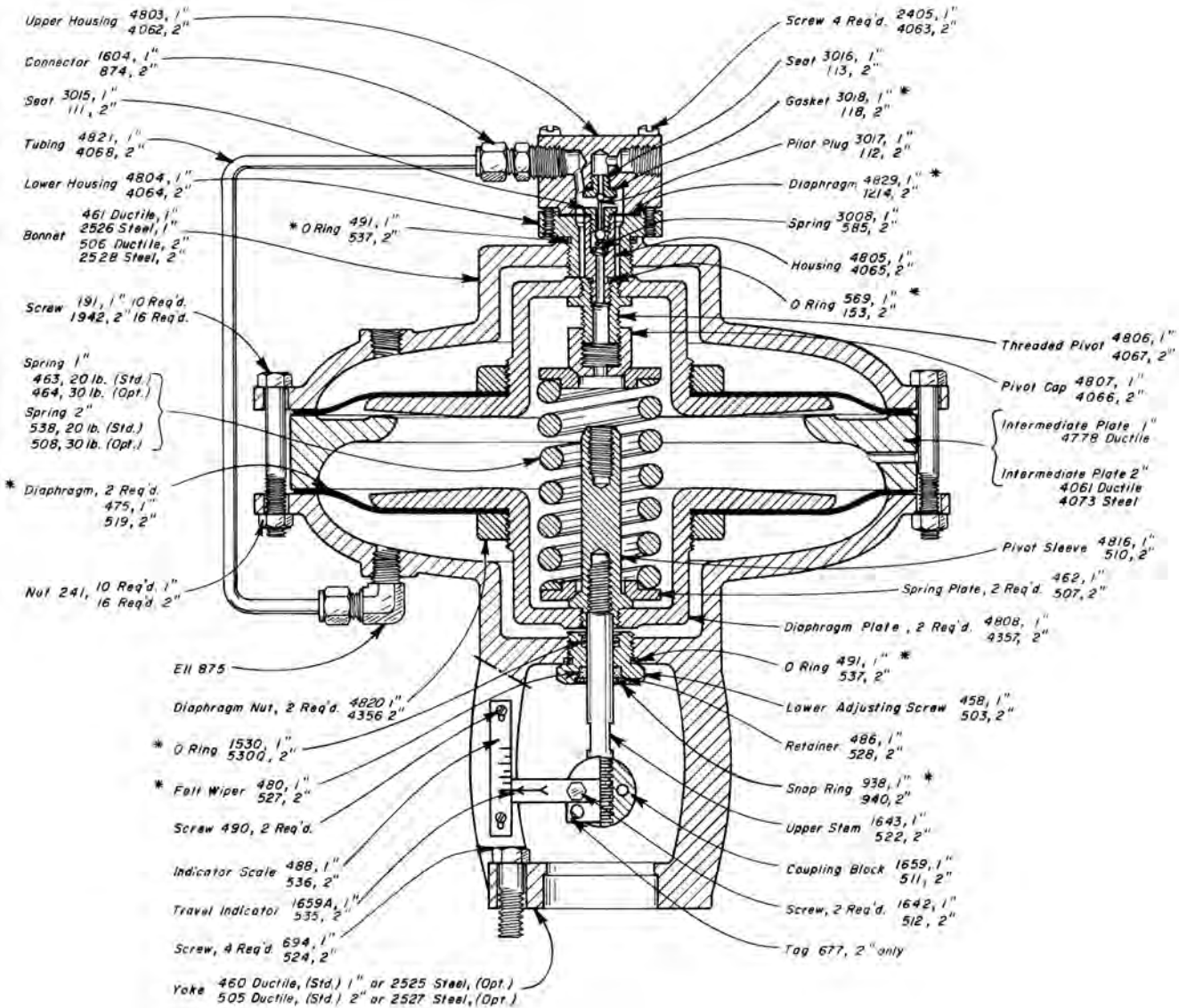


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# HIGH PRESSURE MOTOR VALVES



## PNEUMATIC VALVE POSITIONER DUCTILE & STEEL



### TOPWORKS AVAILABLE:

CAT. NO.	LINE SIZE	TOPWORKS	OPER. PRES.	MAX W.P.	KIT
EBV	1"	13 PVP	3-17	45	RRD
EBM	2"	23 PVP	3-17	45	RRE
EBS	2"	23 PVP-S	3-17	45	RRE

### NOTES:

For dimensions refer to Table of Contents.  
\*These are recommended spare parts and are stocked as repair kits.

#### APPLICATIONS:

Used on all Kimray HPCV topworks or any 30psig and lower diaphragm operated control valve.

Used for field automation where electrical signals or communications are used to actuate a single-acting spring return motor valve.

#### FEATURES:

- Low current consumption
- Class I Div 1 Explosion Proof enclosure
- 3/4" electrical conduit connection
- Discrete Inputs: Compatible with switches, relay contacts, and most flow computers, plunger-lift controllers, scada controllers, RTUs, PLCs, etc..
- MODBUS RTU communication: read actuator status and control remotely over RS-485
- Fail-safe or Fail-in-place options

#### SPECIFICATIONS:

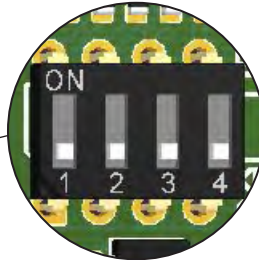
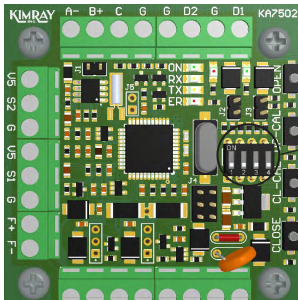
Pressure: 30 PSIG max

Temperature: -40° to +60°C (-40° to +140°F)

Voltage: 12VDC (11 - 14VDC) or 24VDC (22 - 26VDC)

Current: 4A Maximum

Current - Typical applications				
	12 FS	12 FIP	24 FS	24 FIP
Open	3 A	2.6 A	1.4 A	1.2 A
Hold Open	0.3 A	10 mA	0.2 A	10 mA
Closing	10 mA	0.3 A	10 mA	0.2 A
Hold Close	10 mA	10 mA	10 mA	10 mA



DIP SWITCH SETTINGS	ON	OFF
1	Calibration Mode	Operation Mode
2	Pressure to CLOSE valve	Pressure to OPEN valve
3	20 PSI	30 PSI (Default)
4	NC Solenoid	NO Solenoid

#### MANUFACTURING:

The EHA is produced at:  
Kimray, Inc. 52 NW 42nd St, Oklahoma City, Oklahoma, USA.

#### OPERATION:

The Electro-Hydraulic Actuator (EHA) is used to pressurize and release any single-acting spring-return diaphragm motor valve. The oil reservoir is comprised of the spring-containing side of the valve actuator and an additional reservoir attached to the top of the valve actuator. This additional reservoir is used for adding hydraulic oil and to serve as a visual indicator of hydraulic oil level. The other side of the diaphragm is used to contain pressure.

The EHA operates by moving hydraulic oil from one side of the diaphragm to the other through a manifold. A control circuit is used to operate a pump to build pressure, which is monitored via a pressure transducer. A solenoid valve allows the motor valve spring to relieve pressure.

When a discrete input is received at terminal D1 of the control circuit, the valve actuator begins to pressurize until the set maximum pressure is achieved. When a discrete input is received at terminal D2, the valve actuator begins to depressurize.

By using a normally open solenoid valve, the EHA features a mechanical fail-safe in the event of power loss. A normally-closed solenoid will create fail-in-place operation.

#### INSTALLATION:

For full installation instructions, please refer to Kimray document IM0001 available from [www.kimray.com](http://www.kimray.com)

HYDRAULIC OIL: Only use Kimray KIMZOIL HA1

#### WIRING:

- VIN - connect to +12V or +24V supply terminal
- GND—connect to +0V supply terminal
- D1/G—connect to dry contacts for OPEN function
- D2/G—connect to dry contacts for CLOSE function
- A/B/C—connect to RS-485 communication wires

WIRE GAUGE: Power inputs (VIN/GND) should be sized 12-20 AWG to minimize voltage drop. All other signals can be sized 12-30 AWG

NOTE: Wiring to or from this device, which leaves or enters the system enclosure, must utilize wiring methods suitable for Class I, Division 1 Hazardous Locations

WARNING: Explosion Hazard. Do not connect or disconnect this equipment unless power has been removed or the area is known to be nonhazardous.

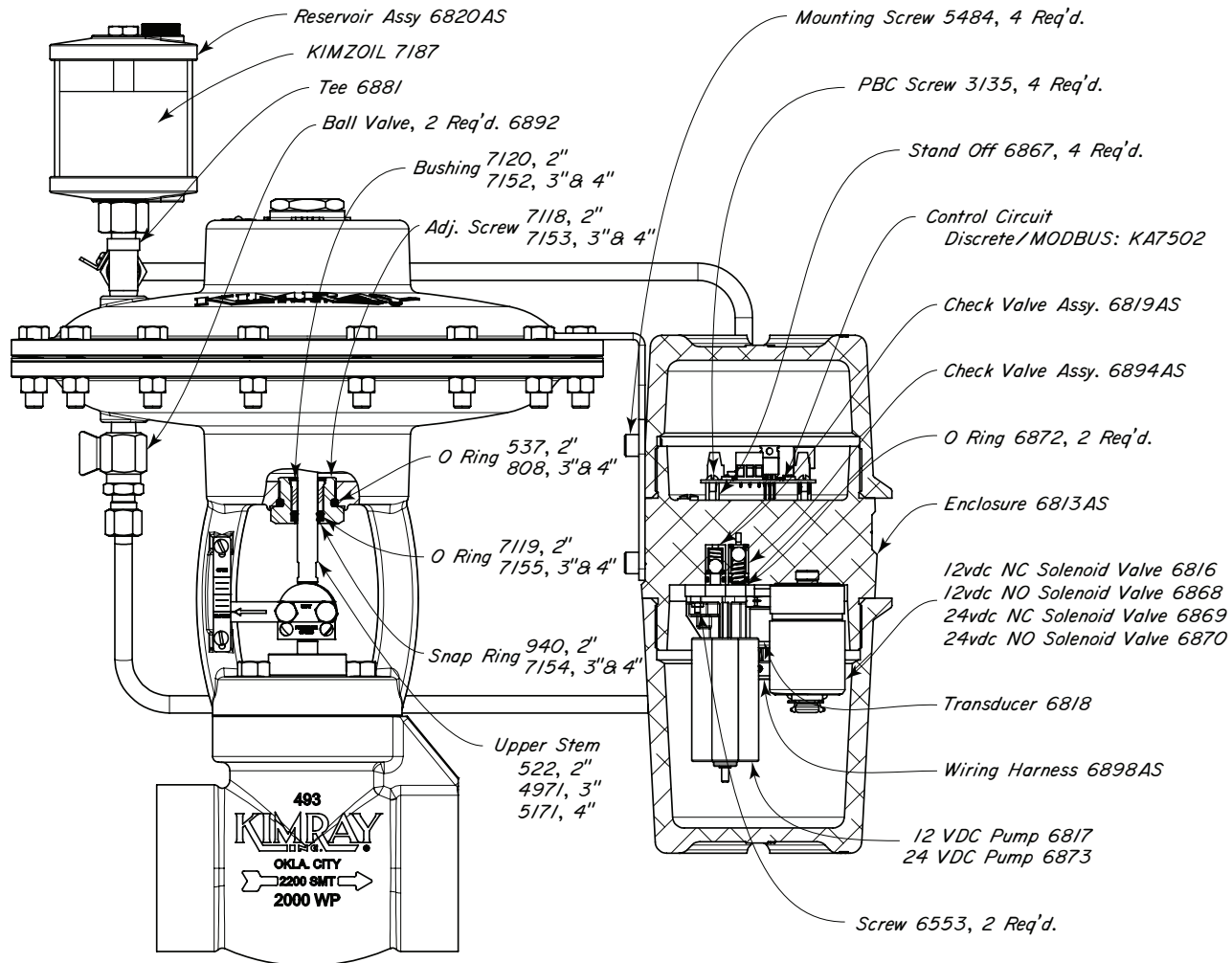


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# HIGH PRESSURE MOTOR VALVES



## ELECTRO HYDRAULIC ACTUATOR ALUMINUM



Adjusting Screw assembly may be purchased for valves equipped with old style Adjusting Screws for 2 inch valve order part number 7118AS for 3 & 4 inch valves order part number 7153AS

### ELECTRO-HYDRAULIC CONTROLLERS:

CAT. NO.	DESC.	OPER. PRESS.	CONTROL VOLTAGE
YHD	EHA 12 FS DM	30 psig	11-14 VDC
YHD24	EHA 24 FS DM	30 psig	22-26 VDC
YHE	EHA 12 FIP DM	30 psig	11-14 VDC
YHE24	EHA 24 FIP DM	30 psig	22-26 VDC

Codes are for Actuator only  
Can also be purchased mounted on valve as shown

### APPROVALS:



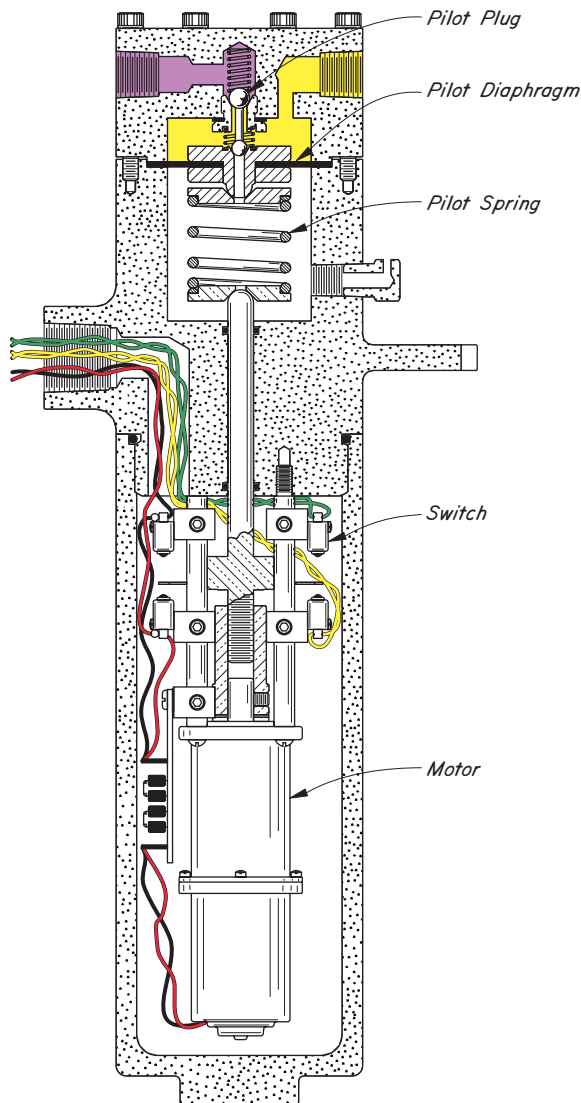
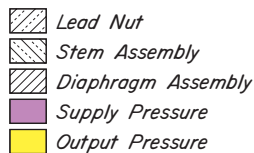
Class I, Div 1, Groups C and D;  
Class II, Div 1, Groups E, F, and G;  
Class III; T6

#### APPLICATIONS:

- Voltage to pressure converter
- Converts 12 Volt DC signal from relay or computer to a pneumatic signal for actuating a valve positioner

#### FEATURES:

- Motor over-travel protection switches
- Positioner full travel indication switches
- Explosion proof design
- Produces a linear output proportional to the pressure on the Pilot Spring
- Factory Calibrated for 0-15 psig, 0-30 psig or 0-100 psig Output Pressure range
- At loss of electrical signal Output Pressure and the resulting valve position remain the same
- Motor commutator noise filter
- Reverse EMF surge suppression



#### SPECIFICATIONS:

- Input Signal: 12 VDC pulse nominal, min. 11 VDC, max. 16 VDC
- Current
  - 15EPC: 225 mA sustained max. 375 mA peak
  - 30EPC: 225 mA sustained max. 360 mA peak
  - 100EPC: 385 mA sustained max. 520 mA peak
- 1/2" Electrical conduit connection
- Pneumatic connections 1/4" NPT
- Max. Supply Pressure(15EPC= 15 psig, 30EPC= 30 psig, 100EPC= 100 psig) marked "SUPPLY"
- Output Pressure signal (15EPC= 0-15 psig, 30EPC= 0-30 psig, 100EPC= 0-100 psig), marked "OUTPUT"
- Hazardous area rating  
CSA , Explosion proof, Certificate (179619 / 1578429)  
Class 1, Group C & D, T6 @ Ta = 60°C

#### MATERIALS:

- Body - Anodized Aluminum
- Springs - Steel or Zinc plated
- Diaphragm - Buna-N
- Valve Element - 316 SS
- Valve Seats - 303 SS

#### OPERATION:

The EPC consists of a DC ELECTRIC MOTOR driving a Stem Assembly to operate a pneumatic pilot. The MOTOR is protected from over-travel by a pair of limit SWITCHES. Another pair of SWITCHES provide signals that indicate full travel.

The MOTOR turns the Lead Nut, applying pressure through the Stem Assembly to the PILOT SPRING and Diaphragm Assembly which is opposed by the Output Pressure (Yellow) above the pilot diaphragm. The PILOT PLUG consists of two stainless steel balls rigidly connected together. The upper seat for the PILOT PLUG is the Supply Pressure inlet (Violet to Yellow). The lower seat for the PILOT PLUG is the Output Pressure vent (Yellow to Atmosphere) through the breather plug.

When a positive 12 VDC is applied to the BLACK LEAD and Ground to RED, the MOTOR moves the Stem Assembly upward, increasing force against the PILOT SPRING and moves the Diaphragm Assembly upward, first to close the lower seat of the PILOT PLUG (Yellow to Atmosphere), then to open the upper seat of the PILOT PLUG (Violet to Yellow). This results in an increase in Output Pressure (Yellow). Pressure will remain the same until a new input voltage is applied.

When a positive 12 VDC is applied to the RED LEAD and Ground to BLACK, the Motor moves the Stem Assembly downward, releasing force from the PILOT SPRING and allowing Output Pressure (Yellow) to force the Diaphragm Assembly downward, first to close the upper seat of the PILOT PLUG (Violet to Yellow), then to Open the lower seat of the PILOT PLUG (Yellow to Atmosphere). This results in relief of Output Pressure (Yellow) through the breather plug. Pressure will remain the same until a new input voltage is applied.

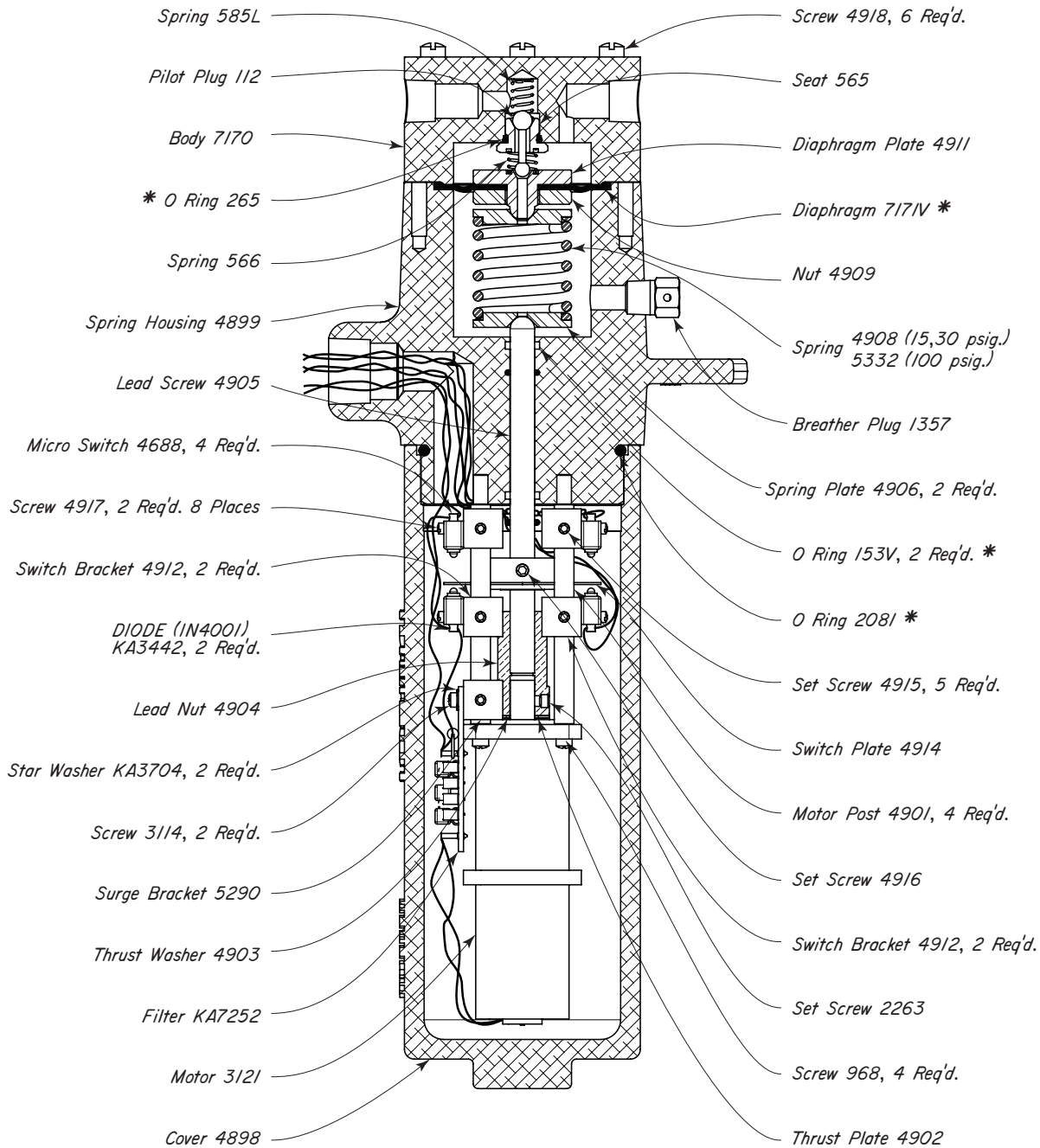


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# HIGH PRESSURE MOTOR VALVES



## ELECTRO-PNEUMATIC CONTROLLER ALUMINUM



### ELECTRO-PNEUMATIC CONTROLLERS:

CAT. NO.	DESC.	OPER. PRESS.	CONTROL VOLTAGE	REPAIR KIT
YHA	15 EPC	15	12 VDC	RSS
YHB	30 EPC	30	12 VDC	RSS
YHC	100 EPC	100	12 VDC	RSS

### INSTALLATION:

#### ELECTRICAL CONNECTIONS:

RED (- Open)(+ Close)	}	Open / Close Control
BLACK (+ Open)(- Close)		
YELLOW N/O	}	Closed Position Switch
BROWN COM		
ORANGE N/C		
GREEN N/O	}	Open Position Switch
BROWN COM		
ORANGE N/C		

#### PNEUMATIC CONNECTIONS: (1/4" NPT Female)

"I" - Input

"O" - Output

Note: A conduit seal shall be installed to maintain CSA explosion proof certification.

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#### APPLICATIONS:

This valve can be used to meter or control flow of liquids and/or gases on meter runs, flow lines, or may be used as a choke under low pressure drop conditions where freezing is not a problem.

Used any time a reference control point is required in 64<sup>ths</sup> of an inch opening.

#### FEATURES:

- Compact design
- O Ring sealed seat
- Teflon packed stuffing box
- Ball-in-Cone seat design
- Easily adjusted
- Large adjusting knob
- Large adjusting screw

#### STEM TRAVEL:

- 1" Meter Valve 1/2" maximum
- 2" Meter Valve 3/4" maximum

#### OPERATIONS:

Rotation of the adjusting knob raises or lowers the valve plug relative to the valve seat. Six full turns are required to fully open the valve. Opening is graduated in 64<sup>ths</sup>.

#### WORKING PRESSURE:

- 1" 4000 psig
- 2" 2000 and 4000 psig

#### MAXIMUM PRESSURE DROP:

- 1" All Sizes 4000 psig
- 2" 7/16" EP Seat 4000 psig
- 2" 5/8" EP Seat 3000 psig
- 2" 7/8" EP Seat 1500 psig

#### INNER VALVE SIZES:

- 1" Equal Percentage Seats 1/4", 1/2"
- 1" Linear Seats 1/4", 1/2"
- 2" Equal Percentage Seats 7/16", 5/8" and 7/8"

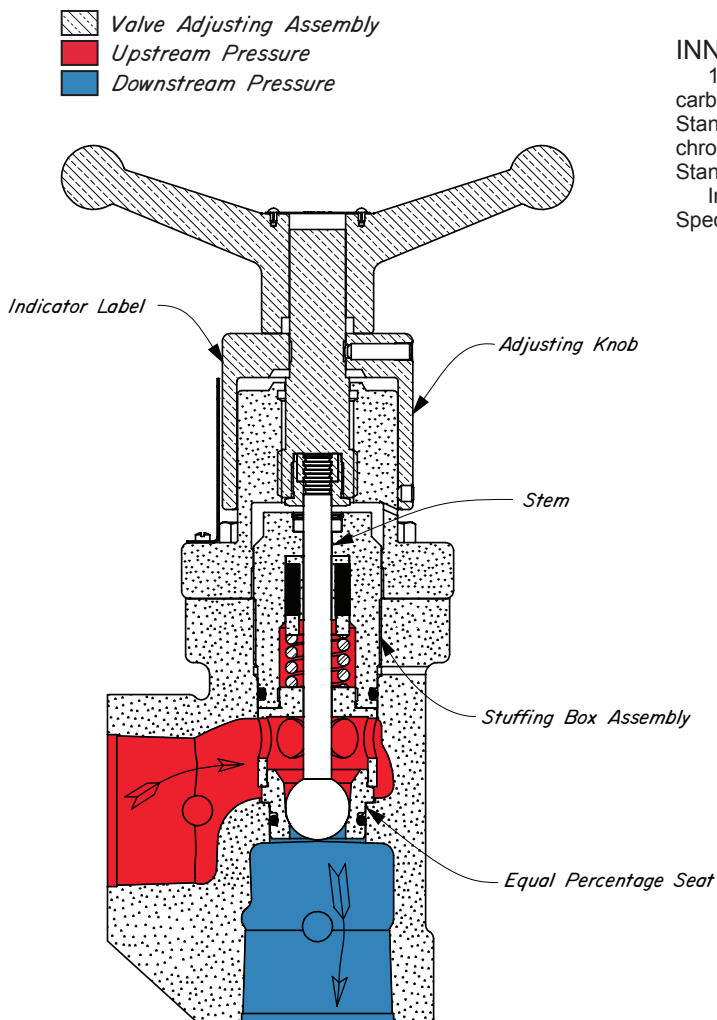
#### CAPACITIES:

Refer to Table of Contents

#### INNER VALVE SPECIFICATIONS:

1" & 2" MV-Standard valve plug for 7/16" consists of a carbide ball rigidly connected to a 303 stainless steel stem. Standard valve plugs for 5/8" and 7/8" consist of a hardened high chrome alloy ball rigidly connected to a 303 stainless steel stem. Standard seats are made of heat treated tool steel.

Inner valves can be made from a wide selection of materials. Specify when ordering.

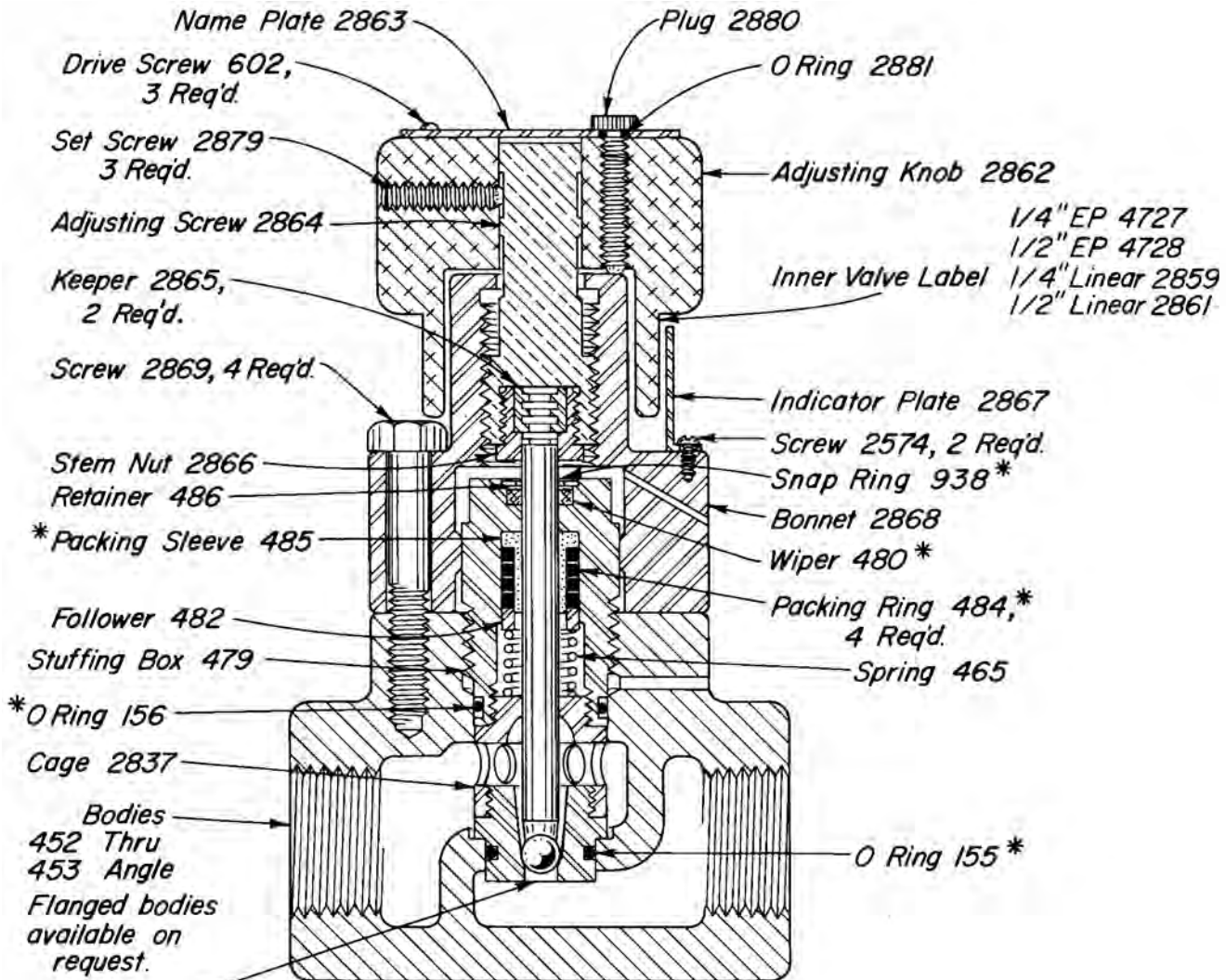


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# HIGH PRESSURE MOTOR VALVES



1" METERING VALVE  
STEEL



Inner Valves

E.P. Inner Valves		Linear Inner Valves	
Size	Trim Set No.	Size	Trim Set No.
1/4"	T4730MV	1/4"	T4729MV
1/2"	T4732MV	1/2"	T4731MV

## THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EGA	1/4"	1400 SMVT 1/4 EP IV	4000	RSH
EGB	1/2"	1400 SMVT 1/2 EP IV	4000	RSH
EGC	1/4"	1400 SMVT 1/4 LINIV	4000	RSH
EGD	1/2"	1400 SMVT 1/2 LIN IV	4000	RSH

## NOTES:

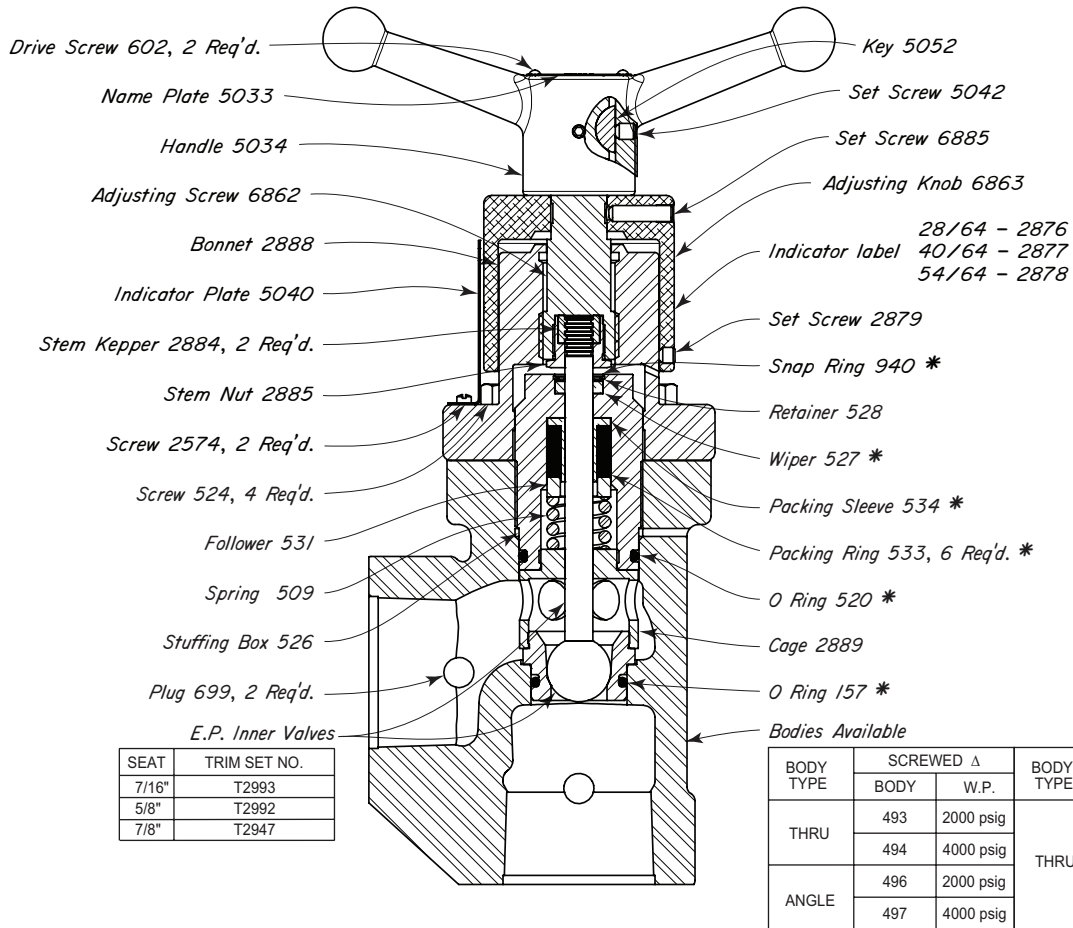
All standard Metering Valves have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel upon special request. Inner valves can be made from a wide selection of materials. Specify when ordering.

Flanged bodies are available. All bodies are available with a 1/4" NPT tapped hole upstream and downstream. Specify when ordering.

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

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SEAT	TRIM SET NO.
7/16"	T2993
5/8"	T2992
7/8"	T2947

BODY TYPE	SCREWED Δ		BODY TYPE	FLANGED	
	BODY	W.P.		BODY	ANSI CLASS
THRU	493	2000 psig	THRU	4510	150 RF
	494	4000 psig		4511	300 RTJ
ANGLE	496	2000 psig		4512	300 RF
				4513	600 RF
	497	4000 psig		4514	600 RTJ
				4515	1500 RTJ
		4516	1500 RF		
		4230	2500 RF		

#### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EEJ	1/4"	2200 SMVT 1/4 IV	2000	RSE
EEL	7/16"	2200 SMVT 7/16 IV	2000	RSE
EEN	5/8"	2200 SMVT 5/8 IV	2000	RSE
EET	7/8"	2200 SMVT 7/8 IV	2000	RSE
EET	5/8"	2400 SMVT 5/8 IV	4000	RSE
EEW	7/8"	2400 SMVT 7/8 IV	4000	RSE
MAQ	7/16"	2500 FMVT 2500RTJ <sup>†</sup>	5000	RSE

All standard Metering Valves have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

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

Current Revision:  
Change Knob to T-Handle

#### ANGLE VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	MAX W.P.	KIT
EEK	7/16"	2200 SMVA 7/16 IV	2000	RSE
EEM	5/8"	2200 SMVA 5/8 IV	2000	RSE
EEO	7/8"	2200 SMVA 7/8 IV	2000	RSE
EES	5/8"	2400 SMVA 5/8 IV	4000	RSE
EEV	7/8"	2400 SMVA 7/8 IV	4000	RSE

Flanged and socket weld bodies are available. All bodies are available with a 1/4" NPT tapped hole upstream and downstream. Specify when ordering.

For dimensions, refer to Table of Contents. Flanged dimensions available upon request.

<sup>†</sup>For working pressure vs. working temperature see ASME B16.34;

For flanges & flanged fittings see ASME B16.5.

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**NOTES:**



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#### APPLICATIONS:

This valve can be used to meter or control flow of liquids and/or gases on meter runs, flow lines, or may be used as a choke under low pressure drop conditions where freezing is not a problem.

Used any time a reference control point is required in 64<sup>ths</sup> of an inch opening.

#### FEATURES:

- Compact design
- O Ring sealed seat
- Teflon packed stuffing box
- Easily adjusted
- Large adjusting knob
- Large adjusting screw

#### STEM TRAVEL:

- 2" HPMV PB -  $\frac{3}{4}$ " nominal
- 3" HPMV PB -  $1\frac{3}{8}$ " nominal

#### OPERATIONS:

Rotation of the adjusting knob raises or lowers the valve plug relative to the valve seat. Six full turns are required to fully open the valve. Opening is graduated in 64<sup>ths</sup>.

#### WORKING PRESSURE:




- 2" HPMV PB - 1500, 4000 psig
- 3" HPMV PB - 1500 psig

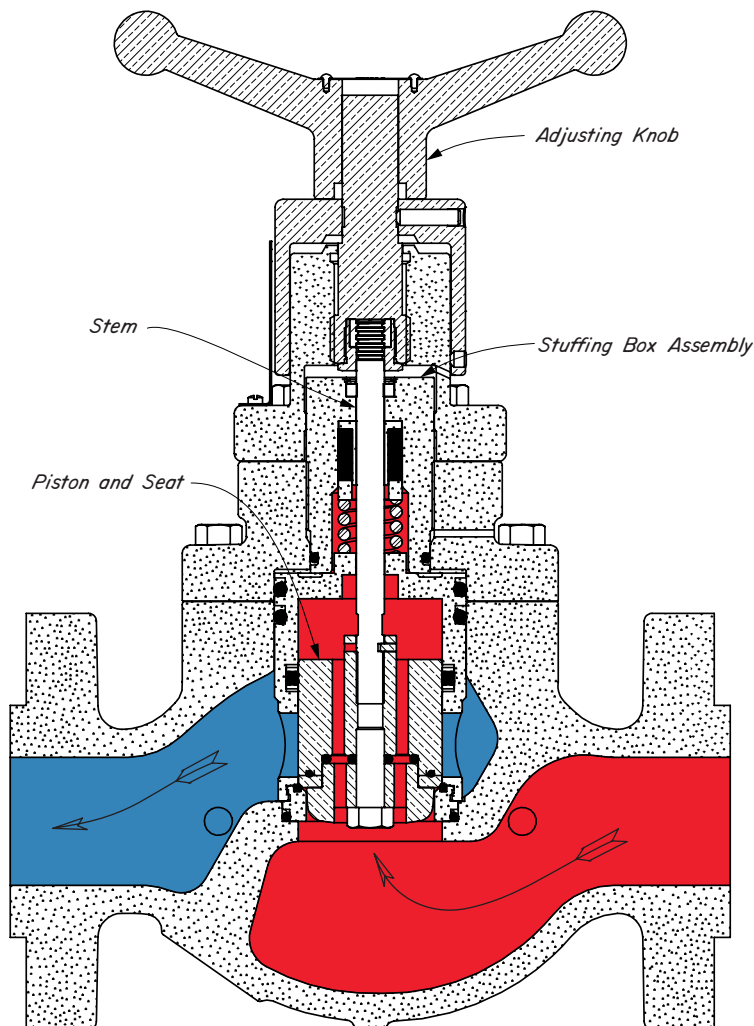
#### INNER VALVE SIZES:

- 2" HPMV PB - 1 $\frac{1}{2}$ " & 2" Equal Percentage
- 3" HPMV PB - 2" & 3" Equal Percentage

#### STANDARD TRIM SPECIFICATIONS:

- 316 stainless steel cage
- D-2 tool steel valve plug assembly
- D-2 tool steel seat
- Polyurethane seal with Metal-to-Metal back-up
- (Other material available on request)

-  Valve Adjusting Assembly
-  Upstream Pressure
-  Downstream Pressure

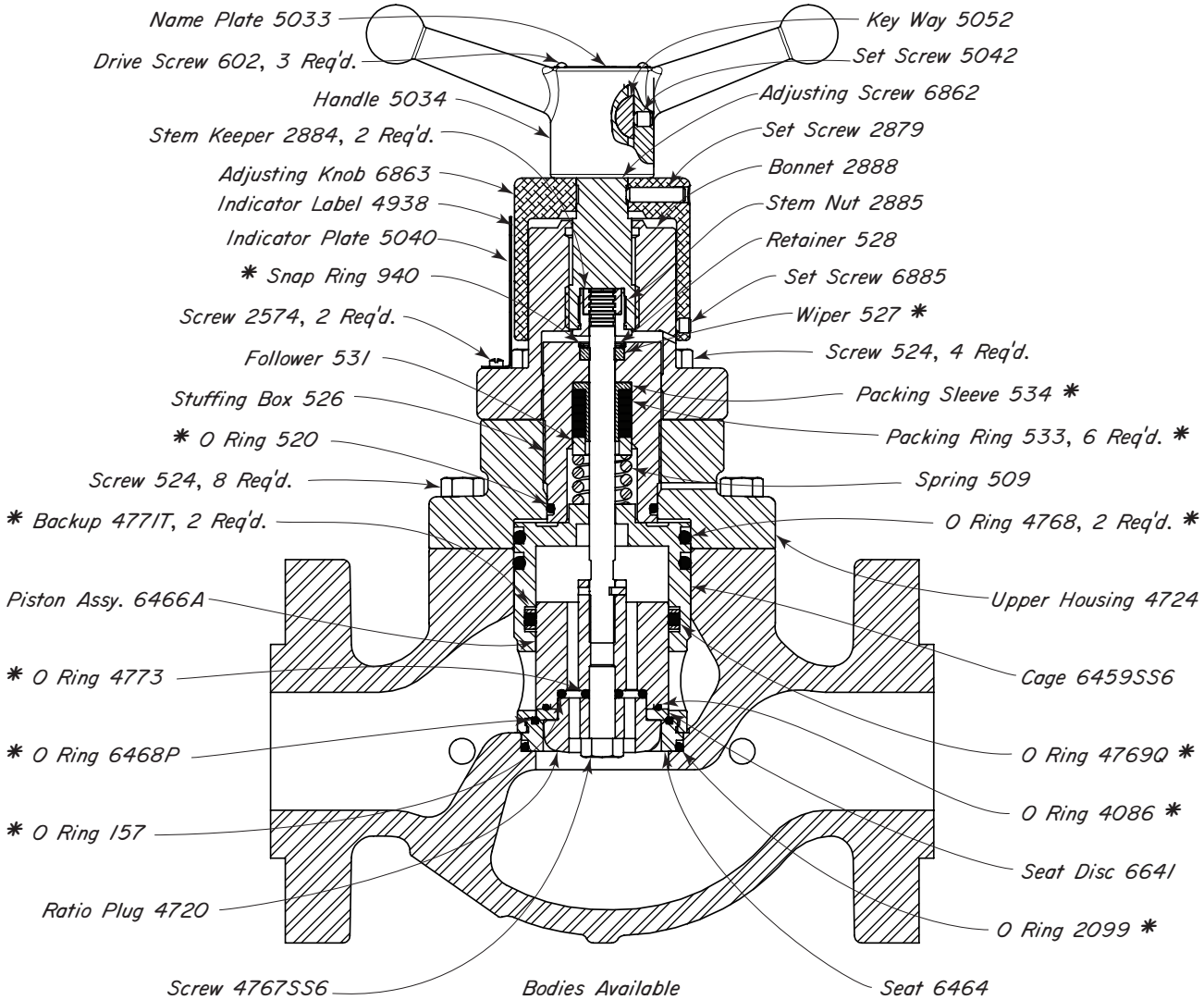


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# HIGH PRESSURE MOTOR VALVES



## 2" PISTON BALANCED METERING VALVE STEEL



BODY TYPE	SCREWED		FLANGED	
	BODY	W.P.	BODY	W.P.
THRU	4813	1500 lbs.	4712	600 RF
	4764	4000 lbs.	4713	600 RTJ
			4714	1500 RF
			4715	1500 RTJ

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	REPAIR KIT
EFE	2" SCRD.	2150 SMVT PB 2 IV	1500	RSN
EGF	2" SCRD.	2400 SMVT PB 2 IV	4000	RSN
EGE	2" FLGD.	2 FMVT PB 600RF	1480	RSN
MBK	2" FLGD.	2 FMVT PB 1500RF	3705	RSN

### NOTES:

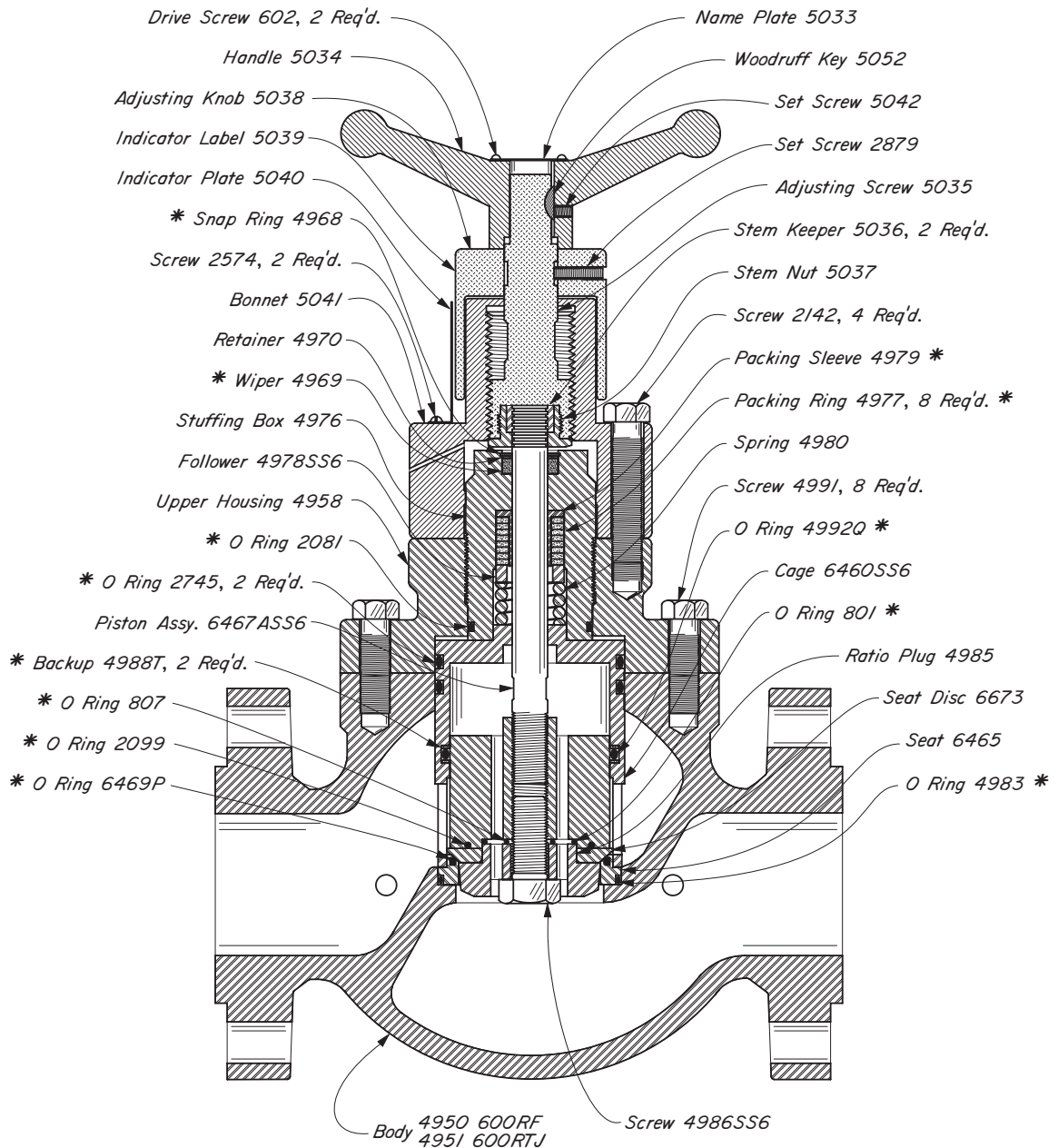
All standard Metering Valves have a Cat. No. seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel upon special request. Inner valves can be made from a wide selection of materials. Specify when ordering.

Flanged bodies are available. All bodies are available with a 1/4" NPT tapped hole upstream and downstream. Specify when ordering.

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

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### 3" PISTON BALANCED METERING VALVE STEEL



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	VALVE	MAX W.P.	REPAIR KIT
EGL	3" FLGD.	3150 FMVT PB 600 RF	1480	RSO
EGM	3" FLGD.	3150 FMVT PB 600 RTJ	1480	RSO

#### NOTES:

All standard Metering Valves have a Cat. No. seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel upon special request. Inner valves can be made from a wide selection of materials. Specify when ordering.

Flanged bodies are available. All bodies are available with a 1/4" NPT tapped hole upstream and downstream. Specify when ordering.

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

**NOTES:**



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#### APPLICATIONS:

For the discharge of liquid from vessels where freezing may occur due to high pressure drop. The inner valve is located to utilize vessel heat to help prevent freezing.

Recommended for use as a pressure opening valve only in non-freeze applications. Excessive diaphragm pressure would be required for pressure closing service.

The -65 allows a wider spring adjustment range for the discharge of liquid from vessels where freezing may occur due to high pressure drop.

#### FEATURES:

- Compact design
- Carboloy valve plug
- O Ring sealed seat
- Valve travel indicator
- Teflon packed stuffing box
- Can be used as a standard 1" angle valve by reversing the direction of flow.
- Easy removal of seat
- 1" NPT inlet and outlet
- 2" NPT vessel mounting

#### TOPWORKS:

Standard topworks have an effective diaphragm area of approximately 30 square inches.

-65 Topworks have an effective diaphragm area of approximately 65 square inches.

#### SPRINGS:

Standard SMS is furnished with a spring de-signed for 30 psig diaphragm pressure.

-65 SMS is furnished with a spring designed for 10 to 30 psig diaphragm pressure.

Top adjusting screw may be adjusted to vary spring tension slightly; This affects pressure required to actuate valve.

#### STEM TRAVEL:

- SMS - 1/2" maximum
- 65 SMS - 3/4" maximum

#### ACTUATOR WORKING PRESSURE:

- 30 psig normal
- 45 psig maximum

#### WORKING PRESSURE:

- 4000 psig maximum

#### MAXIMUM PRESSURE DROP:

- SMS - 1/8", 3/16" and 1/4"(std.) - 2000 psig maximum
- 3/8" - 800 psig maximum
- 1/2" - 450 psig maximum
- 65 SMS - 1/8", 3/16", 1/4", 3/8" and 1/2" - 4000 psig maximum

#### INNER VALVE SIZES:

- 1/8", 3/16", 1/4", 3/8" and 1/2"

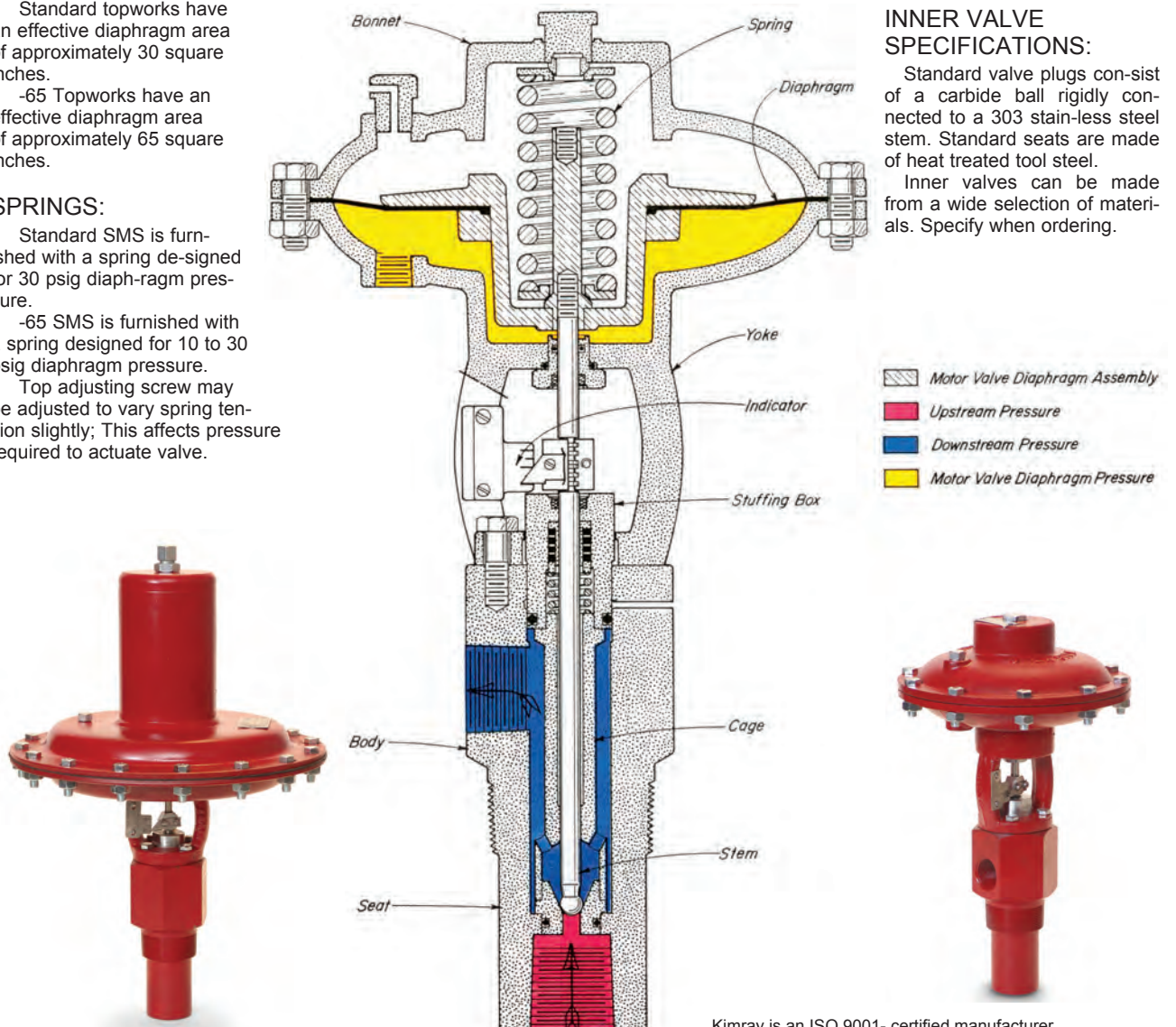
#### CAPACITIES:

Refer to Table of Contents.

#### INNER VALVE SPECIFICATIONS:

Standard valve plugs consist of a carbide ball rigidly connected to a 303 stain-less steel stem. Standard seats are made of heat treated tool steel.

Inner valves can be made from a wide selection of materials. Specify when ordering.

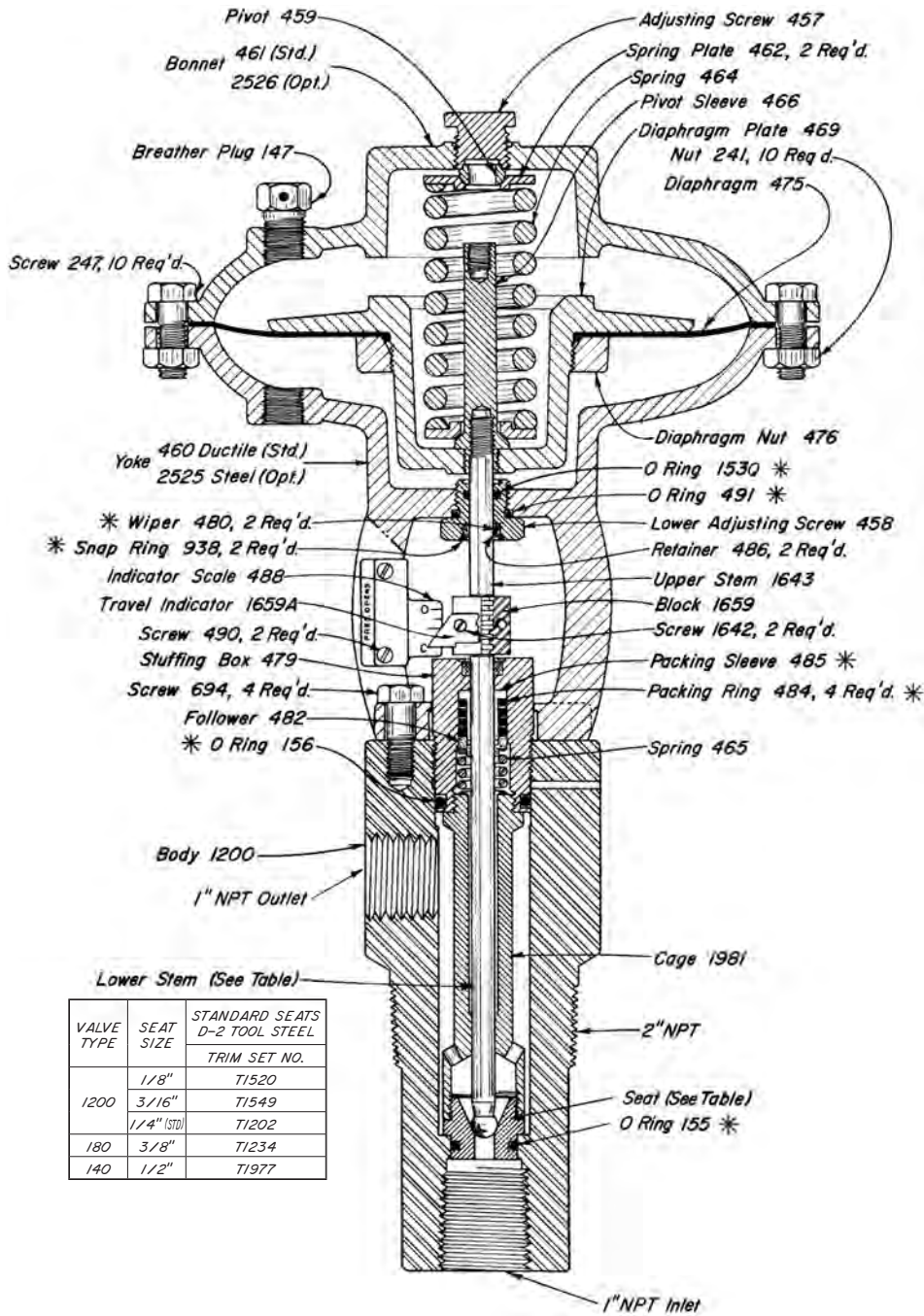


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# HIGH PRESSURE MOTOR VALVES



## NON-FREEZE DUMP VALVE STEEL



VALVE TYPE	SEAT SIZE	STANDARD SEATS
		D-2 TOOL STEEL
		TRIM SET NO.
1200	1/8"	T1520
	3/16"	T1549
	1/4" (STD)	T1202
180	3/8"	T1234
140	1/2"	T1977

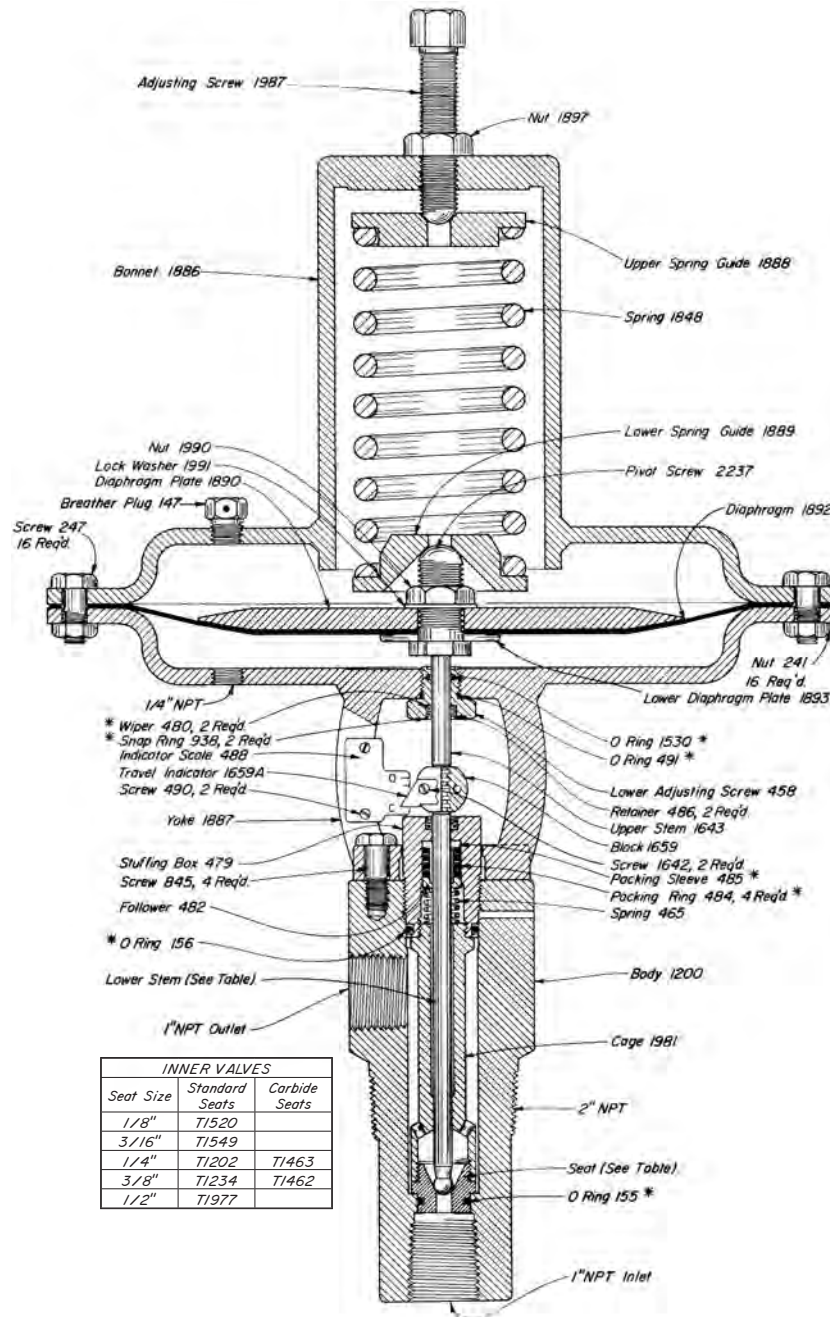
### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	PRES. DROP	MAX W.P.	KIT
EBA	1/4"	1200 SMS PO 1/4 IV	2000	4000	RFA
EBB	3/8"	180 SMS PO 3/8 IV	800	4000	RFA
EBF	1/2"	140 SMS PO 1/2 IV	450	4000	RFA

### NOTES:

For dimensions refer to Table of Contents.  
 \*These are recommended spare parts and are stocked as repair kits.  
 All standard SMS's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.





#### THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	PRES. DROP	MAX W.P.	KIT
EBC	1/4"	1400-65 SMS PO 1/4 IV	4000	4000	RFA
EBD	3/8"	1400-65 SMS PO 3/8 IV	4000	4000	RFA
EBE	1/2"	1400-65 SMS PO 1/2 IV	4000	4000	RFA

#### NOTES:

For dimensions refer to Table of Contents.

\*These are recommended spare parts and are stocked as repair kits. To order repair kits specify: "1" HPMV Repair Kit, RFA."

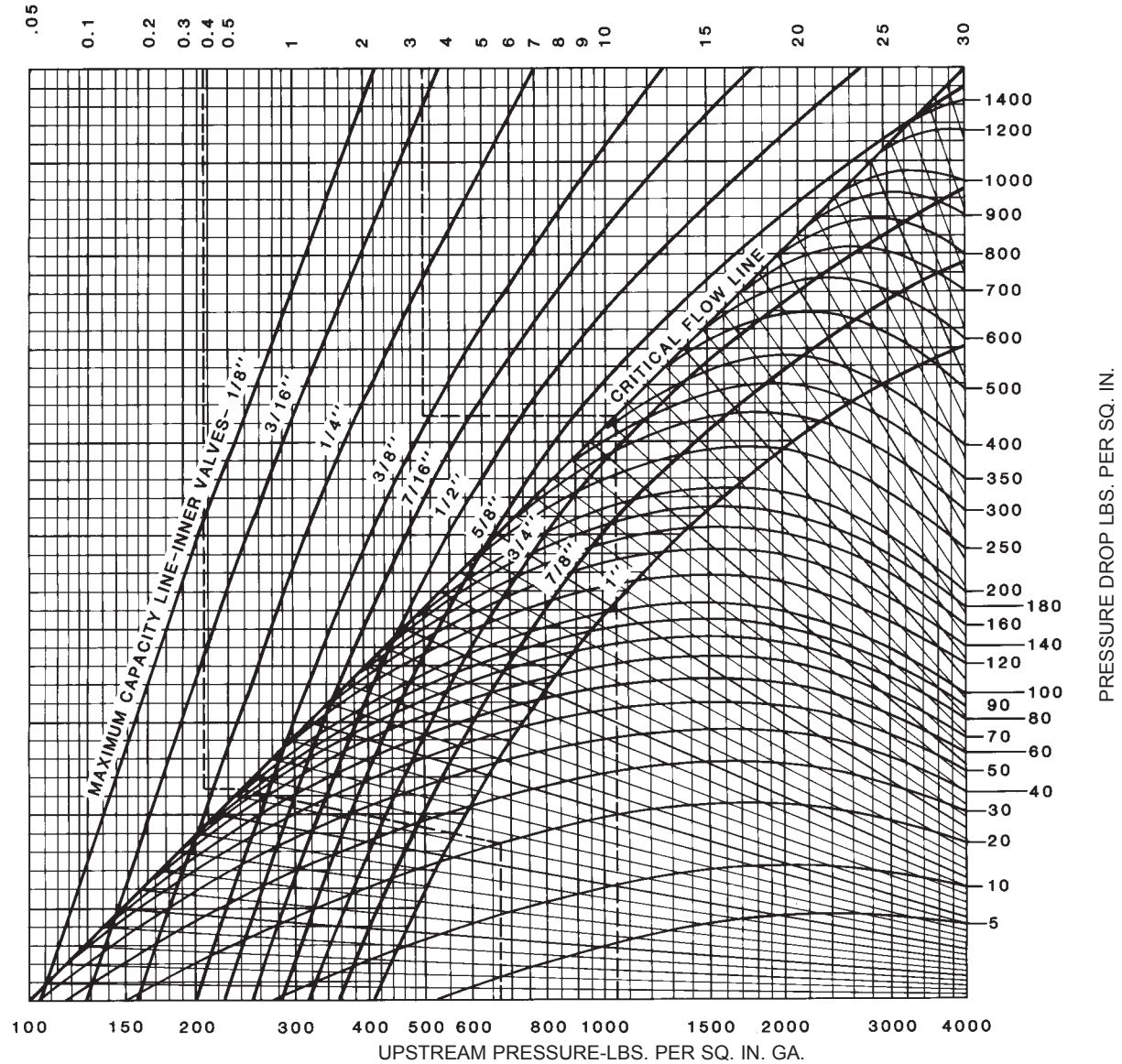
All standard -65 SMS's have a Cat. No. Seats, stems, cages, stuffing boxes and valve bodies are available in 316 stainless steel. Inner valves can be made from a wide selection of materials. Specify when ordering.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

VOLUME-MILLIONS CU. FT. PER 24 HOURS - 65 SP. GR. AT 14.4 & 60°



Gas capacities are based on pressures taken immediately upstream from the valve in a wide open position. Indicated volumes have been corrected for supercompressibility.

**HOW TO USE CHART:** PRESSURE DROP LESS THAN CRITICAL FLOW with: UPSTREAM PRESSURE 670 pounds gauge; PRESSURE DROP 20 pounds; VOLUME 380,000 Cu. Ft. per 24 hours.

Locate 670 at bottom of chart. Project a vertical line to intersect the 20 pound PRESSURE DROP line, and using sloping GUIDE LINES, project this point to the CRITICAL FLOWLINE. A horizontal line drawn through this point intersects all INNER VALVE lines at the maximum capacity is 0.43 millions of 430,000 Std. Cu. Ft. per 24 hours. A 3/8" is 0.78 and a 1/2" is 1.43. Select the inner valve size for the desired over-capacity.

CRITICAL FLOW with: UPSTREAM PRESSURE 1050 pounds gauge. PRESSURE DROP 600 pounds. VOLUME 3.3 millions per 24 hours.

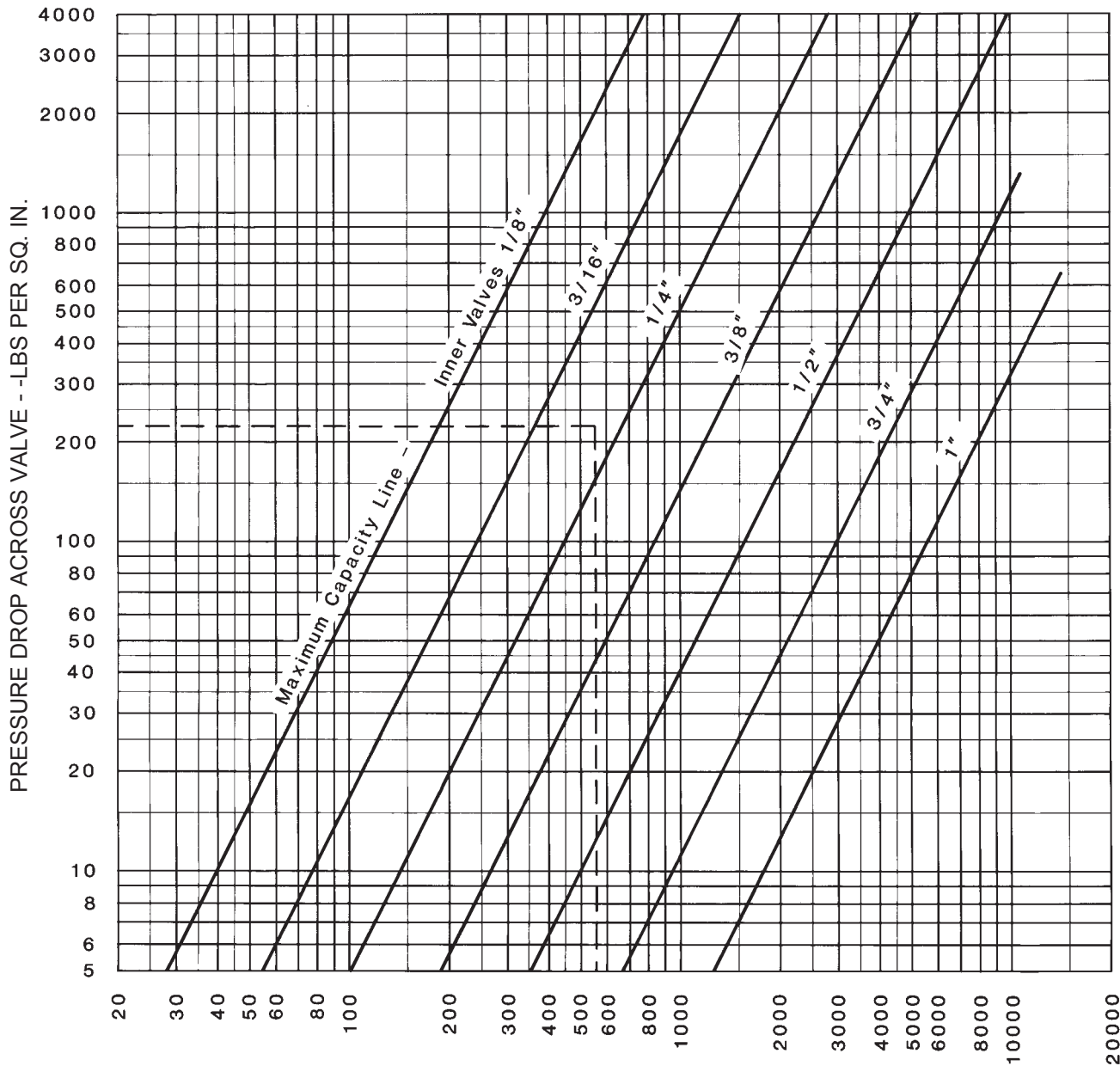
Locate 1050 at bottom of chart. Project a vertical line to intersect the CRITICAL FLOW LINE. A horizontal line drawn through this point intersects all INNER VALVE LINES at the maximum capacity of each for the above conditions. A 3/8" inner valve maximum capacity is 3.4 millions and a 1/2" is 6.4 millions. Select the inner valve size for the desired over-capacity.

\*For Gravity correction multiply above capacities by  $\sqrt{.65/G}$ ; where G equals specific gravity of gas.

See Liquid Capacity Chart for maximum pressure drops on large inner valves.

Flow rates are for steady flow conditions over a 24-hour period. Corrections should be made to deal with intermittent flow conditions.

### STEADY FLOW RATE - BARRELS WATER PER 24 HOURS



A good rule to follow when sizing liquid valves discharging from any kind of accumulator is to assume a volume at least twice that expected under steady flow conditions.

**HOW TO USE CHART:** Assume that it is desired to handle 275 barrels of water per day under steady flow conditions with a 225 psig pressure drop across the valve. Using the rule above we will use a volume of 550 barrels. The intersection of the 550 barrel line and the 225 psig pressure drop line lies between the 3/16" and 1/4" inner valve lines. Since the inner valve lines indicated maximum capacities, we must therefore select the 1/4" inner valve size to handle this volume.

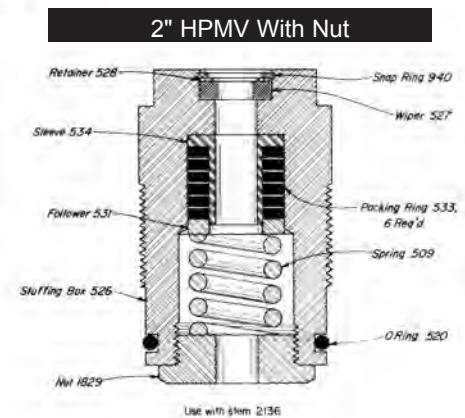
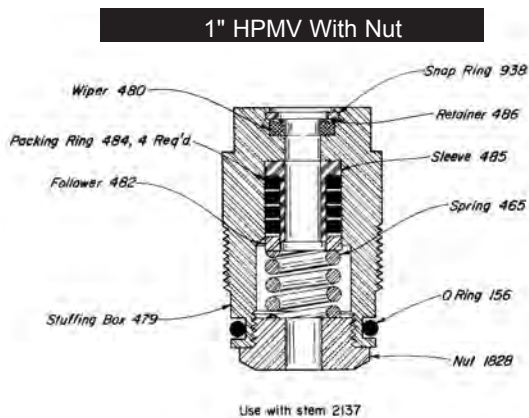
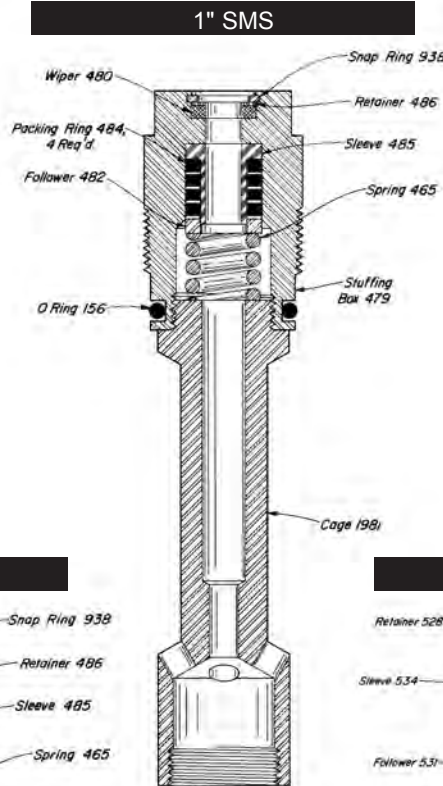
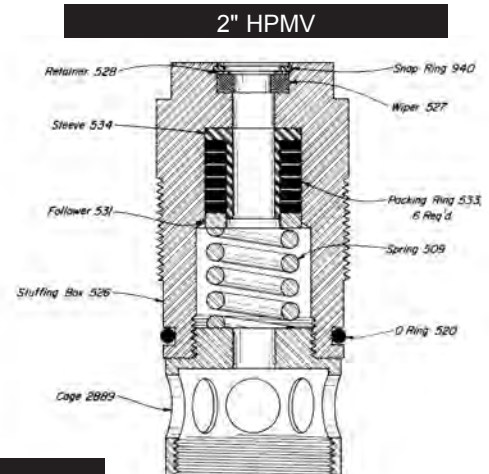
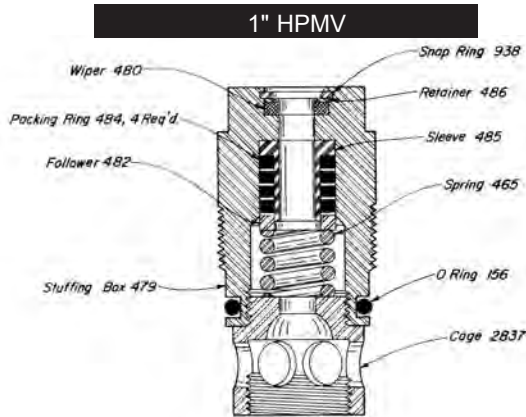
\*For gravity correction multiply above capacities by  $\sqrt{G}$ ; where G equals specific gravity of flowing liquid.

### MAXIMUM PRESSURE DROP for LARGE INNER VALVES

1" MOTOR VALVES			2" MOTOR VALVES		
I.V.	THROTTLE	RELIEF	I.V.	THROTTLE	RELIEF
1/2"	1200	2400	1"	650	1300
3/8"	1850	3700	3/4"	1350	2700

Above values are for valves furnished with standard springs for 20 psig diaphragm pressure.

NOTE: Flow rates are for steady flow conditions over a 24-hour period. Corrections should be made to deal with intermittent flow conditions.



#### STUFFING BOXES AVAILABLE:

CAT. NO	STUFFING BOXES	MAX W.P.
EAV	SMS VALVES	4000
EAW	1" HPMV	4000
EAX	1" HPMV w/NUT	4000
EBY	2" HPMV	4000
EBZ	2" HPMV w/NUT	4000

Current Revision:  
Change Logo

#### NOTES:

Stuffing box assemblies are available in 316 stainless steel. Cage 1981 is also available in heat treated tool steel. Specify when ordering.

Kimray is an ISO 9001- certified manufacturer.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

VALVE	FLOW CHARACTERISTIC	MATERIAL	INNER VALVE SIZE				
			1/8"	3/16"	1/4"	3/8"	1/2"
1" SMA & 1" SMT	LINEAR FLOW	TOOL STEEL <sup>a*</sup>	T2842	T2841	T2840	T2838	T2839
		17-4PH <sup>d</sup>			T2840PH	T2838PH	T2839PH
		316SS <sup>c</sup>	T2842SS6	T2841SS6	T2840SS6	T2838SS6	T2839SS6
	SNAP	CARB. INSERT	T2856	T2855	T2854	T2853	T5307
		17-4PH <sup>d</sup>	T2856PH				
	EQUAL PERCENTAGE	TOOL STEEL <sup>*</sup>	T6400		T4730 <sup>a</sup>		T4732 <sup>a</sup>
316SS <sup>c</sup>		T6400SS6		T4730SS6		T4732SS6	
ZIRCONIA				T4730ZR		T4732ZR	
1" SMS	LINEAR FLOW	TOOL STEEL <sup>a*</sup>			T1202	T1234	T1977
		316SS <sup>c</sup>			T1202SS6	T1234SS6	T1977SS6
	SNAP	CARB. INSERT <sup>a</sup>			T1463	T1462	T5325
1" MV	LINEAR FLOW	TOOL STEEL <sup>a*</sup>			T4729MV		T4731MV
		316SS <sup>c</sup>			T4729SS6MV		T4731SS6MV
	EQUAL PERCENTAGE	TOOL STEEL <sup>a*</sup>			T4730MV		T4732MV
		316SS <sup>c</sup>			T4730SS6MV		T4732SS6MV
		ZIRCONIA			T4730ZRMV		T4732ZRMV
VALVE	FLOW CHARACTERISTIC	MATERIAL	INNER VALVE SIZE				
			1/4"	3/8"	1/2"	3/4"	1"
2" SMA & 2" SMT	LINEAR FLOW	TOOL STEEL <sup>*</sup>	T2895 <sup>a</sup>	T2896 <sup>a</sup>	T2897 <sup>a</sup>	T2898 <sup>b</sup>	T2899 <sup>b</sup>
		17-4PH <sup>d</sup>		T2896PH	T2897PH		
		316SS <sup>c</sup>		T2896SS6	T2897SS6	T2898SS6	T2899SS6
	SNAP	CARB INSERT	T2890	T2891	T2892	T4690	T4691
		ZIRCONIA		T2891ZR		T4690ZR	T2899ZR
2" MV	LINEAR FLOW	TOOL STEEL <sup>*</sup>		T2896MV			
		CARB INSERT		T2896CBMV			T4691CBMV
VALVE	FLOW CHARACTERISTIC	MATERIAL	INNER VALVE SIZES				
			1/4"	7/16"	5/8"	7/8"	1"
2" SMA & 2" SMT	EQUAL PERCENTAGE	TOOL STEEL <sup>*</sup>	T6404	T2993 <sup>a</sup>	T2992 <sup>b</sup>	T2947 <sup>c</sup>	
		17-4PH <sup>d</sup>	T6404PH			T2947PH	
		316SS <sup>c</sup>	T6404SS6	T2993SS6	T2992SS6	T2947SS6	
		ZIRCONIA		T2993ZR	T2992ZR	T2947ZR	
2" MV	EQUAL PERCENTAGE	TOOL STEEL <sup>a*</sup>	T6404MV	T2993MV	T2992MV	T2947MV	
		17-4PH <sup>d</sup>				T2947PHMV	
		316SS <sup>c</sup>	T6404S6MV	T2993S6MV	T2992S6MV	T2947S6MV	
		ZIRCONIA		T2993ZRMV	T2992ZRMV	T2947ZRMV	

<sup>a</sup>Carbide ball rigidly connected to a 303SS stem

<sup>b</sup>Hardened high chrome alloy ball connected to a 303SS stem

<sup>c</sup>One piece 316SS steel stem

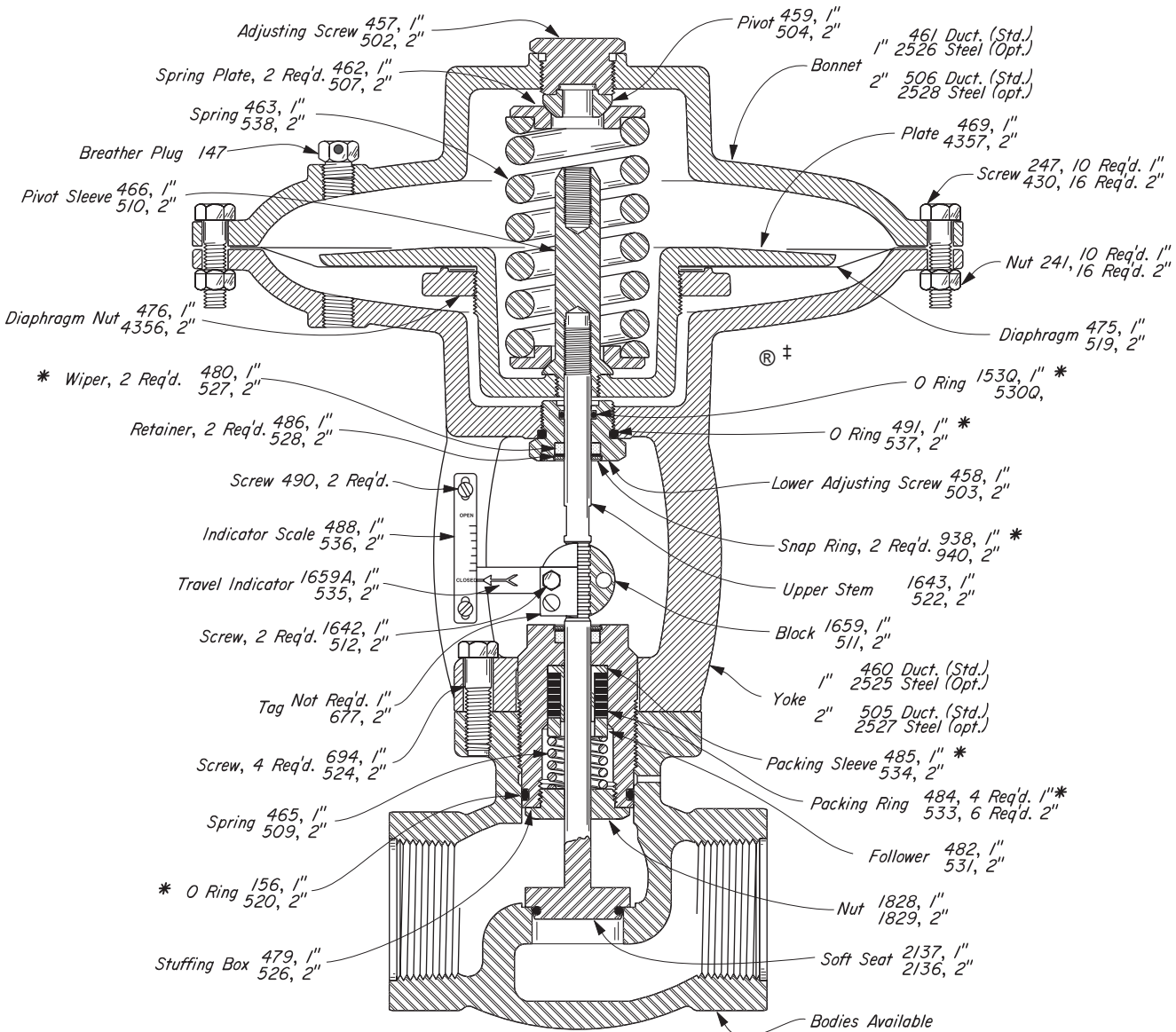
<sup>d</sup>One piece 17-4 PH SS steel stem

\*Seat and Plug furnished with Standard HPMV

# HIGH PRESSURE MOTOR VALVES



1" & 2" HPMV OVERSIZED SOFT SEATS  
STEEL BODY DUCTILE TOPWORKS



BODY TYPE	SCREWED		
	SIZE	BODY	W.P.
THRU	1"	452	4000 lbs.
	2"	493	2000 lbs.
ANGLE	1"	453	4000 lbs.

## THRU VALVES AVAILABLE:

CAT. NO.	INNER VALVE	VALVE	PRES. DROP.	MAX W.P.	KIT
EBK	1"	1400 SMT PO 1 IV	300	4000	RFA
EAD	1"	1400 SMA PO 1 IV	300	4000	RFA
EFS	1-1/2"	2200 SMT PO 1-1/2 IV	300	2000	RFE

Flanged bodies are available. Specify when ordering.  
For dimensions refer to Table of Contents. Flanged dimensions available on request.

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

## APPLICATIONS:

For increased flow at low operating pressure. Maximum pressure drop is 300 psig For on - off service only.

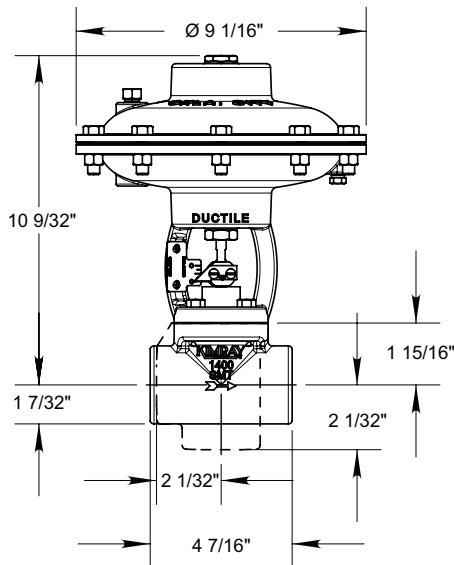
## FEATURES:

- Increased capacity
- Uses standard valve body
- Teflon seal

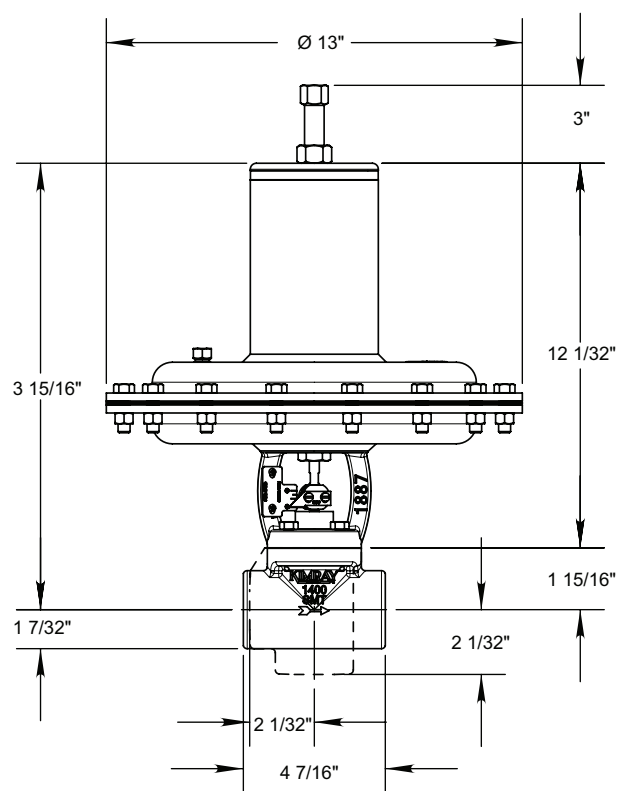
Kimray is an ISO 9001- certified manufacturer.



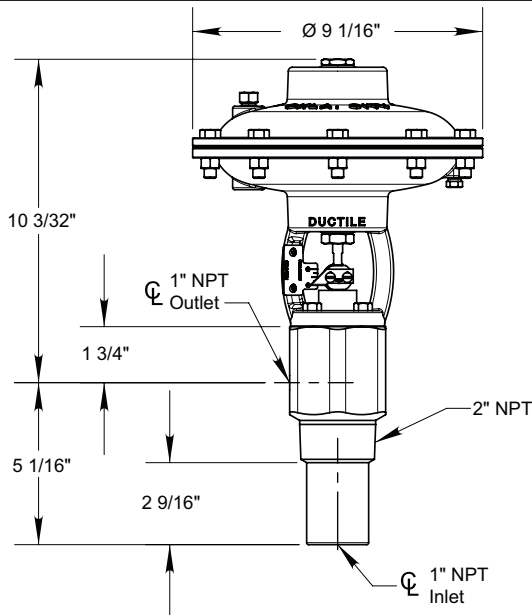
1" HPMV



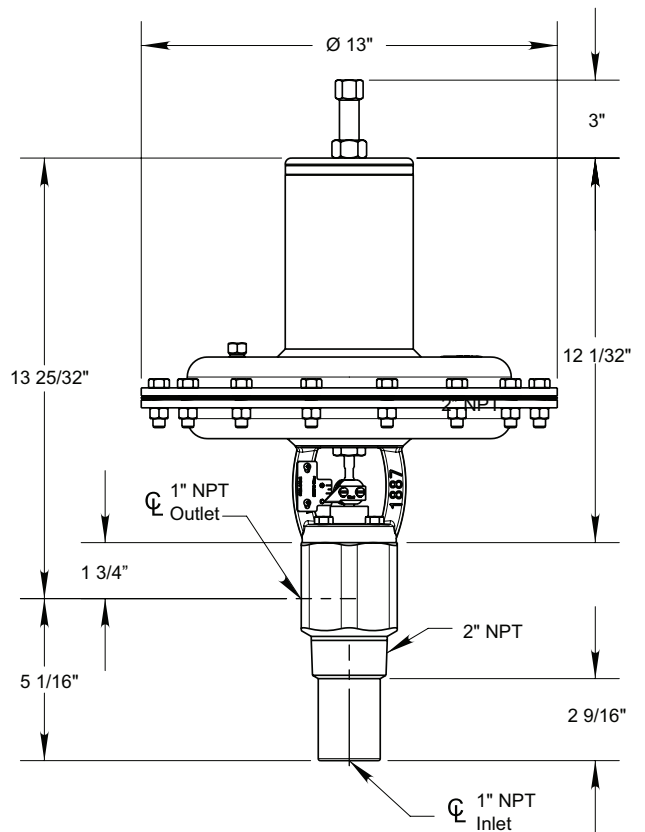
1" HPMV -65 TOPWORKS



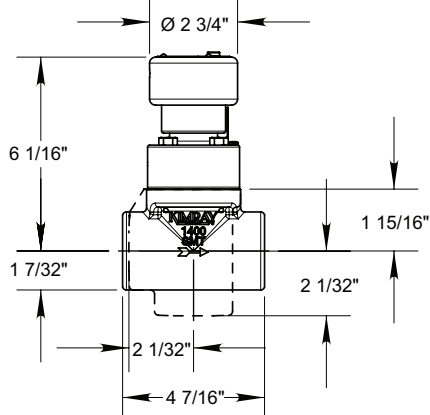
1" SMS



1" SMS -65 TOPWORKS



1" SMVA/T

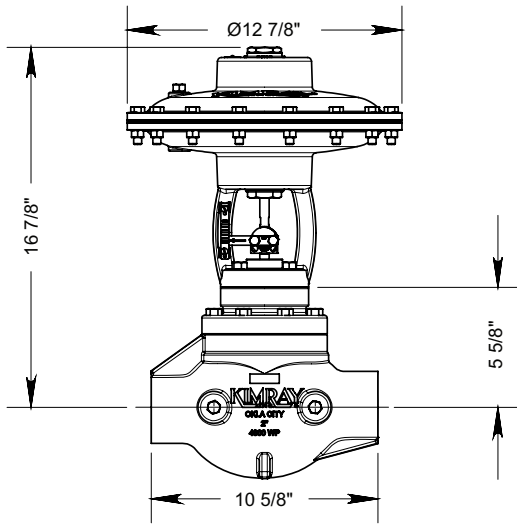


# HIGH PRESSURE MOTOR VALVES

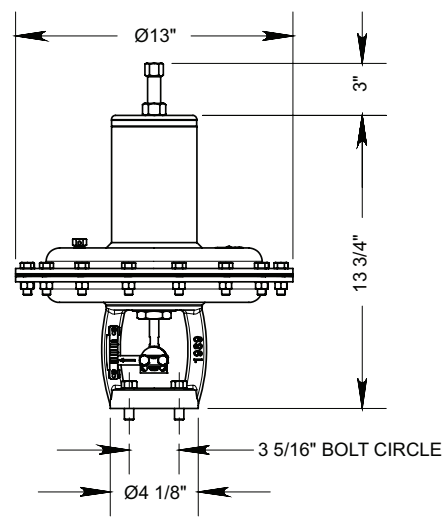


## 2" HPMV DIMENSIONS

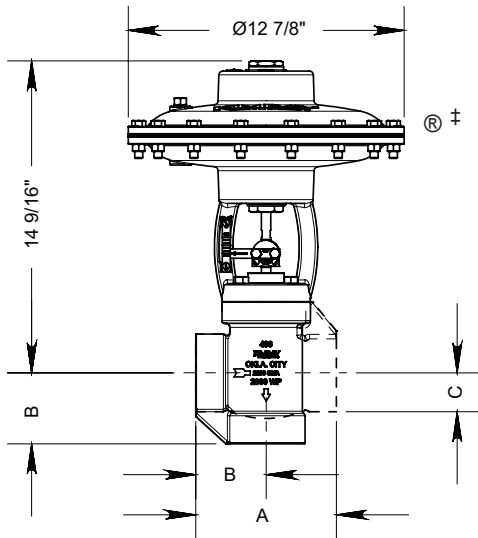
2" HPMV PB



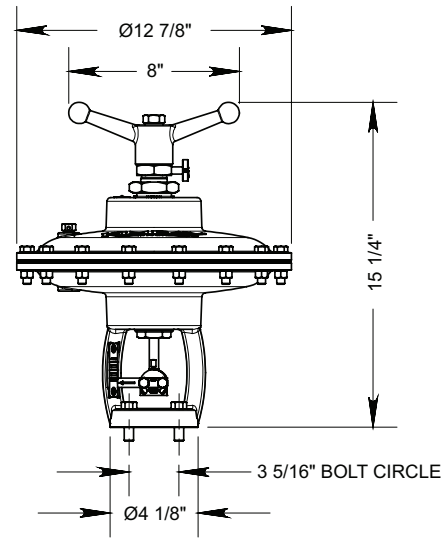
2" -65 TOPWORKS



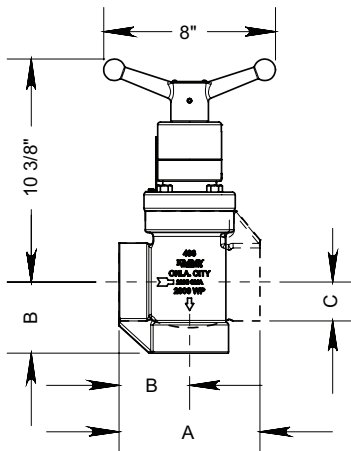
2" HPMV



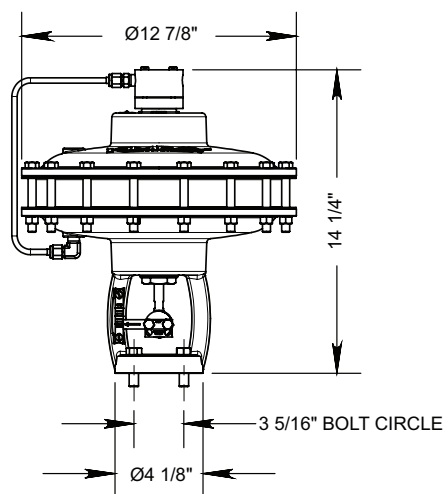
2" MVP TOPWORKS



2" SMVA/T TOPWORKS

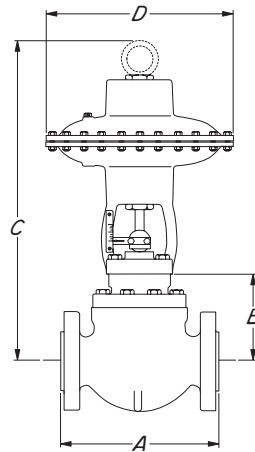


2" PVP TOPWORKS



MODEL NO.	A	B	C
2200	6 9/16"	3 1/4"	2 1/8"
2400	6 7/8"	3 15/32"	2 1/4"

All dimensions are in inches  
Flanged body dimensions available on request.



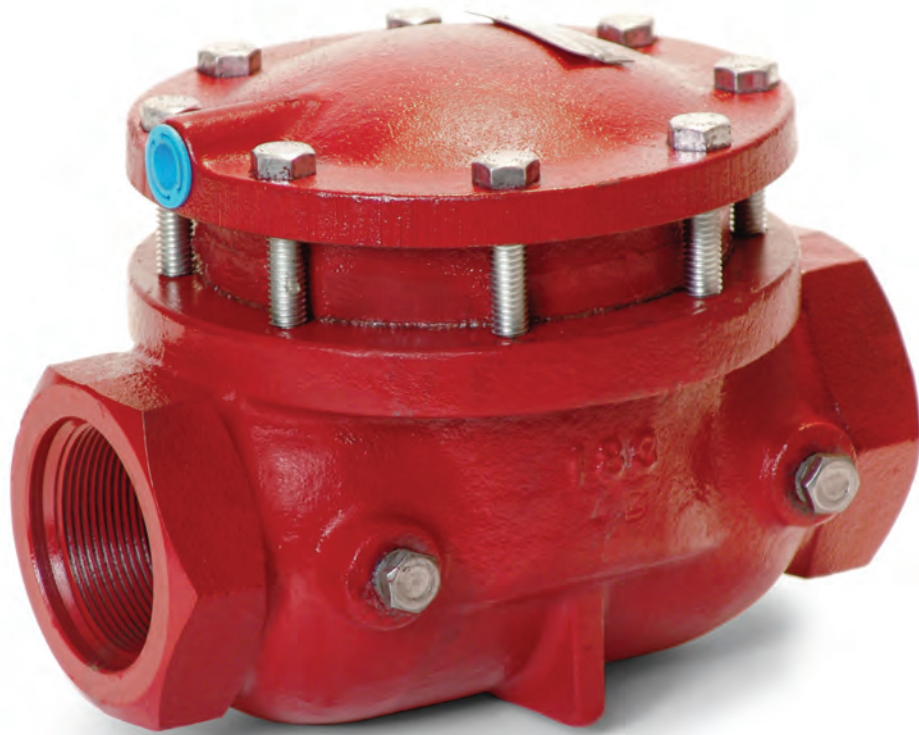
	SIZE	BODY STYLE	A	B	C	D
STANDARD	1"	150RF	7 1/4"	1 15/16"	10 1/2"	9 1/8"
		150RTJ	7 5/8"	1 15/16"	10 1/2"	9 1/8"
		300RF	7 3/4"	1 15/16"	10 1/2"	9 1/8"
		300RTJ	8 1/8"	1 15/16"	10 1/2"	9 1/8"
		600RF	8 1/4"	1 15/16"	10 1/2"	9 1/8"
		600RTJ	8 1/4"	1 15/16"	10 1/2"	9 1/8"
	2"	1500RF	10 3/4"	1 15/16"	10 1/2"	9 1/8"
		1500RTJ	10 3/4"	1 15/16"	10 1/2"	9 1/8"
		150RF	10 1/4"	3 3/16"	14 1/2"	12 7/8"
		150RTJ	12 3/8"	3 3/16"	14 1/2"	12 7/8"
		300RF	10 1/2"	3 3/16"	14 1/2"	12 7/8"
		300RTJ	11 1/8"	3 3/16"	14 1/2"	12 7/8"
		600RF	11 1/4"	3 3/16"	14 1/2"	12 7/8"
		600RTJ	11 3/8"	3 3/16"	14 1/2"	12 7/8"
PISTON BALANCED	2"	1500RF	12 1/4"	3 3/16"	14 1/2"	12 7/8"
		1500RTJ	12 3/8"	3 3/16"	14 1/2"	12 7/8"
		150RF	10 1/4"	5 5/8"	17"	12 7/8"
		300RF	10 1/2"	5 5/8"	17"	12 7/8"
		600RF	11 1/4"	5 5/8"	17"	12 7/8"
	3"	1500RF	12 1/4"	5 5/8"	17"	12 7/8"
		1500RTJ	12 3/8"	5 5/8"	17"	12 7/8"
		150RF	12 5/16"	7 1/4"	27"	15 3/4"
		300RF	12 1/2"	7 1/4"	27"	15 3/4"
	4"	600RF	13 1/4"	7 1/4"	27"	15 3/4"
		600RTJ	13 3/8"	7 1/4"	27"	15 3/4"
		150RF	13 7/8"	11"	30"	15 3/4"
	6"	300RF	14 1/2"	11"	30"	15 3/4"
		600RF	15 1/2"	11"	30"	15 3/4"
		150RF	17 3/4"	11 3/16"	34 1/2"	20 7/16"
	8"	300RF	18 5/8"	11 3/16"	34 1/2"	20 7/16"
		600RF	20"	11 3/16"	34 1/2"	20 7/16"
		150RF	21 3/8"	11 5/16"	34 1/2"	20 1/2"
	10"	300RF	22 3/8"	11 5/16"	34 1/2"	20 1/2"
		600RF	24"	11 5/16"	34 1/2"	20 1/2"
150RF		26 1/2"	11 5/16"	34 1/2"	20 1/2"	
		300RF	27 7/8"	11 5/16"	34 1/2"	20 1/2"
		600RF	29 9/16"	11 5/16"	34 1/2"	20 1/2"

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

# LOW PRESSURE MOTOR VALVES



**KIMRAY**  
INC.®

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® Copyright 1992, KIMRAY, Inc.

**LOW PRESSURE MOTOR VALVES**

Kimray low pressure motor valves are diaphragm operated valves designed to control flow in liquid or gas systems up to 500 psig working pressure from a 30 to 40 psig pneumatic actuating signal. These motor valves can be used for oil and water dump valves on low pressure separators, emulsion treaters and other similar liquid accumulators or metering vessels and as burner valves for throttling or snap action service.

**SINGLE ACTING**

Oil and water dump valve for separators, emulsion treaters and other similar liquid accumulators at pressures up to 500 psig.

MT \_\_\_\_\_ 10.1  
Controls 2 times signal pressure.

**SINGLE ACTING WITH REDUCED INNER VALVE**

Oil and gas separators and liquid meters where a 30 psig maximum pilot supply is available to actuate valves operating at pressures up to 300 psig.

MT 5 \_\_\_\_\_ 30.1  
Controls 5 times signal pressure.

**DOUBLE ACTING**

Liquid metering vessels where from 5 to 25 psig back pressure is desired and a signal on either or both sides of the main diaphragm actuates valve operating at pressures up to 300 psig. Controls 2 times the signal pressure.

MT DA ..... 20.1  
Spring loaded for 5 to 6 psig back pressure.

MT 2DA ..... 50.1  
Spring loaded for 10 to 12 psig back pressure.

MT 4DA ..... 70.1  
Spring loaded for 22 to 25 psig back pressure.

**DOUBLE ACTING WITH REDUCED INNER VALVE**

Liquid metering vessels where from 12 to 50 psig back pressure is desired and a signal on either or both sides of the main diaphragm actuates valve operating at pressures up to 300 psig. Controls 5 times the signal pressure

MT DA5 ..... 40.1  
Spring loaded for 12 to 15 psig back pressure.

MT 2DA5 ..... 60.1  
Spring loaded for 24 to 30 psig back pressure.

MT 4DA5 ..... 80.1  
Spring loaded for 44 to 50 psig back pressure.

**ADJUSTABLE DOUBLE ACTING**

Burner valve for throttling on snap action service. Liquid dump valve on low pressure vessels such as gas/glycol separators. Any system that requires a double acting motor valve but is also required to be able to adjust the maximum spring loaded back pressure the valve will hold. Up to 300 psig.

MT ADA ..... 90.1  
1" ADA adjusts from 0 to 40 psig back pressure.  
2" ADA adjusts from 0 to 175 or 0 to 250 psig back pressure.

**ADJUSTABLE DOUBLE ACTING WITH REDUCED INNER VALVE**

As a burner valve for throttling on snap action service. As a liquid dump valve on low pressure vessels such as gas/glycol separators. Any system that requires a double acting motor valve but is also required to be able to adjust the maximum spring loaded back pressure the valve will hold..

MT ADA B ..... 100.1  
1" ADAB adjusts from 0 to 80 psig back pressure.

**SPRING LOADED BACK PRESSURE**

Non-bleed, spring loaded back pressure valve for heater treaters and water knockouts.

MT BP ..... 110.1  
Maintains 0 to 50 or 0 to 85 psig back pressure.

MT BP5 with reduced inner valve ..... 115.1  
Maintains 0 to 65 or 0 to 125 psig back pressure.

**CAPACITY CHARTS**

LIQUID CAPACITY ..... 120.1

**DIMENSIONS**

VALVE DIMENSIONS ..... 120.3

**OTHER APPLICATIONS**

DOUBLE ACTING MV w/MICRO SWITCH . Bulletin No. E285212  
250 FMT w/2" -65 TOPWORKS .....Bulletin No. E291163  
SINGLE ACTING MV THROTTLE SERV.....Bulletin No. E291164

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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



#### APPLICATIONS:

Pilot operated oil or water dump valve for separators, emulsion treaters and other similar liquid accumulators.

Any system requiring a valve to close when it receives a pneumatic signal.

These valves are available, at extra cost, with a spring under the diaphragm plate that will hold the valve full open whenever pressure on top of the diaphragm is released. This assembly is for applications where small differential pressures exist and capacities required are greater than those shown on the MT capacity chart, this section. To order this assembly, specify Valve Number and add "with spring under diaphragm." For capacities of valves so equipped, refer to MT-DA capacity chart, this section.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Full line size opening
- Removable valve seat
- Minimum maintenance
- All internal parts can be removed with valve in line
- Ratio of diaphragm to seat area is 2:1
- Controls approximately 2 times the pilot signal pressure

#### CAPACITY:

- For liquid capacity chart refer to table of contents.
- For gas capacity chart refer to Catalog Section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

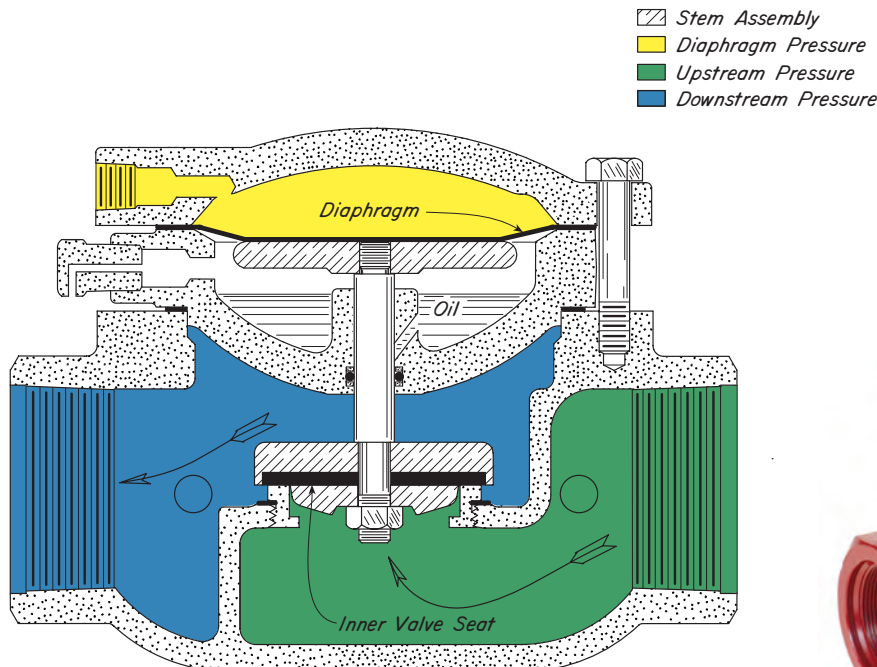
#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. With the valve open, Diaphragm Pressure (Yellow) from a pilot or control, loads the upper side of the DIAPHRAGM and is opposed by the Upstream Pressure (Green) under the INNER VALVE SEAT.

As Diaphragm Pressure (Yellow) increases the Stem Assembly is forced downward closing the motor valve.

As Diaphragm Pressure (Yellow) is reduced, Upstream Pressure (Green) forces the Stem Assembly upward opening the valve.

With an effective DIAPHRAGM area two times the INNER VALVE SEAT area, Diaphragm Pressure (Yellow) must be 60% or more of the Upstream Pressure (Green) in order to achieve a tight shut-off.



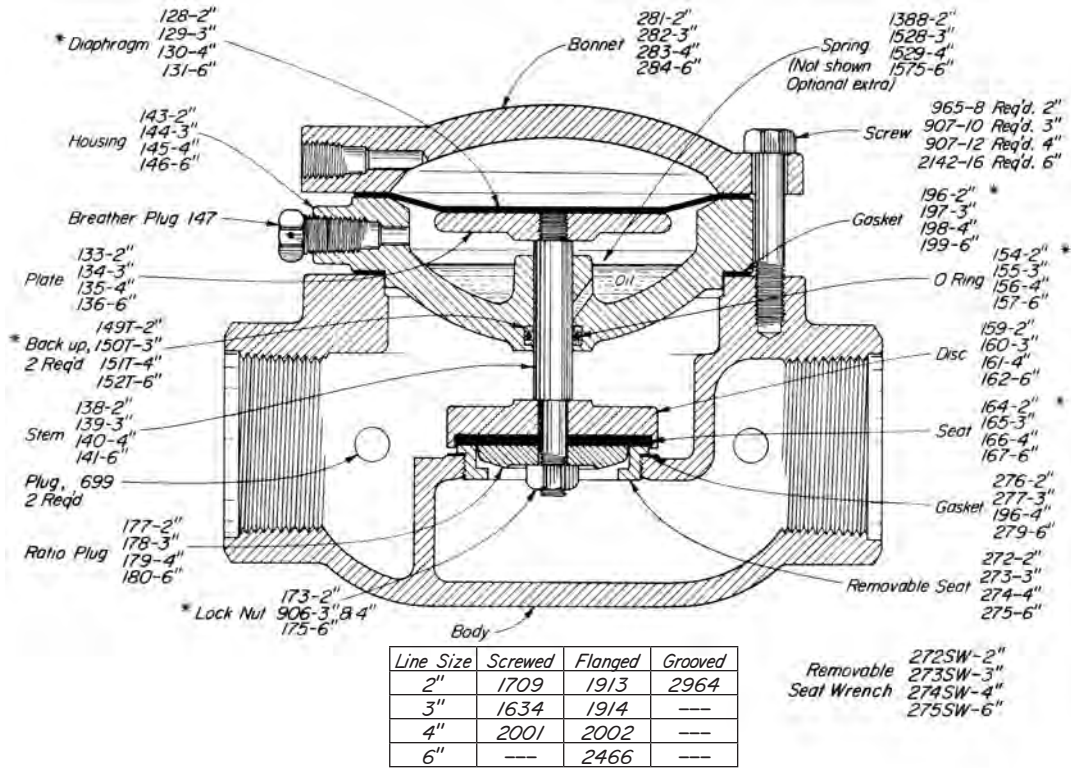
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# LOW PRESSURE MOTOR VALVES

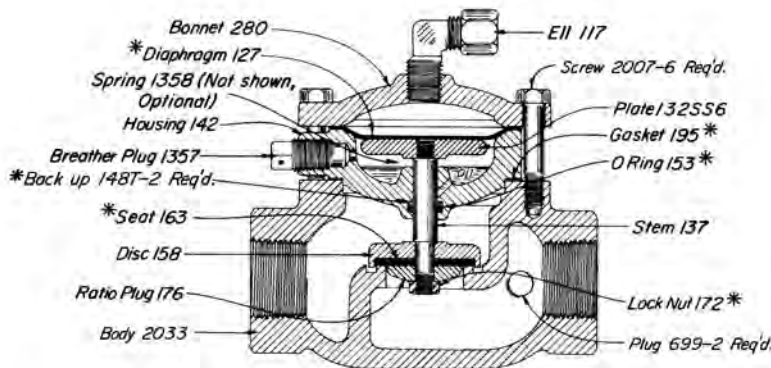


SINGLE ACTING  
DUCTILE IRON

2", 3", 4" & 6"



1"



## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
EMB	1" SCRD.	112 SMT	175	RCM
EMC	2" SCRD.	212 SMT	175	RCN
EMD	2" FLGD. <sup>a</sup>	212 FMT	175	RCN
EME	2" GRVD.	212 GMT	175	RCN
EMF	3" SCRD.	312 SMT	175	RCP
EMG	3" FLGD. <sup>a</sup>	312 FMT	175	RCP
EMH	4" SCRD.	412 SMT	175	RCR
EMI	4" FLGD. <sup>a</sup>	412 FMT	175	RCR
EMJ	6" FLGD. <sup>a</sup>	612 FMT	175	RCS

## NOTES:

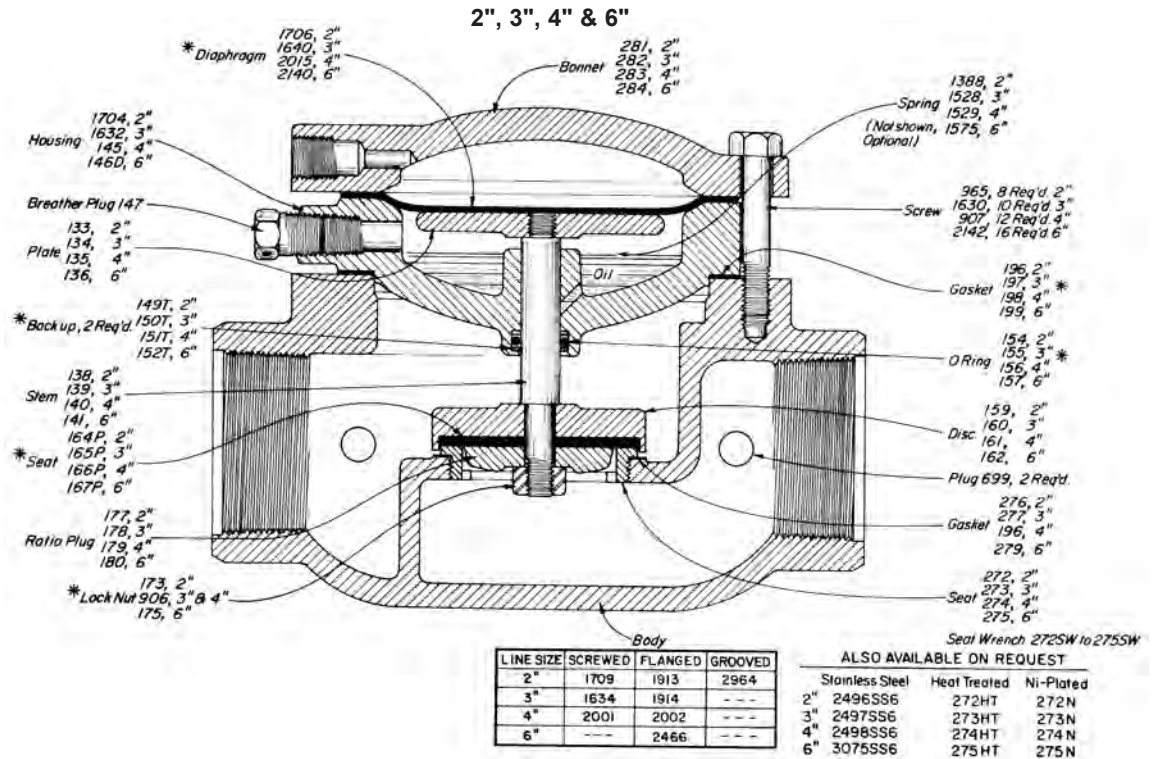
For dimensions refer to Table of Contents.

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

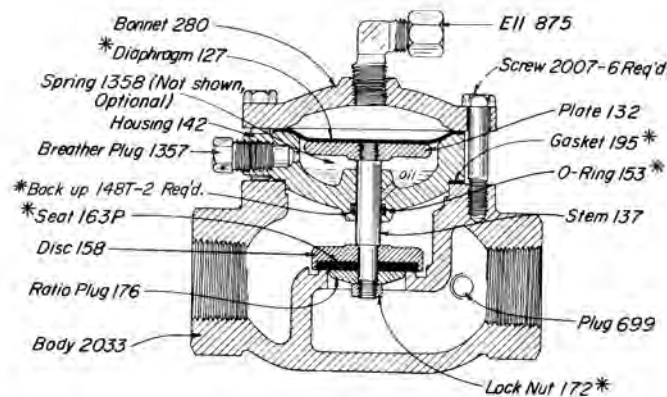
The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4", 199-6".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

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**1"**



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
EUA	1" SCR.D.	130 SMT-D	300	RCM
EUB	2" SCR.D.	230 SMT-D	300	RDL
EUC	2" FLGD.	218 FMT-D	250	RDL
EUD	2" GRVD.	230 GMT-D	300	RDL
EUE	3" SCR.D.	330 SMT-D	300	RDM
EUF	3" FLGD.	318 FMT-D	250	RDM
EUG	4" SCR.D.	430 SMT-D	300	RDN
EUH	4" FLGD.	418 FMT-D	250	RDN
EUI	6" FLGD.	618 FMT-D	250	RDO

#### NOTES:

For dimensions refer to Table of Contents.

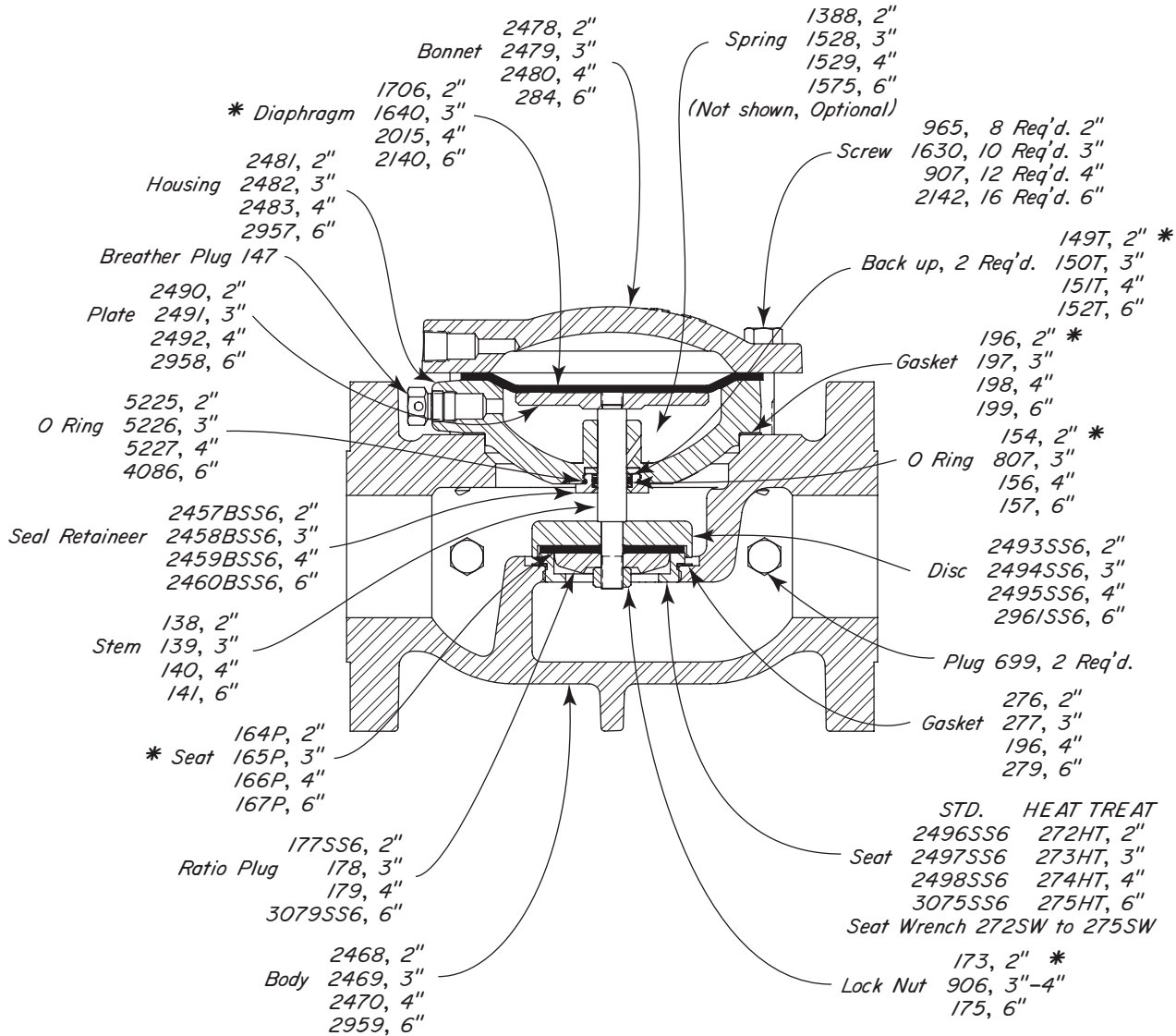
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4", 199-6".

# LOW PRESSURE MOTOR VALVES



SINGLE ACTING  
STEEL



## THRU VALVES AVAILABLE:

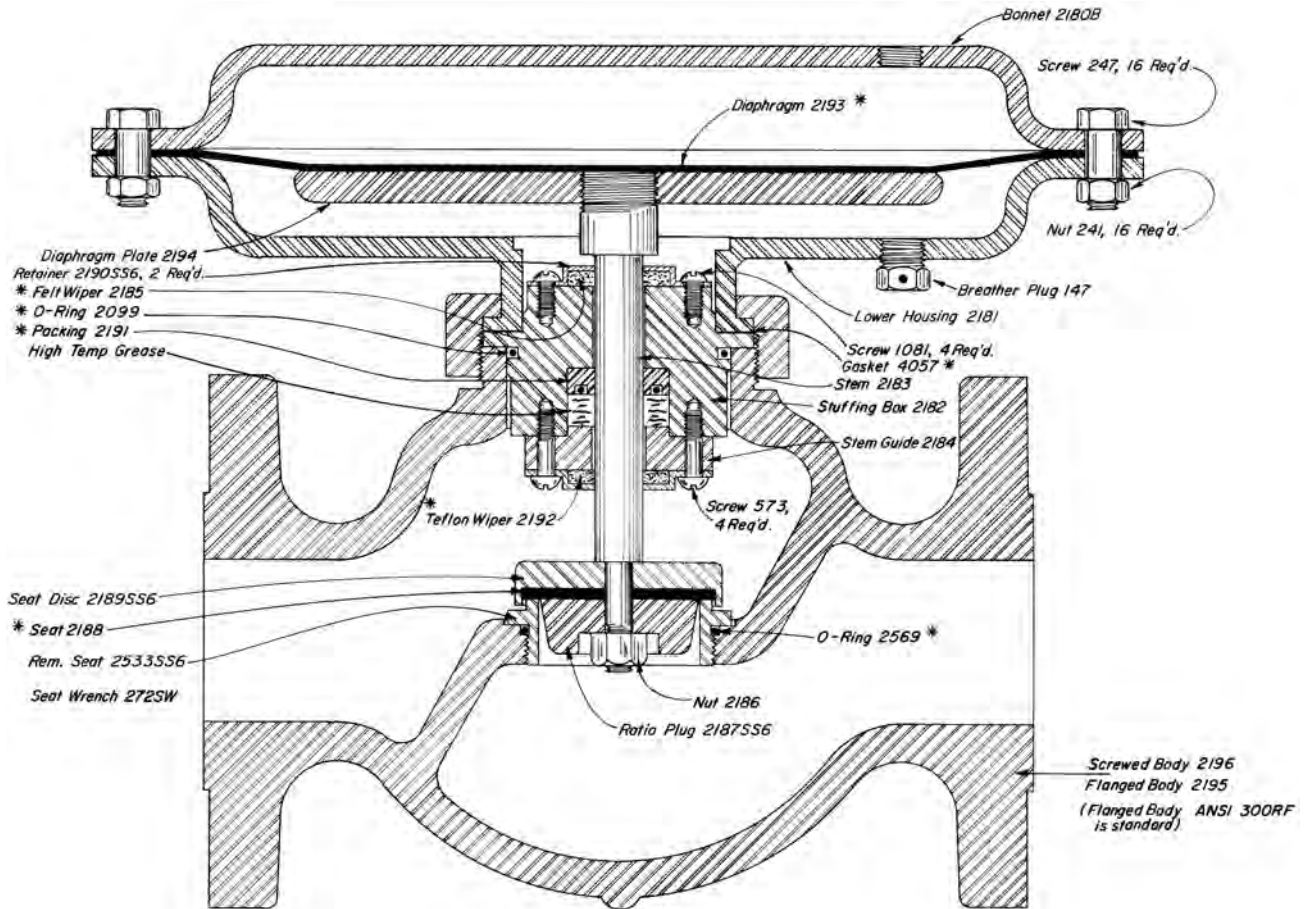
CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
END	2" FLGD.	227 FMT-S	285	REH
ENG	3" FLGD.	327 FMT-S	285	REI
ENI	4" FLGD.	427 FMT-S	285	REJ
EVA	6" FLGD.	627 FMT-S	285	REK

## NOTES:

For dimensions refer to Table of Contents.

\*These 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: Gasket 196-2", 197-3", 198-4", 196 6"



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
ENA	2" SCR.D.	250 SMT-S	500	RDP
ENB	2" FLGD.	250 FMT-S	500	RDP

#### NOTES:

For dimensions refer to Table of Contents.

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

**NOTES:**



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#### APPLICATIONS:

Liquid metering vessels.  
Any system which requires a valve to receive a pilot signal on either or both sides of the main diaphragm.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Full line size opening
- Removable valve seat
- Ratio of diaphragm to seat area is 2:1
- Spring loaded to hold 5 to 6 p.s.i. back pressure
- Minimum Maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

For liquid capacity charts refer to table of contents.  
For gas capacity charts refer to catalog section "A".

#### CONSTRUCTION:

Materials in body and housings are made of cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber. After assembly each valve is given a complete operational test.

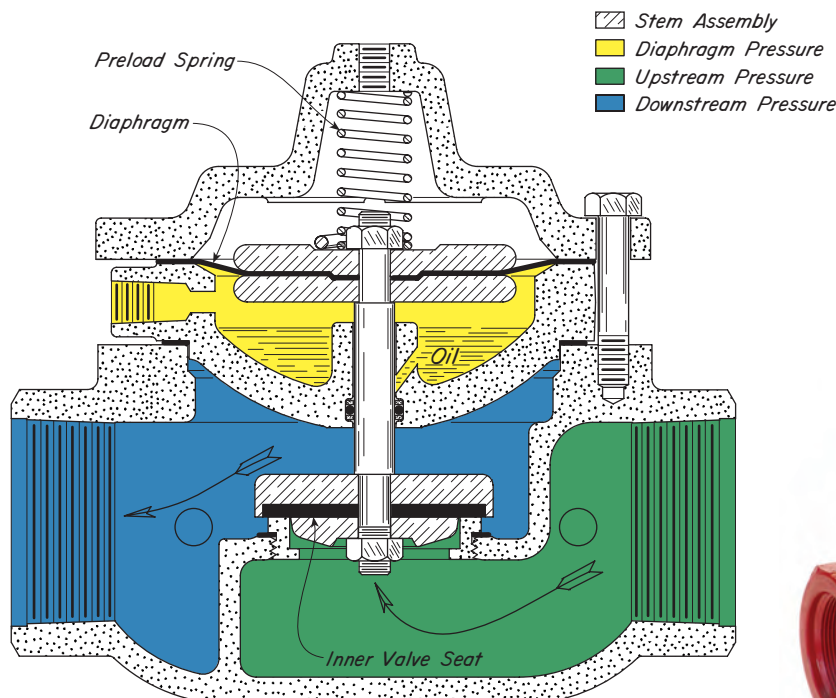
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is 5 to 6 psig or less.

An increase in the Diaphragm Pressure (Yellow) and / or and increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the valve.

A decrease in the Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 5 to 6 psig or less.

With an effective DIAPHRAGM area two times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 5 to 6 psig and/or 3 psig or more Diaphragm Pressure (Yellow) will open the motor valve.

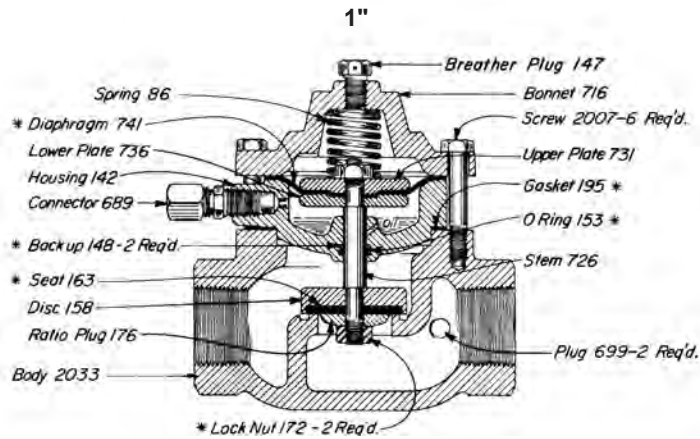
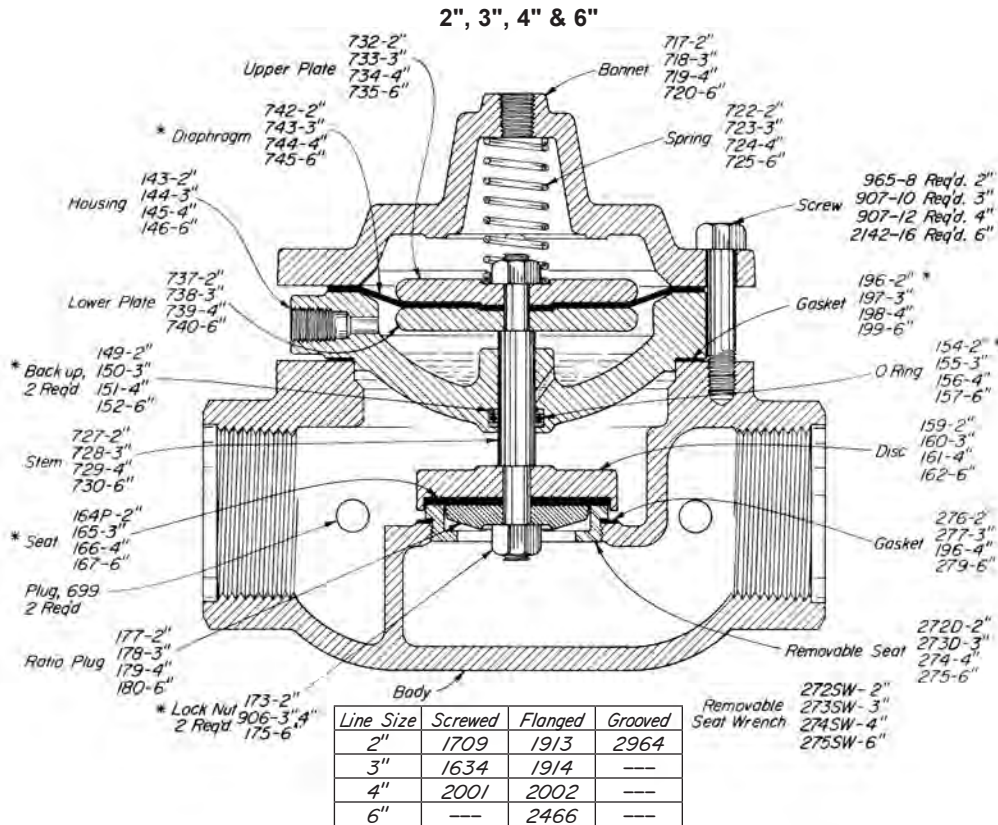


Kimray is an ISO 9001- certified manufacturer.

# LOW PRESSURE MOTOR VALVES



DOUBLE ACTING  
DUCTILE IRON



**THRU VALVES AVAILABLE:**

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER PRESS	MAX. W.P.	KIT
EMB2	1" SCRD.	112 SMT DA	5-6	175	RG5
EMC2	2" SCRD.	212 SMT DA	5-6	175	RGT
EMD2	2" FLGD. <sup>a</sup>	212 FMT DA	5-6	175	RGT
EME2	2" GRVD.	212 GMT DA	5-6	175	RGT
EMF2	3" SCRD.	312 SMT DA	5-6	175	RGU
EMG2	3" FLGD. <sup>a</sup>	312 FMT DA	5-6	175	RGU
EMH2	4" SCRD.	412 SMT DA	5-6	175	RGW
EMI2	4" FLGD. <sup>a</sup>	412 FMT DA	5-6	175	RGW
EMJ2	6" FLGD. <sup>a</sup>	612 FMT DA	5-6	175	RGX

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

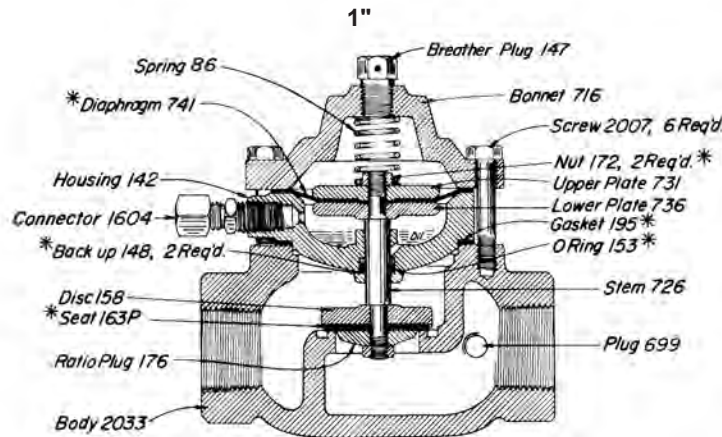
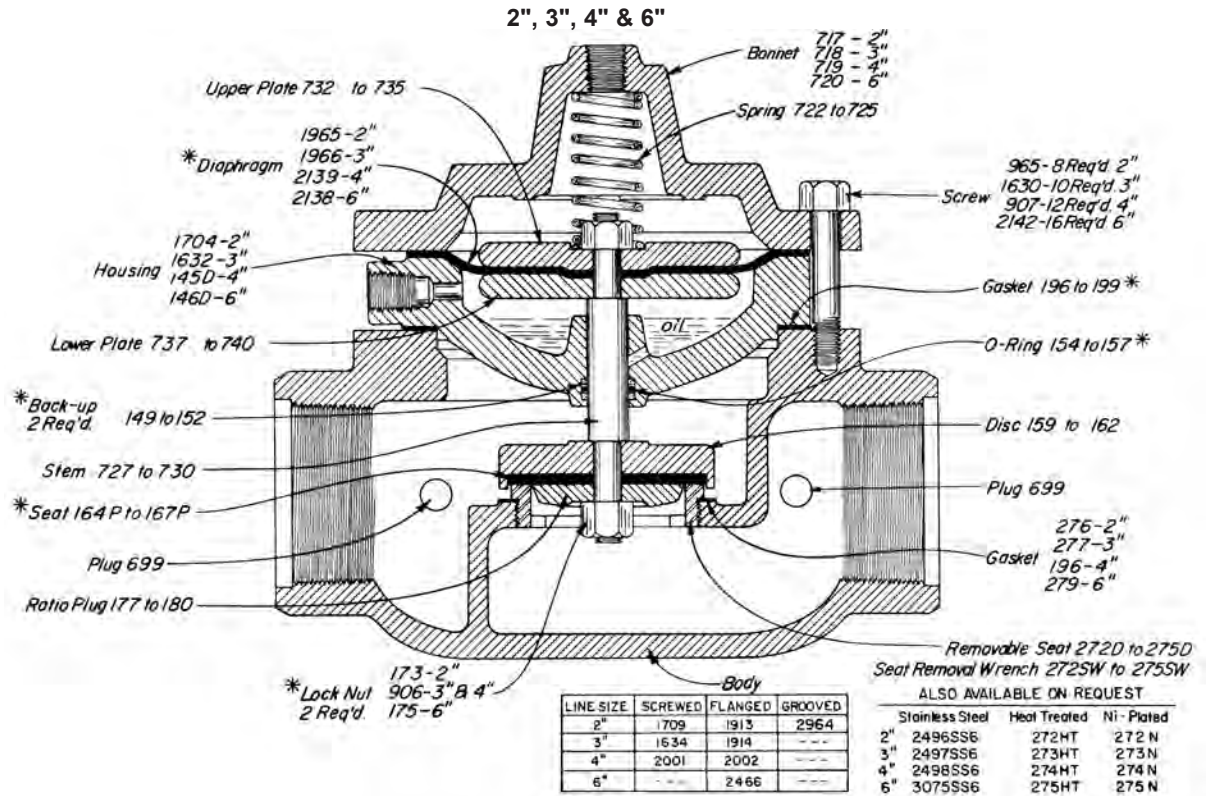
**NOTES:**

\*These 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: Gasket 196-2", 197-3", 198-4", 199-6".

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#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER PRESS	MAX. W.P.	KIT
EUA2	1" SCRD.	130 SMT DA-D	5-6	300	RNQ
EUB2	2" SCRD.	230 SMT DA-D	5-6	300	RNU
EUC2	2" FLGD.	218 FMT DA-D	5-6	250	RNU
EUD2	2" GRVD.	230 SMT DA-D	5-6	300	RNU
EUE2	3" SCRD.	330 SMT DA-D	5-6	300	RNW
EUF2	3" FLGD.	318 FMT DA-D	5-6	250	RNW
EUG2	4" SCRD.	430 SMT DA-D	5-6	300	RNX
EUH2	4" FLGD.	418 FMT DA-D	5-6	250	RNX
EUI2	6" FLGD.	618 FMT DA-D	5-6	250	RNY

#### NOTES:

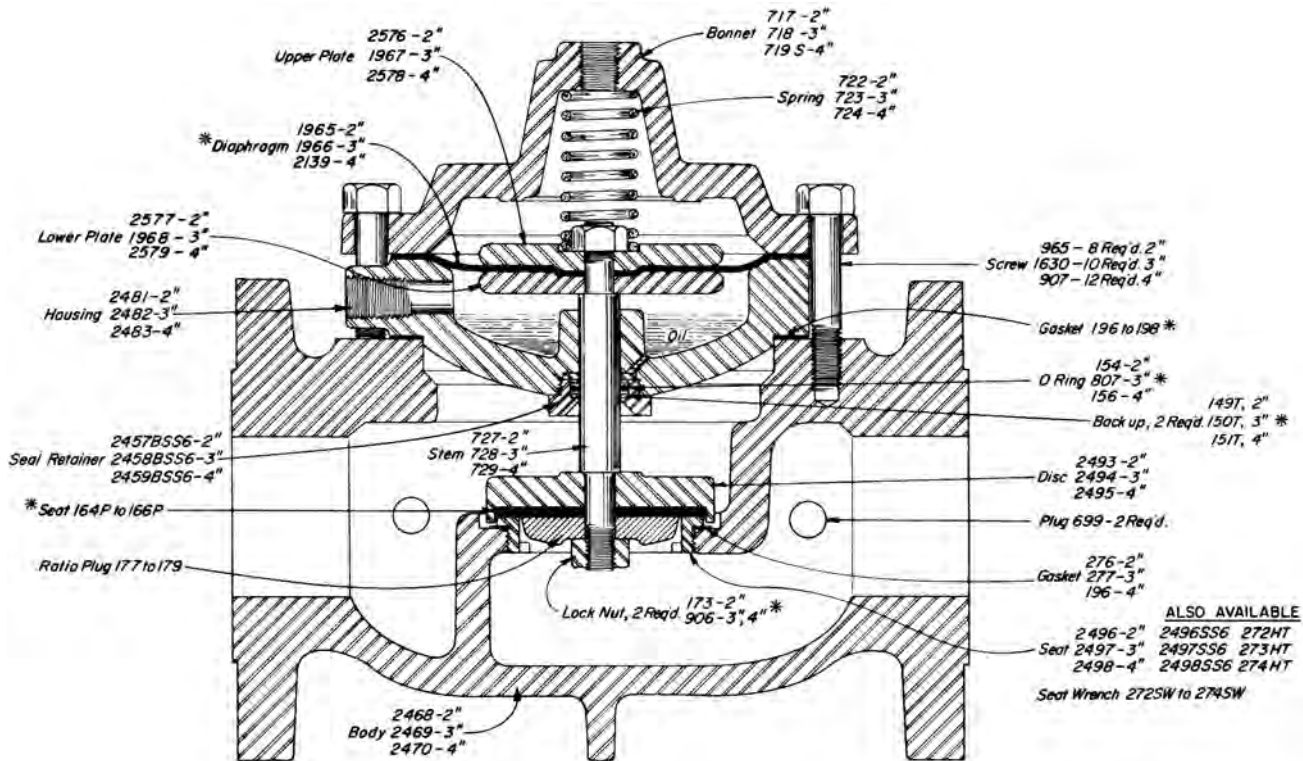
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4", 199-6".

# LOW PRESSURE MOTOR VALVES



## DOUBLE ACTING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS	MAX. W.P.	KIT
END2	2" FLGD.	227 FMT DA-S	5-6	285	ROM
ENG2	3" FLGD.	327 FMT DA-S	5-6	285	RON
ENI2	4" FLGD.	427 FMT DA-S	5-6	285	ROO

### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

#### APPLICATIONS:

For use on oil and gas separators and liquid meters where a 30 psig maximum pilot signal is available to actuate valves operating at pressures up to 300 psig.

These valves are available, at extra cost, with a spring under the diaphragm plate that will hold the valve full open whenever pressure on top of the diaphragm is released. This assembly is for applications where small differential pressures exist and capacities required are greater than those shown on the MT capacity chart, this section. To order this assembly, specify Valve Number and add "with spring under diaphragm." For capacities of valves so equipped, refer to MT-DA capacity chart, this section.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Removable valve seat
- Ratio of diaphragm to seat area is:
  - 8:1 on 1"
  - 5:1 on 2", 3", 4", and 6"
- Controls 8 times signal pressure on 1"
- Controls 5 times signal pressure on 2", 3", 4" and 6"
- Minimum maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

- For liquid capacity refer to table of contents.
- For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

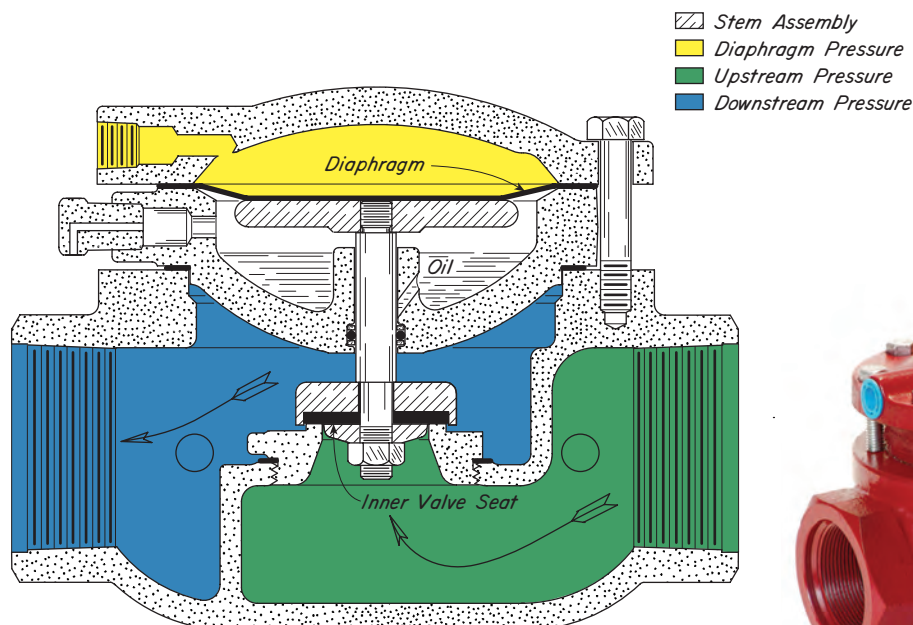
#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. With the valve open, Diaphragm Pressure (Yellow) from a pilot or control, loads the upper side of the DIAPHRAGM and is opened by the Upstream Pressure (Green) under the INNER VALVE SEAT.

As Diaphragm Pressure (Yellow) increases the Stem Assembly is forced downward, closing the motor valve.

As Diaphragm Pressure (Yellow) is reduced, Upstream Pressure (Green) forces the Stem Assembly upward, opening the valve.

With an effective DIAPHRAGM area five times the INNER VALVE SEAT area, Diaphragm Pressure (Yellow) must be 25% or more of the Upstream Pressure (Green) in order to achieve a tight shut-off.



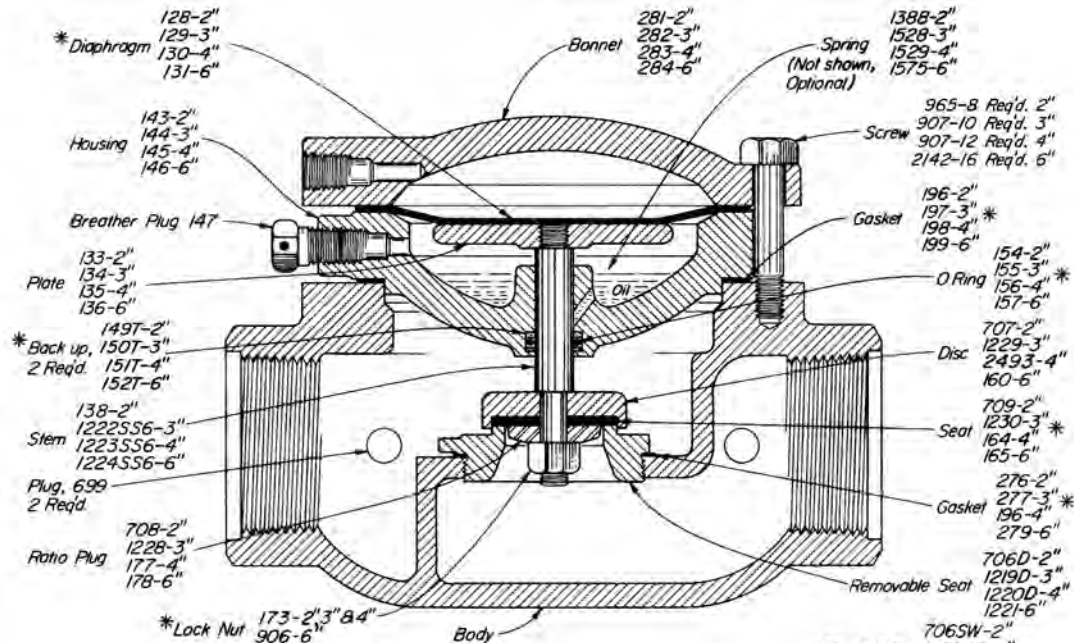
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# LOW PRESSURE MOTOR VALVES



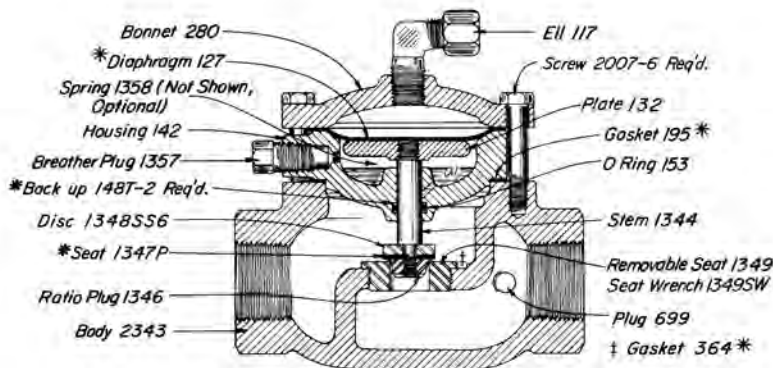
## MT 5 WITH REDUCED INNER VALVE DUCTILE IRON

2", 3", 4" & 6"



Line Size	Screwed	Flanged	Grooved
2"	1709	1913	2964
3"	1634	1914	---
4"	2001	2002	---
6"	---	2466	---

1"



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
EMB1	1" SCR.D.	112 SMT B	175	RDB
EMC1	2" SCR.D.	212 SMT 5	175	RDC
EMD1	2" FLGD.*	212 FMT 5	175	RDC
EME1	2" GRVD.	212 GMT 5	175	RDC
EMF1	3" SCR.D.	312 SMT 5	175	RDD
EMG1	3" FLGD.*	312 FMT 5	175	RDD
EMH1	4" SCR.D.	412 SMT 5	175	RDE
EMI1	4" FLGD.*	412 FMT 5	175	RDE
EMJ1	6" FLGD.*	612 FMT 5	175	RDF

### NOTES:

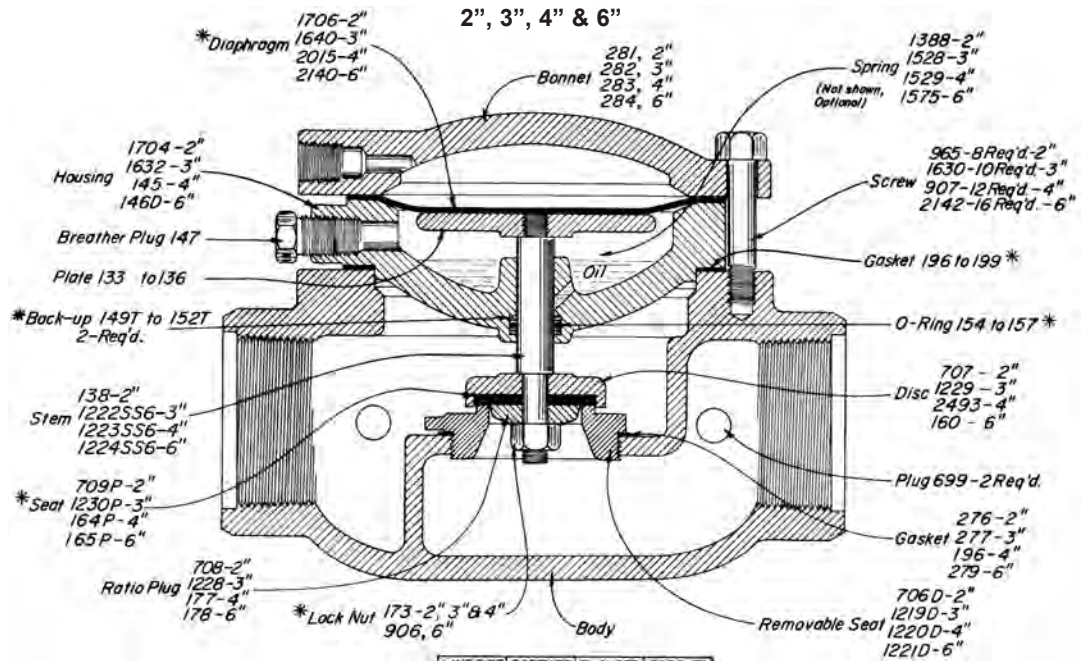
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4", 199-6".

For fail open applications a optional Spring under the Diaphragm Plate is available: 1358-1", 1388-2", 7132-3", 1529-4", 1575-6"

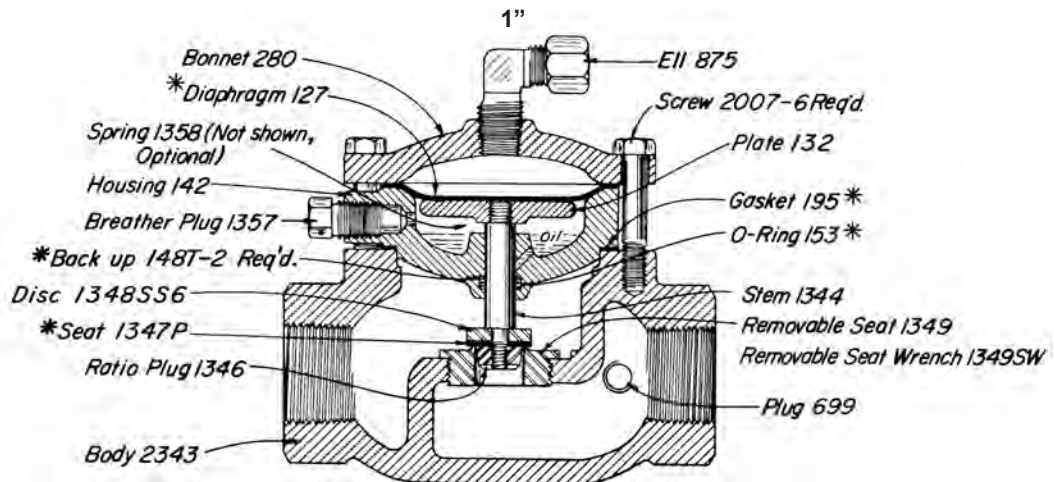
\*Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

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LINE SIZE	SCREWED	FLANGED	GROOVED
2"	1709	1913	2964
3"	1634	1914	
4"	2001	2002	
6"		2466	

ALSO AVAILABLE ON REQUEST		
Stainless Steel	Heat Treated	Seat Wrench
2" 706SS6	706 HT	706HTSW
3" 1219SS	1219 HT	1219HTSW
4" 1220SS	1220 HT	1220HTSW
6" 1221SS	1221 HT	1221HTSW



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
EUA1	1"SCRD.	130 SMT B-D	300	RDB
EUB1	2"SCRD.	230 SMT 5-D	300	RNI
EUC1	2"FLGD.	218 FMT 5-D	250	RNI
EUD1	2"GRVD.	230 GMT 5-D	300	RNI
EUE1	3"SCRD.	330 SMT 5-D	300	RNJ
EUF1	3"FLGD.	318 FMT 5-D	250	RNJ
EUG1	4"SCRD.	430 SMT 5-D	300	RNK
EUH1	4"FLGD.	418 FMT 5-D	250	RNK
EUI1	6"FLGD.	618 FMT 5-D	250	RNL

#### NOTES:

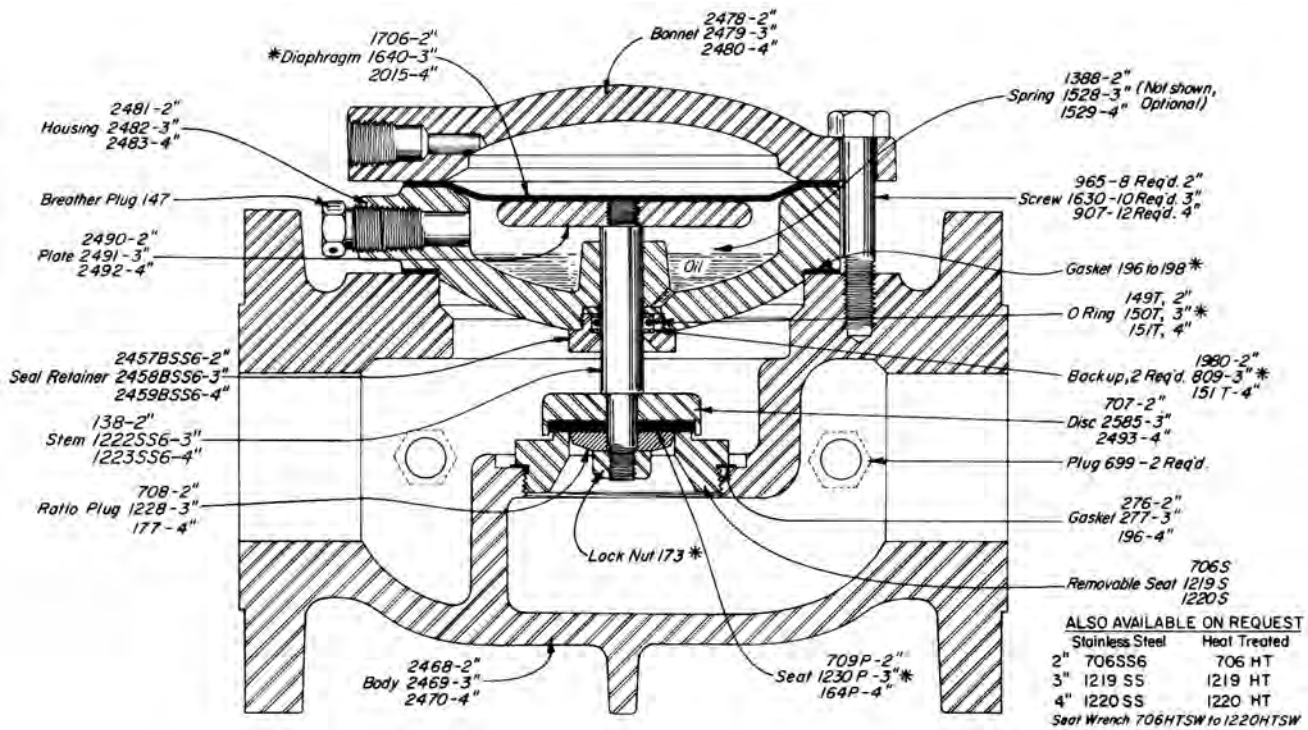
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4", 199-6".

# LOW PRESSURE MOTOR VALVES



## MT 5 WITH REDUCED INNER VALVE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
END1	2" FLGD.	227 FMT 5-S	285	ROX
ENG1	3" FLGD.	327 FMT 5-S	285	ROY
ENI1	4" FLGD.	427 FMT 5-S	285	ROZ

### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATION:

Liquid metering vessels where a 12 to 15 psig back pressure is desired.

Any system which requires a valve to receive a 30 psig maximum pilot signal on either or both sides of the main diaphragm operating at pressures up to 300 psig.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Removable valve seat
- Ratio of diaphragm to seat area is:
  - 8:1 on 1"
  - 5:1 on 2", 3", 4", and 6"
- Controls 8 times signal pressure on 1"
- Controls 5 times signal pressure on 2", 3", 4" and 6"
- Minimum maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

- For liquid capacity refer to table of contents.
- For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

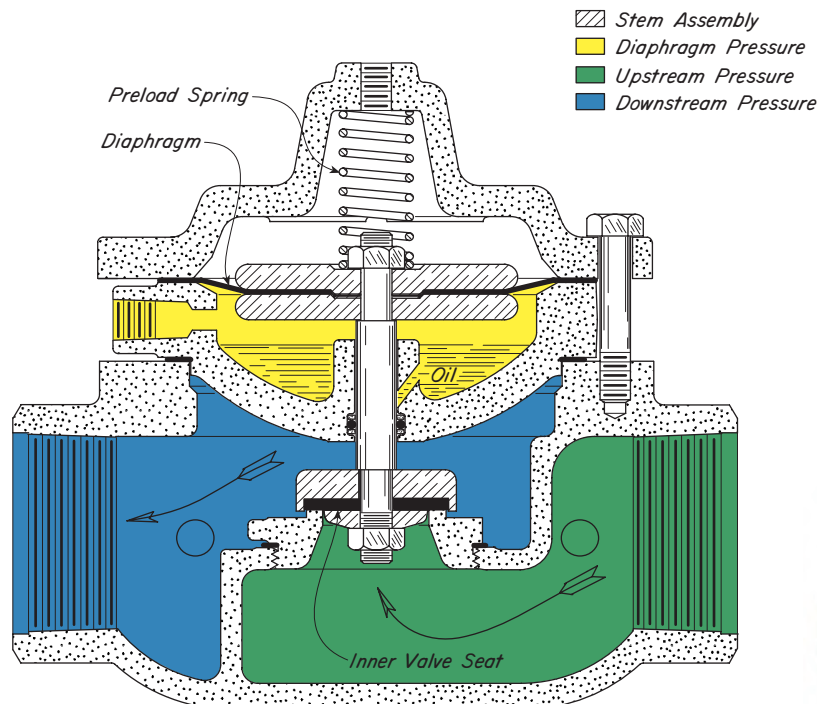
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is 12 to 15 psig or less.

An increase in the Diaphragm Pressure (Yellow) and/or an increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, move the Stem Assembly upward, opening the valve.

A decrease in the Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 12 to 15 psig or less.

With an effective DIAPHRAGM area five times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 12 to 15 psig and/or 3 psig or more Diaphragm Pressure (Yellow) will open the motor valve.



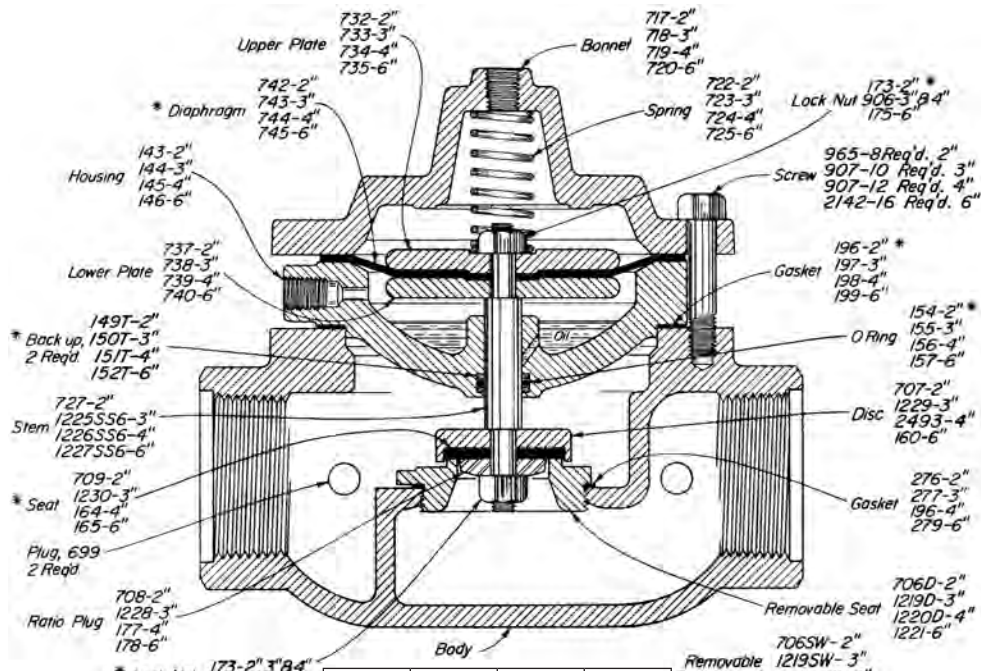
Kimray is an ISO 9001- certified manufacturer.

# LOW PRESSURE MOTOR VALVES

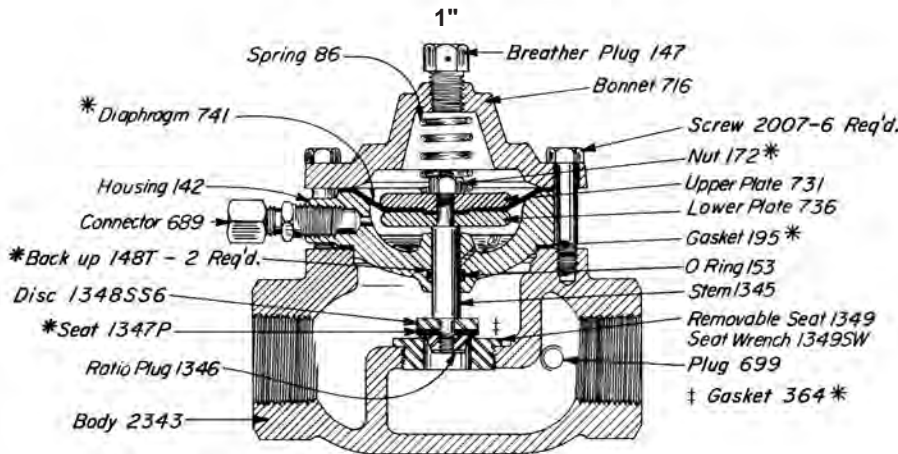


## MT DA5 WITH REDUCED INNER VALVE DUCTILE IRON

2", 3", 4" & 6"



Line Size	Screwed	Flanged	Grooved
2"	1709	1913	2964
3"	1634	1914	---
4"	2001	2002	---
6"	---	2466	---



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EMB3	1" SCRD.	112 SMT DAB	30-35	175	RHE
EMC3	2" SCRD.	212 SMT DA5	12-15	175	RHF
EMD3	2" FLGD. <sup>a</sup>	212 FMT DA5	12-15	175	RHF
EME3	2" GRVD.	212 GMT DA5	12-15	175	RHF
EMF3	3" SCRD.	312 SMT DA5	12-15	175	RHG
EMG3	3" FLGD. <sup>a</sup>	312 FMT DA5	12-15	175	RHG
EMH3	4" SCRD.	412 SMT DA5	12-15	175	RHH
EMI3	4" FLGD. <sup>a</sup>	412 FMT DA5	12-15	175	RHH
EMJ3	6" FLGD. <sup>a</sup>	612 FMT DA5	12-15	175	RHI

### NOTES:

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

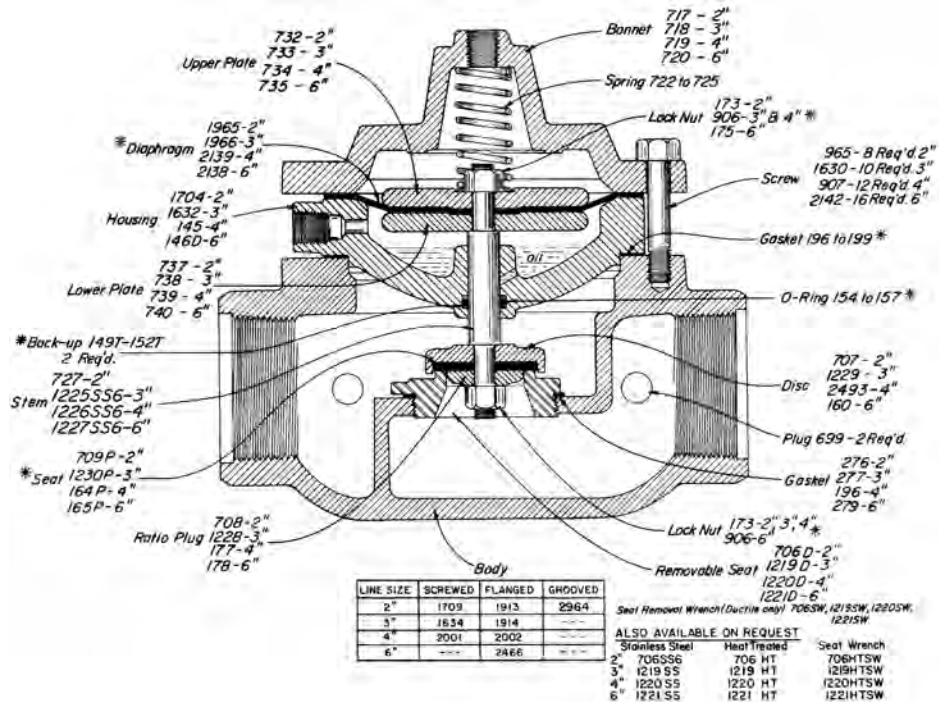
The numbers of a series assigned to a part indicate different line sizes. For example: Gasket "195 1", 196-2", 197-3", 198-4", 199-6".

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

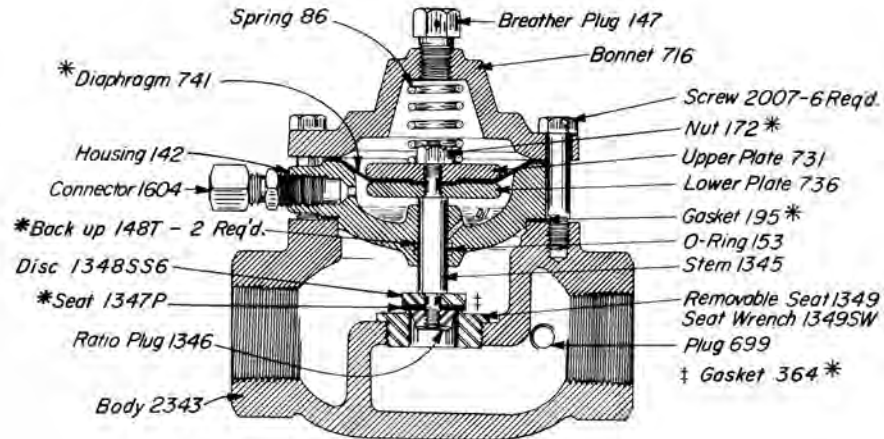
Kimray is an ISO 9001- certified manufacturer.



2", 3", 4" & 6"



1"



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EUA3	1" SCRD.	130 SMT DAB-D	30-35	300	RHE
EUB3	2" SCRD.	230 SMT DA5-D	12-15	300	ROI
EUC3	2" FLGD.	218 FMT DA5-D	12-15	250	ROI
EUD3	2" GRVD.	230 GMT DA5-D	12-15	300	ROI
EUE3	3" SCRD.	330 SMT DA5-D	12-15	300	ROJ
EUF3	3" FLGD.	318 FMT DA5-D	12-15	250	ROJ
EUG3	4" SCRD.	430 SMT DA5-D	12-15	300	ROK
EUH3	4" FLGD.	418 FMT DA5-D	12-15	250	ROK
EUI3	6" FLGD.	618 FMT DA5-D	12-15	250	ROL

#### NOTES:

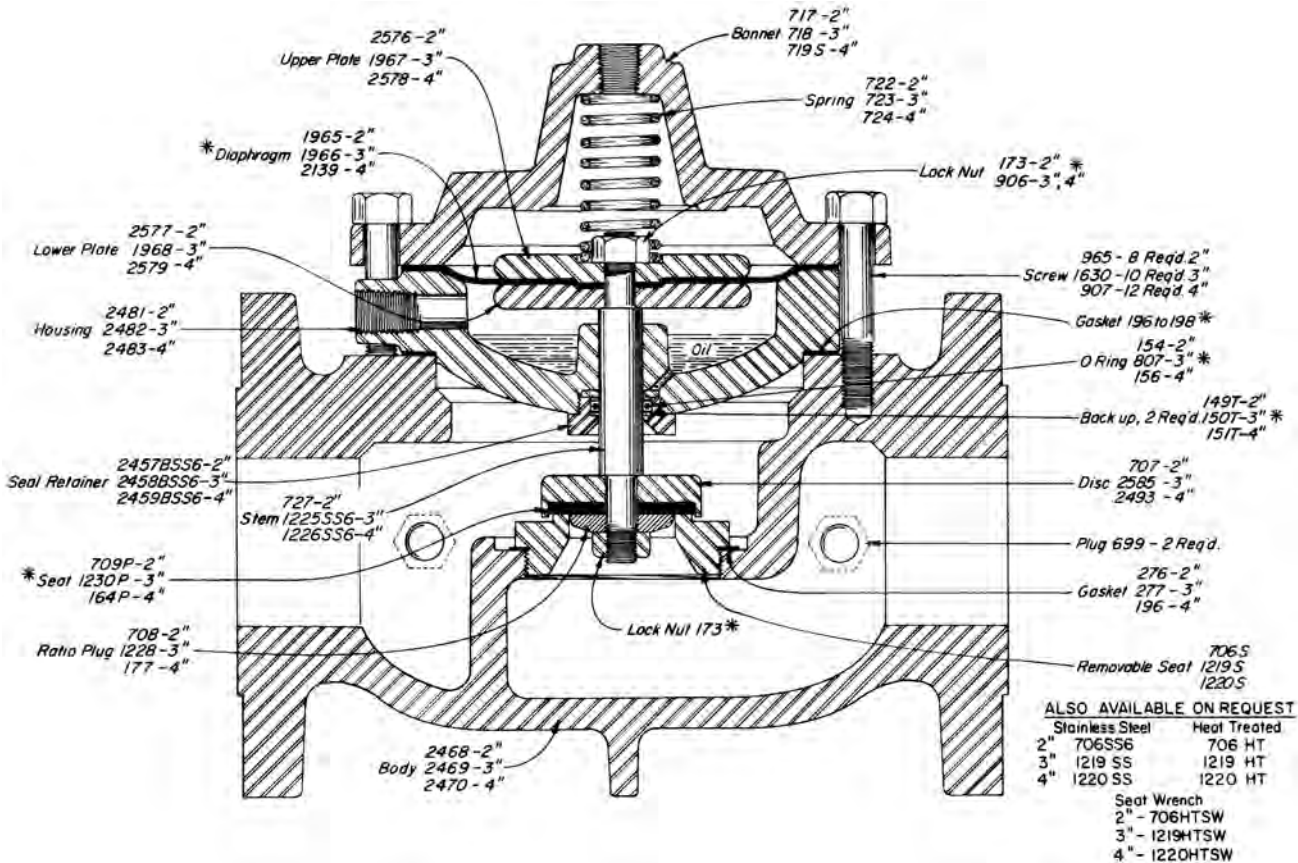
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 195-1", 196-2", 197-3", 198-4", 199-6".

# LOW PRESSURE MOTOR VALVES



## MT DA5 WITH REDUCED INNER VALVE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	MAX. W.P.	KIT
END3	2" FLGD.	227 FMT DA5-S	285	RPW
ENG3	3" FLGD.	327 FMT DA5-S	285	RPX
ENI3	4" FLGD.	427 FMT DA5-S	285	RPY

### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

#### APPLICATIONS:

Liquid metering vessels where a 10 to 12 psig back pressure is desired.

Any system which requires a valve to receive a pilot signal on either or both sides of the main diaphragm.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Full line size opening
- Removable valve seat
- Ratio of diaphragm to seat area is 2:1
- Spring loaded to hold 10 to 12 psig back pressure
- Minimum maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

- For liquid capacity chart refer to table of contents.
- For gas capacity chart refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

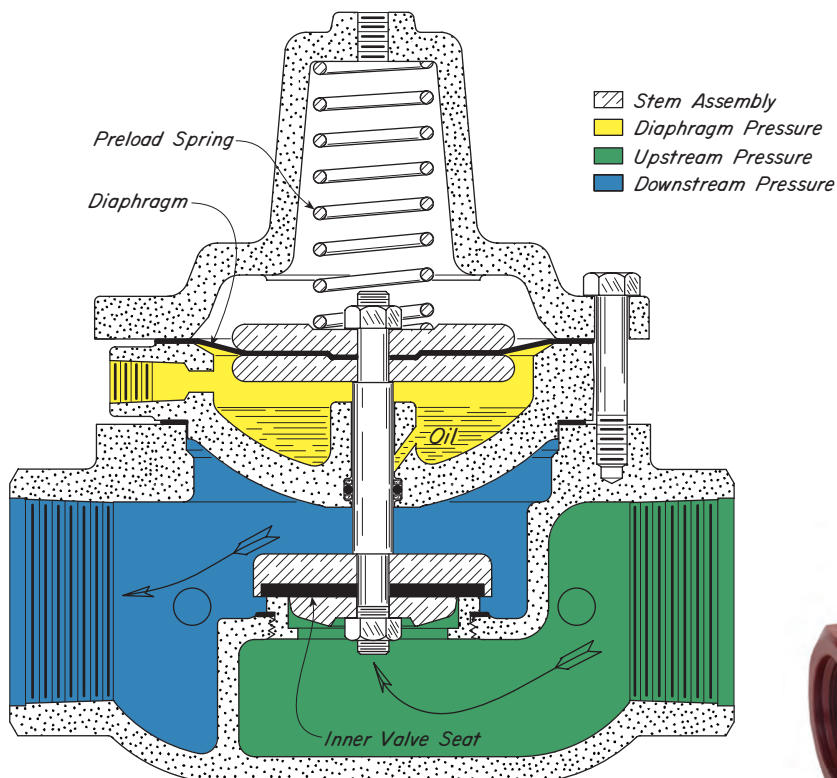
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is 10 to 12 psig or less.

An increase in Diaphragm Pressure (Yellow) and/or an increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the valve.

A decrease in diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 10 to 12 psig or less.

With an effective DIAPHRAGM area two times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 10 to 12 psig and/or 6 psig or more Diaphragm Pressure (Yellow) will open the motor valve.

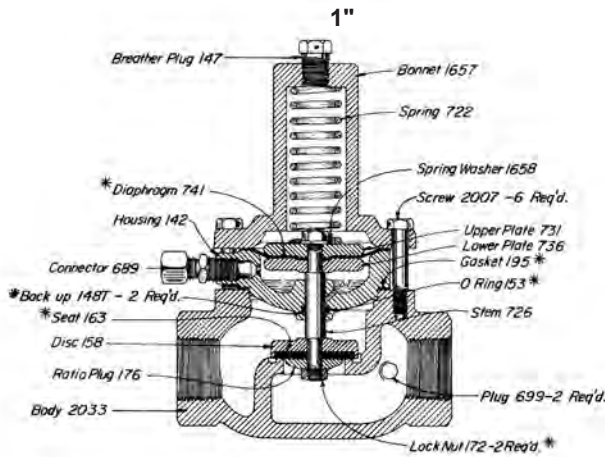
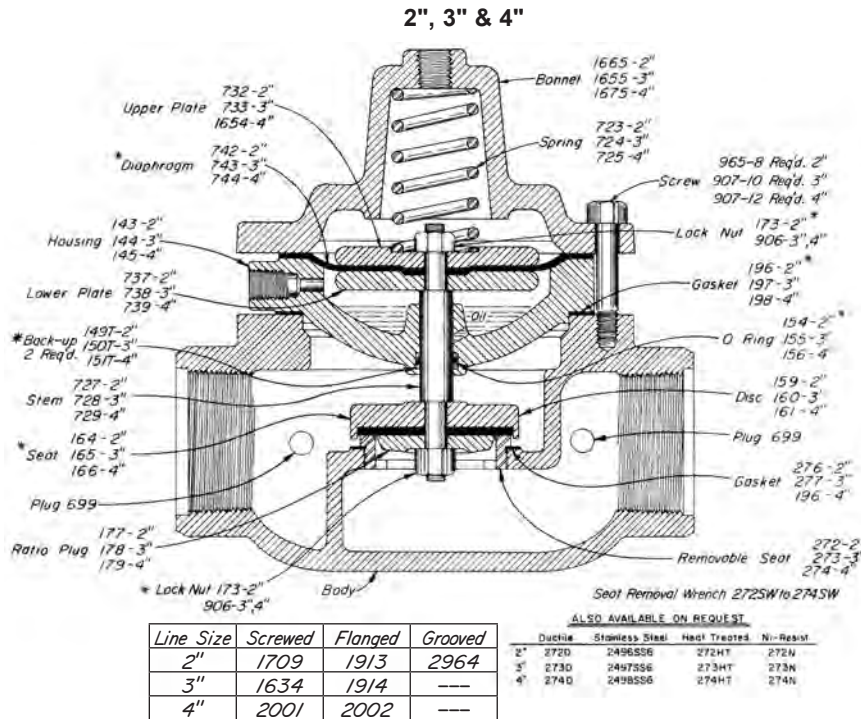


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# LOW PRESSURE MOTOR VALVES



## MT 2DA DOUBLE ACTING DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EMB4	1" SCR.D.	112 SMT 2DA	10-12	175	RGS
EMC4	2" SCR.D.	212 SMT 2DA	10-12	175	RGT
EMD4	2" FLGD. <sup>a</sup>	212 FMT 2DA	10-12	175	RGT
EME4	2" GRVD.	212 GMT 2DA	10-12	175	RGT
EMF4	3" SCR.D.	312 SMT 2DA	10-12	175	RGU
EMG4	3" FLGD. <sup>a</sup>	312 FMT 2DA	10-12	175	RGU
EMH4	4" SCR.D.	412 SMT 2DA	10-12	175	RGW
EMI4	4" FLGD. <sup>a</sup>	412 FMT 2DA	10-12	175	RGW

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

E2:50.2  
Issued 5/13

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### NOTES:

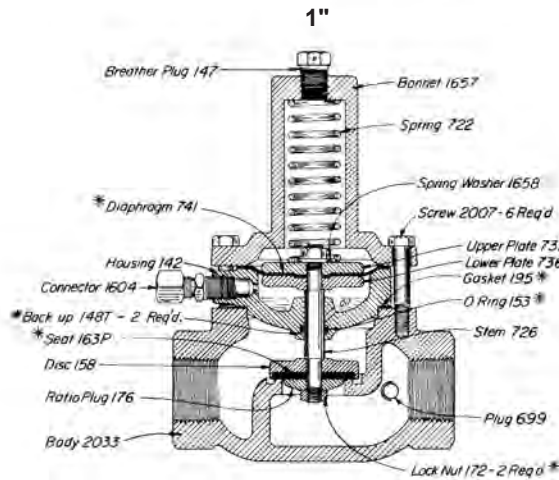
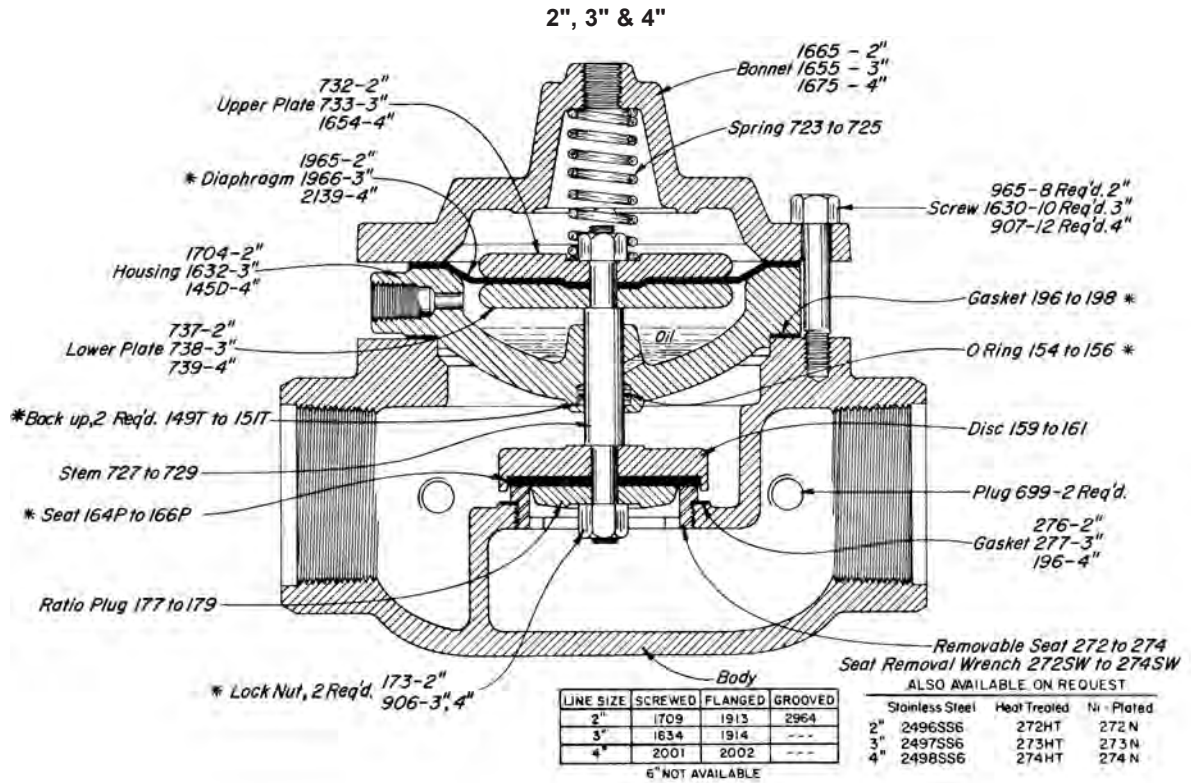
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

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Current Revision:  
Change 1 inch Screw & Body



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EUA4	1" SCR.D.	130 SMT 2DA-D	10-12	300	RNQ
EUB4	2" SCR.D.	230 SMT 2DA-D	10-12	300	RNU
EUC4	2" FLGD. <sup>a</sup>	218 FMT 2DA-D	10-12	250	RNU
EUD4	2" GRVD.	230 GMT 2DA-D	10-12	300	RNU
EUE4	3" SCR.D.	330 SMT 2DA-D	10-12	300	RNW
EUF4	3" FLGD. <sup>a</sup>	318 FMT 2DA-D	10-12	250	RNW
EUG4	4" SCR.D.	430 SMT 2DA-D	10-12	300	RNX
EUH4	4" FLGD. <sup>a</sup>	418 FMT 2DA-D	10-12	250	RNX

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

Current Revision:  
Change Logo

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#### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

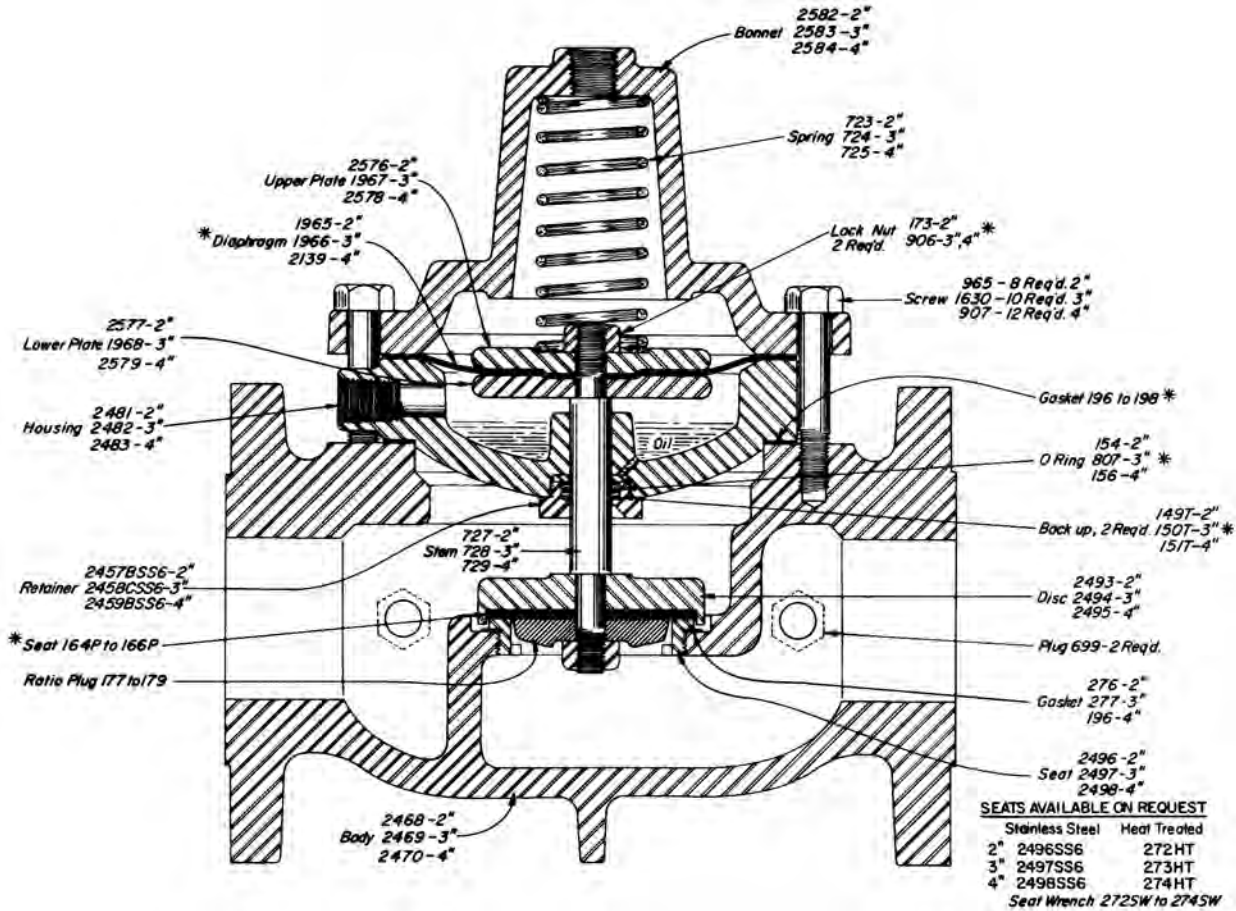
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E2:50.3  
Issued 1/13

# LOW PRESSURE MOTOR VALVES



## MT 2DA DOUBLE ACTING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
END4	2" FLGD. <sup>a</sup>	227 FMT 2DA-S	10-12	285	ROM
ENG4	3" FLGD. <sup>a</sup>	327 FMT 2DA-S	10-12	285	RON
ENI4	4" FLGD. <sup>a</sup>	427 FMT 2DA-S	10-12	285	ROO

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified

### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

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#### APPLICATIONS:

Liquid metering vessels where a 24 to 30 psig back pressure is desired.

Any system which requires a valve to receive a 30 psig maximum pilot signal on either or both sides of the main diaphragm operating at pressures up to 300 psig.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Removable valve seat
- Ratio of diaphragm to seat area is:
  - 8:1 on 1"
  - 5:1 on 2", 3", 4", and 6"
- Controls 8 times signal pressure on 1"
- Controls 5 times signal pressure on 2", 3", 4" and 6"
- Spring loaded to hold:
  - 35 to 40 psig back pressure on 1"
  - 24 to 30 psig back pressure on 2", 3", 4" and 6"
- Minimum maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

- For liquid capacity refer to table of contents.
- For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

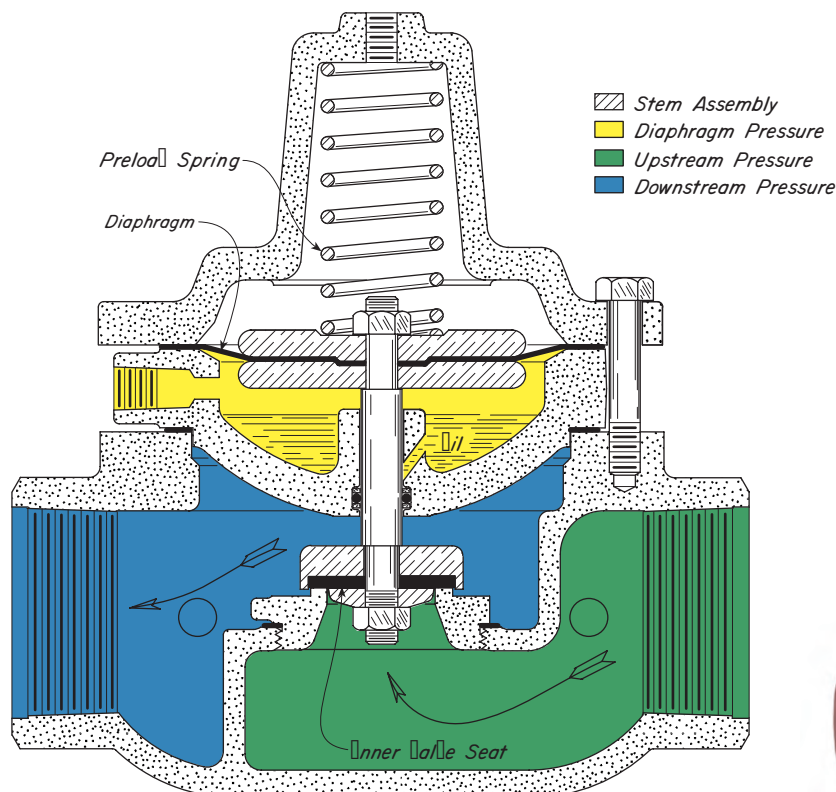
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is 24 to 30 psig or less.

An increase in the Diaphragm Pressure (Yellow) and/or an increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the valve.

A decrease in the Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 24 to 30 psig or less.

With an effective DIAPHRAGM area five times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 24 to 30 psig and/or 6 psig or more Diaphragm Pressure (Yellow) will open the motor valve.

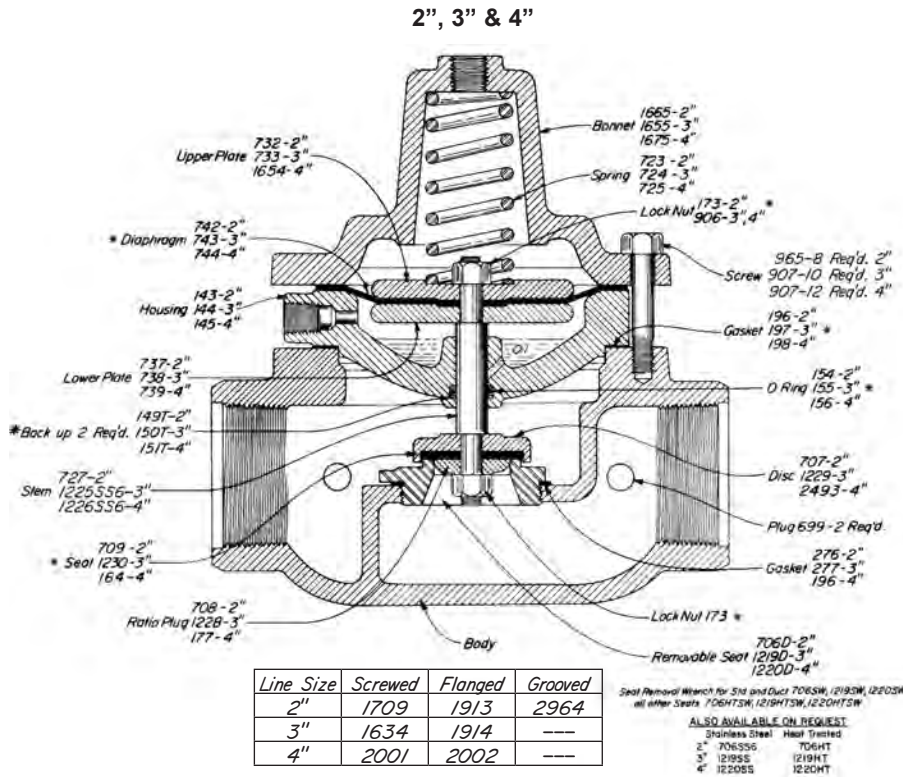


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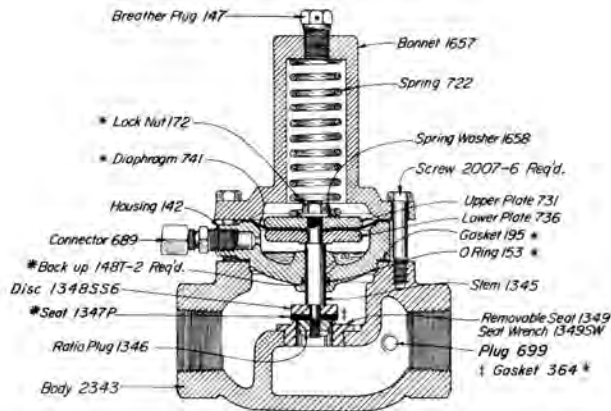
# LOW PRESSURE MOTOR VALVES



## MT 2DA5 WITH REDUCED INNER VALVE DUCTILE IRON



**1"**



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EMB5	1" SCR.D.	112 SMT 2DAB	35 -40	125	RHE
EMC5	2" SCR.D.	212 SMT 2DA5	24 -30	125	RHF
EMD5	2" FLGD. <sup>a</sup>	212 FMT 2DA5	24 -30	125	RHF
EME5	2" GRVD.	212 GMT 2DA5	24 -30	125	RHF
EMF5	3" SCR.D.	312 SMT 2DA5	24 -30	125	RHG
EMG5	3" FLGD. <sup>a</sup>	312 FMT 2DA5	24 -30	125	RHG
EMH5	4" SCR.D.	412 SMT 2DA5	24 -30	125	RHH
EMI5	4" FLGD. <sup>a</sup>	412 FMT 2DA5	24 -30	125	RHH

### NOTES:

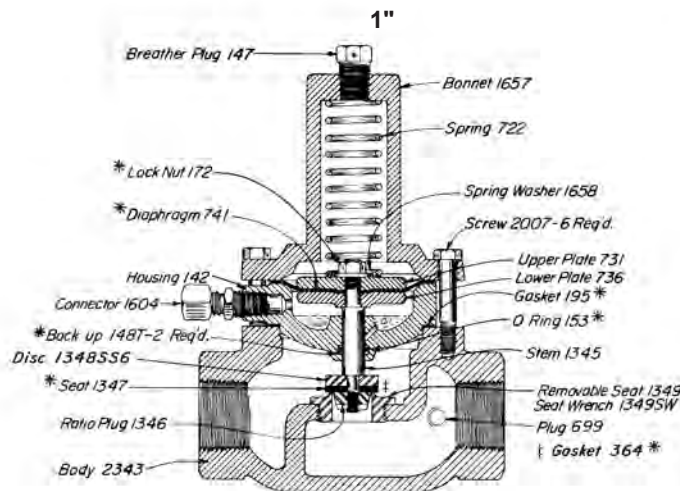
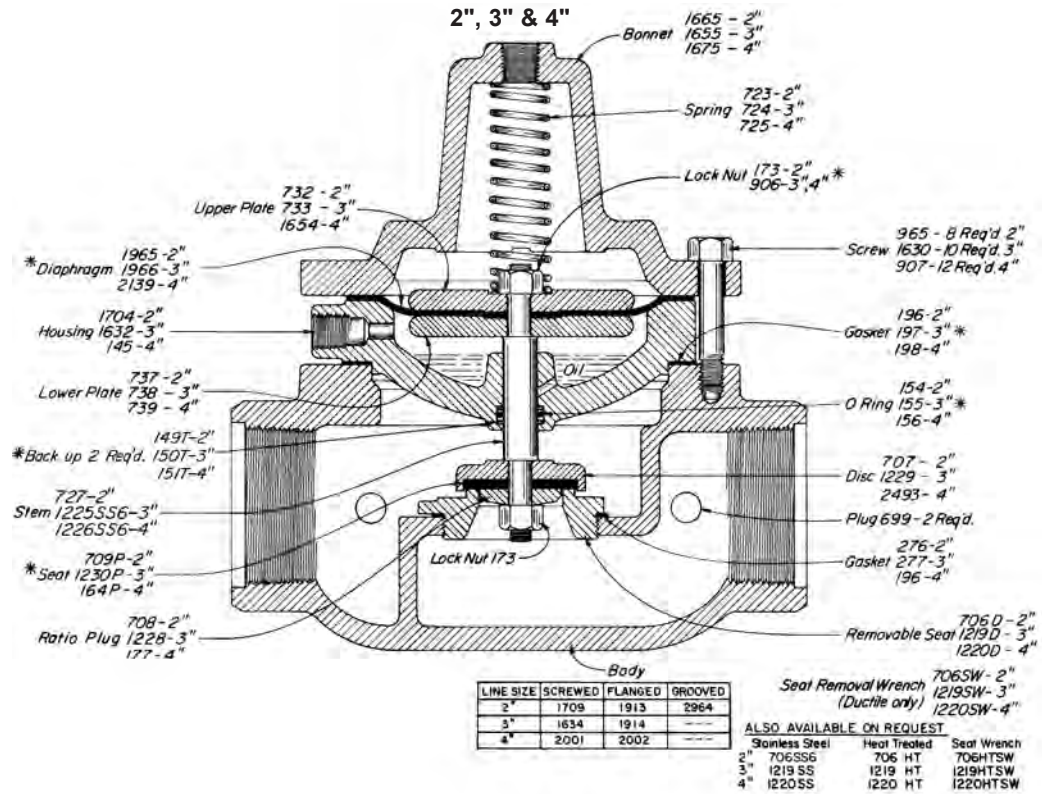
\*These are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.





#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EUA5	1" SCR.D.	130 SMT 2DAB-D	35 - 40	300	RHE
EUB5	2" SCR.D.	230 SMT 2DA5-D	35 - 40	300	ROI
EUC5	2" FLGD. <sup>a</sup>	218 FMT 2DA 5-D	35 - 40	250	ROI
EUD5	2" GRVD.	230 GMT 2DA5-D	35 - 40	300	ROI
EUE5	3" SCR.D.	330 SMT 2DA5-D	35 - 40	300	ROJ
EUF5	3" FLGD. <sup>a</sup>	318 FMT 2DA5-D	35 - 40	250	ROJ
EUG5	4" SCR.D.	430 SMT 2DA5-D	35 - 40	300	ROK
EUH5	4" FLGD. <sup>a</sup>	418 FMT 2DA5-D	35 - 40	250	ROK

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

Current Revision:  
Change Stem numbers

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#### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

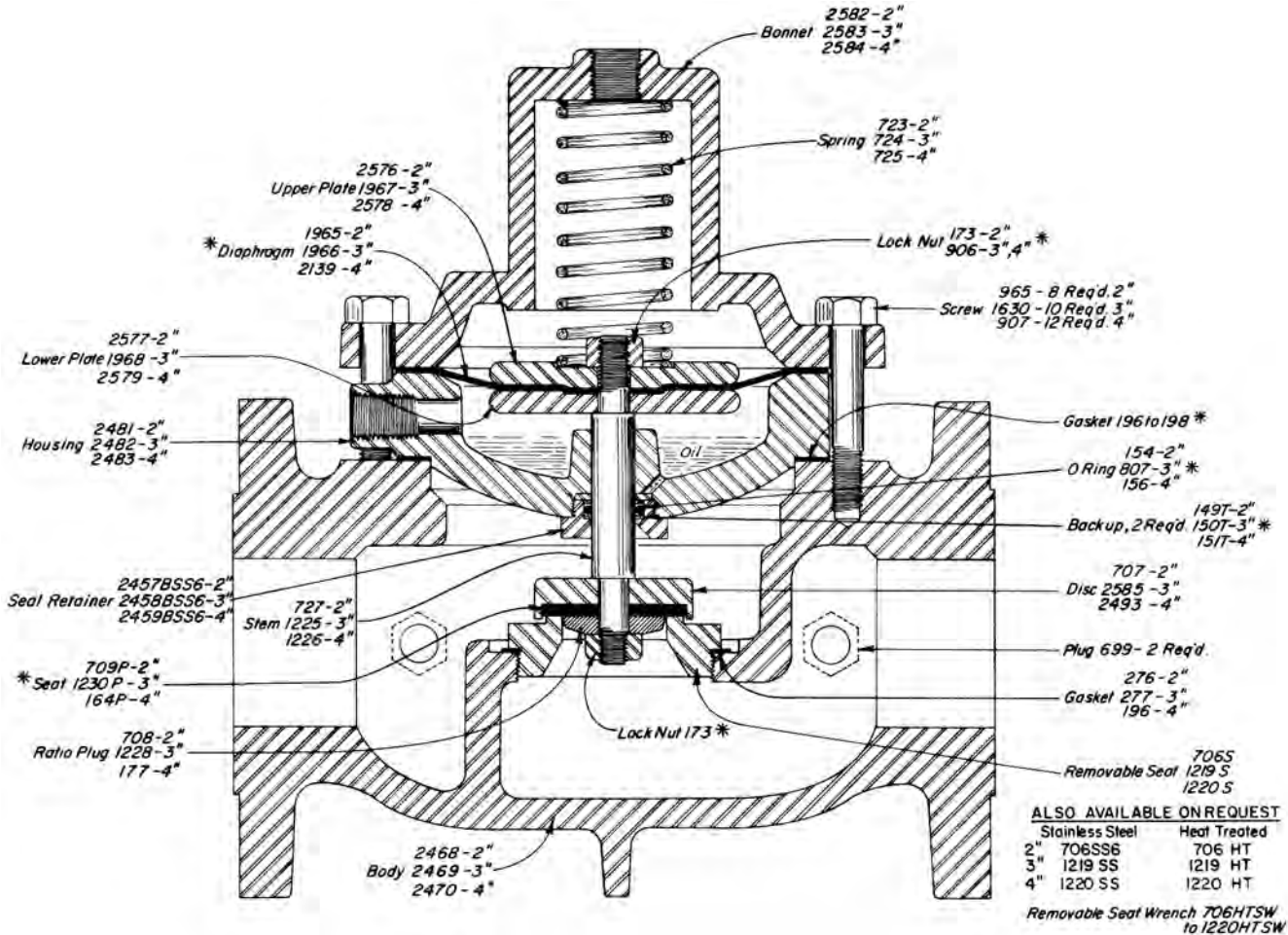
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E2:60.3  
Issued 10/13

# LOW PRESSURE MOTOR VALVES



## MT 2DA5 WITH REDUCED INNER VALVE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
END5	2" FLGD. <sup>a</sup>	227 FMT 2DA5-S	24 -30	285	RPW
ENG5	3" FLGD. <sup>a</sup>	327 FMT 2DA5-S	24 -30	285	RPX
EN15	4" FLGD. <sup>a</sup>	427 FMT 2DA5-S	24 -30	285	RPY

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

### NOTES:

\*These 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: Gasket 196-2", 197-3", 198-4".

For dimensions refer to Table of Contents.

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#### APPLICATIONS:

Liquid metering vessels where a 22 to 25 psig back pressure is desired.

Any system which requires a valve to receive a pilot signal on either or both sides of the main diaphragm.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Full line size opening
- Removable valve seat
- Ratio of diaphragm to seat area is 2:1
- Spring loaded to hold 22 to 25 psig back pressure
- Minimum maintenance
- All internal parts can be removed with valve in line.

#### CAPACITY:

- For liquid capacity refer to table of contents
- For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

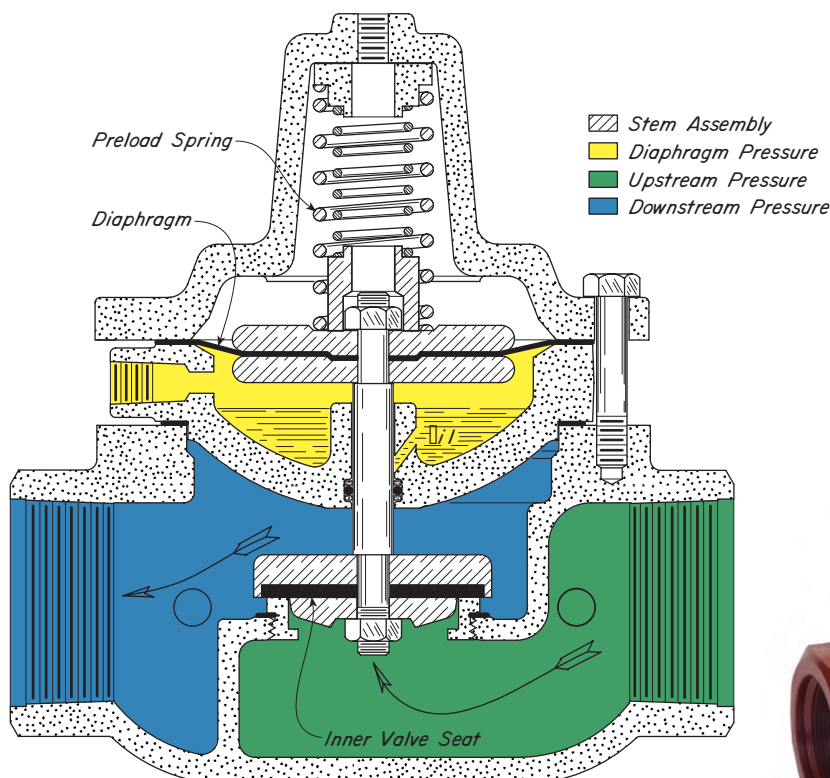
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is 22 to 25 psig or less.

An increase in the Diaphragm Pressure (Yellow) and/or an increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the motor valve.

A decrease in the Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 22 to 25 psig or less.

With an effective DIAPHRAGM area two times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 22 to 25 psig and/or 12 psig or more Diaphragm Pressure (Yellow) will open the motor valve.

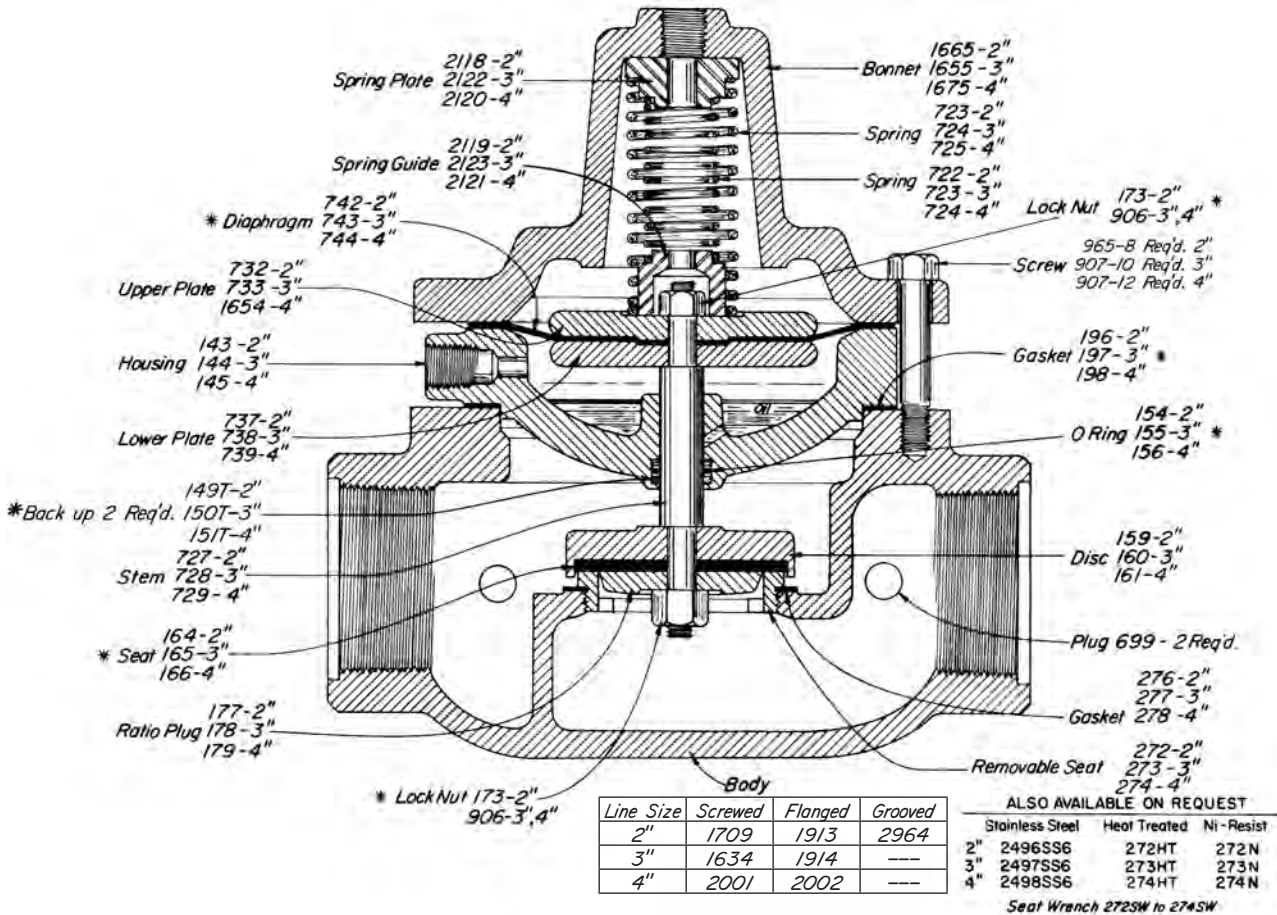


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# LOW PRESSURE MOTOR VALVES



## MT 4DA DOUBLE ACTING DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EMC6	2" SCR.D.	212 SMT 4DA	22 -25	175	RGT
EMD6	2" FLGD. <sup>a</sup>	212 FMT 4DA	22 -25	175	RGT
EME6	2" GRVD.	212 GMT 4DA	22 -25	175	RGT
EMF6	3" SCR.D.	312 SMT 4DA	22 -25	175	RGU
EMG6	3" FLGD. <sup>a</sup>	312 FMT 4DA	22 -25	175	RGU
EMH6	4" SCR.D.	412 SMT 4DA	22 -25	175	RGW
EMI6	4" FLGD. <sup>a</sup>	412 FMT 4DA	22 -25	175	RGW

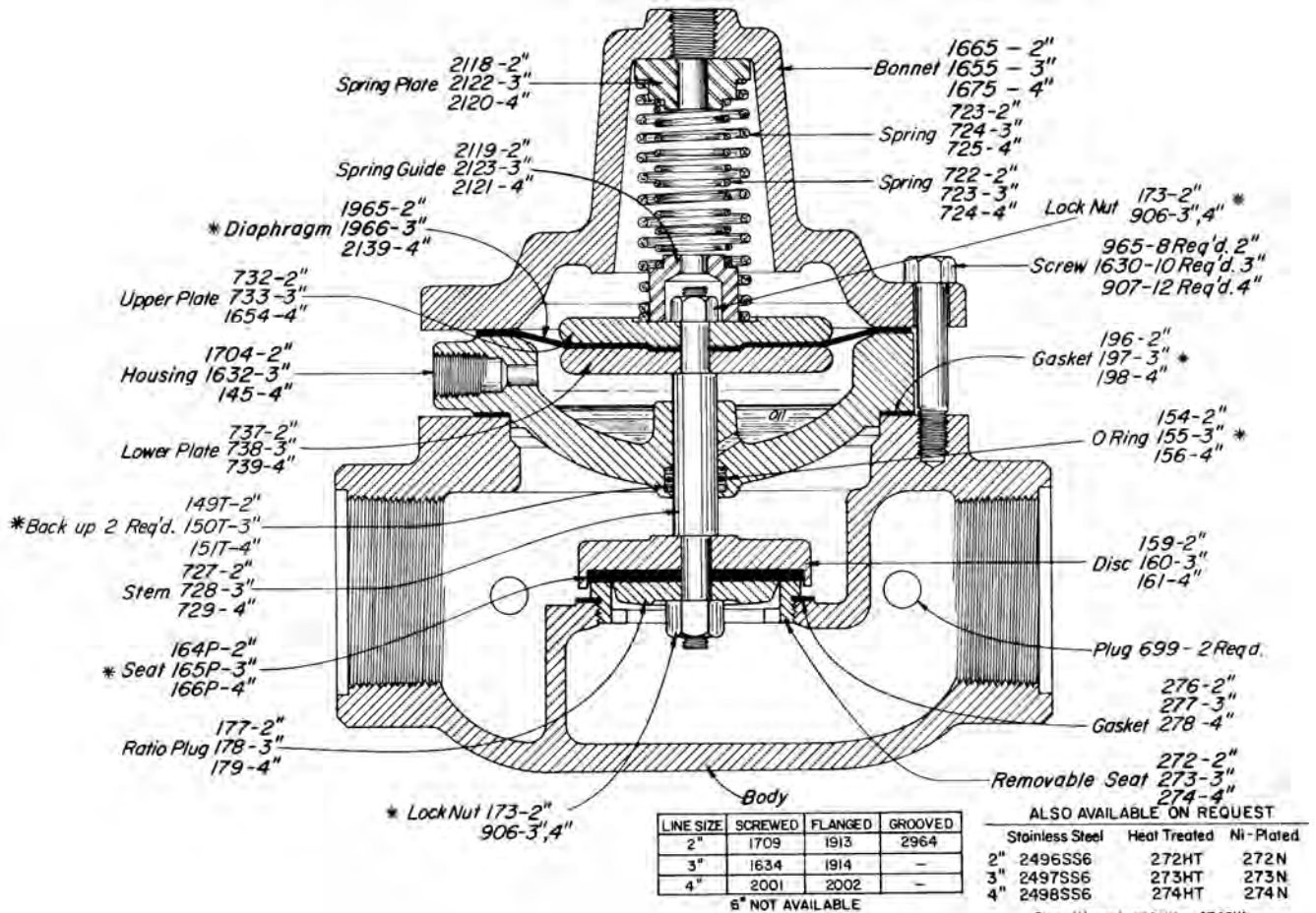
<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

### NOTES:

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

The number of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4".

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#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EUB6	2" SCR.D.	230 SMT 4DA-D	22 -35	300	RNU
EUC6	2" FLGD.	218 FMT 4DA-D	22 -35	250	RNU
EUD6	2" GRVD.	230 GMT 4DA-D	22 -35	300	RNU
EUE6	3" SCR.D.	330 SMT 4DA-D	22 -35	300	RNW
EUF6	3" FLGD.	318 FMT 4DA-D	22 -35	250	RNW
EUG6	4" SCR.D.	430 SMT 4DA-D	22 -35	300	RNX
EUH6	4" FLGD.	418 FMT 4DA-D	22 -35	250	RNX

#### NOTES:

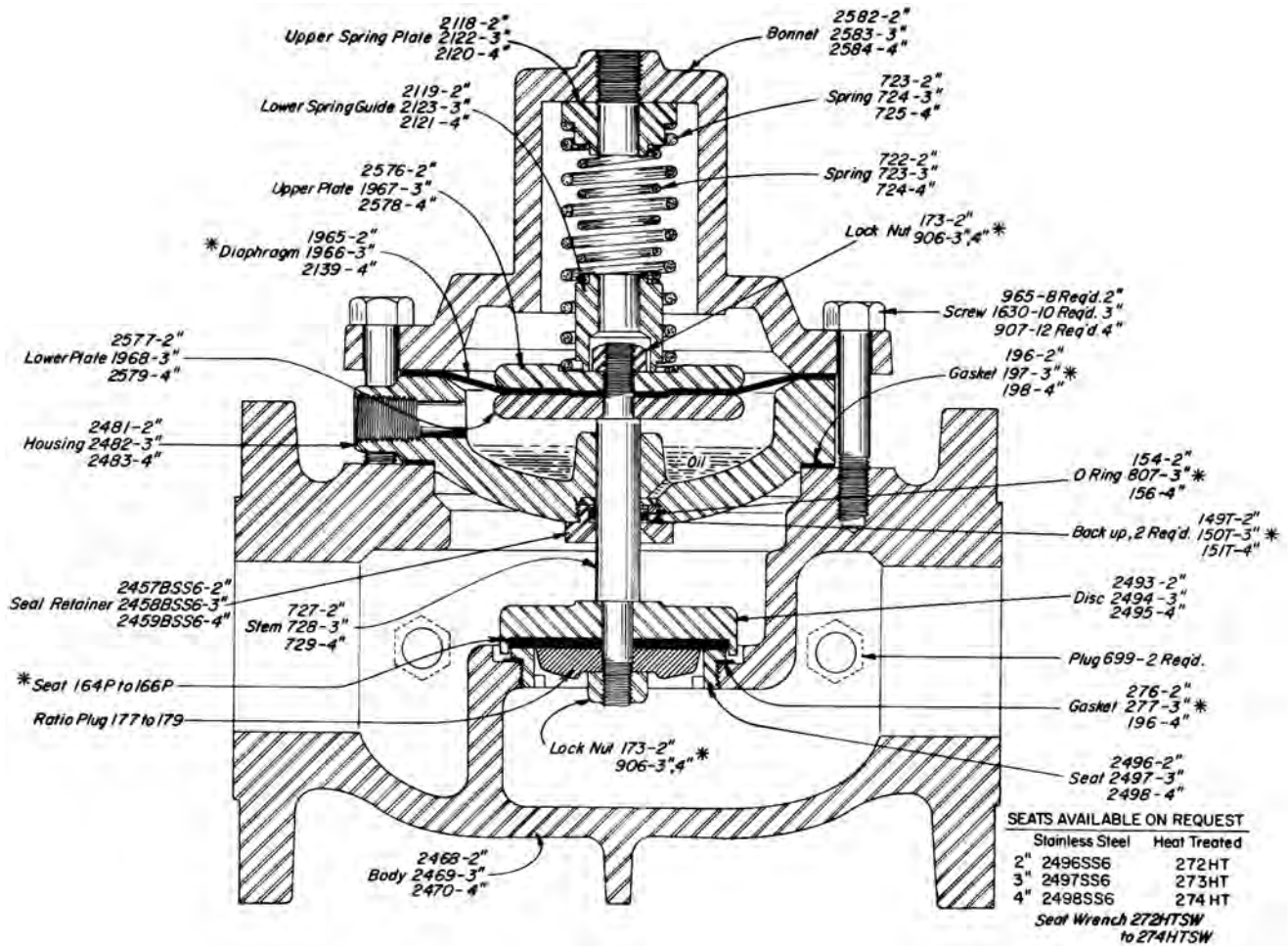
\*These are recommended spare parts and are stocked as repair kits.

The number of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4".

# LOW PRESSURE MOTOR VALVES



## MT 4DA DOUBLE ACTING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
END6	2" FLGD.	227 FMT 4DA-S	22 -35	285	ROM
ENG6	3" FLGD.	327 FMT 4DA-S	22 -35	285	RON
ENI6	4" FLGD.	427 FMT 4DA-S	22 -35	285	ROO

### NOTES:

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

The number of a series assigned to a part indicate different line sizes. For example: Gasket 196-2", 197-3", 198-4"

#### APPLICATIONS:

Liquid metering vessels where a 44 to 50 psig back pressure is desired.

Any system which requires a valve to receive a pilot signal on either or both sides of the main diaphragm.

#### FEATURES:

- Tight shut-off
- Single soft seat
- Removable valve seat
- Ratio of diaphragm to seat area is 5:1
- Controls approximately 5 times signal pressure
- Spring loaded to hold 44 to 50 psig back pressure
- Minimum maintenance
- All internal parts can be removed with valve in line

#### CAPACITY:

- For liquid capacity refer to table of contents
- For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

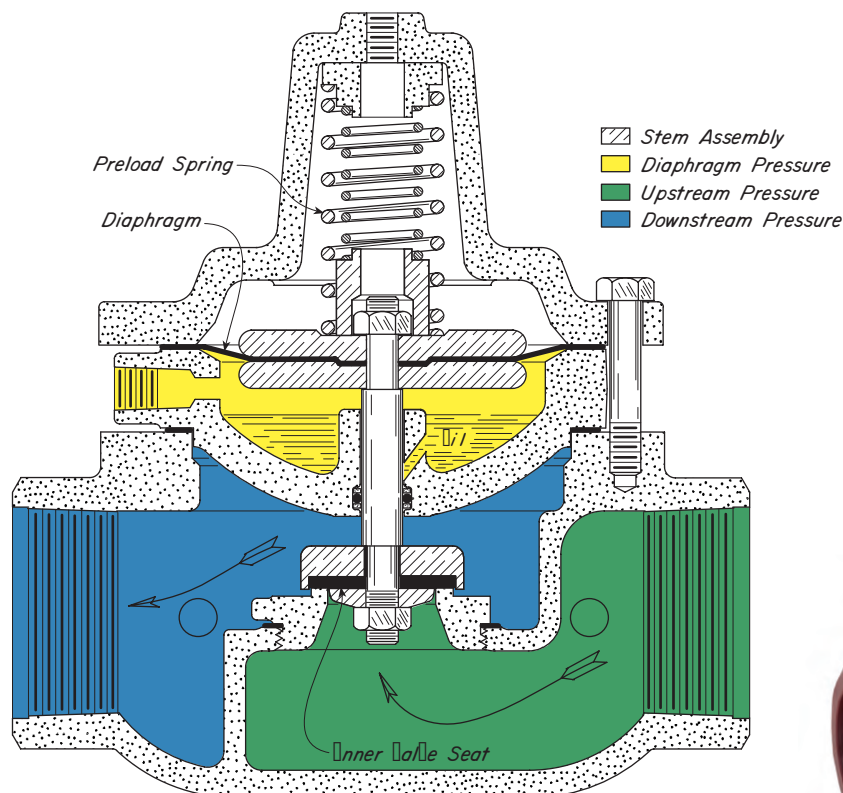
#### OPERATION:

The Stem Assembly is the only moving unit in the double acting motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus downstream Pressure (Blue) is 44 to 50 psig or less.

An increase in Diaphragm Pressure (Yellow) and/or an increase in the differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the valve.

A decrease in Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is 44 to 50 psig or less.

With an effective DIAPHRAGM area five times the INNER VALVE SEAT area, and the PRELOAD SPRING, a differential pressure greater than 44 to 50 psig and/or 10 psig or more Diaphragm Pressure (Yellow) will open the motor valve.

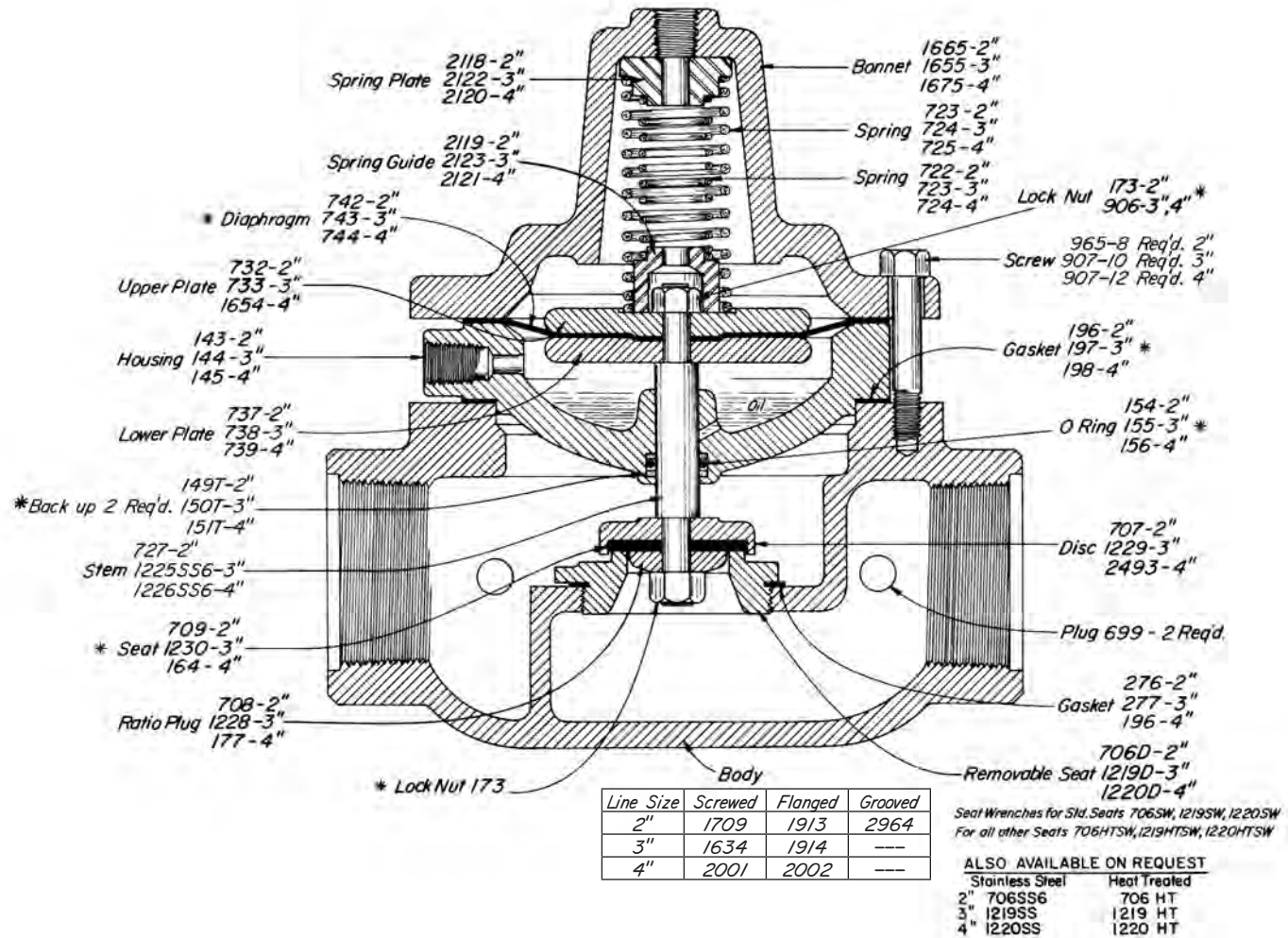


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# LOW PRESSURE MOTOR VALVES



## MT 4DA5 WITH REDUCED INNER VALVE DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EMC7	2" SCR.D.	212 SMT 4DA5	44 -50	175	RHF
EMD7	2" FLGD.*	212 FMT 4DA5	44 -50	175	RHF
EME7	2" GRVD.	212 GMT 4DA5	44 -50	175	RHF
EMF7	3" SCR.D.	312 SMT 4DA5	44 -50	175	RHG
EMG7	3" FLGD.*	312 FMT 4DA5	44 -50	175	RHG
EMH7	4" SCR.D.	412 SMT 4DA5	44 -50	175	RHH
EMI7	4" FLGD.*	412 FMT 4DA5	44 -50	175	RHH

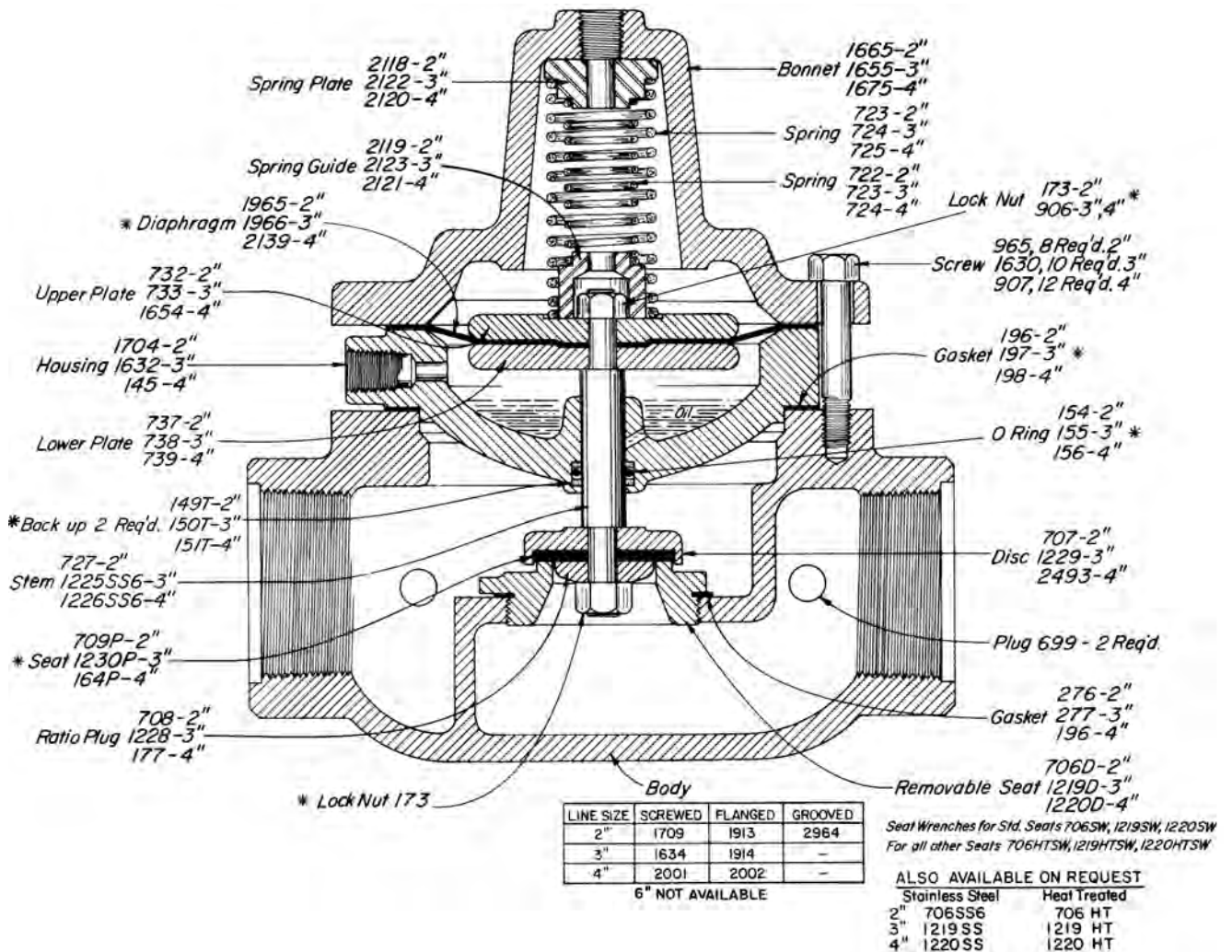
\*Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

### NOTES:

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

The number of a series assigned to a part indicate different line sizes. For example: 196-2", 197-3", 198-4"





#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
EUB7	2" SCRD.	230 SMT 4DA5-D	44 -50	300	ROI
EUC7	2" FLGD.*	218 FMT 4DA5-D	44 -50	250	ROI
EUE7	3" SCRD.	330 SMT 4DA5-D	44 -50	300	ROJ
EUF7	3" FLGD.*	318 FMT 4DA5-D	44 -50	250	ROJ
EUG7	4" SCRD.	430 SMT 4DA5-D	44 -50	300	ROK
EUH7	4" FLGD.*	418 FMT 4DA5-D	44 -50	250	ROK

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

#### NOTES:

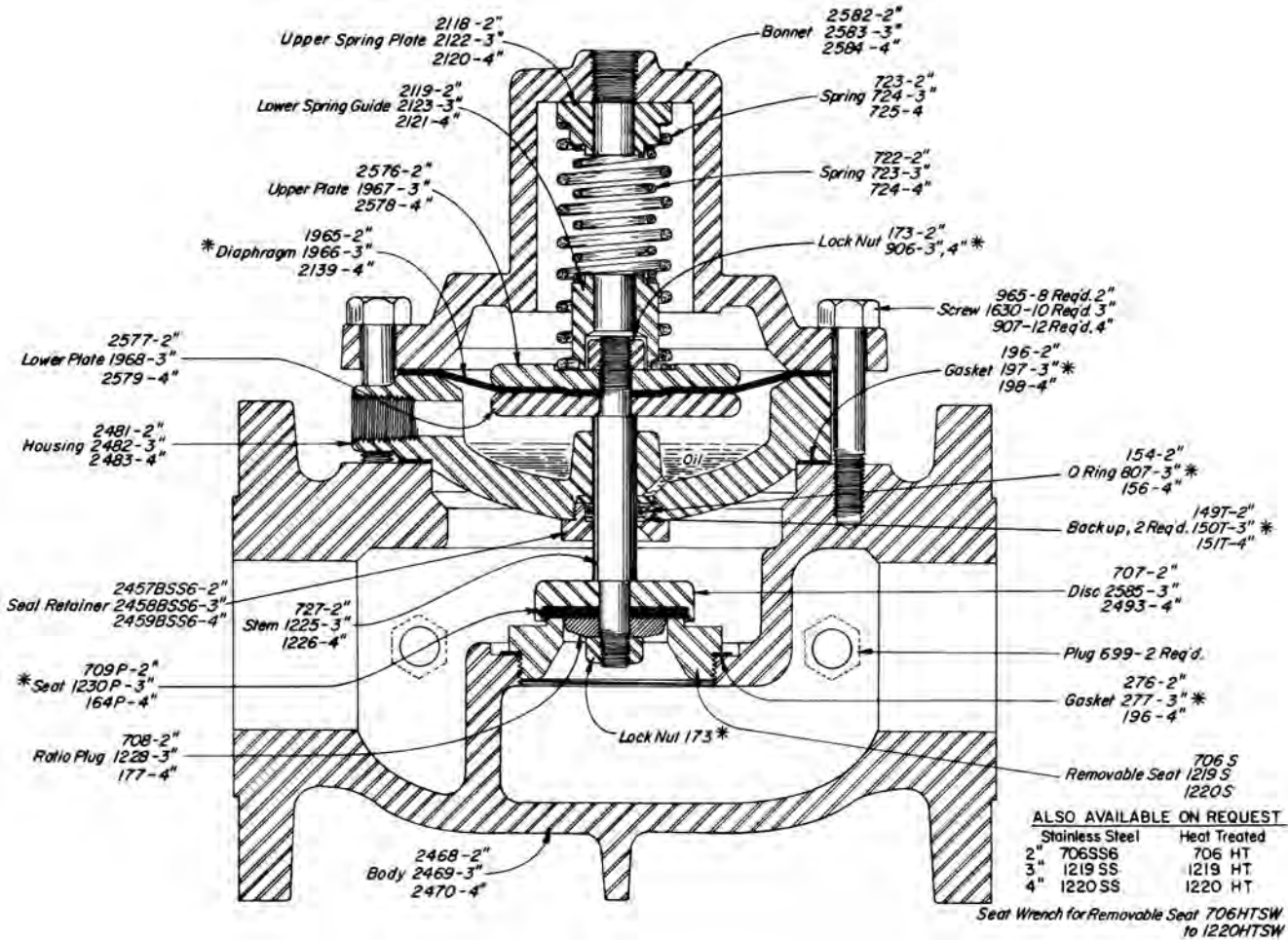
\*These are recommended spare parts and are stocked as repair kits.

The number of a series assigned to a part indicate different line sizes. For example: 196-2", 197-3", 198-4"

# LOW PRESSURE MOTOR VALVES



## MT 4DA5 WITH REDUCED INNER VALVE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
END7	2" FLGD.*	227 FMT 4DA5-S	44 -50	285	RPW
ENG7	3" FLGD.*	327 FMT 4DA5-S	44 -50	285	RPX
ENI7	4" FLGD.*	427 FMT 4DA5-S	44 -50	285	RPY

### NOTES:

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

The number of a series assigned to a part indicate different line sizes. For example: 196-2", 197-3", 198-4"

#### APPLICATIONS:

Liquid metering vessels where up to 250 psig adjustable back pressure is desired.

Burner valve for throttling or snap action service.

Any system that requires a double acting motor valve but also requires an adjustable maximum back pressure.

#### FEATURES:

All internal parts can be removed with valve in line

Ratio of diaphragm to seat area is 2:1

Controls approximately 2 times signal pressure

Spring adjustment:

5 to 40 psig on 1"

5 to 175 psig on 2" standard

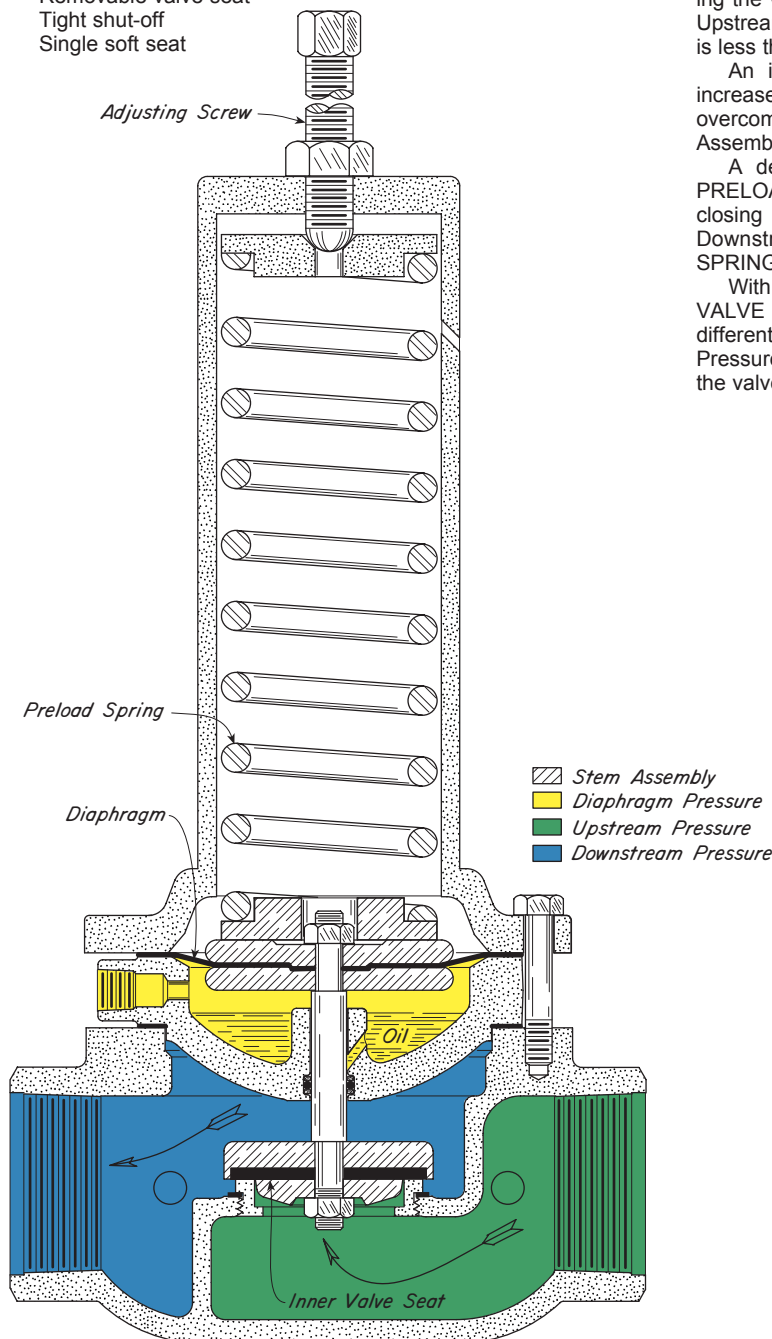
5 to 250 psig optional on 2" ductile and steal

Minimum maintenance

Removable valve seat

Tight shut-off

Single soft seat



#### CAPACITY:

For liquid capacity refer to table of contents.

For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve if there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus downstream Pressure (Blue) is less than the PRELOAD SPRING force.

An increase in Diaphragm Pressure (Yellow) and/or an increase in differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upward, opening the valve.

A decrease in Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward closing the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is less than the PRELOAD SPRING setting.

With an effective DIAPHRAGM area two times the INNER VALVE SEAT area, and an adjustable PRELOAD SPRING, a differential pressure ranging up to 250 psig and/or a Diaphragm Pressure (Yellow) ranging from 3 to 125 psig or greater will open the valve depending on the PRELOAD SPRING setting.

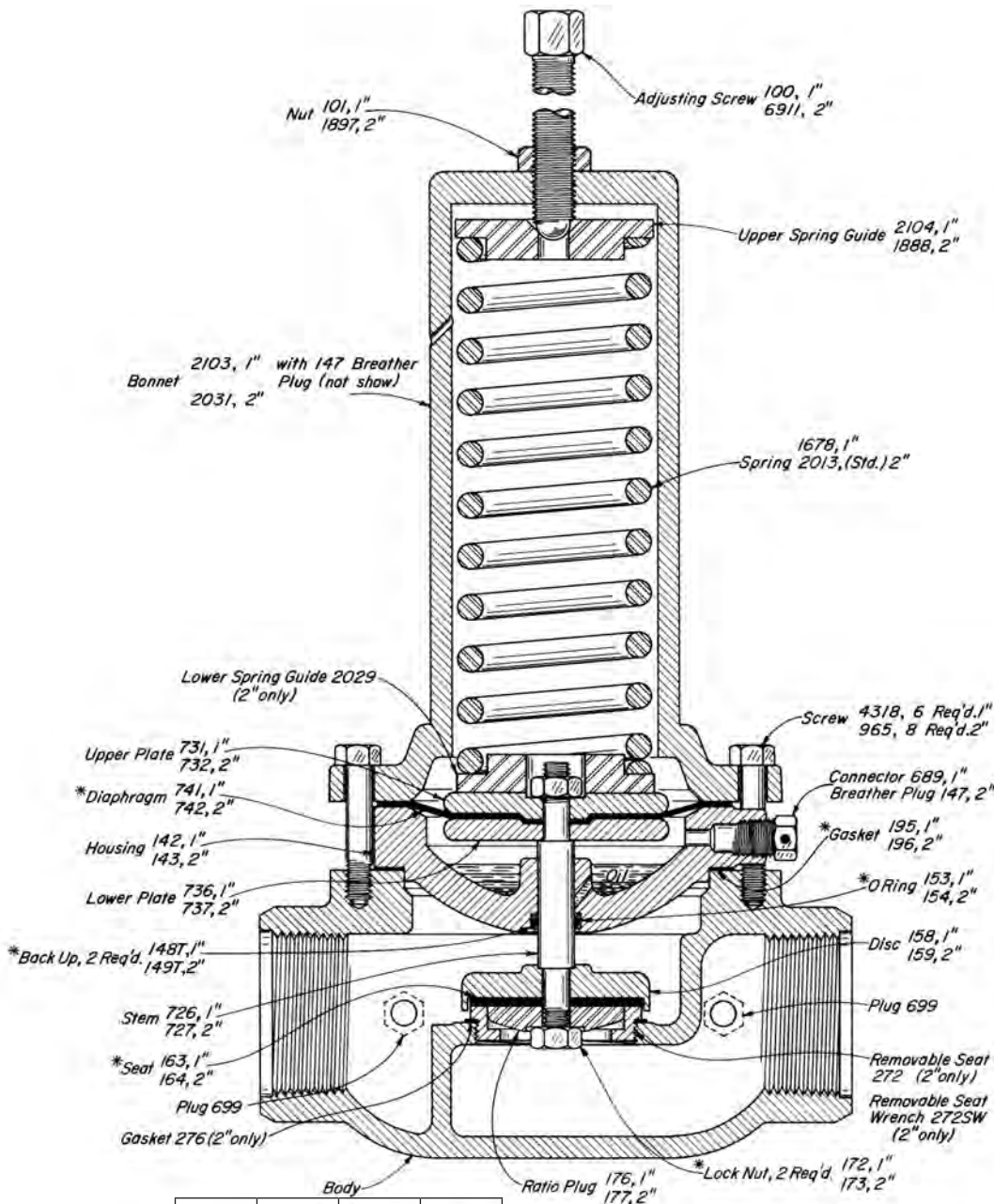


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# LOW PRESSURE MOTOR VALVES



## MT ADA ADJUSTABLE DOUBLE ACTING DUCTILE IRON



Line Size	Screwed	Flanged	Grooved
1"	2033	---	---
2"	1709	1913	2964

### THRU VALVES AVAILABLE:

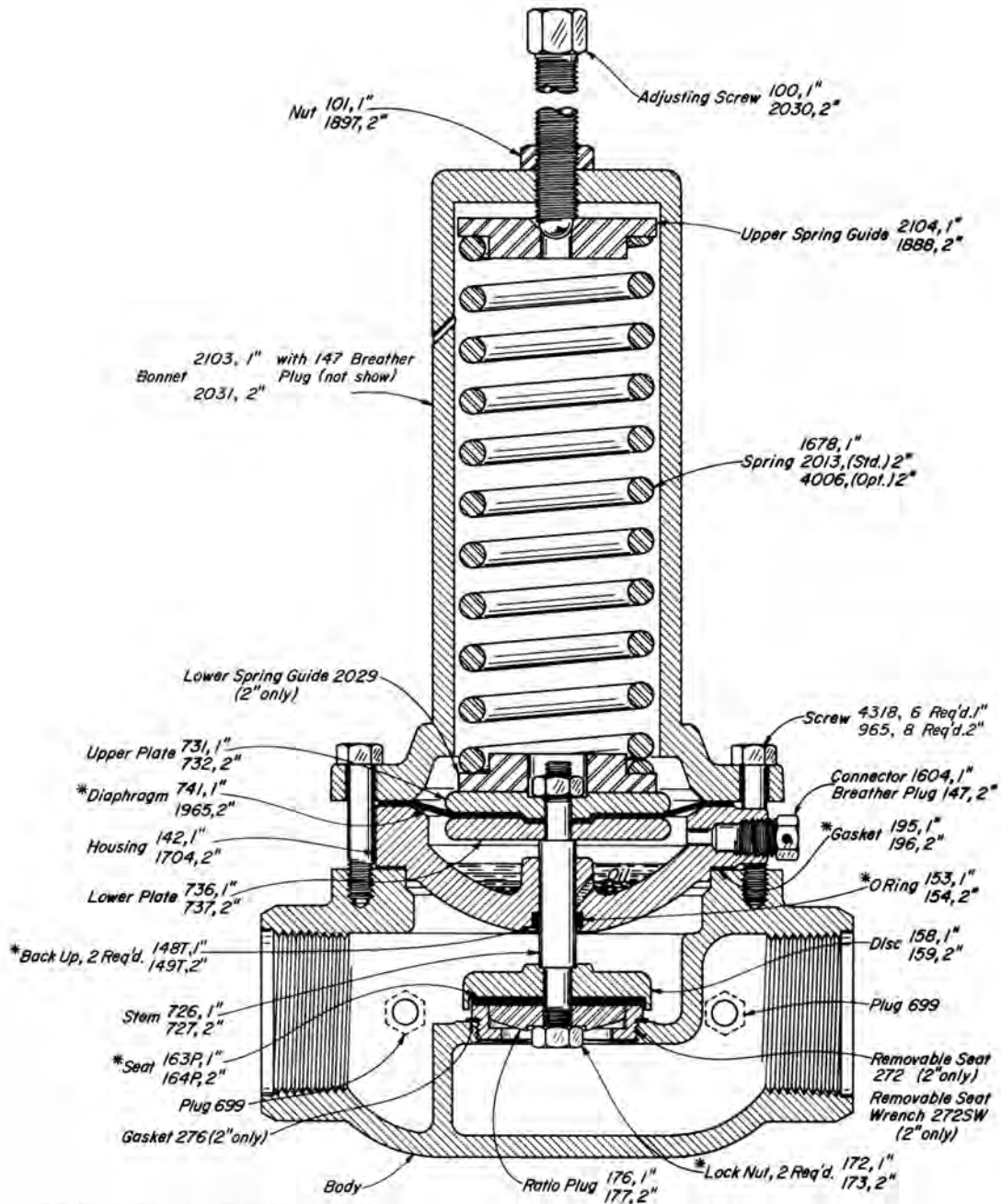
CAT. NO.	SIZE	TYPE	MOTOR VALVES	MAX. W.P.	MAX. DIFF. PRESS.	KIT
ABC	1"	SCRD.	112 SMT ADA	175	40	RGS
ATC	2"	SCRD.	212 SMT ADA	175	175	RGT

### NOTES:

\*These 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 741-1", 742-2"

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Line Size	Screwed	Flanged	Grooved
1"	2033	—	—
2"	1709	1913	2964

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE	TYPE	MOTOR VALVES	MAX. W.P.	MAX. DIFF. PRESS.	KIT
ABC3	1"	SCRD.	130 SMT ADA-D	300	40	RNQ
ATC3	2"	SCRD.	230 SMT ADA-D	300	175	RG7

Optional Heavy Spring 4006 raises Max. Diff. to 250 psig.

#### NOTES:

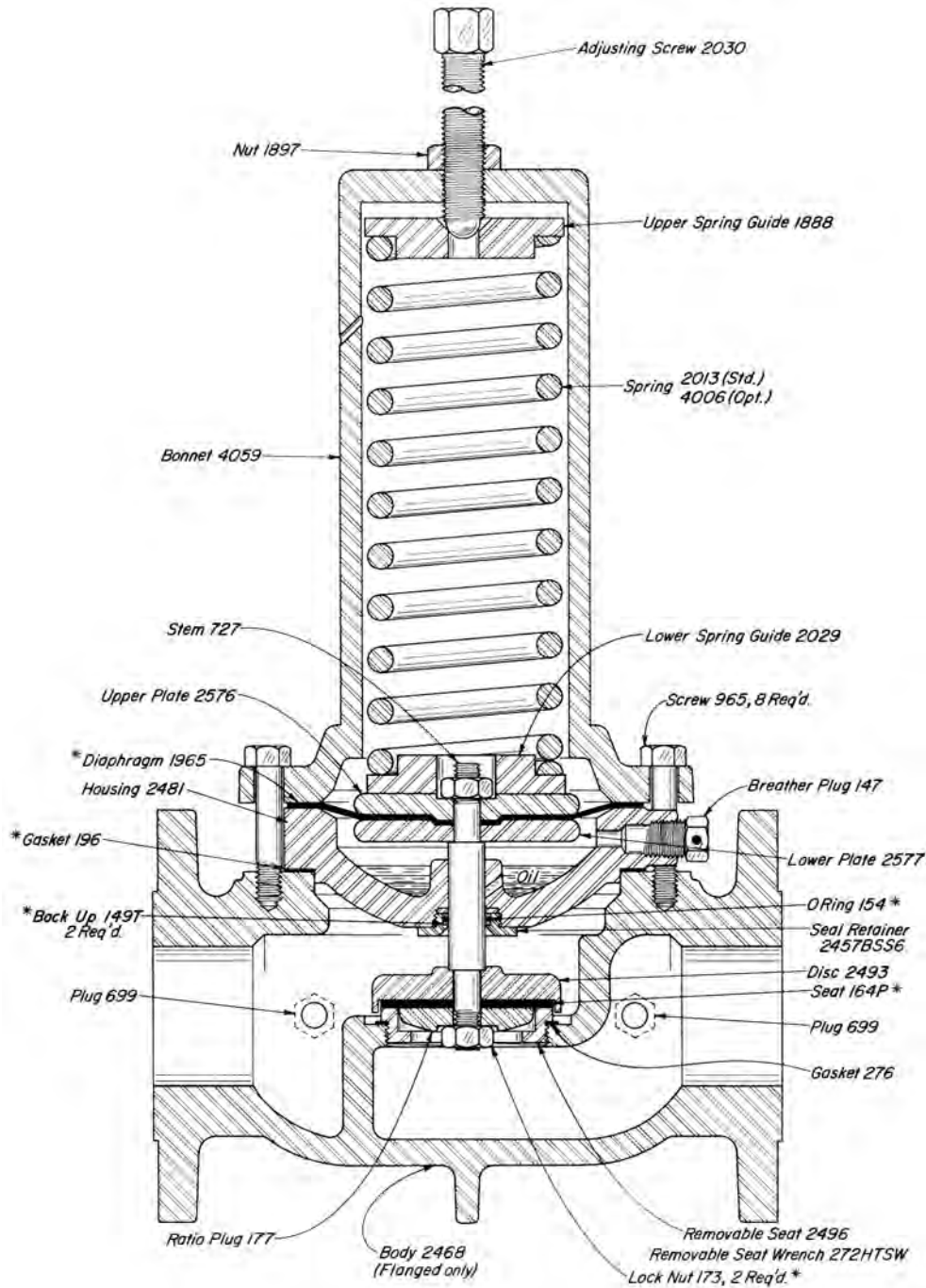
\*These are recommended spare parts and are stocked as repair kits.

NOTE: The numbers of a series assigned to a part indicated different line sizes. For example: Diaphragm 741-1", 742-2"

# LOW PRESSURE MOTOR VALVES



## MT ADA ADJUSTABLE DOUBLE ACTING STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE	TYPE	MOTOR VALVES	MAX. W.P.	MAX. DIFF. PRESS.	KIT
ATC4	2"	FLGD.	227 FMT ADA-S	285	175	ROM

Optional Heavy Spring 4006 raises Max. Diff. to 250 psig.

### NOTES:

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

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#### APPLICATIONS:

Liquid metering vessels where a 5 to 80 psig adjustable back pressure is desired.

Burner valve for throttling or snap action service.

Any system that requires a double acting motor valve but also requires an adjustable maximum back pressure.

#### FEATURES:

Tight shut-off

Single soft seat

Removable valve seat

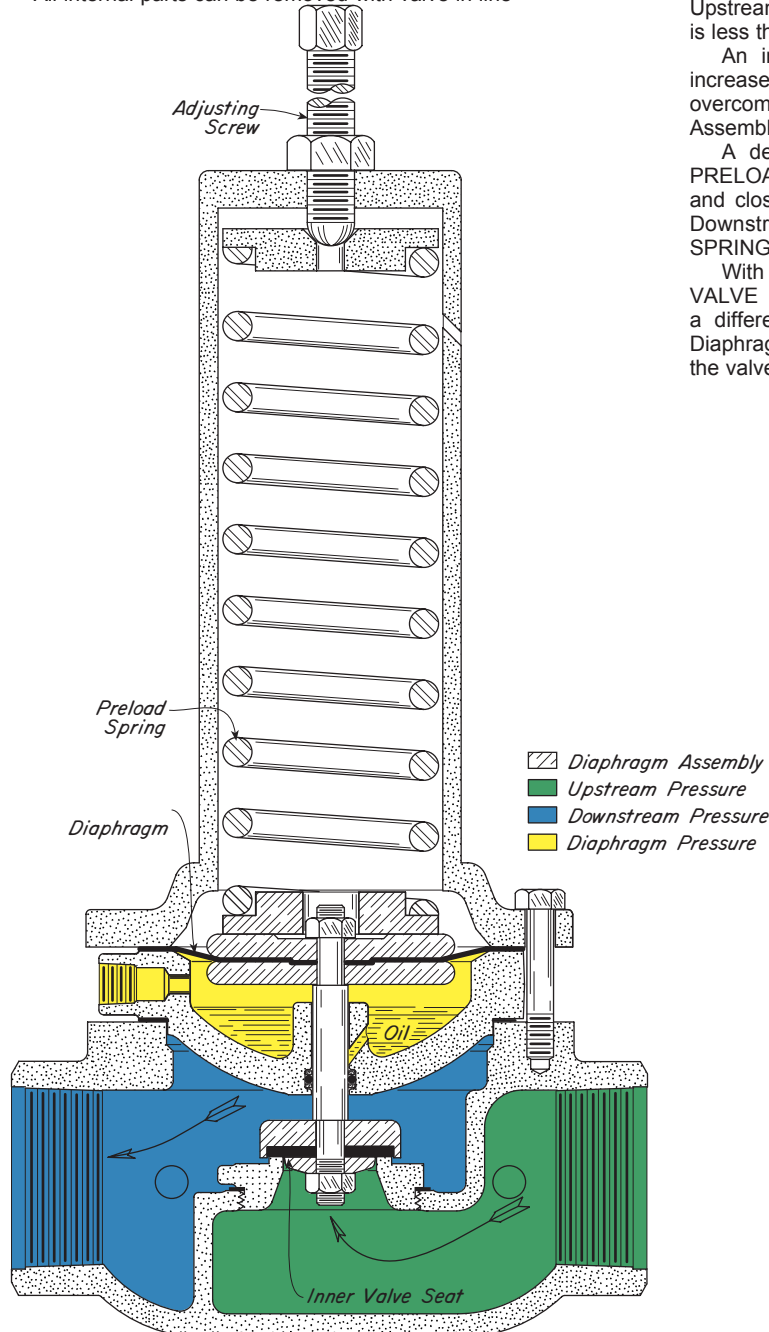
Ratio of diaphragm to seat area is 8:1

Controls approximately 8 times signal pressure

Spring adjustment from 5 to 80 psig

Minimum maintenance

All internal parts can be removed with valve in line



#### CAPACITY:

For liquid capacity refer to table of contents.

For gas capacity refer to catalog section "A."

#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. The PRELOAD SPRING loads the Stem Assembly closing the valve. If there is no Diaphragm Pressure (Yellow) and if Upstream Pressure (Green) minus Downstream Pressure (Blue) is less than the PRELOAD SPRING force.

An increase in Diaphragm Pressure (Yellow) and/or an increase in differential pressure across the INNER VALVE SEAT overcomes the PRELOAD SPRING force, moves the Stem Assembly upwards, opening the valve.

A decrease in Diaphragm Pressure (Yellow) allows the PRELOAD SPRING to move the Stem Assembly downward and close the valve when Upstream Pressure (Green) minus Downstream Pressure (Blue) is less than the PRELOAD SPRING setting.

With an effective DIAPHRAGM area eight times the INNER VALVE SEAT area, and an adjustable PRELOAD SPRING, a differential pressure ranging from 5 to 80 psig and/or a Diaphragm Pressure (Yellow) ranging from 3 to 10 psig will open the valve depending on the PRELOAD SPRING setting.

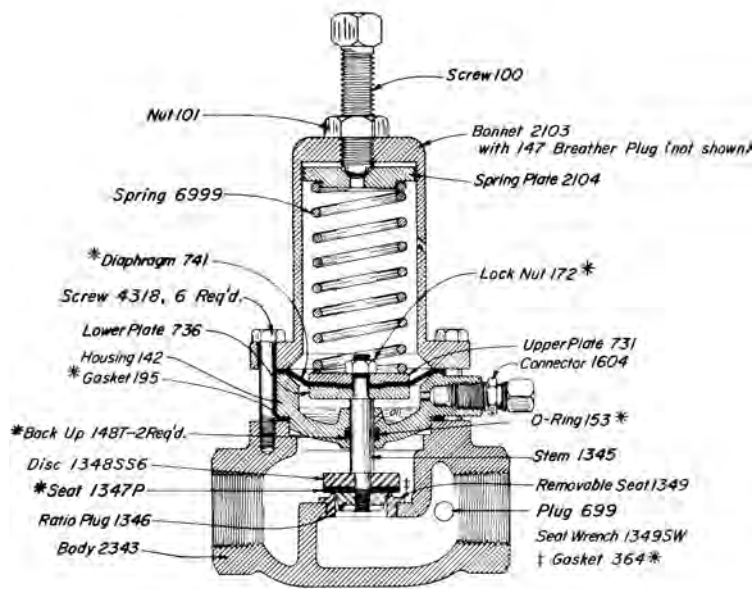


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# LOW PRESSURE MOTOR VALVES



MT ADAB ADJ. DOUBLE ACTING w/REDUCED INNER VALVE  
DUCTILE IRON



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRESS.	MAX. W.P.	KIT
ABC2	1" SCR.D.	130 SMT ADAB-D	80	300	RHE

### NOTES:

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

For dimensions refer to Table of Contents.

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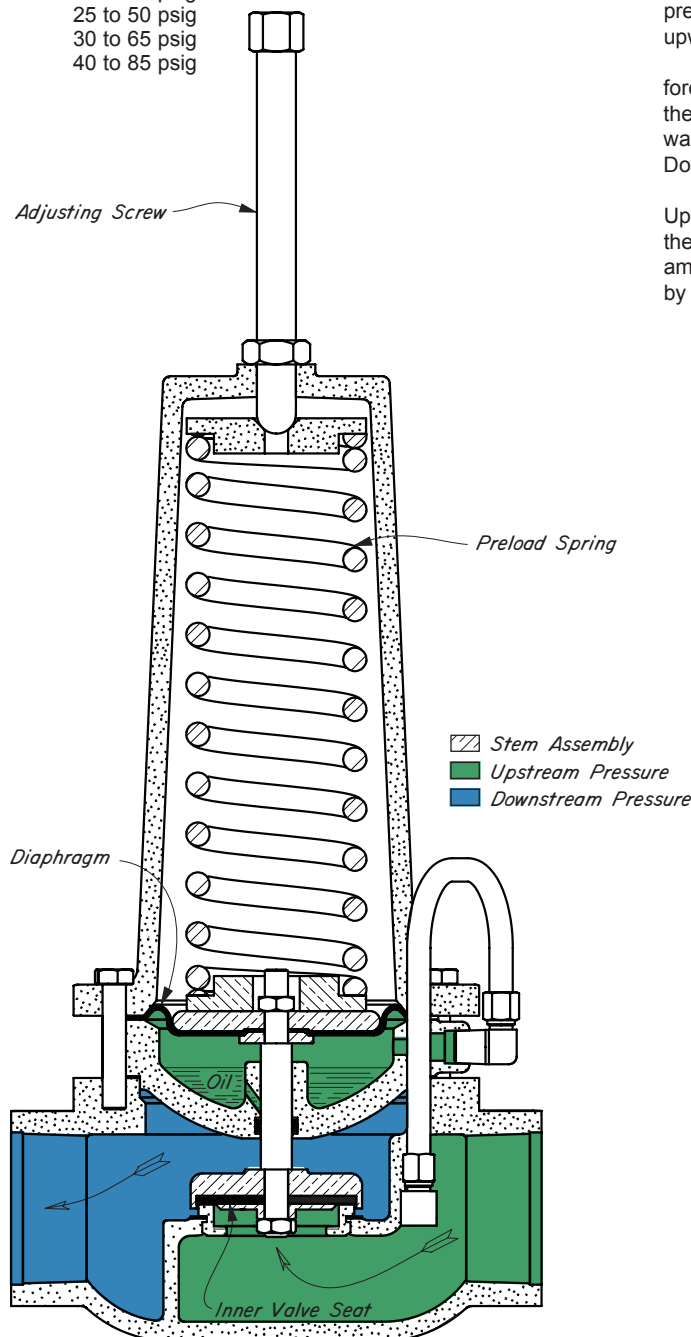


#### APPLICATIONS:

Liquid or gas systems where a 0 to 85 psig adjustable back pressure is desired, such as treaters, free water knockouts, pressure vessels, vent lines on separators, flow treaters, compressor stations, and gas gathering systems.

#### FEATURES:

- Single adjustment
- Single soft seat
- Removable valve seat
- Minimum maintenance
- All internal parts can be removed with valve in line
- Spring adjustment:
  - 0 to 10 psig
  - 10 to 20 psig
  - 15 to 30 psig
  - 25 to 50 psig
  - 30 to 65 psig
  - 40 to 85 psig



#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. The PRELOAD SPRING loads the Stem Assembly and is opposed by Upstream Pressure (Green) on the under side of the DIAPHRAGM plus the differential of Upstream Pressure (Green) minus Downstream Pressure (Blue) across the INNER VALVE SEAT.

An increase in Upstream Pressure (Green) exceeding the set pressure of the PRELOAD SPRING moves the Stem Assembly upward, opening the INNER VALVE SEAT.

A decrease in Upstream Pressure (Green) decreases the force on the INNER VALVE SEAT and DIAPHRAGM allowing the PRELOAD SPRING to move the Stem Assembly downward reducing the flow from Upstream Pressure (Green) to Downstream Pressure (Blue).

The interaction between the PRELOAD SPRING and the Upstream Pressure (Green) on the INNER VALVE SEAT and the DIAPHRAGM will cause the valve to open or close the amount required to maintain the Upstream Pressure (Green) set by the ADJUSTING SCREW.

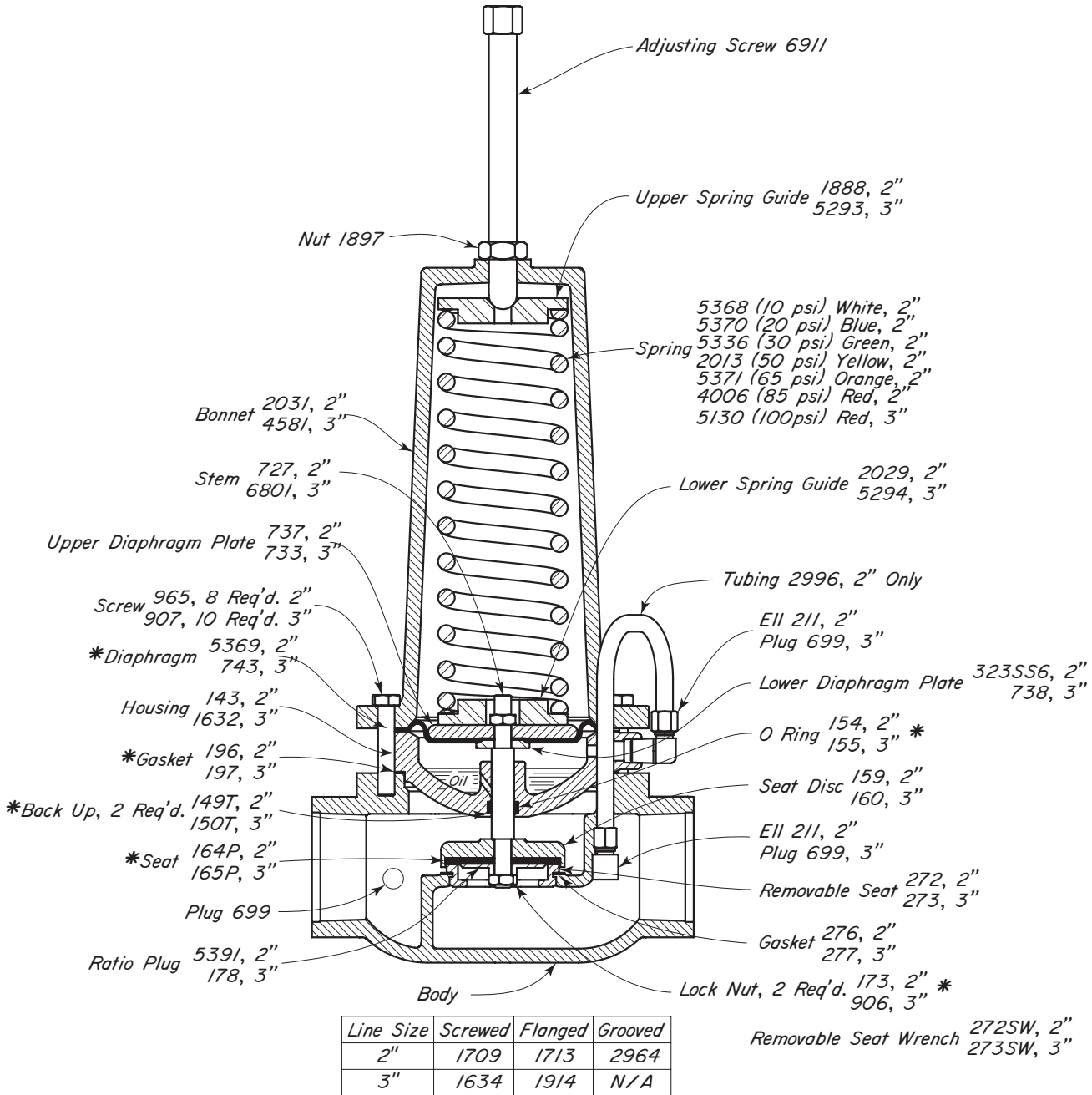


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# LOW PRESSURE MOTOR VALVES



## MT BP SPRING LOADED BACK PRESSURE DUCTILE IRON



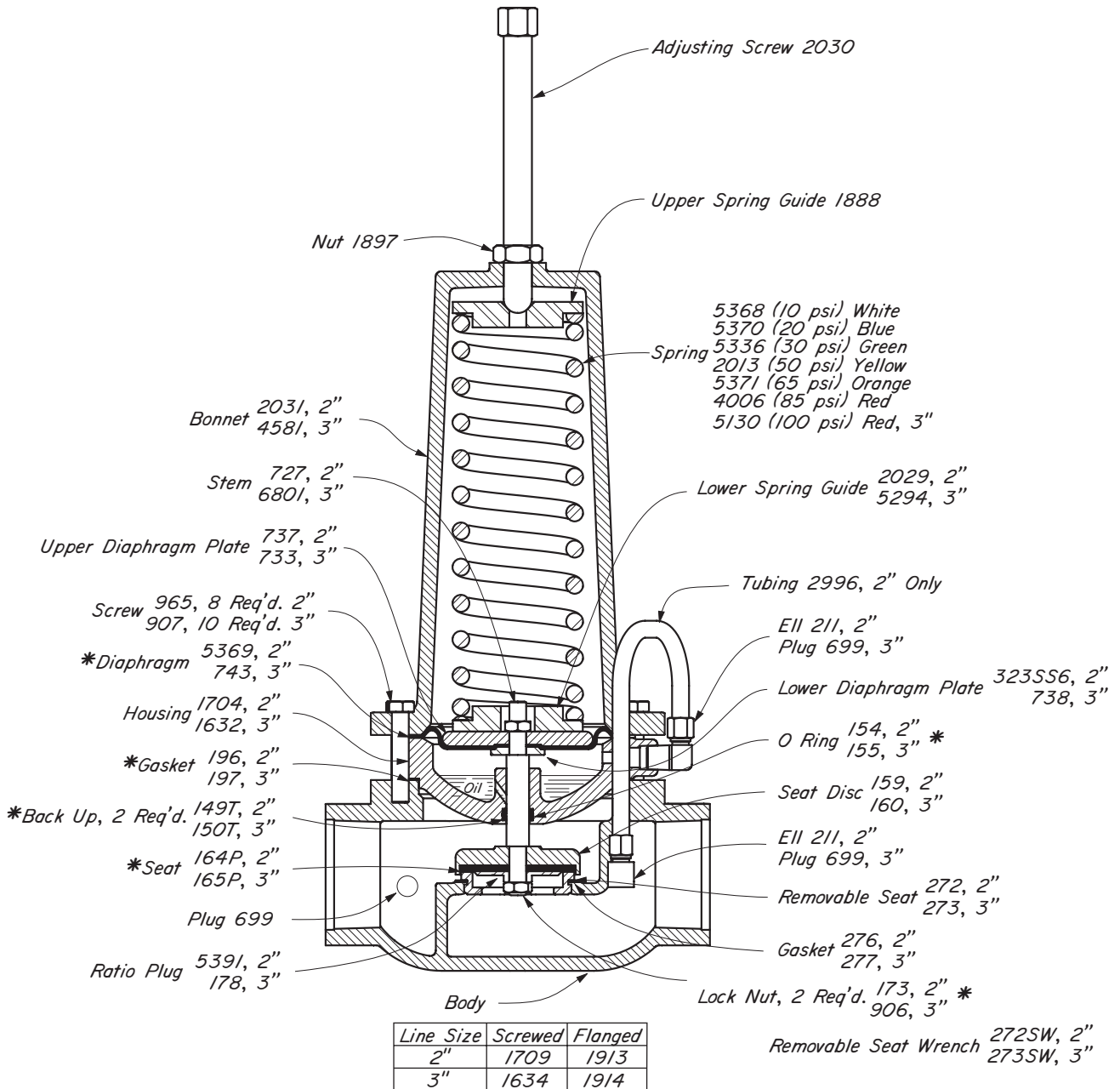
### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
AMN1	2" SCR.D.	201 SMT BP	0-10	175	RGT1
AMN2	2" SCR.D.	202 SMT BP	10-20	175	RGT1
AMN3	2" SCR.D.	203 SMT BP	15-30	175	RGT1
AMN5	2" SCR.D.	205 SMT BP	25-50	175	RGT1
AMN6	2" SCR.D.	206 SMT BP	30-65	175	RGT1
AMN8	2" SCR.D.	208 SMT BP	40-85	175	RGT1
AMO1	2" GRVD.	201 GMT BP	0-10	175	RGT1
AMO2	2" GRVD.	202 GMT BP	10-20	175	RGT1
AMO3	2" GRVD.	203 GMT BP	15-30	175	RGT1
AMO5	2" GRVD.	205 GMT BP	25-50	175	RGT1
AMO6	2" GRVD.	206 GMT BP	30-65	175	RGT1
AMO8	2" GRVD.	208 GMT BP	40-85	175	RGT1

### THRU VALVES AVAILABLE CONT'D:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
AMP1	2" FLGD.	201 FMT BP	0-10	175	RGT1
AMP2	2" FLGD.	202 FMT BP	10-20	175	RGT1
AMP3	2" FLGD.	203 FMT BP	15-30	175	RGT1
AMP5	2" FLGD.	205 FMT BP	25-50	175	RGT1
AMP6	2" FLGD.	206 FMT BP	30-65	175	RGT1
AMP8	2" FLGD.	208 FMT BP	40-85	175	RGT1
ENS	3" SCR.D.	310 SMT BP	10-100	175	RTD
ENT	3" FLGD.	310 FMT BP	10-100	175	RTD

NOTES:  
\*These are recommended spare parts and are stocked as repair kits. Dimensions, refer to Table of Contents.  
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#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
AMU1	2" SCR.D.	201 SMT BP-D	0-10	300	RNU1
AMU2	2" SCR.D.	202 SMT BP-D	10-20	300	RNU1
AMU3	2" SCR.D.	203 SMT BP-D	15-30	300	RNU1
AMU5	2" SCR.D.	205 SMT BP-D	25-50	300	RNU1
AMU6	2" SCR.D.	206 SMT BP-D	30-65	300	RNU1
AMU8	2" SCR.D.	208 SMT BP-D	40-85	300	RNU1
AMW1	2" FLGD.	201 FMT BP-D	0-10	250	RNU1
AMW2	2" FLGD.	202 FMT BP-D	10-20	250	RNU1
AMW3	2" FLGD.	203 FMT BP-D	15-30	250	RNU1
AMW5	2" FLGD.	205 FMT BP-D	25-50	250	RNU1
AMW6	2" FLGD.	206 FMT BP-D	30-65	250	RNU1
AMW8	2" FLGD.	208 FMT BP-D	40-85	250	RNU1

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ENU	3" SCR.D.	310 SMT BP-D	10-100	300	RTD
ENZ	3" FLGD.	310 FMT BP-D	10-100	285	RTD

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

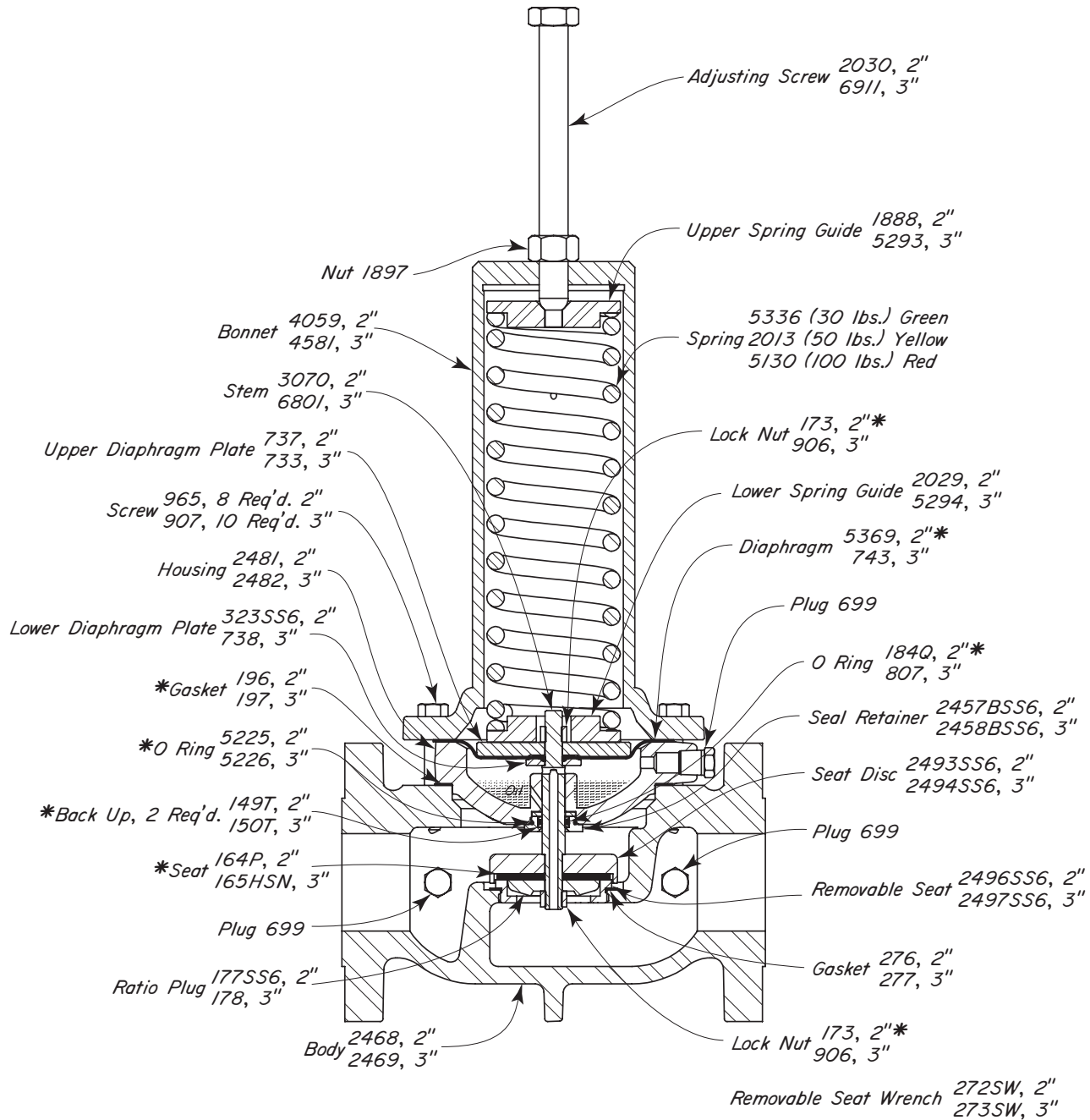
Dimensions, refer to Table of Contents.

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# LOW PRESSURE MOTOR VALVES



## MT BP SPRING LOADED BACK PRESSURE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALZ4	2" FLGD.	204 FMT BP-S	15-30	285	RNP
ALZ6	2" FLGD.	206 FMT BP-S	25-50	285	RNP
MGB	3" FLGD.	310 FMT BP-S	10-100	285	RTD

### NOTES:

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

For dimensions refer to Table of Contents.

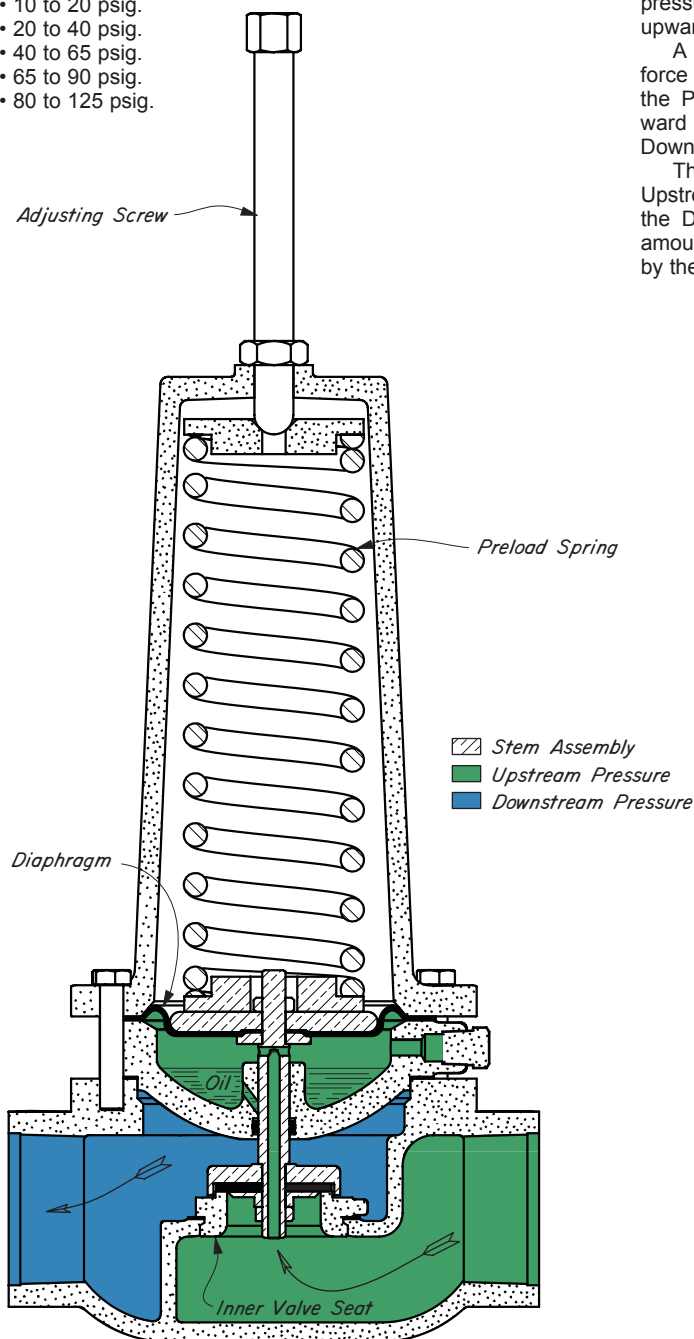
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#### APPLICATIONS:

Liquid or gas systems where a 0 to 125 psig adjustable back pressure is desired, such as treaters, free water knockouts, pressure vessels, vent lines on separators, flow treaters, compressor stations, and gas gathering systems.

#### FEATURES:

- Single adjustment
- Single soft seat
- Removable valve seat
- Internal sense line
- Minimum maintenance
- All internal parts can be removed with valve in line
- Spring adjustment
  - 0 to 10 psig.
  - 10 to 20 psig.
  - 20 to 40 psig.
  - 40 to 65 psig.
  - 65 to 90 psig.
  - 80 to 125 psig.



#### CONSTRUCTION:

Body and housings are available in cast iron, ductile iron or steel. Valve stem is 303 stainless steel. Spring is stainless steel. Diaphragm and seating materials are oil resistant synthetic rubber or polyurethane. After assembly each valve is given a complete operational test.

#### OPERATION:

The Stem Assembly is the only moving unit in the motor valve. The PRELOAD SPRING loads the Stem Assembly and is opposed by Upstream Pressure (Green) on the under side of the DIAPHRAGM plus the differential of Upstream Pressure (Green) minus Downstream Pressure (Blue) across the INNER VALVE SEAT.

An increase in Upstream Pressure (Green) exceeding the set pressure of the PRELOAD SPRING moves the Stem Assembly upward, opening the INNER VALVE SEAT.

A decrease in Upstream Pressure (Green) decreases the force on the INNER VALVE SEAT and DIAPHRAGM allowing the PRELOAD SPRING to move the Stem Assembly downward reducing the flow from Upstream Pressure (Green) to Downstream Pressure (Blue).

The interaction between the PRELOAD SPRING and the Upstream Pressure (Green) on the INNER VALVE SEAT and the DIAPHRAGM will cause the valve to open or close the amount required to maintain the Upstream Pressure (Green) set by the ADJUSTING SCREW.

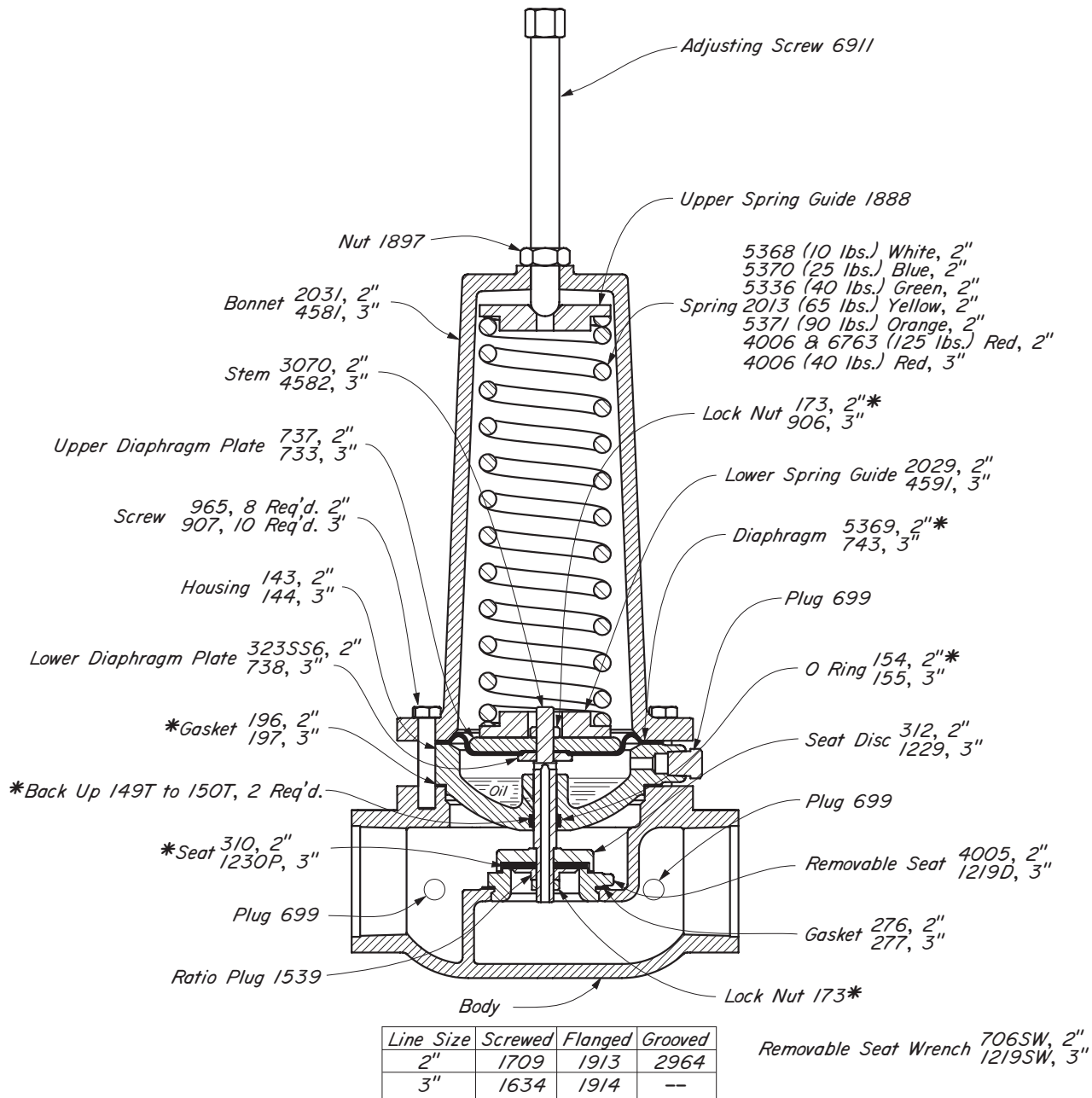


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# LOW PRESSURE MOTOR VALVES



MT BP5 SPRING LOADED BACK PRESS. w/REDUCED INNER VALVE  
DUCTILE IRON



## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALN1	2" SCR.D.	201 SMT BP5	0-10	175	RTA1
ALN2	2" SCR.D.	202 SMT BP5	10-20	175	RTA1
ALN4	2" SCR.D.	204 SMT BP5	20-40	175	RTA1
ALN6	2" SCR.D.	206 SMT BP5	40-65	175	RTA1
ALN9	2" SCR.D.	209 SMT BP5	65-90	175	RTA1
ALN12	2" SCR.D.	212 SMT BP5	80-125	175	RTA1
ALO1	2" GRVD.	201 GMT BP5	0-10	175	RTA1
ALO2	2" GRVD.	202 GMT BP5	10-20	175	RTA1
ALO4	2" GRVD.	204 GMT BP5	20-40	175	RTA1
ALO6	2" GRVD.	206 GMT BP5	40-65	175	RTA1

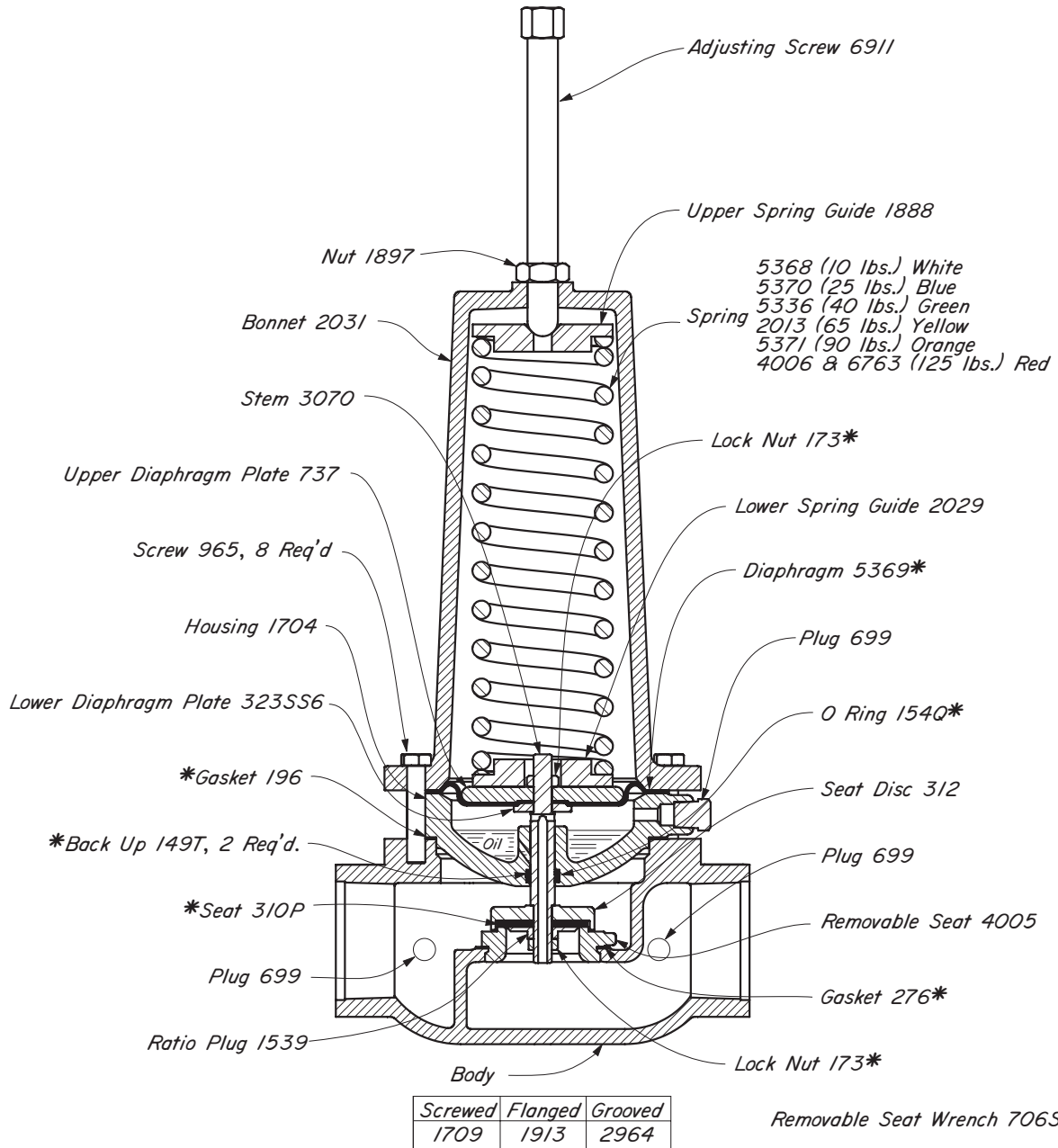
## NOTES:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALO9	2" GRVD.	209 GMT BP5	65-90	175	RTA1
ALO12	2" GRVD.	212 GMT BP5	80-125	175	RTA1
ALP1	2" FLGD.	201 FMT BP5	0-10	175	RTA1
ALP2	2" FLGD.	202 FMT BP5	10-20	175	RTA1
ALP4	2" FLGD.	204 FMT BP5	20-40	175	RTA1
ALP6	2" FLGD.	206 FMT BP5	40-65	175	RTA1
ALP9	2" FLGD.	209 FMT BP5	65-90	175	RTA1
ALP12	2" FLGD.	212 FMT BP5	80-125	175	RTA1
ENQ	3" SCR.D.	304 SMT BP5	10-40	175	RTD1
ENR	3" FLGD.	304 FMT BP5	10-40	175	RTD1

\*Companion flanges, nuts, bolts and gaskets are furnished, at extra cost, only when specified.

\*These are recommended spare parts and are stocked as repair kits. For dimensions refer to Table of Contents.

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#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALU1	2" SCR.D.	201 SMT BP5-D	0-10	300	RTB1
ALU2	2" SCR.D.	202 SMT BP5-D	10-20	300	RTB1
ALU4	2" SCR.D.	204 SMT BP5-D	20-40	300	RTB1
ALU6	2" SCR.D.	206 SMT BP5-D	40-65	300	RTB1
ALU9	2" SCR.D.	209 SMT BP5-D	65-90	300	RTB1
ALU12	2" SCR.D.	212 SMT BP5-D	80-125	300	RTB1
ALV1	2" GRVD.	201 GMT BP5-D	0-10	300	RTB1
ALV2	2" GRVD.	202 GMT BP5-D	10-20	300	RTB1
ALV4	2" GRVD.	204 GMT BP5-D	20-40	300	RTB1

#### NOTES:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALV6	2" GRVD.	206 GMT BP5-D	40-65	300	RTB1
ALV9	2" GRVD.	209 GMT BP5-D	65-90	300	RTB1
ALV12	2" GRVD.	212 GMT BP5-D	80-125	300	RTB1
ALW1	2" FLGD.	201 FMT BP5-D	0-10	250	RTB1
ALW2	2" FLGD.	202 FMT BP5-D	10-20	250	RTB1
ALW4	2" FLGD.	204 FMT BP5-D	20-40	250	RTB1
ALW6	2" FLGD.	206 FMT BP5-D	40-65	250	RTB1
ALW9	2" FLGD.	209 FMT BP5-D	65-90	250	RTB1
ALW12	2" FLGD.	212 FMT BP5-D	80-125	250	RTB1

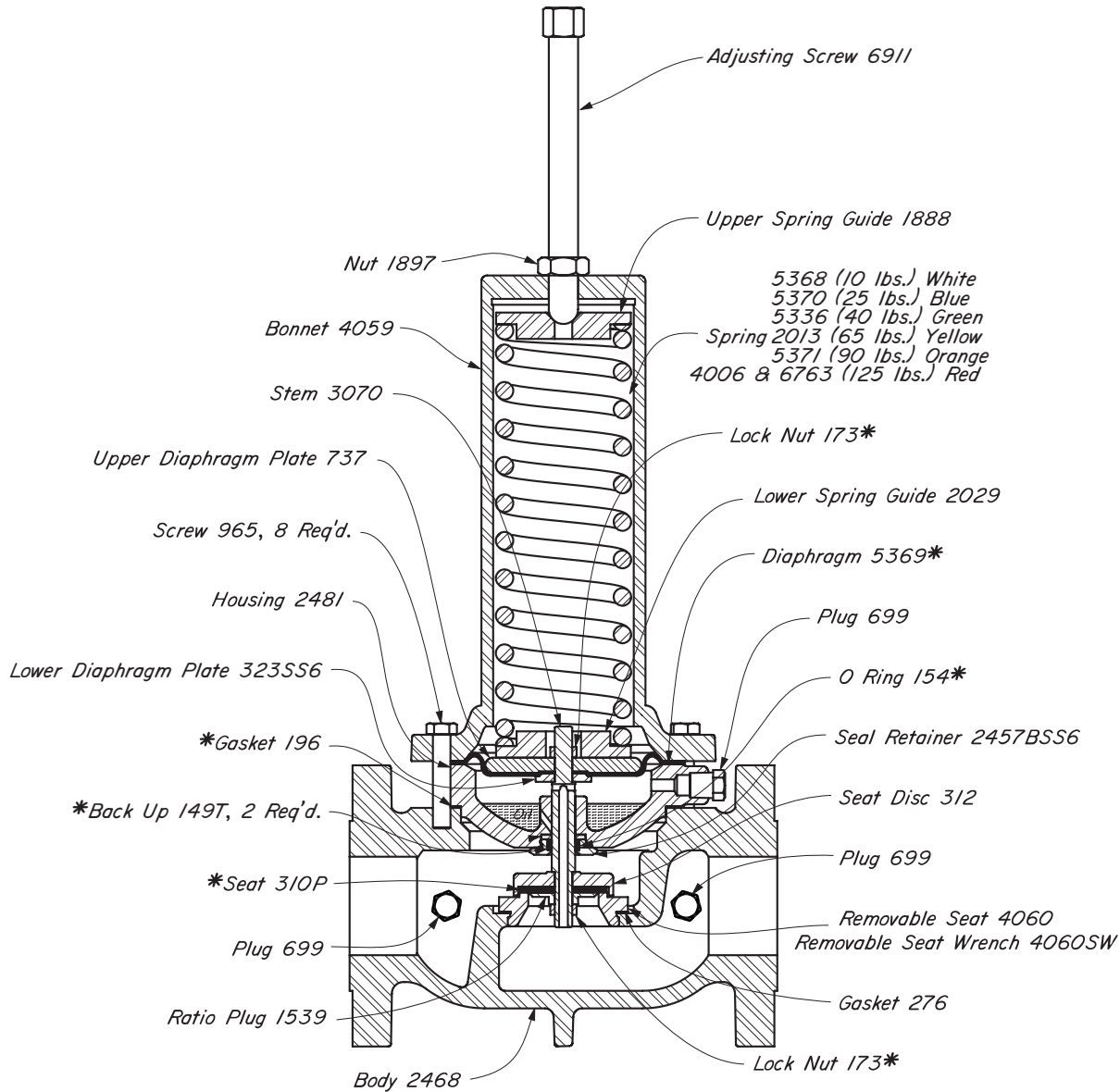
\*These are recommended spare parts and are stocked as repair kits. For dimensions refer to Table of Contents.

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# LOW PRESSURE MOTOR VALVES



MT BP5 SPRING LOADED BACK PRESS. w/REDUCED INNER VALVE  
STEEL



## THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER PRESS	MAX. W.P.	KIT
ALY1	2" FLGD.	201 FMT BP5-S	0-10	285	RTC1
ALY2	2" FLGD.	202 FMT BP5-S	10-20	285	RTC1
ALY4	2" FLGD.	204 FMT BP5-S	20-40	285	RTC1
ALY6	2" FLGD.	206 FMT BP5-S	40-65	285	RTC1
ALY9	2" FLGD.	209 FMT BP5-S	65-90	285	RTC1
ALY12	2" FLGD.	212 FMT BP5-S	80-125	285	RTC1

## NOTES:

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

For dimensions refer to Table of Contents.

Kimray is an ISO 9001- certified manufacturer.



CAPACITY - Blds. Water/Day, Steady Row

SINGLE ACTING MOTOR VALVES					
PRESSURE DROP ACROSS VALVE PSIG.	VALVE SIZE-INCHES				
	1	2	3	4	6
1	105	745	1,760	3,350	7,800
2	150	1,060	2,500	4,900	11,000
3	180	1,300	3,050	6,100	13,500
4	210	1,500	3,500	7,000	15,600
5	235	1,700	3,900	7,800	17,500
10	330	2,300	5,600	11,000	24,700
15	405	2,900	6,800	13,500	30,200
20	465	3,300	7,900	15,600	34,900
30	575	4,100	9,600	19,200	42,700
40	660	4,700	11,100	22,100	49,300
50	740	5,300	12,400	24,800	55,200
60	810	5,800	13,600	27,100	60,500
70	875	6,200	14,700	29,300	65,400
80	935	6,700	15,700	31,300	69,800
100	1,045	7,500	17,600	33,500	78,200
125	1,170	8,400	19,700	38,200	87,500

WITH REDUCED INNER VALVES					
PRESSURE DROP ACROSS VALVE PSIG.	VALVE SIZE-INCHES				
	1	2	3	4	6
1	26	290	515	835	1,950
2	37	410	735	1,225	2,750
3	45	510	895	1,525	3,370
4	52	590	1,025	1,750	3,900
5	59	660	1,140	1,950	4,375
10	82	900	1,640	2,750	6,175
15	101	1,130	2,000	3,370	7,550
20	116	1,290	2,320	3,900	8,725
30	145	1,600	2,820	4,800	10,675
40	165	1,840	3,260	5,500	12,300
50	185	2,070	3,640	6,200	13,800
60	200	2,260	4,000	6,750	15,100
70	220	2,420	4,300	7,300	16,350
80	230	2,620	4,600	7,800	17,450
100	260	2,940	5,150	8,350	19,500
125	290	3,280	5,750	9,800	21,900

For gravity correction, multiply the above figures by  $\sqrt{\frac{1}{G}}$   
 Where "G" is the specific gravity of the flowing liquid.

**CAPACITY - Blds. Water/Day, Steady Row**

**DOUBLE ACTING MOTOR VALVES**

PRESSURE DROP ACROSS VALVE PSIG.	VALVE SIZE-INCHES				
	1	2	3	4	6
1	405	1,520	3,150	5,830	13,150
2	573	2,150	4,460	8,250	18,600
3	702	2,630	5,450	10,700	22,800
4	810	3,040	6,300	11,700	26,300
5	905	3,400	7,030	13,100	29,400
10	1,280	4,800	9,980	18,500	41,700
15	1,570	5,880	12,200	22,600	50,900
20	1,810	6,800	14,100	26,100	58,800
30	2,220	8,320	17,300	31,900	72,000
40	2,560	9,600	19,900	36,900	83,100
50	2,860	10,750	22,300	41,300	93,000
60	3,130	11,780	24,400	45,200	102,000
70	3,380	12,700	26,400	48,800	110,000
80	3,620	13,600	28,200	52,100	117,500
100	4,050	15,200	31,500	58,300	131,500
125	4,520	16,900	35,200	65,100	147,000

**WITH REDUCED INNER VALVES**

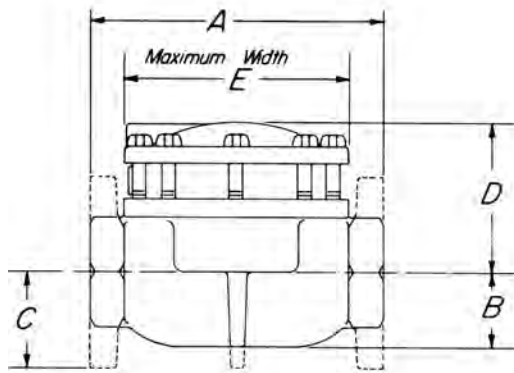
PRESSURE DROP ACROSS VALVE PSIG.	VALVE SIZE-INCHES				
	1	2	3	4	6
1	101	740	1,080	1,650	3,740
2	143	1,040	1,525	2,340	5,330
3	175	1,280	1,860	2,860	6,530
4	200	1,475	2,150	3,300	7,550
5	225	1,650	2,400	3,700	8,400
10	320	2,330	3,400	5,250	11,950
15	390	2,875	4,150	6,400	14,600
20	450	3,300	4,800	7,400	16,850
30	555	4,050	5,900	9,050	20,600
40	640	4,650	6,800	10,500	23,800
50	710	5,200	7,600	11,700	26,600
60	780	5,700	8,350	12,800	29,200
70	845	6,150	9,000	13,800	31,500
80	905	6,600	9,650	14,800	33,600
100	1,010	7,375	10,800	16,500	37,400
125	1,105	8,200	12,000	18,450	42,000

**ADJUSTABLE DOUBLE ACTING WITH REDUCED INNER VALVES**

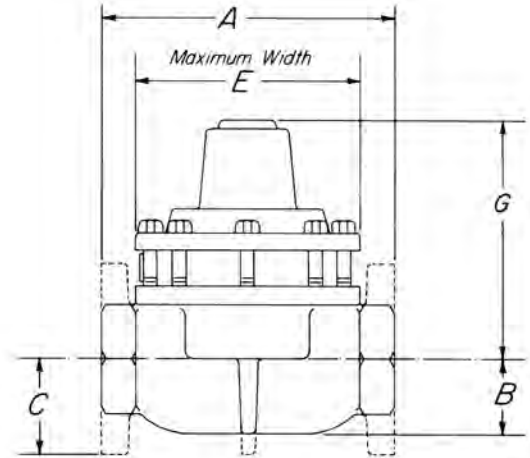
PRESSURE DROP ACROSS VALVE PSIG.	ADAB
1	101
2	143
3	175
4	200
5	225
10	320
15	390
20	450
30	555
40	640
50	710
60	780
70	845
80	905
100	1,010
125	1,105

For gravity correction, multiply the above figures by  $\sqrt{\frac{1}{G}}$   
 Where "G" is the specific gravity of the flowing liquid.

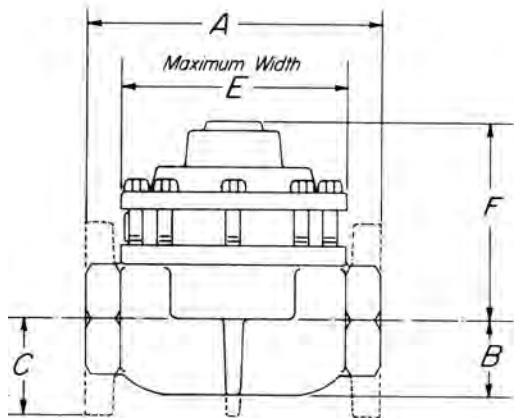
MT (SINGLE ACTING MOTOR VALVE)  
MT-5 (WITH REDUCED INNER VALVES)



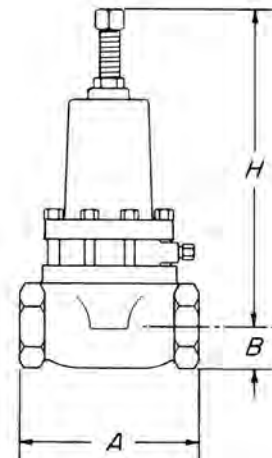
MT-2DA, MT-4DA (DOUBLE ACTING MOTOR VALVE)  
MT-2DA5, MT-4DA5 (WITH REDUCED INNER VALVES)



MT-DA (DOUBLE ACTING MOTOR VALVE)  
MT-DA5 (WITH REDUCED INNER VALVES)



MT-ADA, MT ADAB (ADJUSTABLE DOUBLE ACTING)  
MT BP, MT BP5 (SPRING LOADED BACK PRESSURE)



LINE SIZE	BODY STYLE	A	B	C	D	E	F	G	H
1"	SCRD	4 3/8	1 1/8		2 3/4	3 3/8	3 3/8	3 3/8	8
2"	SCRD	8 1/2	2 1/8		4 3/8	5 7/8	6 7/8	6 7/8	18 1/2
	FLGD	9		3	4 3/8	5 7/8	6 7/8	6 7/8	18 1/2
3"	GRVD	8 3/4	2 1/8		4 3/8	5 7/8	6 7/8	6 7/8	18 1/2
	SCRD	12	3 1/16		5 7/8	8	8	8	
4"	FLGD	12 3/16		3 3/4	5 7/8	8	8	8	
	SCRD	15	4		7 1/2	9 3/4	9 1/2	9 1/2	
6"	FLGD	15 1/8		4 1/2	7 1/2	9 3/4	9 1/2	9 1/2	
	FLGD	22 1/8		5 1/2	11	16	15 1/4		

FLANGE DIMENSIONS ARE ASA 150 LB. STANDARD.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

# MOTOR VALVES BALANCED SERIES



SECTION E3

# KIMRAY INC.®

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.  
® Copyright 1992, KIMRAY, Inc.

#### BALANCED MOTOR VALVES

Kimray balanced motor valves are designed to control flow in liquid or gas systems up to 400 psig. Utilizing a 10 to 30 psig. pneumatic actuating signal. These motor valves can be used for oil and water dump valves on high pressure separators, emulsion treaters, and other similar liquid accumulators or metering vessels.

#### DIAPHRAGM BALANCED

Diaphragm operated motor valves for control of low pressure water or oil in separators, meters, and water knockouts where as little as a 10 psig pneumatic signal is available. Maximum operating pressure: 125 psig.

MA DB PO _____	10.1
MA DB PC _____	10.5

#### PISTON BALANCED

Diaphragm operated motor valves for control of medium pressure water or oil in separators, meters, and water knockouts where as little as a 10 psig. pneumatic signal is available and where freezing occurs due to higher pressure drop. 125, 250, 400 psig. Maximum operating pressures: 125, 250, 400 psig.

MA PB PO _____	20.1
MA PB PC _____	20.5

#### PISTON BALANCED THROTTLING

Diaphragm operated motor valves designed to control flow or pressure in liquid or gas systems up to 400 psig with 15 to 30 psig pneumatic actuating signal. Can be used for oil or water dump valves and for throttling service in back pressure or pressure reducing applications when installed with pressure pilots.

PBT PO _____	25.1
PBT PC _____	25.5

#### CAPACITY CHARTS

LIQUID CAPACITY .....	30.1
-----------------------	------

#### CAGE & HARD SEAT

CAGE & HARD SEAT .....	40.1
------------------------	------

#### DIMENSIONS

VALVE DIMENSIONS .....	50.1
------------------------	------

#### OTHER APPLICATIONS

OTHER APPLICATIONS.....	60.1
MICROSWITCH .....	Bulletin No. E385224
60 psig WATER VALVES.....	Bulletin No. E385225
TREATER SERVICE.....	Bulletin No. D84333

#### ORDERING INFORMATION

To order a standard Balanced Series Motor Valve, refer to Valves Available chart on each parts reference page. Determine which BSMV is needed and order by "Cat. No."

BSMV's are available in a choice of either gray iron, ductile iron, or steel cast bodies and diaphragm housings. Valve stem is a type 303 stainless. Cage and Seat is available with a hardened removable seat.

To order BSMV's with materials or features not listed in "Valves Available" chart, contact the KIMRAY Inc. Authorized Distributor in your area

**ELASTOMERS****AFLAS**® is a trade mark of Asahi Glass Co**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

**HSN (HNBR)****TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

**TEFLON (T)****TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

**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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

**EP (EPDM)****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 (P)****TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

**POLYACRYLATE (H)****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



#### APPLICATIONS:

As oil or water valve for separators, meters, water knock-outs where a reduced signal pressure is available.

#### FEATURES:

- Diaphragm balanced single seat.
- 10 psig minimum diaphragm pressure.
- Reinforced oil resistant synthetic rubber diaphragms and seats.
- Easy to service and repair.
- Available for pressure opening or pressure closing service.

#### SUPPLY PRESSURE:





10 to 100 psig.

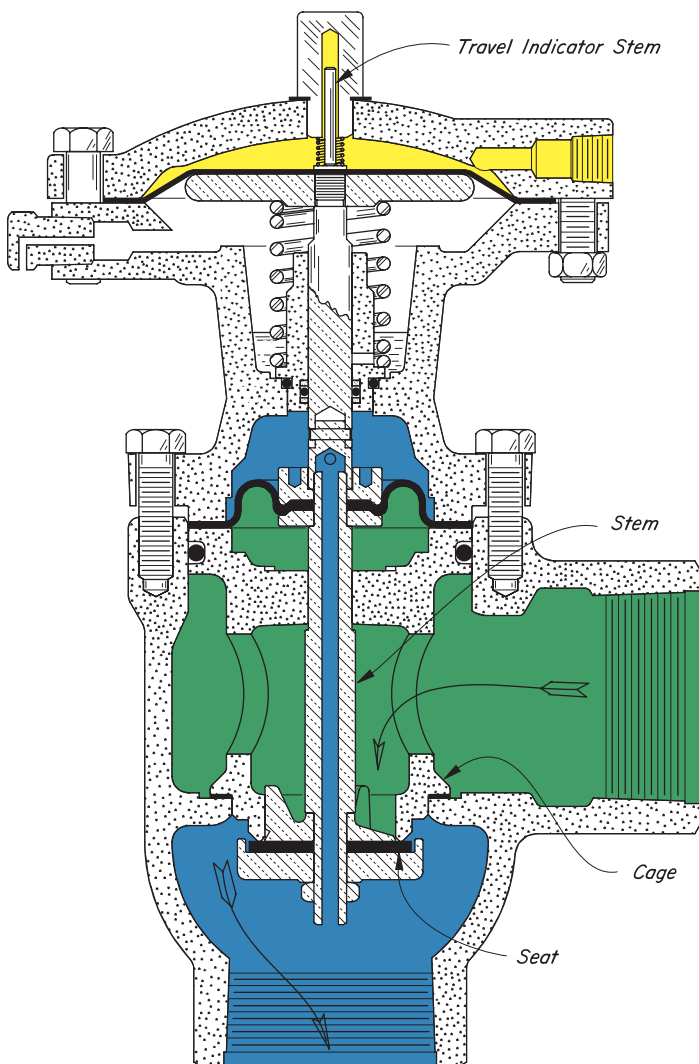
#### OPERATION TEMPERATURE:

Standard - 225°F. Max.  
Heat Modified - 350°F. Max.

#### CAPACITY:

Refer to Table of Contents.

-  Stem and Seat Assembly
-  Motor Valve Diaphragm Pressure
-  Upstream Pressure
-  Downstream Pressure

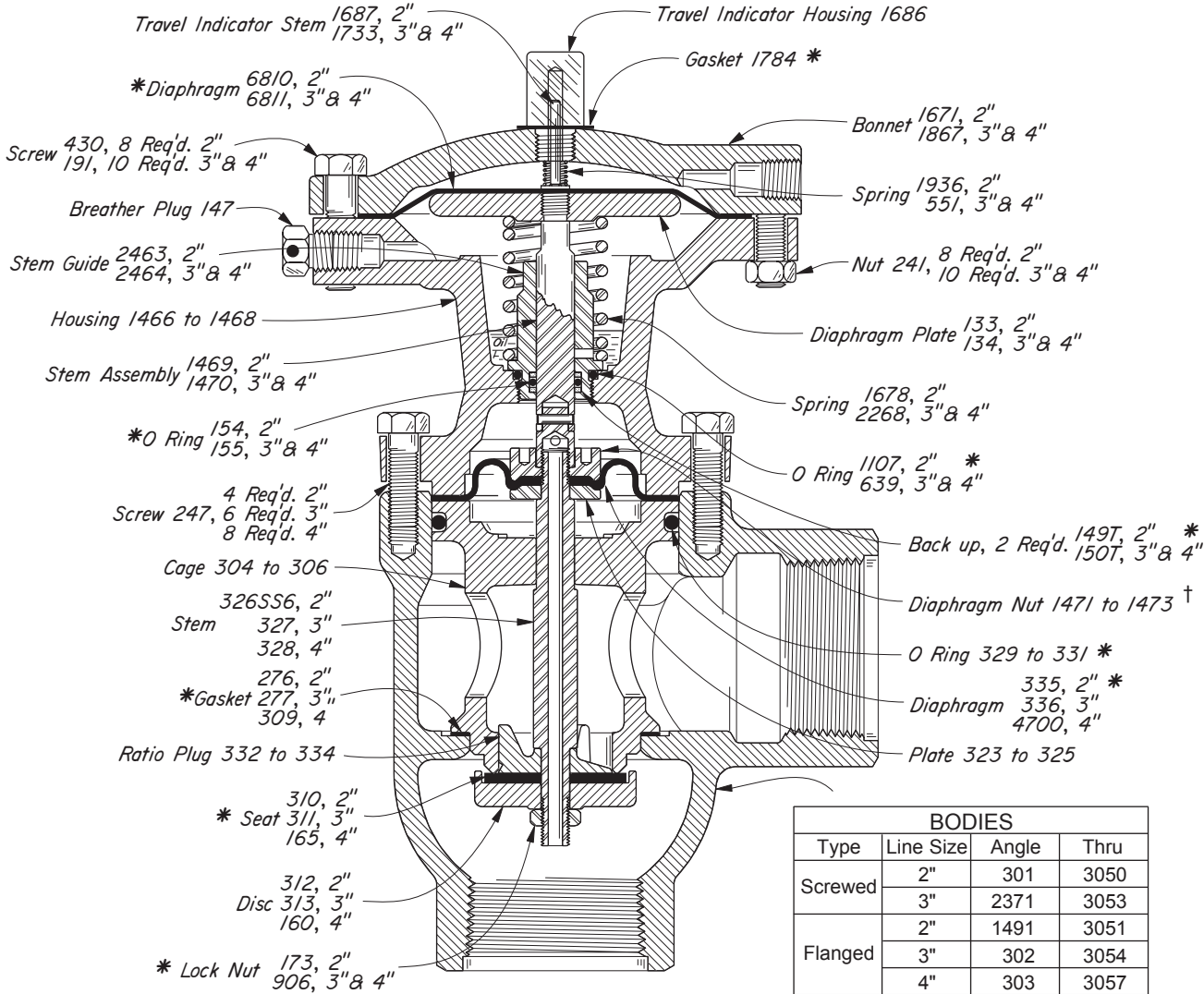


Kimray is an ISO 9001- certified manufacturer.

# BALANCED MOTOR VALVES



## DIAPHRAGM BALANCED PRESSURE OPEN CAST IRON



BODIES			
Type	Line Size	Angle	Thru
Screwed	2"	301	3050
	3"	2371	3053
Flanged	2"	1491	3051
	3"	302	3054
	4"	303	3057
Grooved	3"	2372	-----

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EJA1	2" SCRD.	212 SMA DB PO w/o TI	125	175	RFL
EJA	2" SCRD.	212 SMA DB PO w/TI	125	175	RFL
EJC	2" FLGD. <sup>a</sup>	212 FMA DB PO w/TI	125	175	RFL
EJG	3" SCRD.	312 SMA DB PO w/TI	125	175	RFR
EJI	3" FLGD. <sup>a</sup>	312 FMA DB PO w/TI	125	175	RFR
EJK	3" GRVD.	312 GMA DB PO w/TI	125	175	RFW
EJM	4" FLGD. <sup>a</sup>	412 FMA DB PO w/TI	125	175	RFW

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

†To remove Diaphragm Nut 1471, use Spanner Wrench 1471SNW. To remove Diaphragm Nut 1472, use Spanner Wrench 1472SNW. Spanner Wrench not required, for removal of Diaphragm Nut 1473.

For dimensions refer to Table of Contents.

### THRU VALVES AVAILABLE:

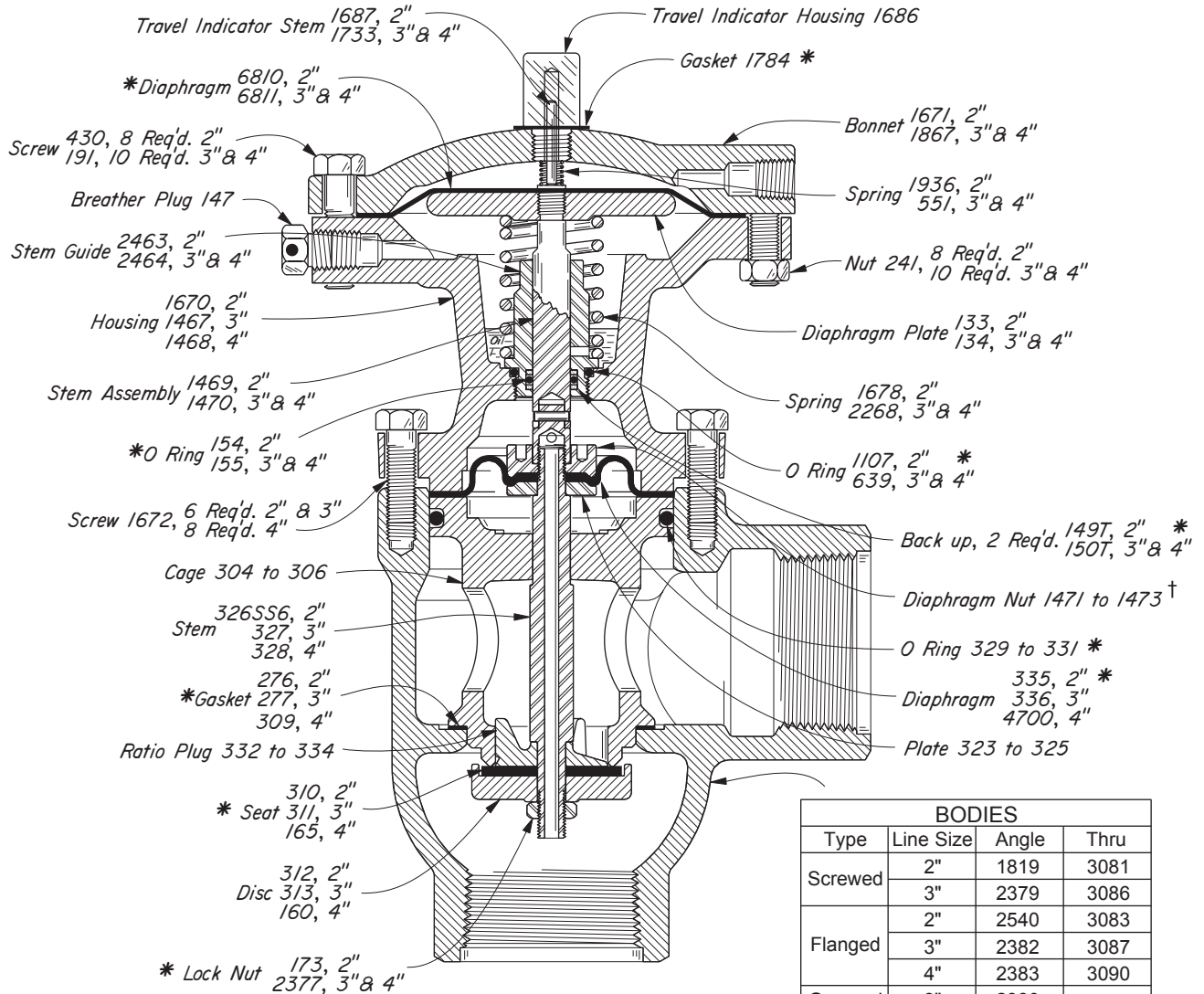
CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EWA	2" SCRD.	212 SMT DB PO w/TI	125	175	RFL
EWC	2" FLGD. <sup>a</sup>	212 FMT DB PO w/TI	125	175	RFL
EWG	3" SCRD.	312 SMT DB PO w/TI	125	175	RFR
EWI	3" FLGD. <sup>a</sup>	312 FMT DB PO w/TI	125	175	RFR
EWM	4" FLGD. <sup>a</sup>	412 FMT DB PO w/TI	125	175	RFW

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

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

NOTE: Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat." w/TI

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#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EKI	2" SCR.D.	212 SMA DB PO-D w/TI	125	400	RFL
EKK	2" FLGD.	212 FMA DB PO-D w/TI	125	250	RFL
EKO	3" SCR.D.	312 SMA DB PO-D w/TI	125	250	RFR
EKQ	3" FLGD.	312 FMA DB PO-D w/TI	125	250	RFR
EKS	3" GRVD.	312 GMA DB PO-D w/TI	125	250	RFR
EKU	4" FLGD.	412 FMA DB PO-D w/TI	125	250	RFW

†To remove Diaphragm Nut 1471, use Spanner Wrench 1471SNW. To remove Diaphragm Nut 1472, use Spanner Wrench 1472SNW. Spanner Wrench not required, for removal of Diaphragm Nut 1473.

For dimensions refer to Table of Contents.

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EXI	2" SCR.D.	212 SMT DB PO-D w/TI	125	400	RFL
EXK	2" FLGD.	212 FMT DB PO-D w/TI	125	250	RFL
EXO	3" SCR.D.	312 SMT DB PO-D w/TI	125	250	RFR
EXQ	3" FLGD.	312 FMT DB PO-D w/TI	125	250	RFR
EXU	4" FLGD.	412 FMT DB PO-D w/TI	125	250	RFW

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

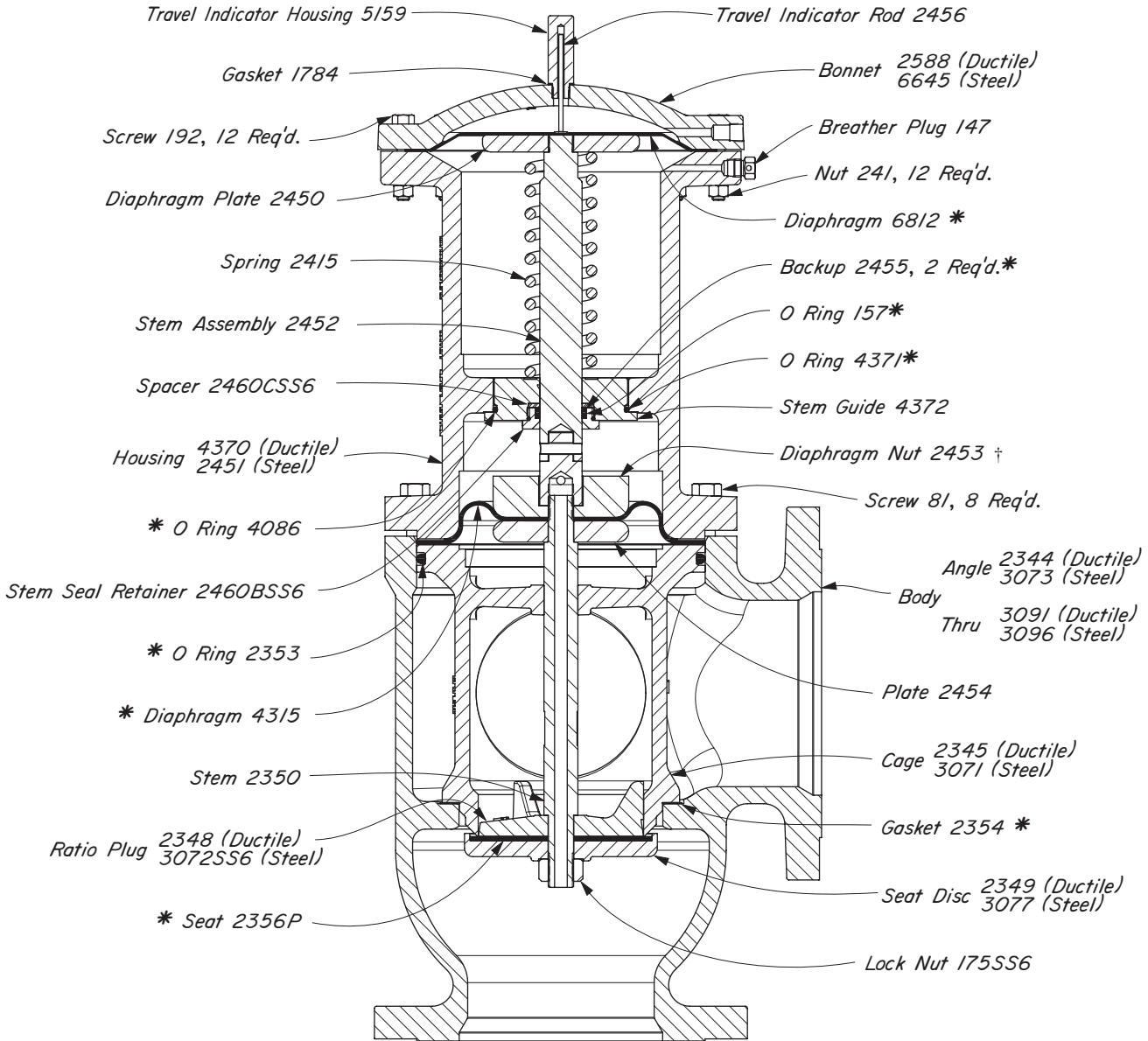
NOTE: Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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# BALANCED MOTOR VALVES



## DIAPHRAGM BALANCED PRESSURE OPEN DUCTILE IRON, STEEL



### THRU VALVES AVAILABLE

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EKX	6" FLGD.	612 FMA DB PO-D w/TI	125	250	RGB
EKY	6" FLGD.	612 FMA DB PO-S w/TI	125	250	RGB
EXX	6" FLGD.	612 FMT DB PO-D w/TI	125	250	RGB
EXY	6" FLGD.	612 FMT DB PO-S w/TI	125	250	RGB

For dimensions refer to Table of Contents.

### NOTES:

†To remove Diaphragm Nut 2453, use Seat Wrench 706HTSW.  
\*These are recommended spare parts and are stocked as repair kits.

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### DIAPHRAGM BALANCED PRESSURE CLOSED

#### APPLICATIONS:

As oil or water valve for separators, meters, water knock-outs where a reduced signal pressure is available.

#### FEATURES:

- Diaphragm balanced single seat.
- 10 psig minimum diaphragm pressure.
- Reinforced oil resistant synthetic rubber diaphragms and seats.
- Easy to service and repair.
- Available for pressure opening or pressure closing service.

#### SUPPLY PRESSURE:





10 to 25 psig.

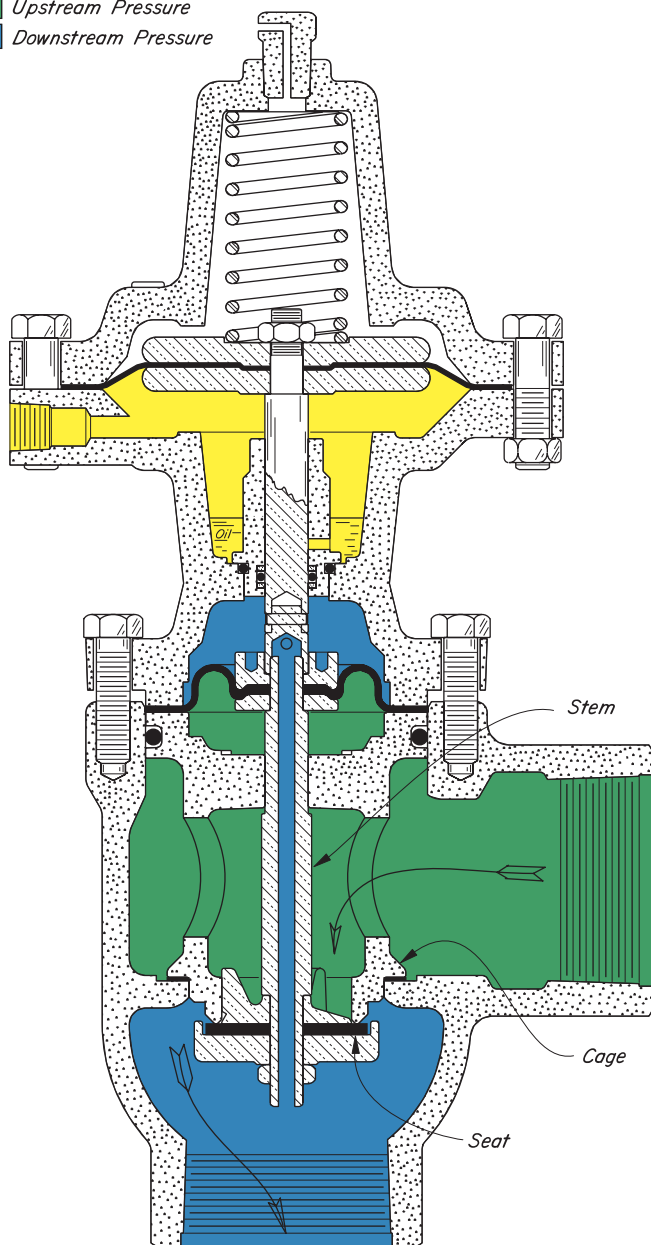
#### OPERATION TEMPERATURE:

Standard - 225°F. Max.  
Heat Modified - 350°F. Max.

#### CAPACITY:

Refer to Table of Contents.

-  Diaphragm Assembly
-  Diaphragm Pressure
-  Upstream Pressure
-  Downstream Pressure

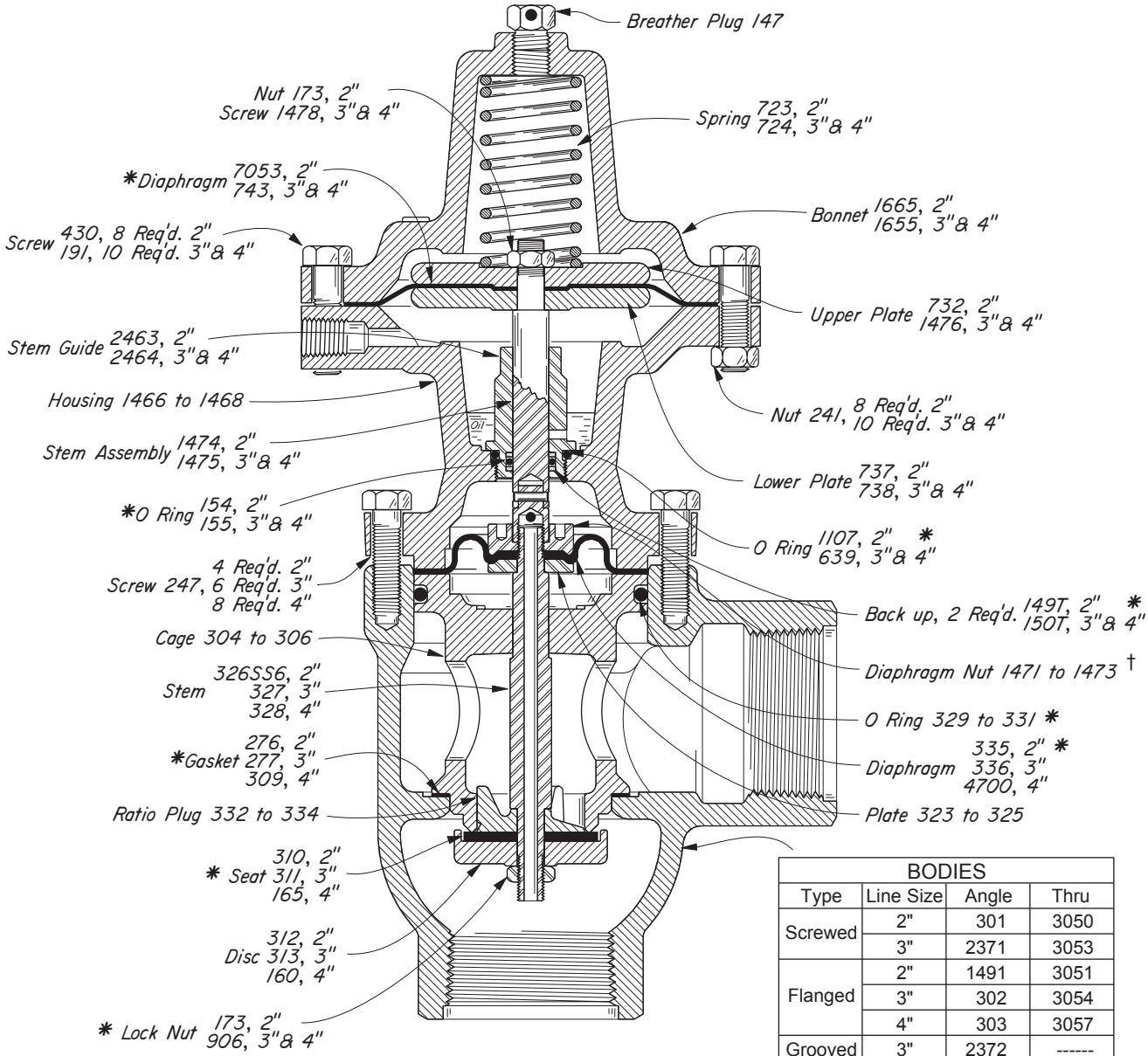


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# BALANCED MOTOR VALVES



## DIAPHRAGM BALANCED PRESSURE CLOSED CAST IRON



### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EJB	2" SCR.D.	212 SMA DB PC w/ TI	125	175	RFM
EJD	2" FLGD. <sup>a</sup>	212 FMA DB PC w/ TI	125	175	RFM
EJH	3" SCR.D.	312 SMA DB PC w/ TI	125	175	RFS
EJJ	3" FLGD. <sup>a</sup>	312 FMA DB PC w/ TI	125	175	RFS
EJL	3" GRVD.	312 GMA DB PC w/ TI	125	175	RFS
EJN	4" FLGD. <sup>a</sup>	412 FMA DB PC w/ TI	125	175	RFX

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

†To remove Diaphragm Nut 1471, use Spanner Wrench 1471SNW. To remove Diaphragm Nut 1472, use Spanner Wrench 1472SNW. Spanner Wrench not required, for removal of Diaphragm Nut 1473.

For dimensions refer to Table of Contents.

### THRU VALVES AVAILABLE:

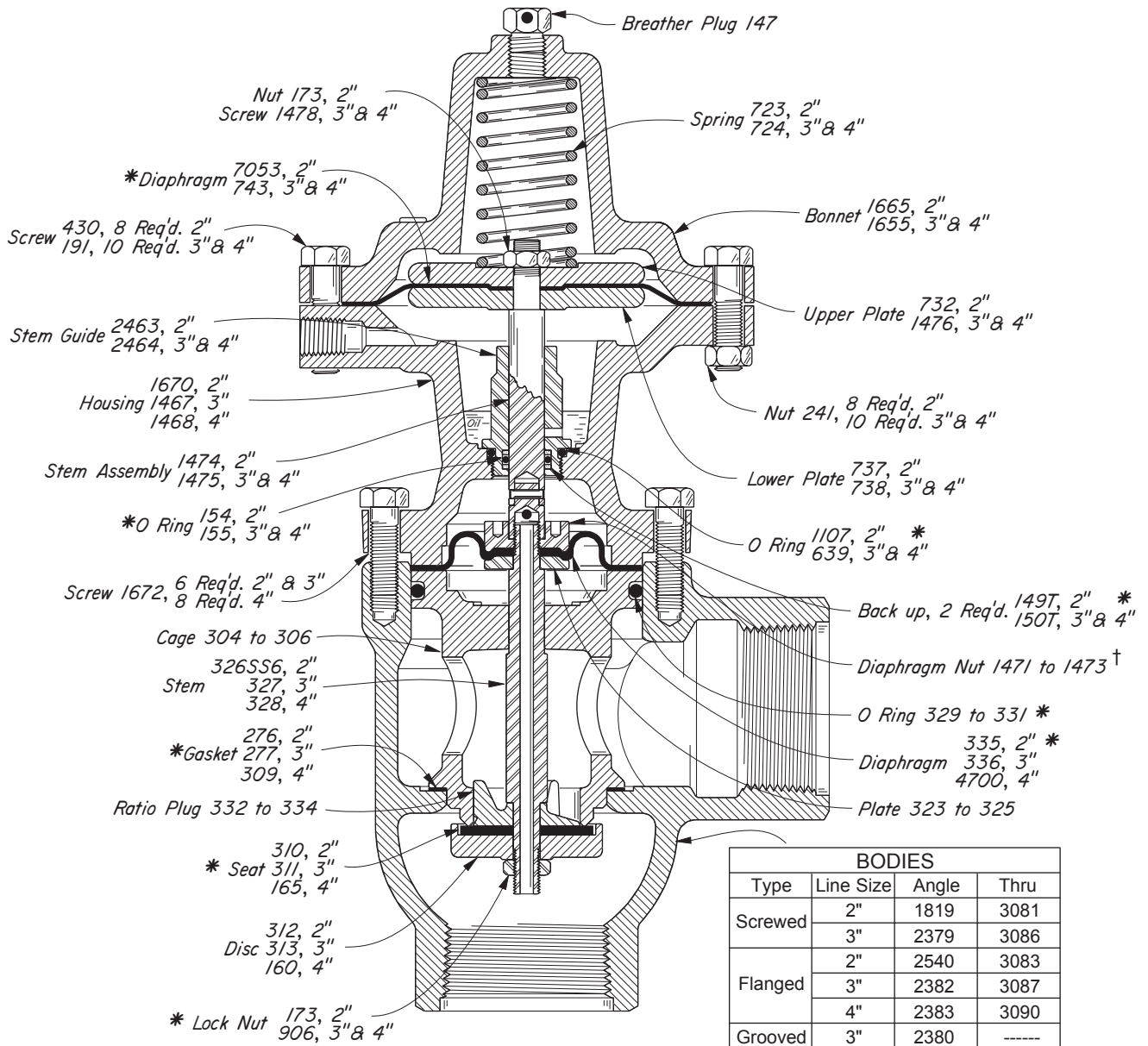
CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EWB	2" SCR.D.	212 SMT DB PC w/ TI	125	175	RFM
EWD	2" FLGD. <sup>a</sup>	212 FMT DB PC w/ TI	125	175	RFM
EWH	3" SCR.D.	312 SMT DB PC w/ TI	125	175	RFS
EWJ	3" FLGD. <sup>a</sup>	312 FMT DB PC w/ TI	125	175	RFS
EWN	4" FLGD. <sup>a</sup>	412 FMT DB PC w/ TI	125	175	RFX

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

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

Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EKJ	2" SCRD.	212 SMA DB PC-D $\frac{w}{o}$ TI	125	400	RFM
EKL	2" FLGD.	212 FMA DB PC-D $\frac{w}{o}$ TI	125	400	RFM
EKP	3" SCRD.	312 SMA DB PC-D $\frac{w}{o}$ TI	125	400	RFS
EKR	3" FLGD.	312 FMA DB PC-D $\frac{w}{o}$ TI	125	400	RFS
EKT	3" GRVD.	312 GMA DB PC-D $\frac{w}{o}$ TI	125	400	RFS
EKW	4" FLGD.	412 FMA DB PC-D $\frac{w}{o}$ TI	125	400	RFX

†To remove Diaphragm Nut 1471, use Spanner Wrench 1471SNW. To remove Diaphragm Nut 1472, use Spanner Wrench 1472SNW. Spanner Wrench not required, for removal of Diaphragm Nut 1473.

For dimensions refer to Table of Contents.

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EXJ	2" SCRD.	212 SMT DB PC-D $\frac{w}{o}$ TI	125	400	RFM
EXL	2" FLGD.	212 FMT DB PC-D $\frac{w}{o}$ TI	125	250	RFM
EXP	3" SCRD.	312 SMT DB PC-D $\frac{w}{o}$ TI	125	250	RFS
EXR	3" FLGD.	312 FMT DB PC-D $\frac{w}{o}$ TI	125	250	RFS
EXW	4" FLGD.	412 FMT DB PC-D $\frac{w}{o}$ TI	125	250	RFX

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

Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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**NOTES:**



Kimray is an ISO 9001- certified manufacturer.



#### APPLICATIONS:

Pilot operated oil or water valve for separators, meters, and water knockouts where a reduced signal pressure is available, and where freezing occurs due to a higher pressure drop.

#### FEATURES:

- Piston balanced single seat
- 10 psig minimum diaphragm pressure
- Standard 303 stainless valve stem
- Reinforced oil resistant synthetic rubber diaphragms and seats
- Easy to service and repair
- Available for pressure opening or pressure closing service

#### SUPPLY PRESSURE:





10 to 100 psig.

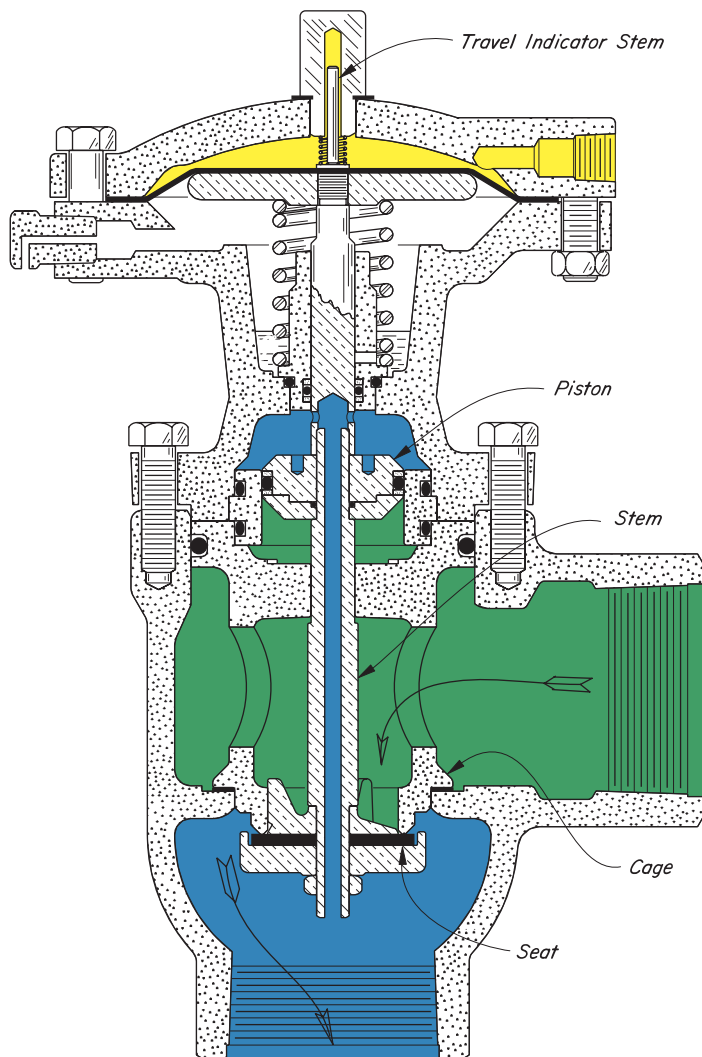
#### OPERATION TEMPERATURE:

Standard - 225°F. Max.  
Heat Modified - 350°F. Max.

#### CAPACITY:

Refer to Table of Contents.

-  Stem and Seat Assembly
-  Motor Valve Diaphragm Pressure
-  Upstream Pressure
-  Downstream Pressure

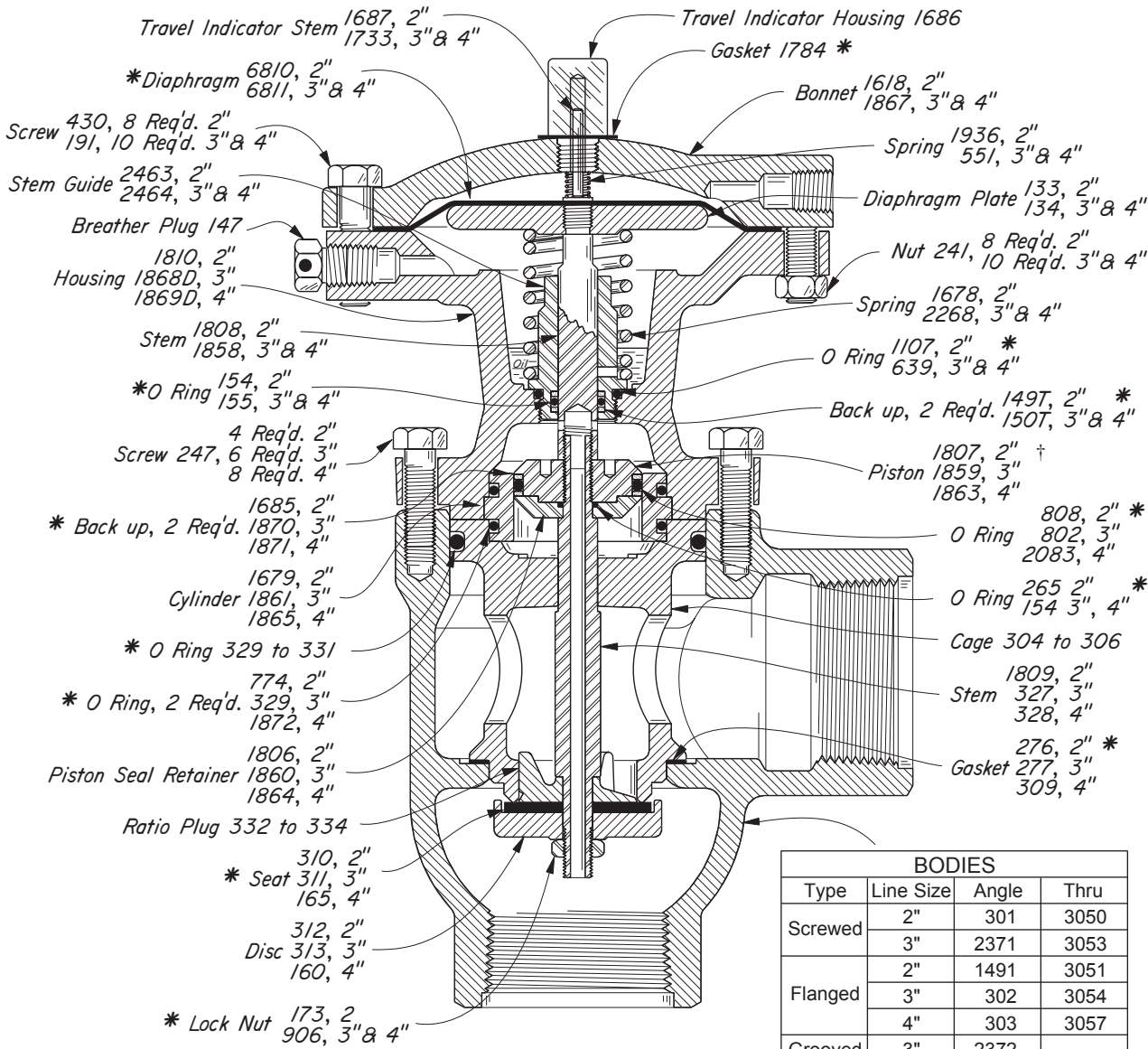


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# BALANCED MOTOR VALVES



## PISTON BALANCED PRESSURE OPEN CAST IRON



### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EJR	2" SCRD.	212 SMA PB PO w/TI	175	175	RFN
EJT	2" FLGD. <sup>a</sup>	212 FMA PB PO w/TI	175	175	RFN
EJX	3" SCRD.	312 SMA PB PO w/TI	175	175	RFT
EJZ	3" FLGD.	312 FMA PB PO w/TI	175	175	RFT
EKB	3" GRVD.	312 GMA PB PO w/TI	175	175	RFT
EKD	4" FLGD. <sup>a</sup>	412 FMA PB PO w/TI	175	175	RFZ

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with Spanner Wrench holes on top.

For dimensions refer to Table of Contents.

### THRU VALVES AVAILABLE:

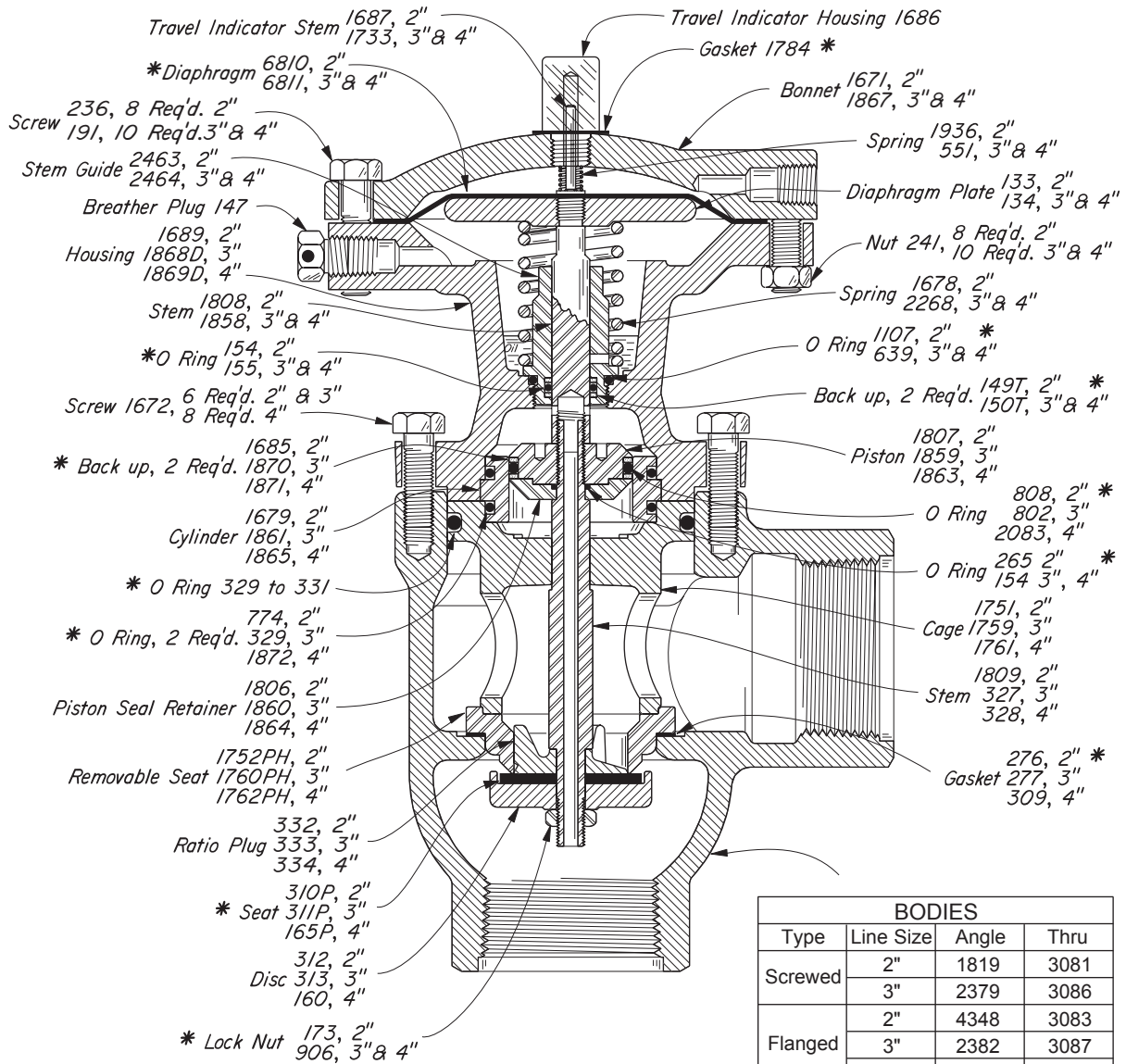
CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EWR	2" SCRD.	212 SMT PB PO w/TI	175	175	RFN
EWT	2" FLGD. <sup>a</sup>	212 FMT PB PO w/TI	175	175	RFN
EWX	3" SCRD.	312 SMT PB PO w/TI	175	175	RFT
EWZ	3" FLGD. <sup>a</sup>	312 FMT PB PO w/TI	175	175	RFT
EXD	4" FLGD. <sup>a</sup>	412 FMT PB PO w/TI	175	175	RFZ

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

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

Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
ELA	2" SCRD.	250 SMA PB PO-D w/TI	500	500	RFP
ELC	2" FLGD.	225 FMA PB PO-D w/TI	250	250	RFP
ELG	3" SCRD.	325 SMA PB PO-D w/TI	250	250	RTR
ELI	3" FLGD.	325 FMA PB PO-D w/TI	250	250	RTR
ELK	3" GRVD.	325 GMA PP PO-D w/TI	250	250	RTR
ELM	4" FLGD.	425 FMA PB PO-D w/TI	250	250	RTT

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with spanner wrench holes on top.

For dimensions refer to Table of Contents.

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EYA	2" SCRD.	250 SMT PB PO-D w/TI	500	500	RFP
EYC	2" FLGD.	225 FMT PB PO-D w/TI	250	250	RFP
EYG	3" SCRD.	325 SMT PB PO-D w/TI	250	250	RTR
EYI	3" FLGD.	325 FMT PB PO-D w/TI	250	250	RTR
EYM	4" FLGD.	425 FMT PB PO-D w/TI	250	250	RTT

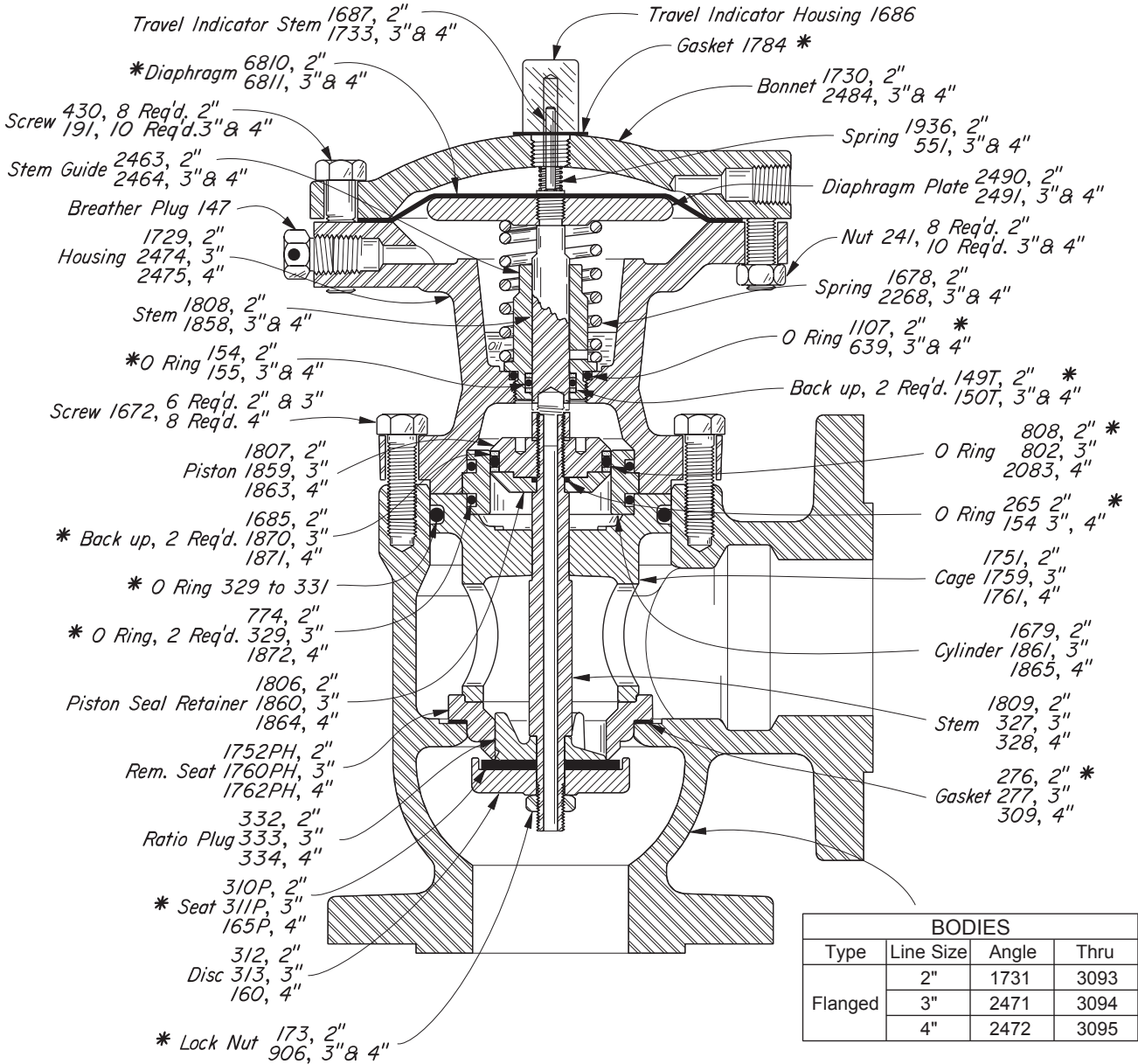
\*These are recommended spare parts and are stocked as repair kits.

Kimray is an ISO 9001- certified manufacturer.

# BALANCED MOTOR VALVES



## PISTON BALANCED PRESSURE OPEN STEEL



### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
ELR	2" FLGD.	228 FMA PB PO-S w/TI	285	285	RFP
ELT	3" FLGD.	328 FMA PB PO-S w/TI	285	285	RTR
ELW	4" FLGD.	428 FMA PB PO-S w/TI	285	285	RTT

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EYR	2" FLGD.	228 FMT PB PO-S w/TI	285	285	RFP
EYT	3" FLGD.	328 FMT PB PO-S w/TI	285	285	RTR
EYW	4" FLGD.	428 FMT PB PO-S w/TI	285	285	RTT

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with spanner wrench holes on top

For dimensions refer to Table of Contents.

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

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Pilot operated oil or water valve for separators, meters, and water knockouts where a reduced signal pressure is available, and where freezing occurs due to a higher pressure drop.

#### FEATURES:

- Piston balanced single seat
- 10 psig minimum diaphragm pressure
- Standard 303 stainless valve stem
- Reinforced oil resistant synthetic rubber diaphragms and seats
- Easy to service and repair
- Available for pressure opening or pressure closing service

#### SUPPLY PRESSURE:





10 to 25 psig.

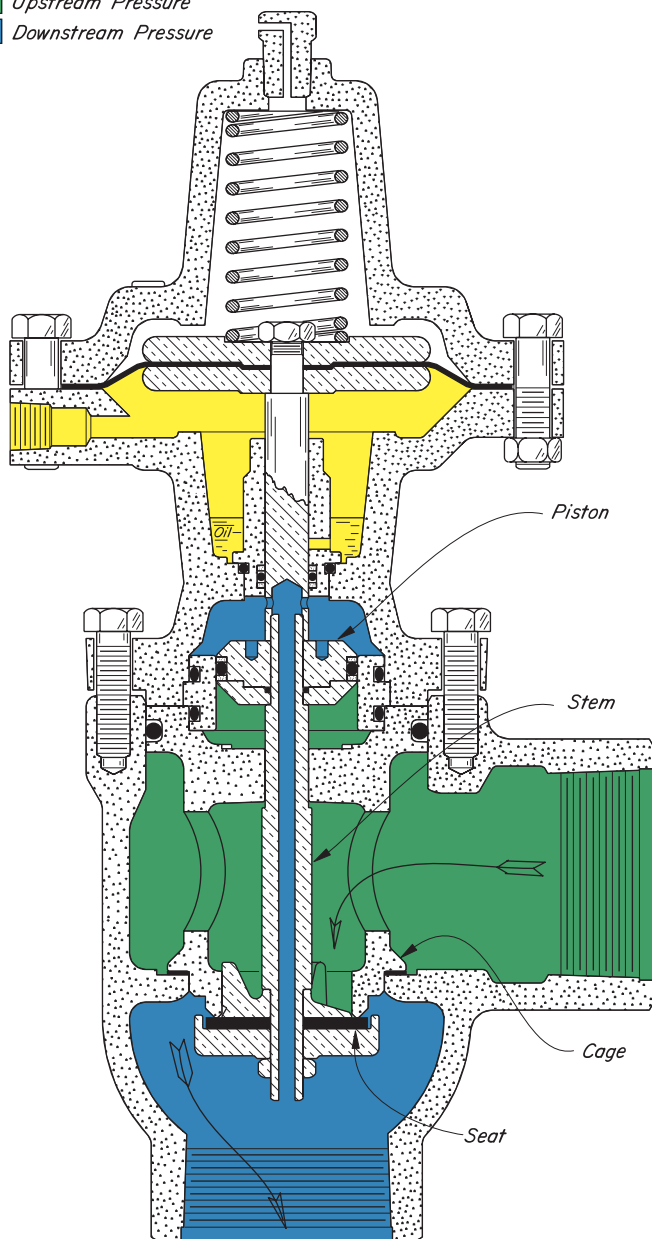
#### OPERATION TEMPERATURE:

Standard - 225°F. Max.  
Heat Modified - 350°F. Max.

#### CAPACITY:

Refer to Table of Contents.

-  Diaphragm Assembly
-  Diaphragm Pressure
-  Upstream Pressure
-  Downstream Pressure

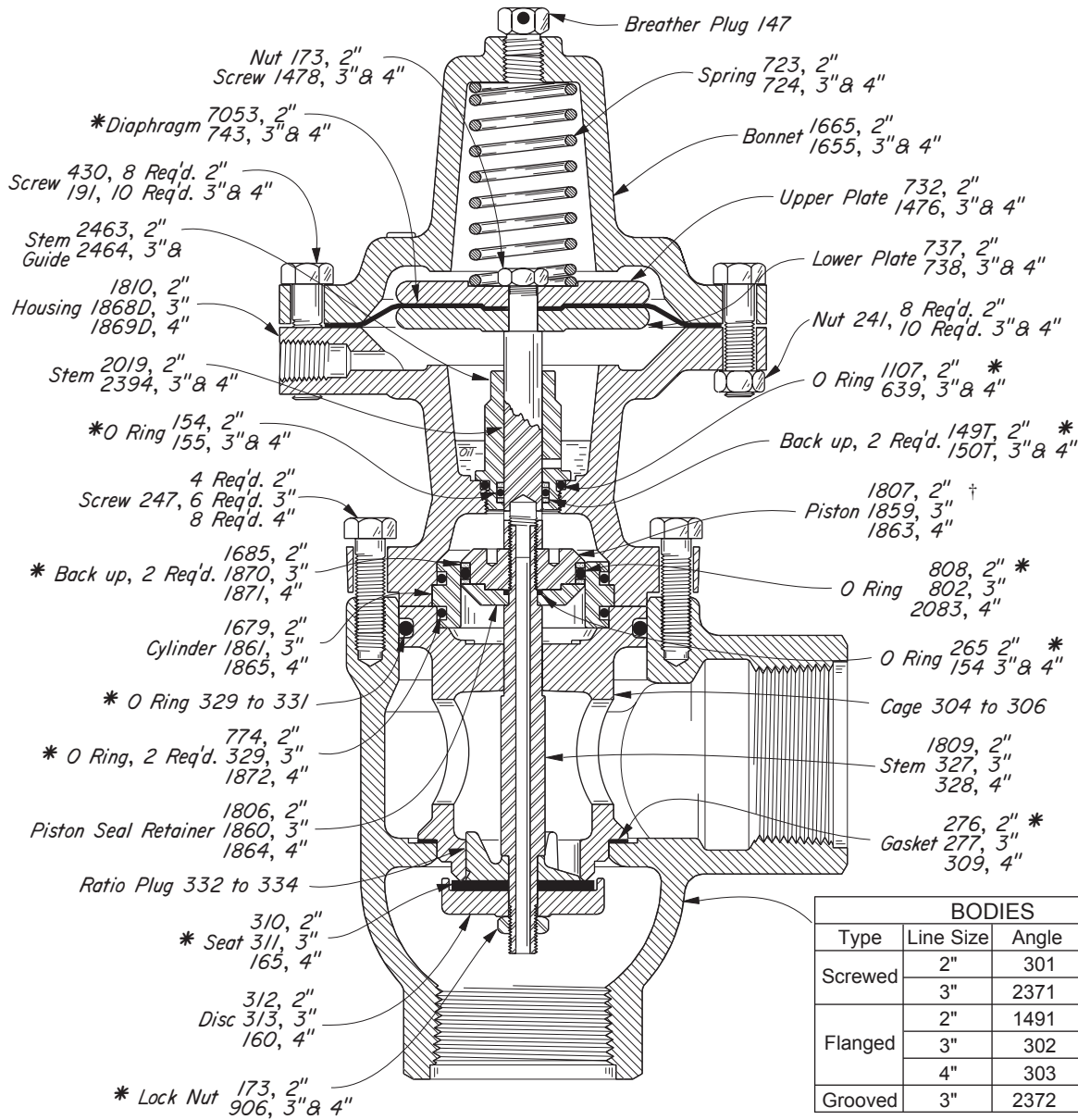


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# BALANCED MOTOR VALVES



## PISTON BALANCED PRESSURE CLOSE CAST IRON



BODIES			
Type	Line Size	Angle	Thru
Screwed	2"	301	3050
	3"	2371	3053
Flanged	2"	1491	3051
	3"	302	3054
	4"	303	3057
Grooved	3"	2372	-----

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EJS	2" SCRD.	212 SMA PB PC w <sub>o</sub> /TI	175	175	RFO
EJU	2" FLGD. <sup>a</sup>	212 FMA PB PC w <sub>o</sub> /TI	175	175	RFO
EJY	3" SCRD.	312 SMA PB PC w <sub>o</sub> /TI	175	175	RFU
EKA	3" FLGD. <sup>a</sup>	312 FMA PB PC w <sub>o</sub> /TI	175	175	RFU
EKC	3" GRVD.	312 GMA PB PC w <sub>o</sub> /TI	175	175	RFU
EKE	4" FLGD. <sup>a</sup>	412 FMA PB PC w <sub>o</sub> /TI	175	175	RFY

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with Spanner Wrench holes on top.

For dimensions refer to Table of Contents.

### THRU VALVES AVAILABLE:

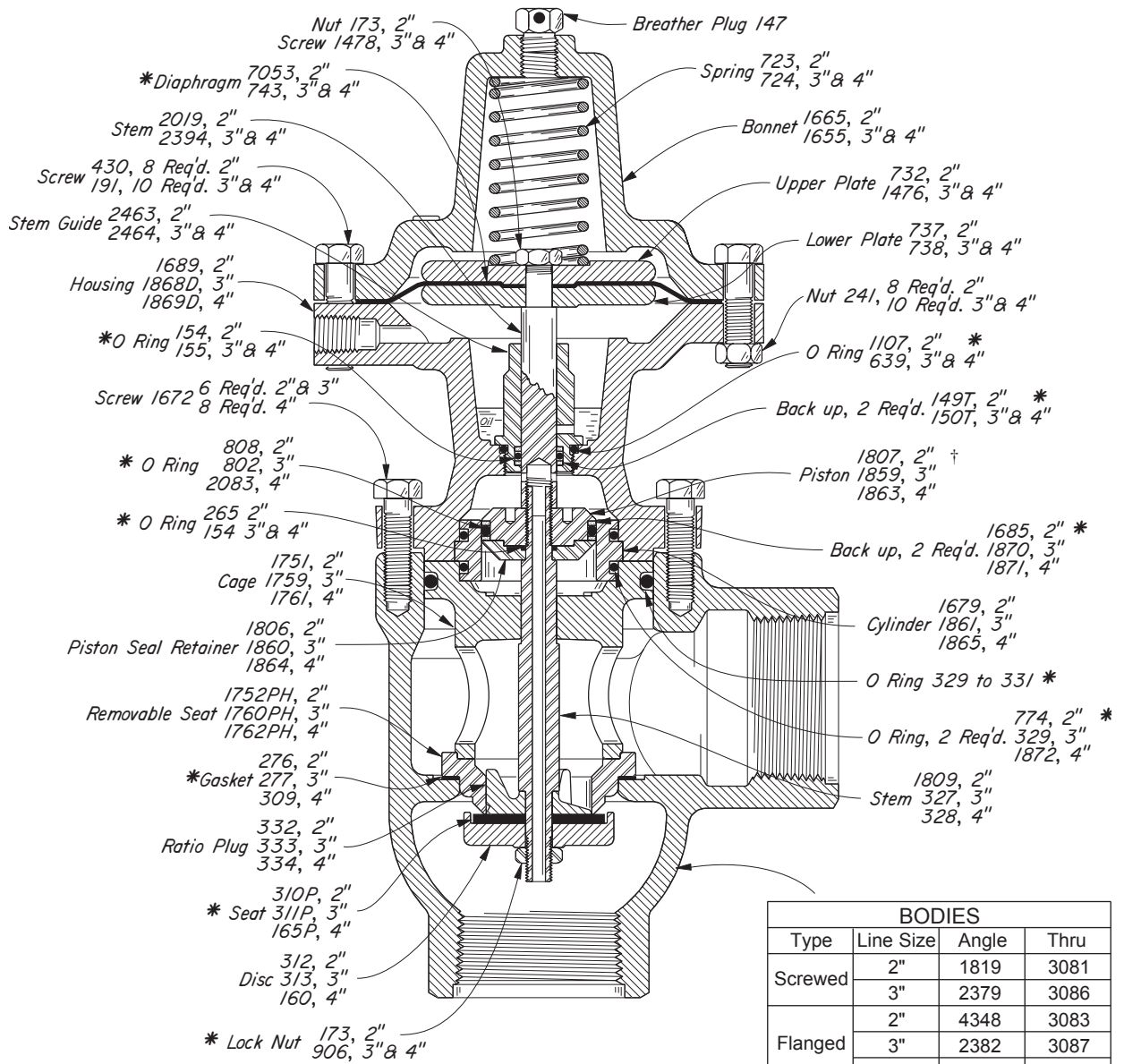
CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EWS	2" SCRD.	212 SMT PB PC w <sub>o</sub> /TI	175	175	RFO
EWU	2" FLGD. <sup>a</sup>	212 FMT PB PC w <sub>o</sub> /TI	175	175	RFO
EWY	3" SCRD.	312 SMT PB PC w <sub>o</sub> /TI	175	175	RFU
EXA	3" FLGD. <sup>a</sup>	312 FMT PB PC w <sub>o</sub> /TI	175	175	RFU
EXE	4" FLGD. <sup>a</sup>	412 FMT PB PC w <sub>o</sub> /TI	175	175	RFY

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

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

Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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#### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
ELB	2" SCR D	250 SMA PB PC-D w/TI	500	500	RFQ
ELD	2" FLGD	225 FMA PB PC-D w/TI	250	250	RFQ
ELH	3" SCR D	325 SMA PB PC-D w/TI	250	250	RTS
ELJ	3" FLGD	325 FMA PB PC-D w/TI	250	250	RTS
ELL	3" GRVD	325 GMA PB PC-D w/TI	250	250	RTS
ELN	4" FLGD	425 FMA PB PC-D w/TI	250	250	RTU

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with Spanner Wrench holes on top.

For dimensions refer to Table of Contents.

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EYB	2" SCR D	250 SMT PB PC-D w/TI	500	500	RFQ
EYD	2" FLGD	225 FMT PB PC-D w/TI	250	250	RFQ
EYH	3" SCR D	325 SMT PB PC-D w/TI	250	250	RTS
EYJ	3" FLGD	325 FMT PB PC-D w/TI	250	250	RTS
EYN	4" FLGD	425 FMT PB PC-D w/TI	250	250	RTU

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

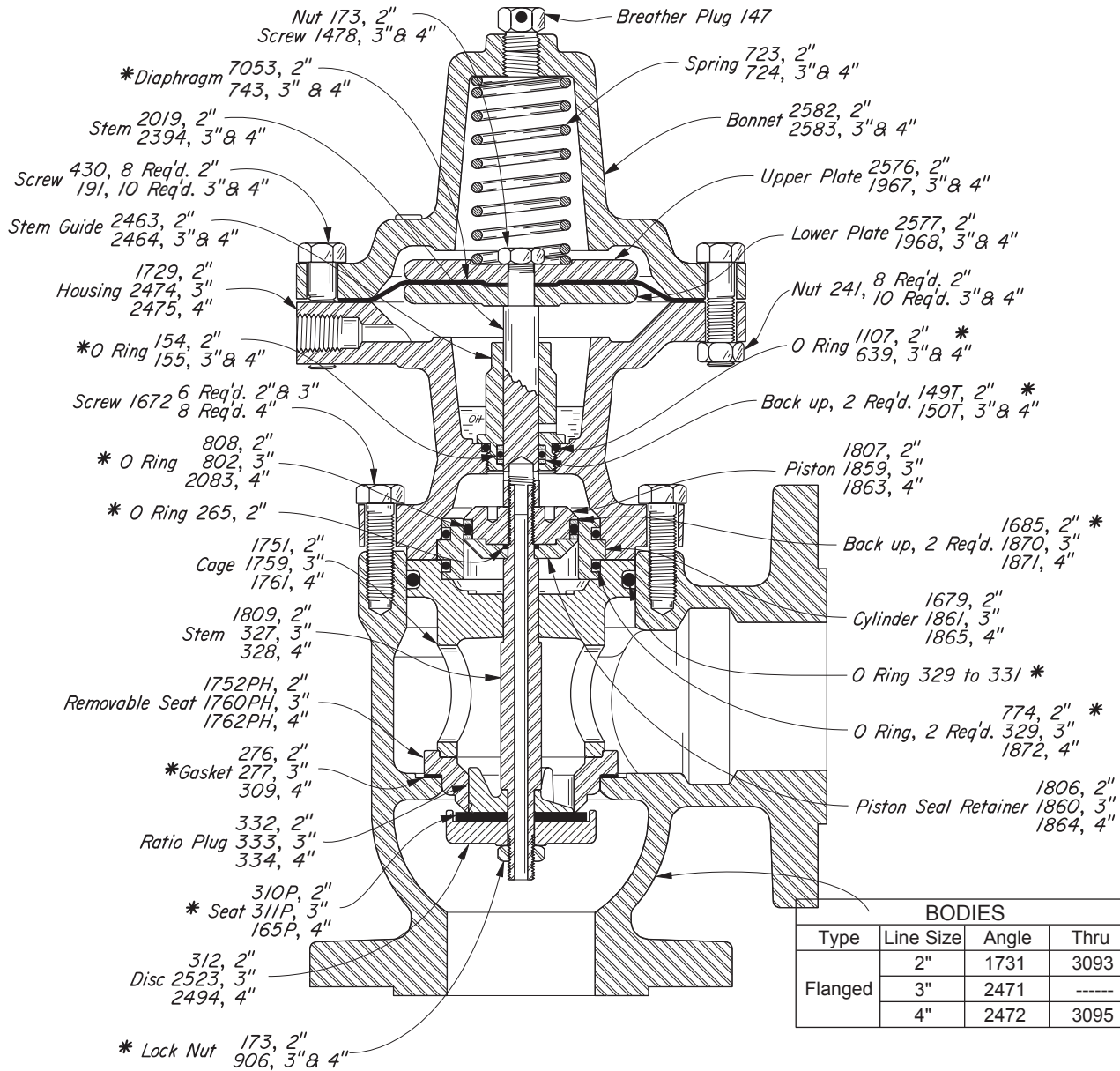
NOTE: Cage and removable hard seat is available on new valves at extra cost. Refer to Table of Contents for Cage and Hard Seats available. When ordering specify valve model, then add "with removable seat."

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# BALANCED MOTOR VALVES



## PISTON BALANCED PRESSURE CLOSE STEEL



BODIES			
Type	Line Size	Angle	Thru
Flanged	2"	1731	3093
	3"	2471	-----
	4"	2472	3095

### ANGLE VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
ELS	2" FLGD.	228 FMA PB PC-S w/o/TI	285	285	RFQ
ELU	3" FLGD.	328 FMA PB PC-S w/o/TI	285	285	RTS
ELX	4" FLGD.	428 FMA PB PC-S w/o/TI	285	285	RTU

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EYS	2" FLGD.	228 FMT PB PC-S w/o/TI	285	285	RFQ

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

†To remove Piston 1807, use Spanner Wrench 1471SNW. To remove Pistons 1859 and 1863, use Spanner Wrench 1859SNW. Note: Drawing depicts 2" valve. Piston design varies, install with Spanner Wrench holes on top.

For dimensions refer to Table of Contents.

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#### APPLICATION:

For control of discharge of liquid or gas from vessels, separators, treaters, knockouts and other similar liquid accumulators. For back pressure or pressure reducing applications with pressure pilots.

#### FEATURES:

- Soft seat
- Bubble tight shut-off at full range of pressure
- Piston balanced seat assembly
- Full line size opening
- 30 psig max. required actuating pressure
- Trim contoured for throttle or on/off service

#### OPERATION:

The Diaphragm Assembly is the only moving unit in the valve. The SPRING loads the Diaphragm Assembly closing the valve if there is no Diaphragm Pressure (Yellow). The communicating hole in the lower portion of the STEM balances the forces Upstream Pressure (Red) applies to the PLUG preventing Upstream Pressure (Red) from forcing the valve open.

An increase in the Diaphragm Pressure (Yellow) overcomes the spring force, and moves the Diaphragm Assembly upward opening the valve.

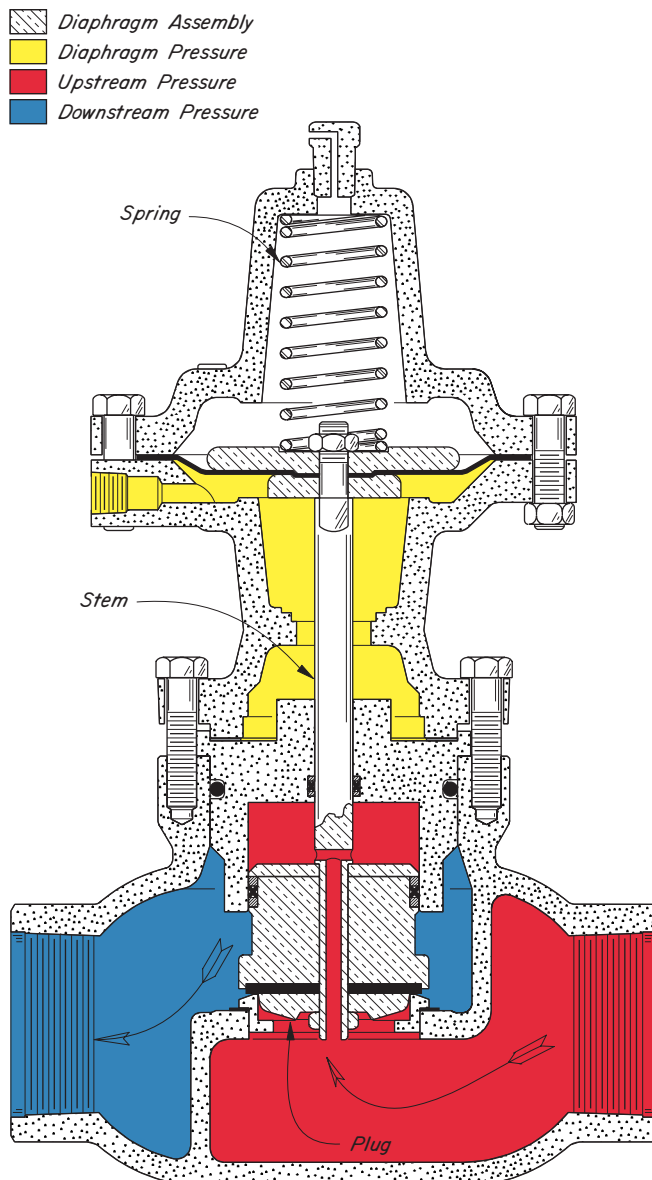
A decrease in the Diaphragm Pressure (Yellow) allows the SPRING to move the Diaphragm Assembly downward closing the valve.

#### SUPPLY PRESSURE:

30 psig Max.

#### OPERATION TEMPERATURE:

225°F. Max.

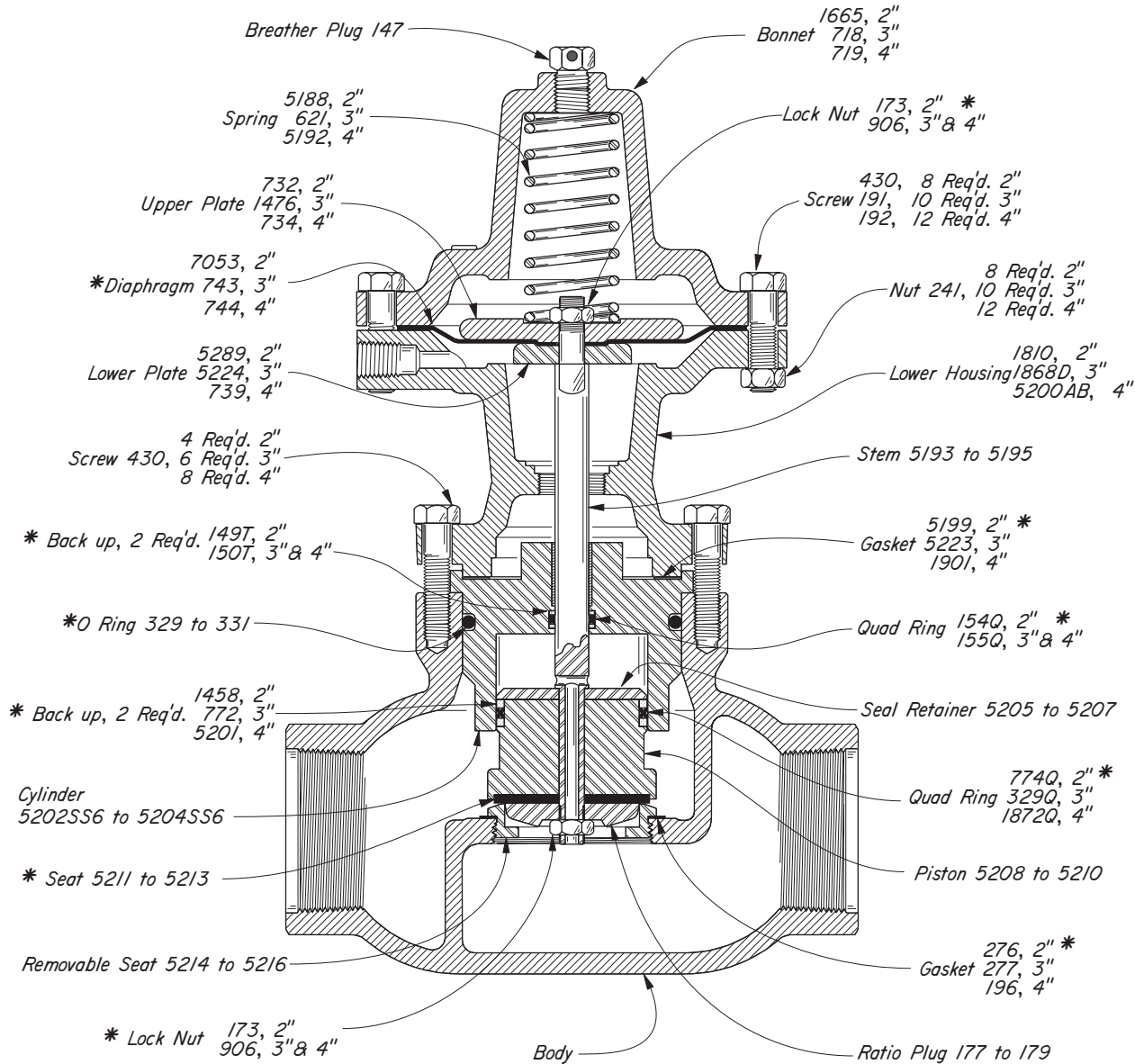


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# BALANCED MOTOR VALVES



## PISTON BALANCED THROTTLING PRESSURE OPEN CAST IRON



LINE SIZE	BODIES	
	SCREWED	FLANGED
2"	5217	5218
3"	5219	5220
4"		5222

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EMM	2" SCRD.	212 SMT PBT PO	175	175	RUM
EMN	2" FLGD. <sup>a</sup>	212 FMT PBT PO	175	175	RUM
EMO	3" SCRD.	312 SMT PBT PO	175	175	RUN
EMP	3" FLGD. <sup>a</sup>	312 FMT PBT PO	175	175	RUN
EMQ	4" FLGD. <sup>a</sup>	412 FMT PBT PO	175	175	RUO

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

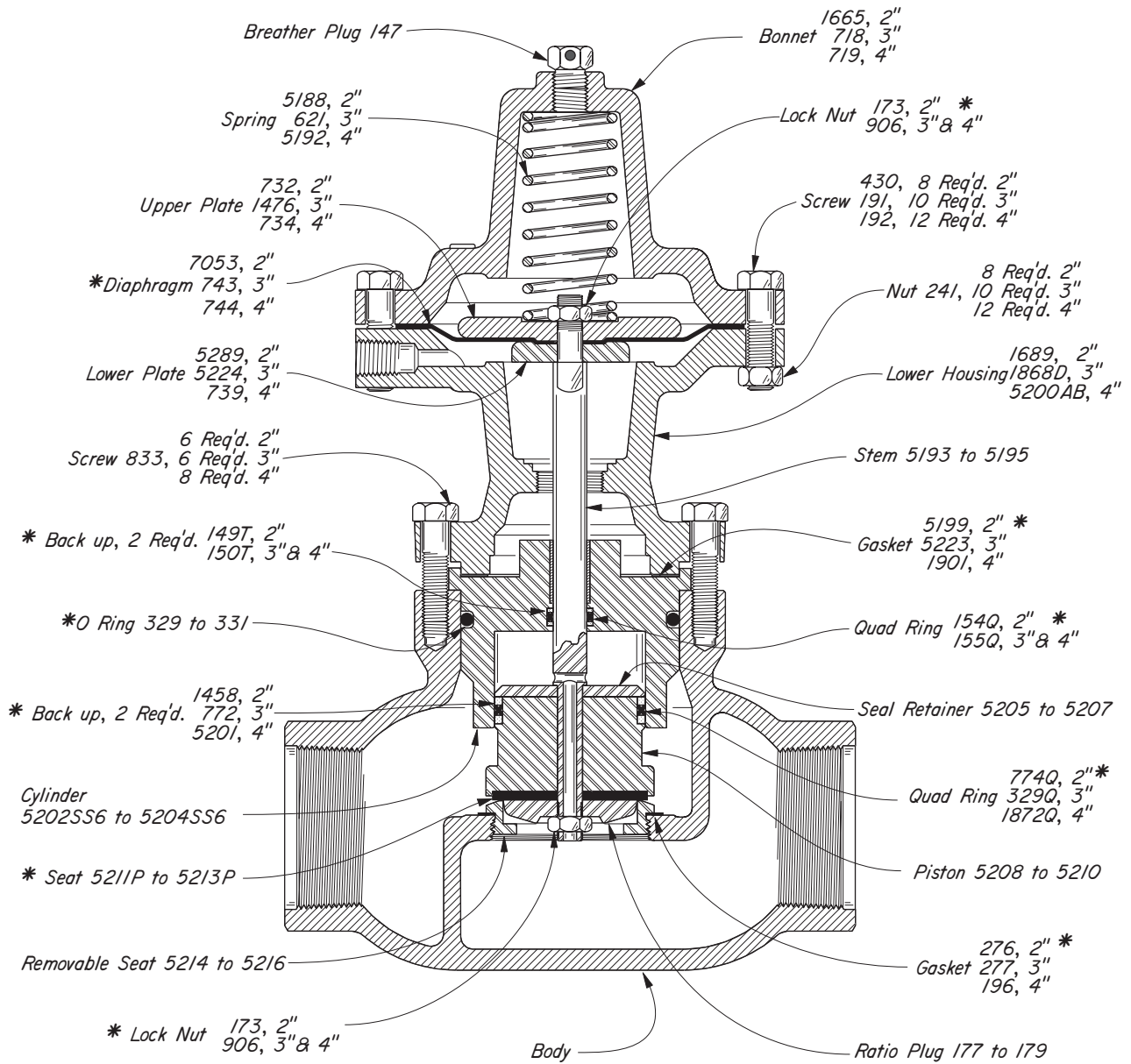
### NOTES:

For 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: Ratio Plug 177-2", 178-3", 179-4"

### PISTON BALANCED THROTTLING PRESSURE OPEN DUCTILE IRON



LINE SIZE	BODIES	
	SCREWED	FLANGED
2"	5217D	5218
3"	5219D	5220D
4"		5222D

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EMS	2" SCRD.	250 SMT PBT PO-D	500	500	RUM-P
EMT	2" FLGD.	225 FMT PBT PO-D	250	250	RUM-P
EMU	3" SCRD.	325 SMT PBT PO-D	250	250	RUN-P
EMV	3" FLGD.	325 FMT PBT PO-D	250	250	RUN-P
EMW	4" FLGD.	425 FMT PBT PO-D	250	250	RUO-P

#### NOTES:

For dimensions, refer to Table of Contents.

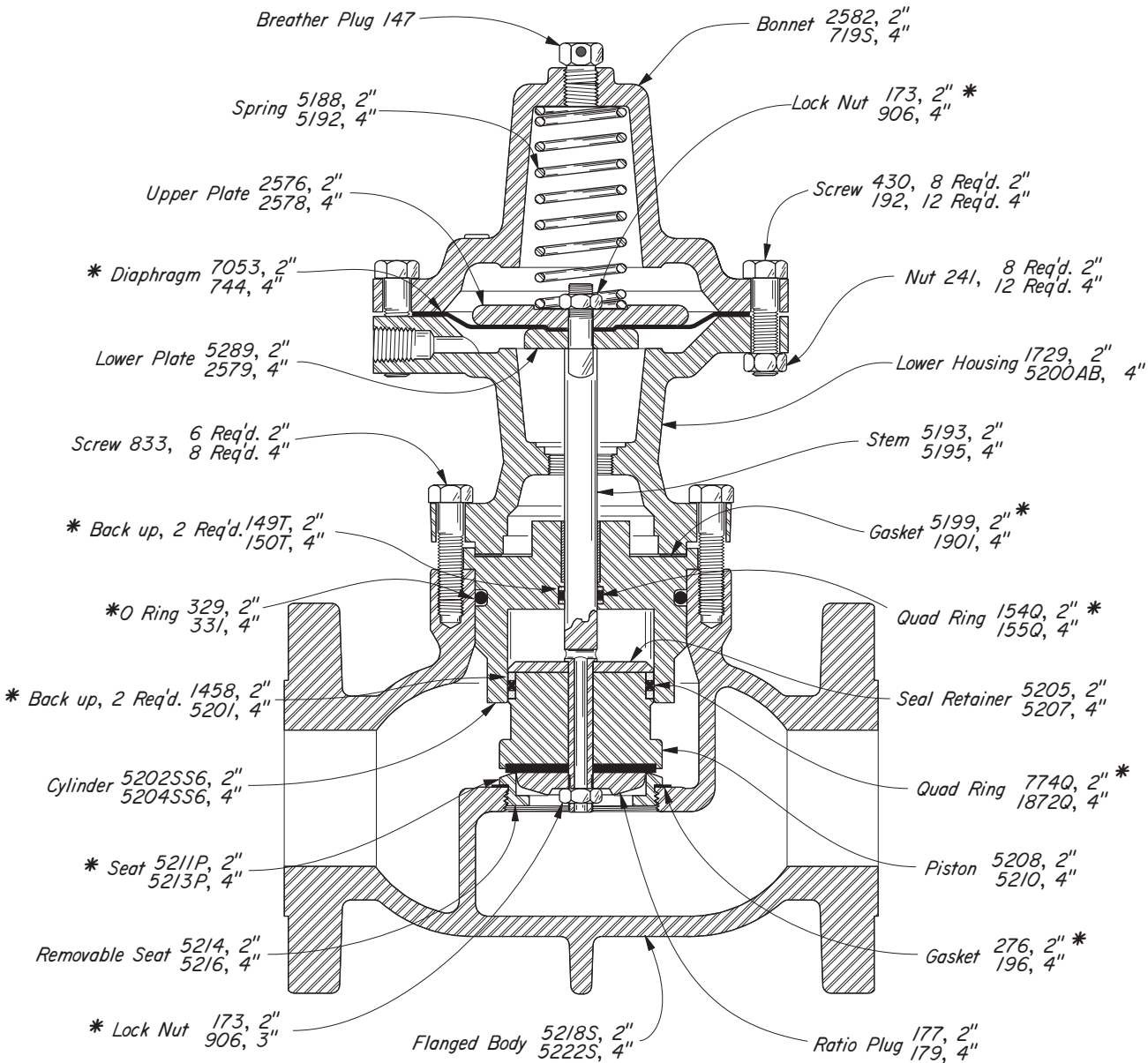
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Ratio Plug 177-2", 178-3", 179-4"

# BALANCED MOTOR VALVES



## PISTON BALANCED THROTTLING PRESSURE OPEN STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EMX	2" FLGD.	228 FMT PBT PO-S	285	285	RUM-P
EMZ	4" FLGD.	428 FMT PBT PO-S	285	285	RUO-P

### NOTES:

For dimensions, refer to Table of Contents.

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

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### PISTON BALANCED THROTTLING PRESSURE CLOSE

#### APPLICATION:

For control of discharge of liquid or gas from vessels, separators, treaters, knockouts and other similar liquid accumulators. For back pressure or pressure reducing applications with pressure pilots.

#### FEATURES:

- Soft seat
- Bubble tight shut-off at full range of pressure
- Piston balanced seat assembly
- Full line size opening
- 30 psig max. required actuating pressure
- Trim contoured for throttle or on/off service

#### OPERATION:

The Diaphragm Assembly is the only moving unit in the valve. The Spring loads the Diaphragm Assembly opening the valve if there is no Diaphragm Pressure (Yellow). The communicating hole in the lower portion of the Stem balances the forces Upstream Pressure (Red) applies to the plug preventing Upstream Pressure (Red) from forcing the valve open.

An increase in the Diaphragm Pressure (Yellow) overcomes the Spring force, and moves the Diaphragm Assembly downward closing the valve.

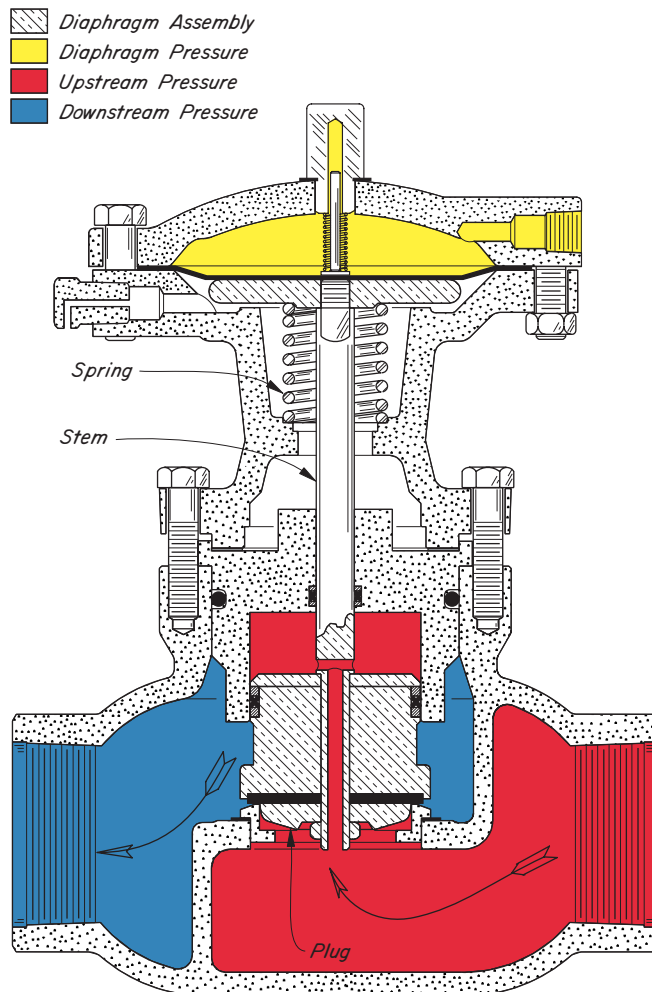
A decrease in the Diaphragm Pressure (Yellow) allows the Spring to move the Diaphragm Assembly upward opening the valve.

#### SUPPLY PRESSURE:

30 psig Max.

#### OPERATION TEMPERATURE:

225°F. Max.

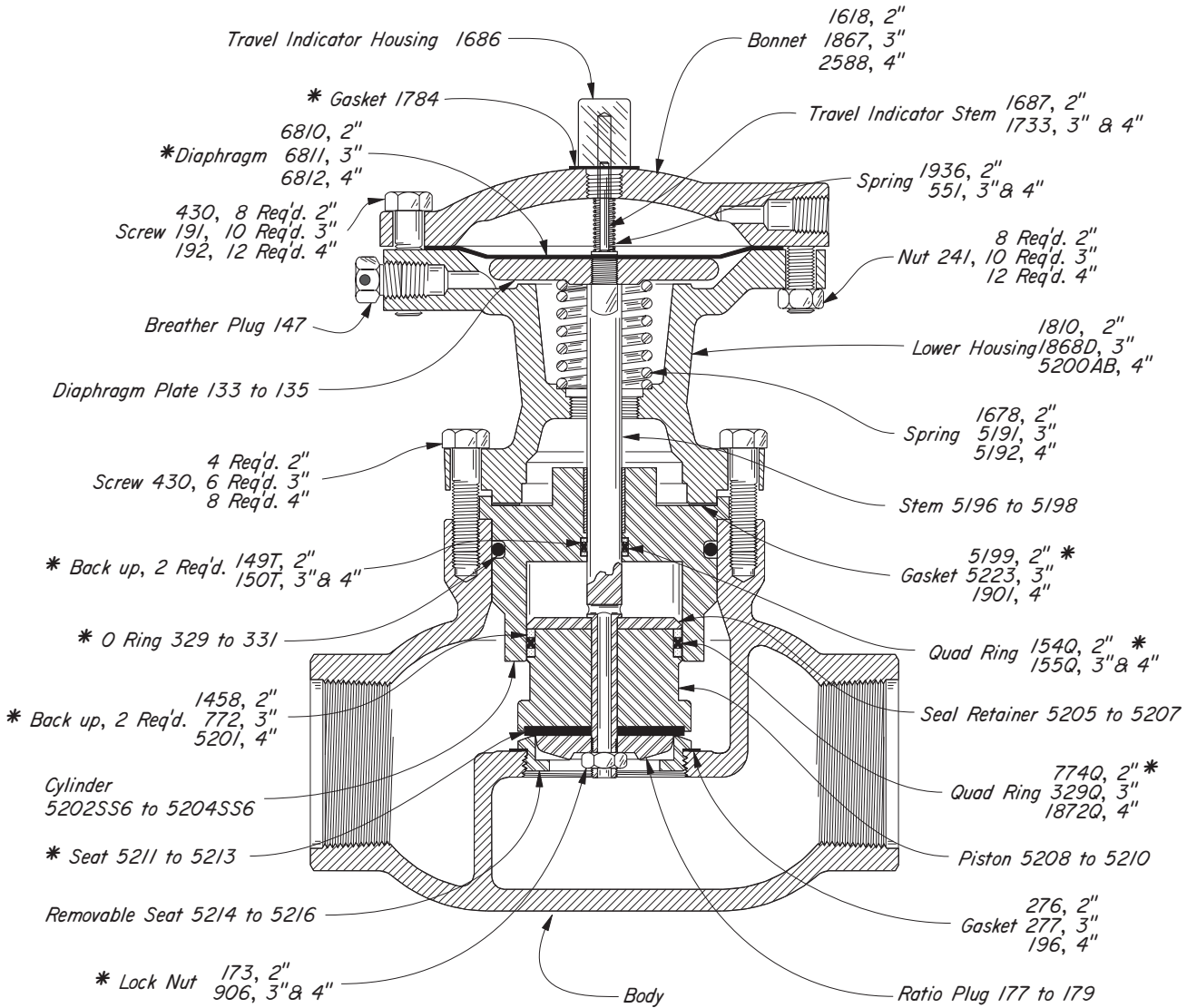


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# BALANCED MOTOR VALVES



## PISTON BALANCED THROTTLING PRESSURE CLOSE CAST IRON



LINE SIZE	BODIES	
	SCREWED	FLANGED
2"	5217	5218
3"	5219	5220
4"	---	5222

### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EUM	2" SCR.D.	212 SMT PBT PC	175	175	R UW
EUN	2" FLGD. <sup>a</sup>	212 FMT PBT PC	175	175	R UW
EUO	3" SCR.D.	312 SMT PBT PC	175	175	R UX
EUP	3" FLGD. <sup>a</sup>	312 FMT PBT PC	175	175	R UX
EUQ	4" FLGD. <sup>a</sup>	412 FMT PBT PC	175	175	R UY

### NOTES:

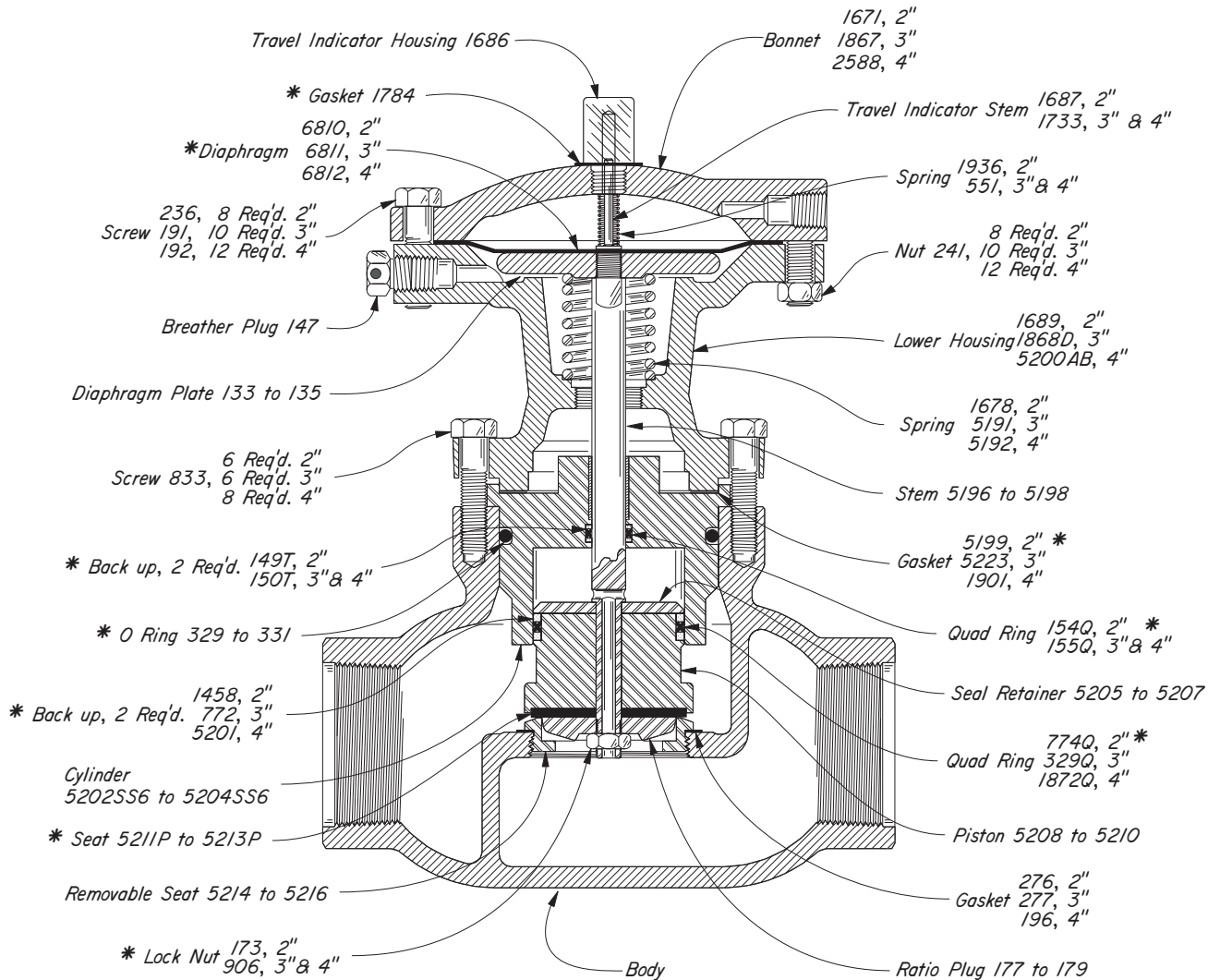
For dimensions, refer to Table of Contents.

\*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: Ratio Plug 177-2", 178-3", 179-4"

<sup>a</sup>Companion flanges, nuts, bolts and gaskets are furnished at extra cost. Refer to Section "Y" for ordering.

### PISTON BALANCED THROTTLING PRESSURE CLOSE DUCTILE IRON



LINE SIZE	BODIES	
	SCREWED	FLANGED
2"	5217D	5218
3"	5219D	5220D
4"	----	5222D

#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EUS	2" SCRD.	250 SMT PBT PC-D	500	500	RUW-P
EUT	2" FLGD.	225 FMT PBT PC-D	250	250	RUW-P
EUU	3" SCRD.	325 SMT PBT PC-D	250	250	RUX-P
EUV	3" FLGD.	325 FMT PBT PC-D	250	250	RUX-P
EUW	4" FLGD.	425 FMT PBT PC-D	250	250	RUY-P

#### NOTES:

For dimensions, refer to Table of Contents.

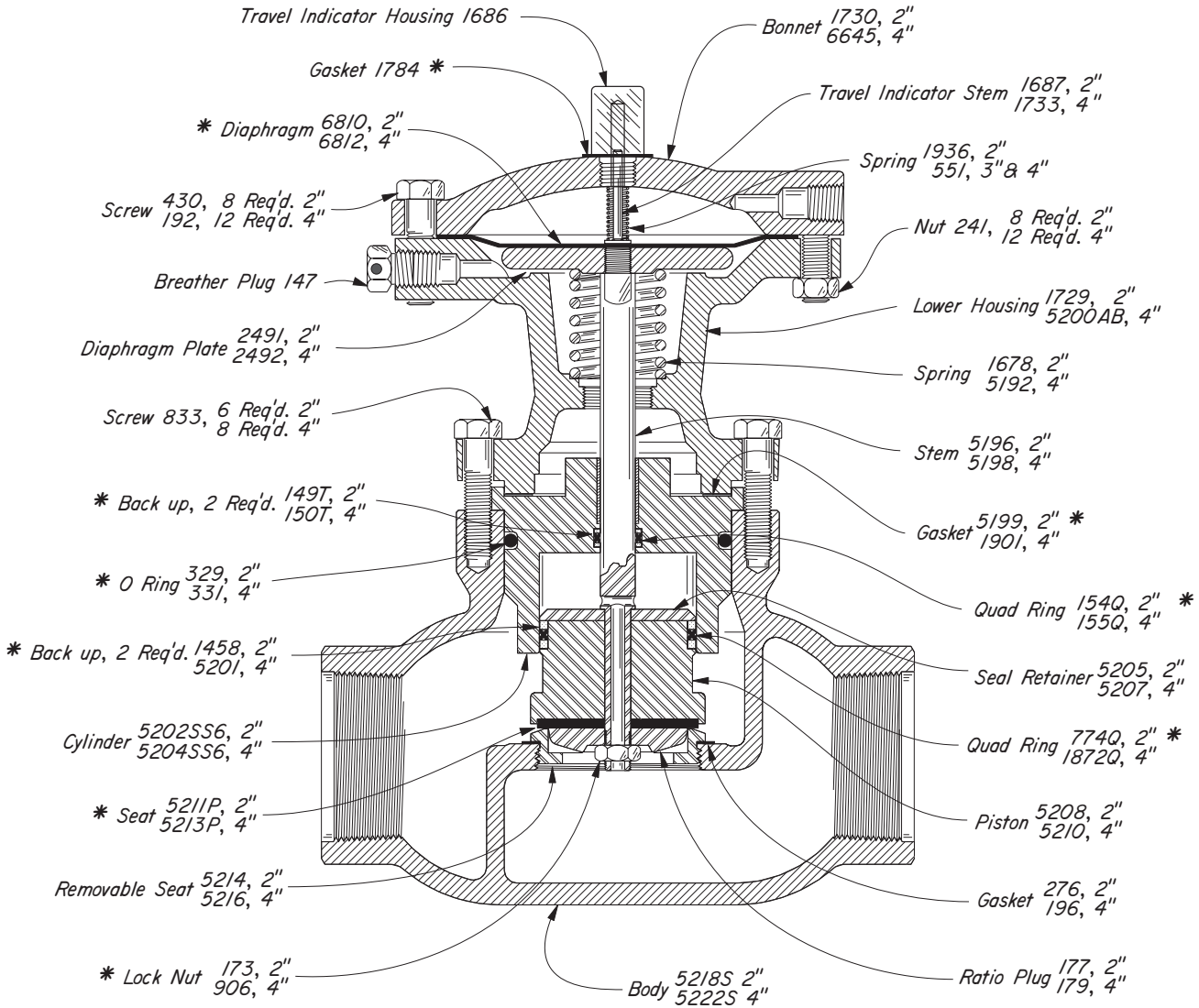
\*These parts are recommended spare parts and are stocked as repair kits.

The numbers of a series assigned to a part indicate different line sizes. For example: Ratio Plug 177-2", 178-3", 179-4"

# BALANCED MOTOR VALVES



## PISTON BALANCED THROTTLING PRESSURE CLOSE STEEL



### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVE	OPER. PRES.	MAX W.P.	KIT
EUX	2" FLGD.	228 FMT PBT PC-S	285	285	RUW-P
EUZ	4" FLGD.	428 FMT PBT PC-S	285	285	RUY-P

### NOTES:

For dimensions, refer to Table of Contents.

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



## CAPACITY-Bbls. Water/Day, Steady Flow

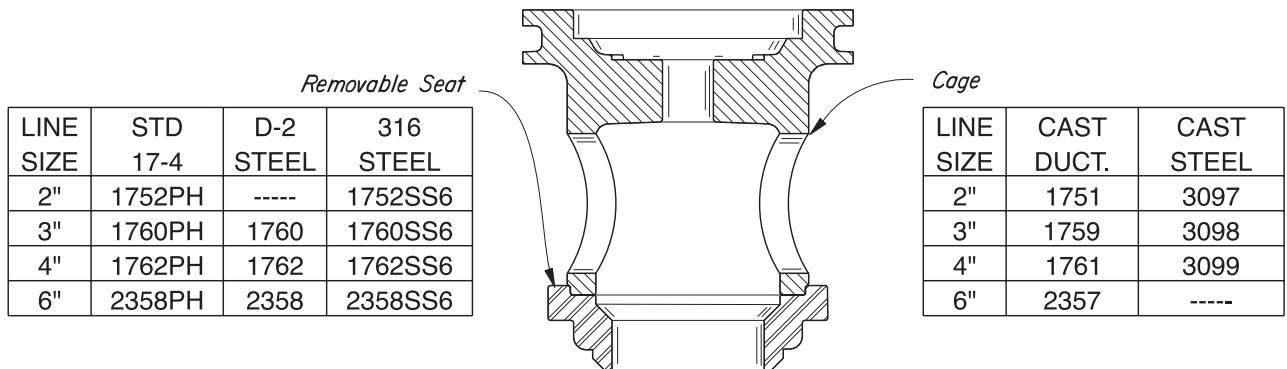
PRESSURE DROP ACROSS VALVE PSIG	VALVE SIZE - INCHES			
	2	3	4	6
1	800	1,500	2,400	9,500
2	1,150	2,100	3,400	13,450
3	1,400	2,600	4,150	16,450
4	1,600	3,000	4,800	19,000
5	1,800	3,350	5,350	21,250
10	2,550	4,750	7,600	30,050
15	3,100	5,800	9,300	36,800
20	3,600	6,700	10,750	42,500
30	4,400	8,200	13,150	52,000
40	5,100	9,500	15,200	60,050
50	5,700	10,600	16,950	67,150
60	6,250	11,600	18,600	73,550
70	6,750	12,550	20,100	79,450
80	7,200	13,400	21,450	84,950
90	7,650	14,200	22,750	90,100
100	8,050	15,000	24,000	94,950
120	8,850	16,400	26,300	104,050
140	9,550	17,750	28,400	112,350
160	10,200	18,950	30,350	120,150
180	10,800	20,100	32,200	127,400
200	11,400	21,200	33,950	134,300
220	11,950	22,200	35,600	140,850
240	12,500	23,200	37,200	147,150
260	13,000	24,150	38,700	153,150
280	13,500	25,050	40,150	158,900
300	13,950	25,950	41,550	164,500
325	14,500	27,000	43,250	171,200
350	15,050	28,050	44,900	177,700
375	15,600	29,000	46,500	183,900
400	16,100	29,950	48,000	189,950

For gravity correction, multiply the above figures by  $\sqrt{\frac{1}{G}}$   
 Where "G" is the specific gravity of the flowing liquid.  
 NOTE: Flow rates are for steady flow conditions  
 over a 24 hour period. Corrections should be made  
 to deal with intermittent flow conditions.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.



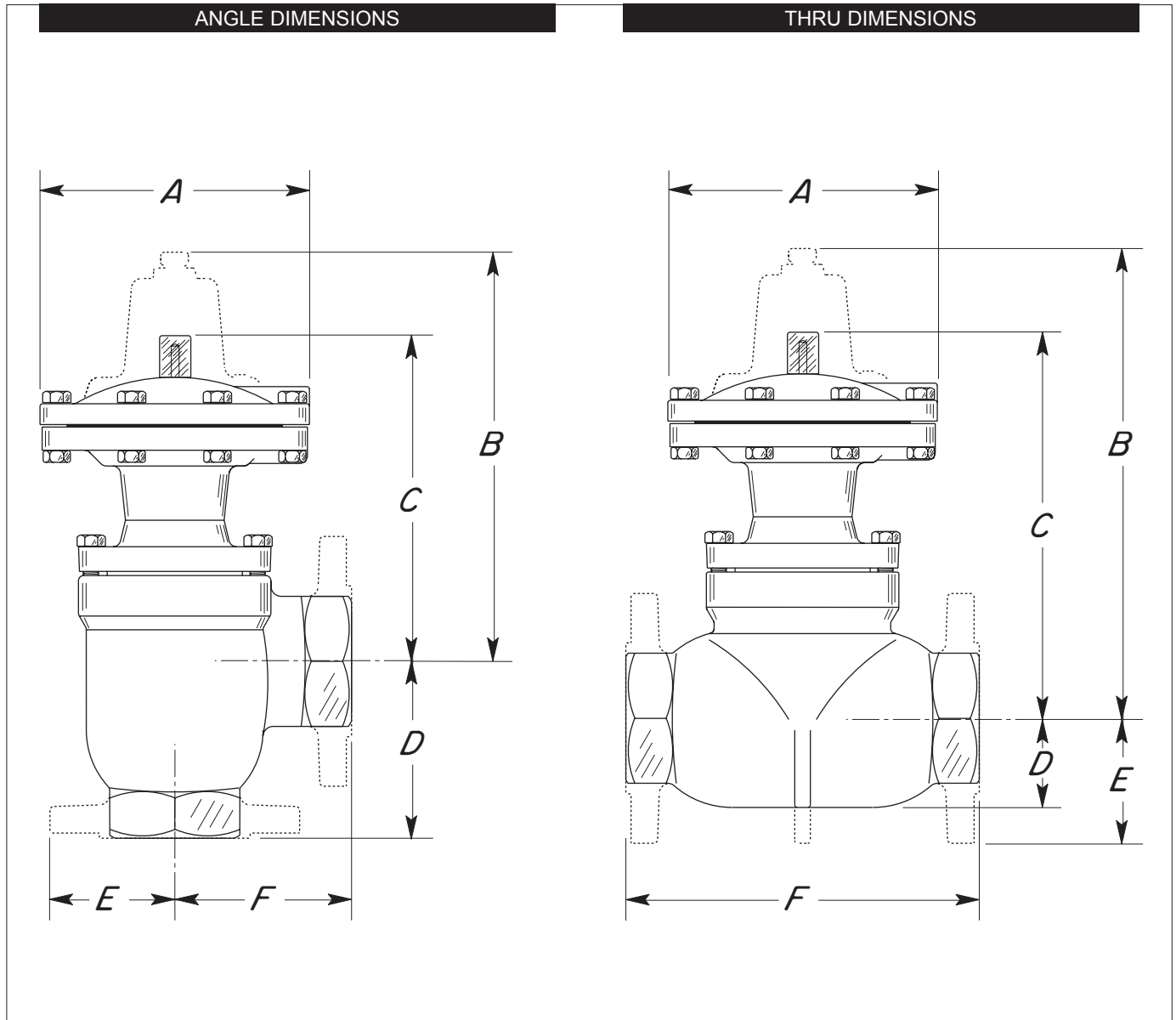
#### NOTES:

Removable seat and cage is standard in Piston Balanced Motor Valves. But is optional in Diaphragm Balanced Motor Valve. To order specify valve model, then add "with removable seat."

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.



VALVE	A	B	C	D	E	F
2" S/FMA	6 1/2	9	8 1/2	4 1/4	3	4 1/4
3" S/FMA	8 1/2	11 3/4	10 1/4	5 1/2	3 3/4	5 1/2
4" FMA	8 1/2	12 1/2	11	6 1/2	4 1/2	6 1/2
6" FMA	10 3/4	—	19 3/4	10 1/4	5 1/2	7 11/16

VALVE	A	B	C	D	E	F
2" SMT	6 1/2	10 3/8	9 7/8	2 1/8	—	8 1/2
2" FMT	6 1/2	10 3/8	9 7/8	—	3	9
3" SMT	8 1/2	13 5/16	11 9/16	2 7/8	—	12
3" FMT	8 1/2	13 5/16	11 9/16	—	3 3/4	12 3/16
4" FMT	8 1/2	14 7/8	13 3/8	—	4 1/2	15 1/8
6" FMT	10 3/4	—	19 3/4	—	5 1/2	22

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

# MOTOR VALVES 3 WAY SERIES



**KIMRAY**  
INC.®

SECTION E4

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.  
® Copyright 1992, KIMRAY, Inc.



### DIAPHRAGM BALANCED

#### APPLICATION:

Three-Way Valves provide a convenient means for diverting flow from one pipeline to another, for bypass applications where part or all of the fluid passing through the valve is diverted through either or both of the outlets, or as a mixing valve for combining two fluid streams and discharging them through a common outlet port.

Material	Operating Pressure	Description of Operation	Parts List
Ductile Iron	125 psig Max.	Pg. 10.1	Pg. 10.2

### PISTON BALANCED

#### APPLICATION:

Three-Way Valves provide a convenient means for diverting flow from one pipeline to another, for bypass applications where part or all of the fluid passing through the valve is diverted through either or both of the outlets, or as a mixing valve for combining two fluid streams and discharging them through a common outlet port.

Material	Line Size	Operating Pressure	Description of Operation	Parts List
Ductile	2"	250/400 psig Max.	Pg. 10.1	Pg. 10.3
Ductile	3"	250/400 psig Max.	Pg. 10.1	Pg. 10.4
Steel	2"	285/400 psig Max.	Pg. 10.1	Pg. 10.5

### SPLITTER VALVE

#### APPLICATION:

Three-Way Valves provide a convenient means for diverting flow from one pipeline to another, for bypass applications where part or all of the fluid passing through the valve is diverted through either or both of the outlets, or as a mixing valve for combining two fluid streams and discharging them through a common outlet port.

Material	Line Size	Operating Pressure	Parts List
Steel	2"	3000 psig Max.	Pg. 20.1

### MOTOR VALVE

#### APPLICATION:

Three-Way Valves provide a convenient means for diverting flow from one pipeline to another, for bypass applications where part or all of the fluid passing through the valve is diverted through either or both of the outlets, or as a mixing valve for combining two fluid streams and discharging them through a common outlet port.

Material	Line Size	Operating Pressure	Parts List
Steel	2"	3000 psig Max.	Pg. 20.2
Steel	1"	3000 psig Max.	Pg. 30.1

#### LOWER PORT CLOSED:

Steel	1"	3000 psig Max.	Pg. 30.2
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## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

**TEMPERATURE:**

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

**TEMPERATURE:**

-15° to +300° F  
-26° to +149° C

**APPLICATION:**

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

**FLUID / GAS:**

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

**TEMPERATURE:**

-40° to +400° F  
-20° to +204° C

**APPLICATION:**

Chemically Inert Elastomer Best in static Do not use at low temps

**FLUID / GAS:**

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

**DO NOT USE WITH:**

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

**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 (P)

**TEMPERATURE:**

-40° to +220° F  
-40° to +104° C

**APPLICATION:**

High abrasion resistance Seats, Diaphragms

**FLUID / GAS:**

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

**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

#### FEATURES:

- Soft seats
- Tight shut-off
- Balanced design
- Removable seats
- Minimum maintenance
- Valve position indicator
- All internal parts can be removed with valve in line.

#### CONSTRUCTION:

Bodies & diaphragm housings are available in a choice of either ductile or iron or steel castings. Valve stem is a type of 303 stainless. Diaphragms and seat materials are reinforced oil resistant synthetic rubber. Each valve is given a complete operational test after assembly. Standard maximum service temperature is 225° F. Modification for service temperature of 350° F. is available as and "extra", when specified on order.

125# W.P. are Diaph. Balance Valves.

400# W.P. are Piston Balance Valves.

#### DIAPHRAGM PRESSURE:

10 to 100 psig

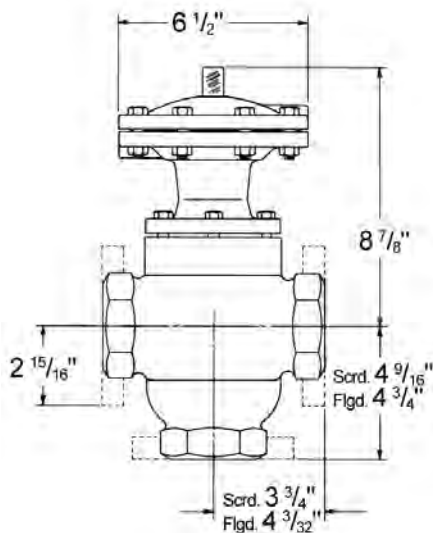
#### 2" CAPACITY - Bbls. Water/Day, Steady Flow

DIRECTION OF FLOW	PRESSURE DROP ACROSS VALVE - PSIG											
	1	2	3	4	5	10	15	20	30	40	50	60
* PRODUCTION	1,250	1,800	2,200	2,500	2,800	4,000	-----	-----	-----	-----	-----	-----
† TEST	1,100	1,550	1,900	2,200	2,500	3,450	4,250	4,900	6,000	6,950	7,800	8,500
† TEST	PRESSURE DROP ACROSS VALVE - PSIG											
	70	80	100	120	140	160	180	200	225	250	275	300
† TEST	9,200	9,800	11,000	12,000	13,000	14,000	14,750	15,500	16,500	17,400	18,200	19,000

\*Pressure drops greater than 10 psig will cause lower seat to leak.

†On diaphragm balanced valves, with "Production" side of valve at 0 psig, "Test" pressures greater than 30 psig will invert Diaphragm #335 and should be avoided. Use Piston Balanced Valve

#### DIMENSIONS

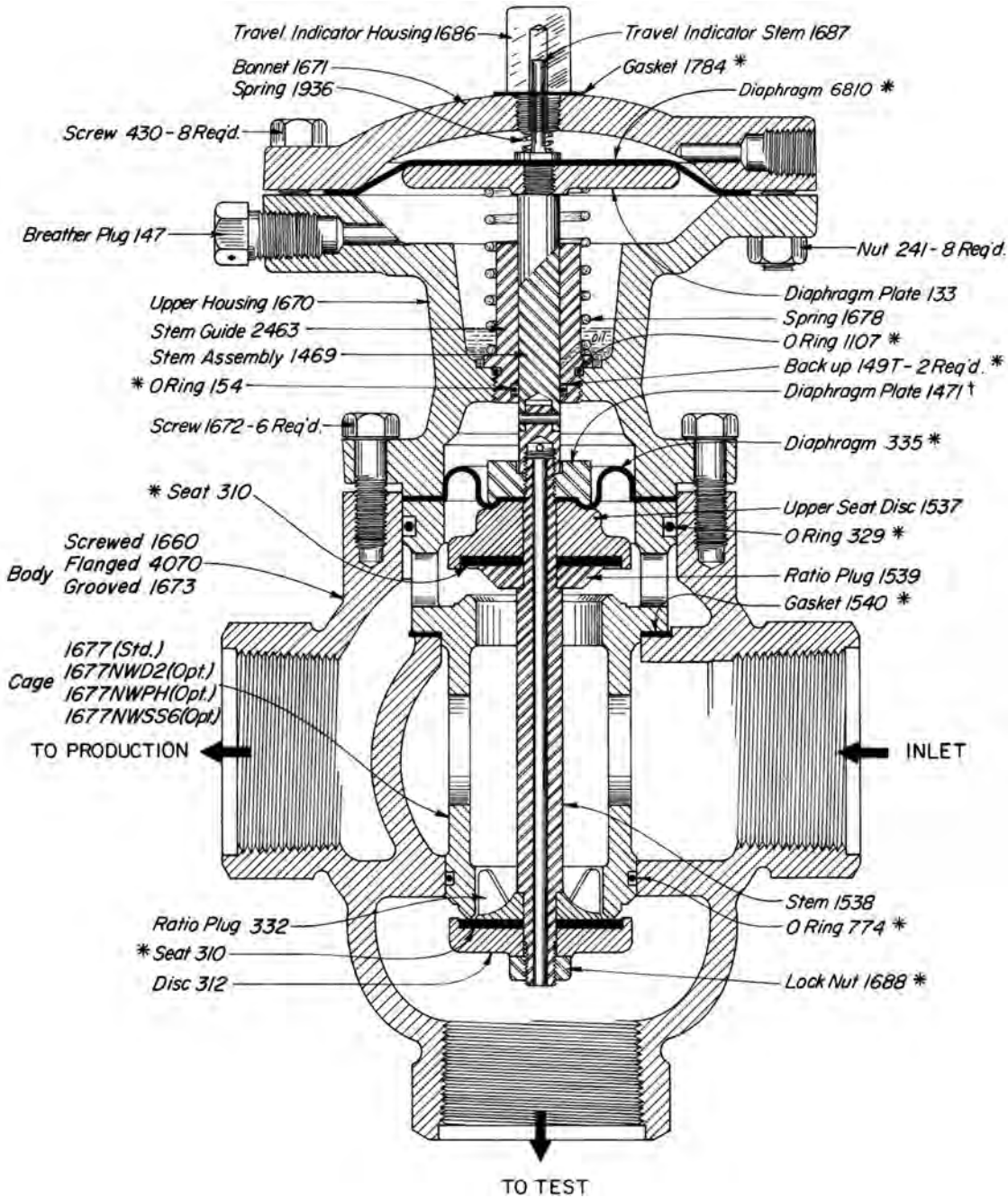


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# 3 WAY MOTOR VALVES



DIAPHRAGM BALANCED  
DUCTILE IRON



## VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ERM	2" SCRD.	212 S3W-D-LPC	125	400	RHP
ERN	2" GRVD.	212 G3W-D-LPC	125	400	RHP
ERO	2" FLGD.	212 F3W-D-LPC	125	250	RHP

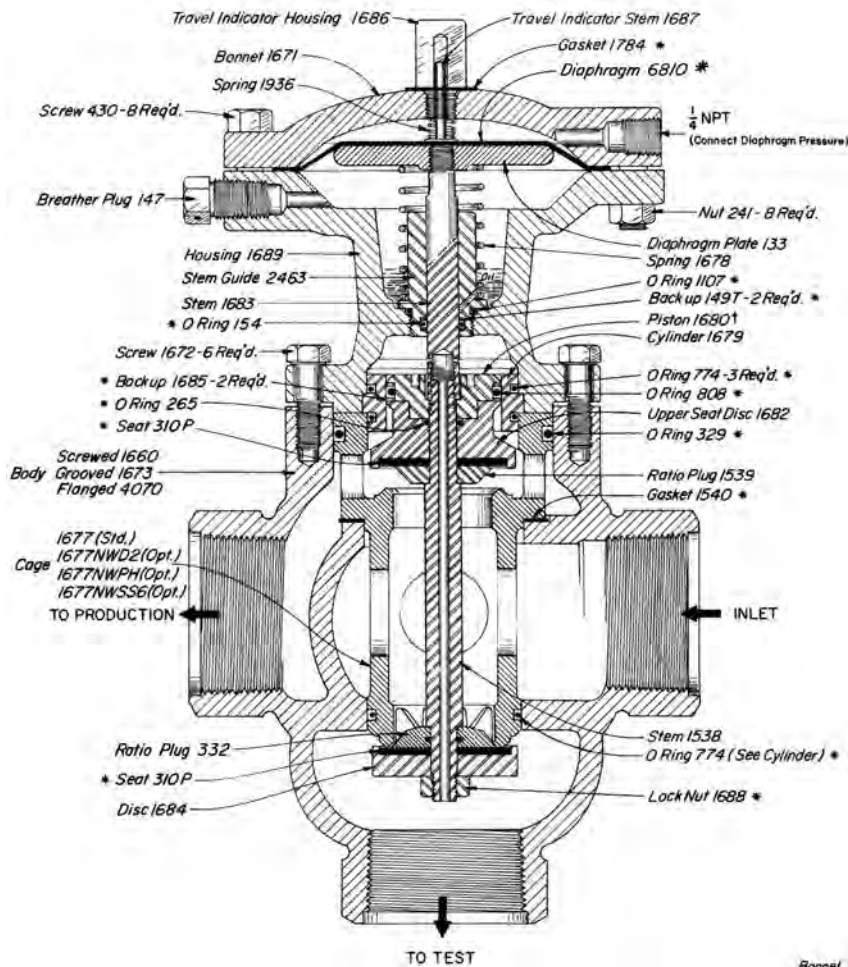
## NOTES:

† To remove Diaphragm Plate 1471, use Spanner Wrench 1471SNW.

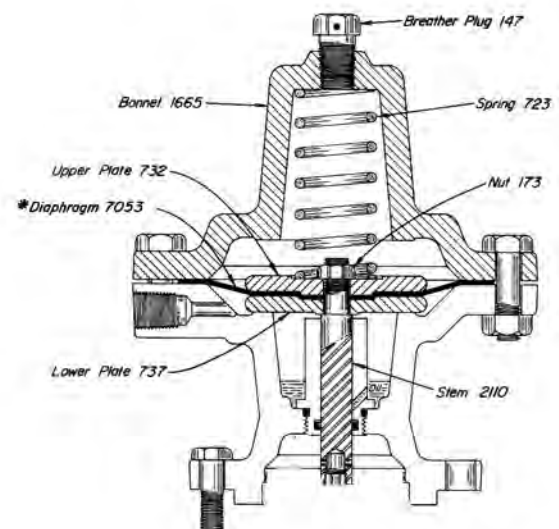
\*These are recommended spare parts and are stocked as repair kits.

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#### LOWER PORT CLOSED



#### LOWER PORT OPEN



#### VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ERL	2" FLGD.	218 F3W-D-LPO	250	250	RHY
ERP	2" SCR.D.	240 S3W-D-LPC	400	400	RHX
ERQ	2" FLGD.	218 F3W-D-LPC	250	250	RHX
ERR	2" GRVD.	240 G3W-D-LPC	400	400	RHX
ERS	2" SCR.D.	240 S3W-D-LPO	400	400	RHY
ERT	2" GRVD.	240 G3W-D-LPO	400	400	RHY

#### NOTES:

† To remove Piston 1680, use Spanner Wrench 1471SNW.

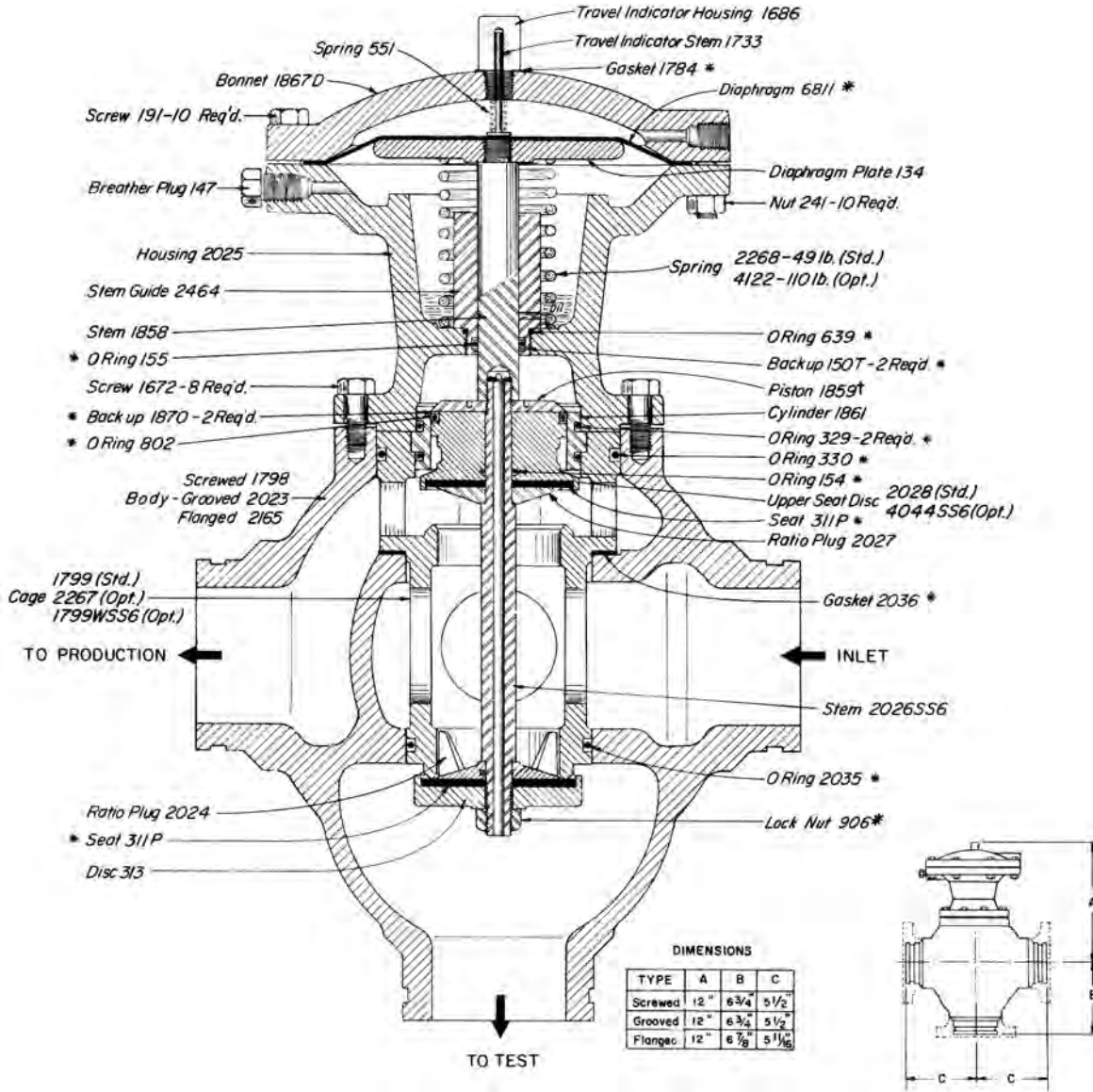
\*These are recommended spare parts and are stocked as repair kits.

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# 3 WAY MOTOR VALVES



PISTON BALANCED  
DUCTILE IRON



DIRECTION OF FLOW	PRESSURE DROP ACROSS VALVE - P.S.I.											
	1	2	3	4	5	10	15	20	30	40	50	60
PRODUCTION	2800	4050	4950	5600	6300	9000						
TEST	2500	3500	4250	4950	5600	7750	9550	11,000	13,500	15,600	17,500	19,100
	PRESSURE DROP ACROSS VALVE - P.S.I.											
	70	80	100	120	140	160	180	200	225	250	275	300
TEST	20,700	22,000	25,000	27,000	29,000	31,000	33,400	34,800	35,100	39,200	41,000	42,700

**VALVES AVAILABLE:**

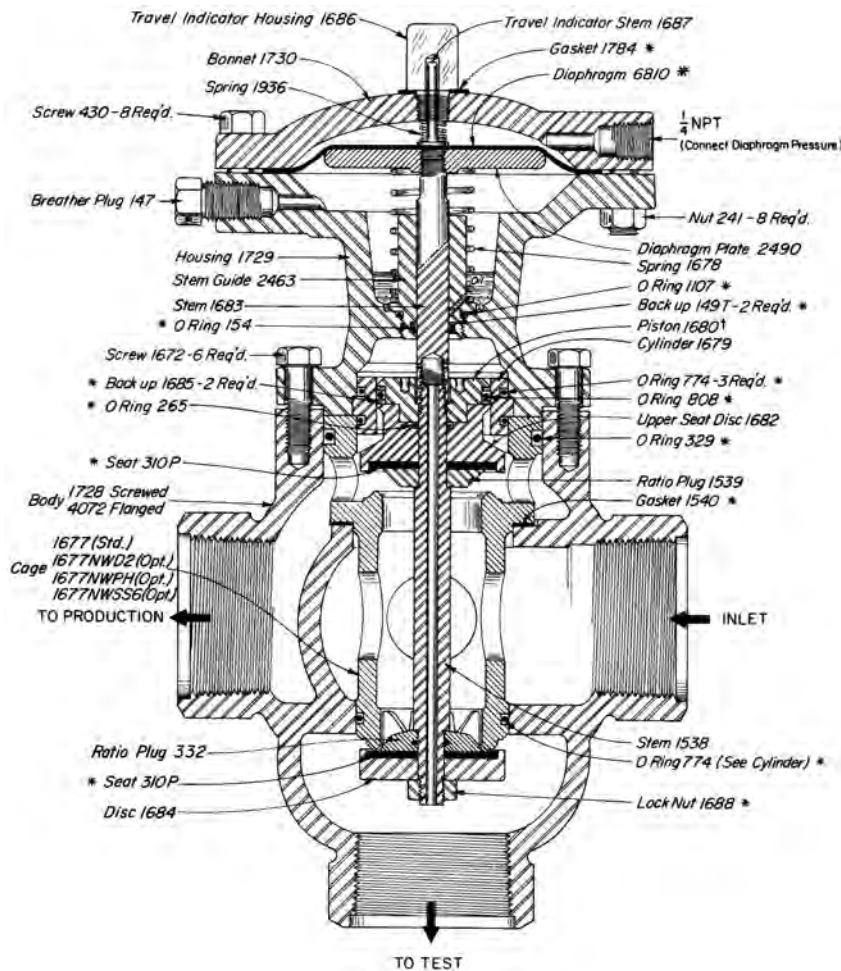
CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ERU	3" SCRD.	340 S3W-D-LPC	400	400	RHT
ERW	3" GRVD.	340 G3W-D-LPC	400	400	RHT
ERX	3" FLGD.	318 F3W-D-LPC	250	250	RHT

**NOTES:**

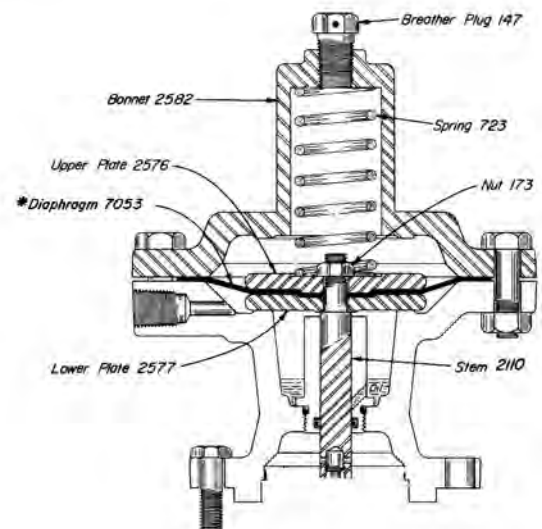
† To remove Piston 1859, use Spanner Wrench 1859SNW.  
 \*These are recommended spare parts and are stocked as repair kits.  
 3" CAPACITY - Bbls. water/day - Steady Flow

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#### LOWER PORT CLOSED



#### LOWER PORT OPEN



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ERY	2" SCR.D.	240 S3W-S-LPC	400	400	RHX
ERZ	2" SCR.D.	240 S3W-S-LPO	400	400	RHY
ESY	2" FLGD.	228 F3W-S-LPC	285	285	RHX
EUL	2" FLGD.	228 F3W-S-LPO	285	285	RHX

#### NOTES:

† To remove Piston 1680, use Spanner Wrench 1471SNW.

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

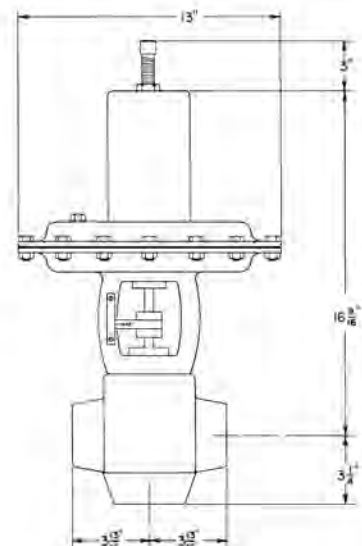
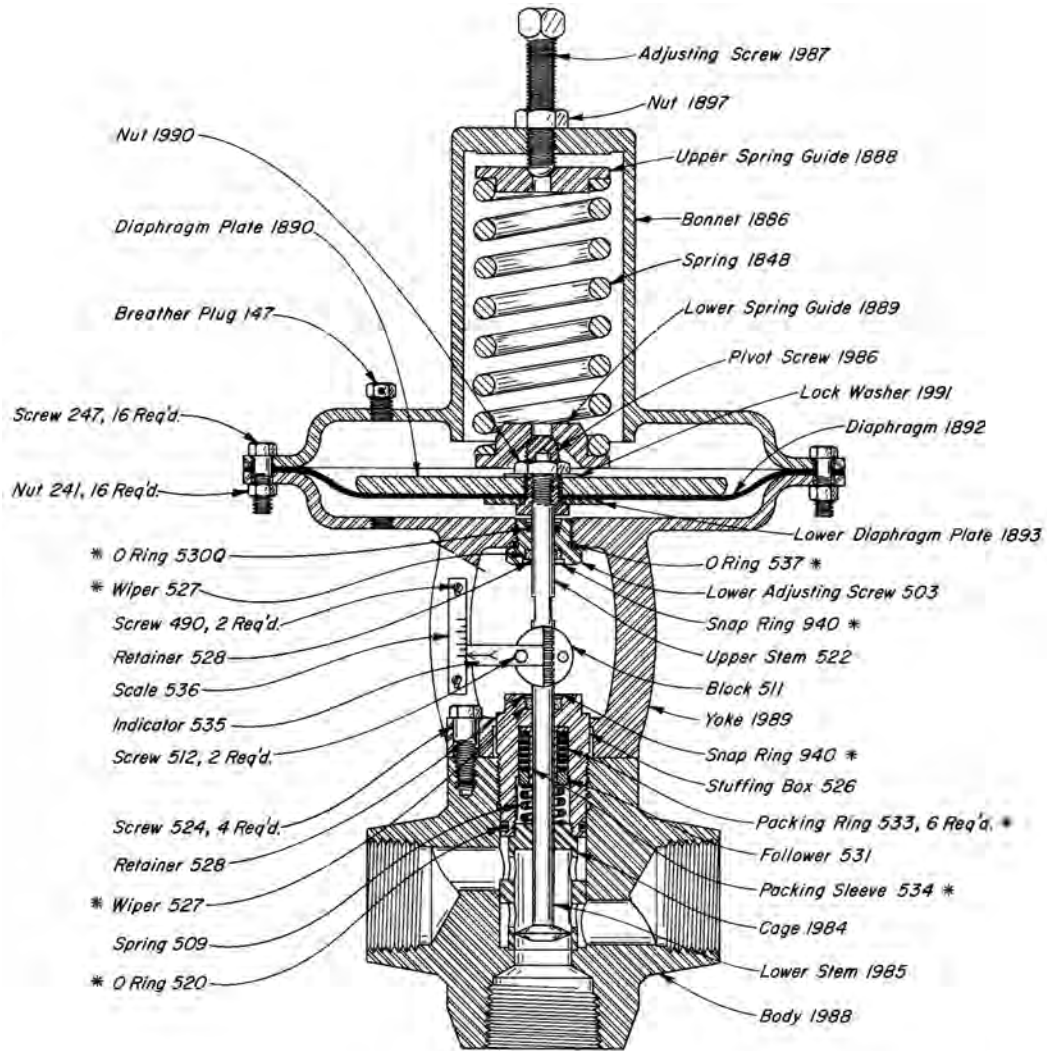
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**NOTES:**



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#### VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ESC	2" SCR.D.	2300 SDV-S	3000	3000	RFG

Flange Body available. Specify Flange Type when ordering.

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

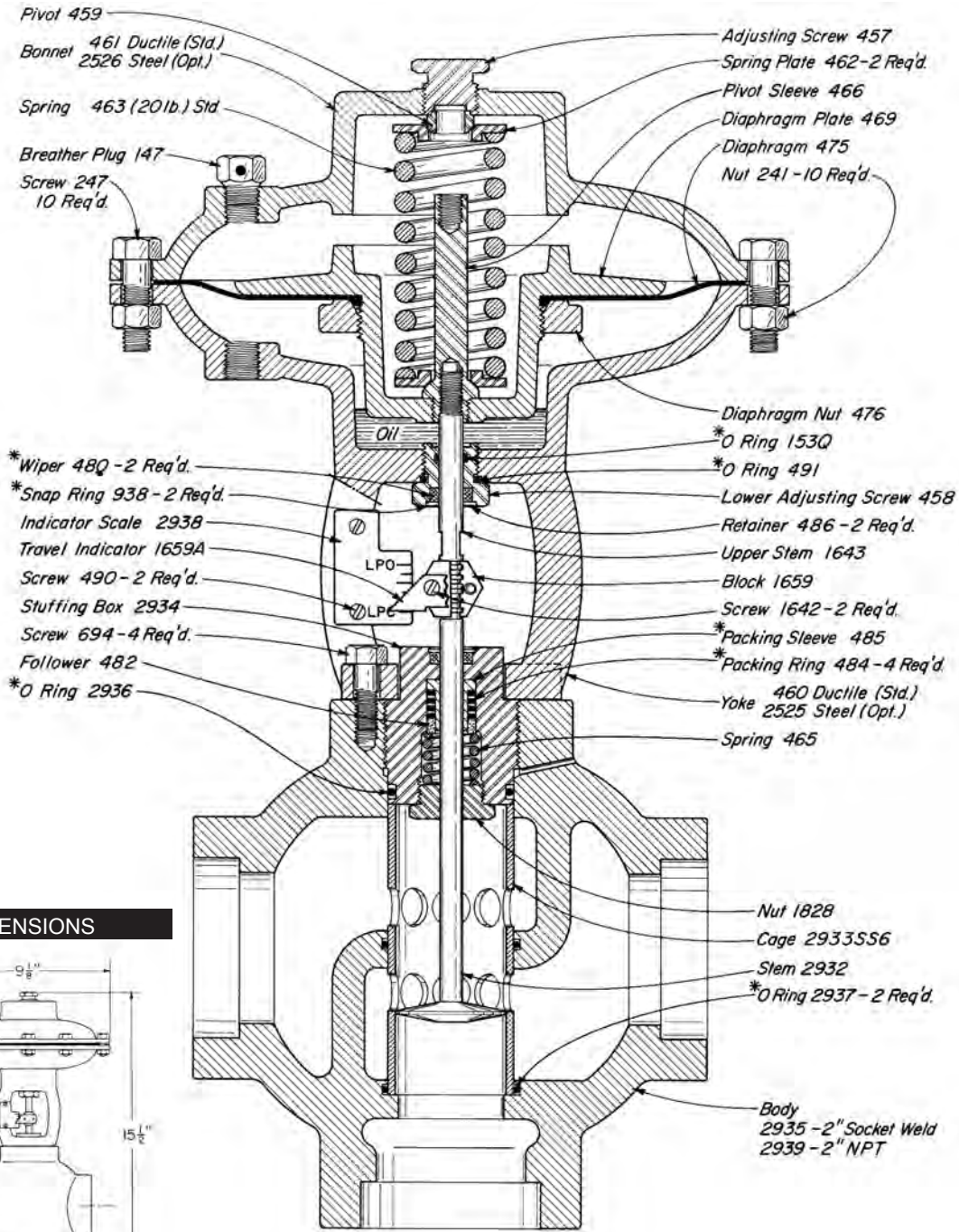
#### DIMENSIONS

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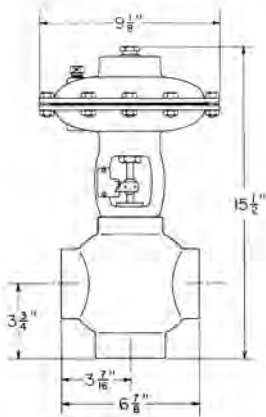
# 3 WAY MOTOR VALVES



2" HIGH PRESSURE  
STEEL



### DIMENSIONS



### VALVES AVAILABLE:

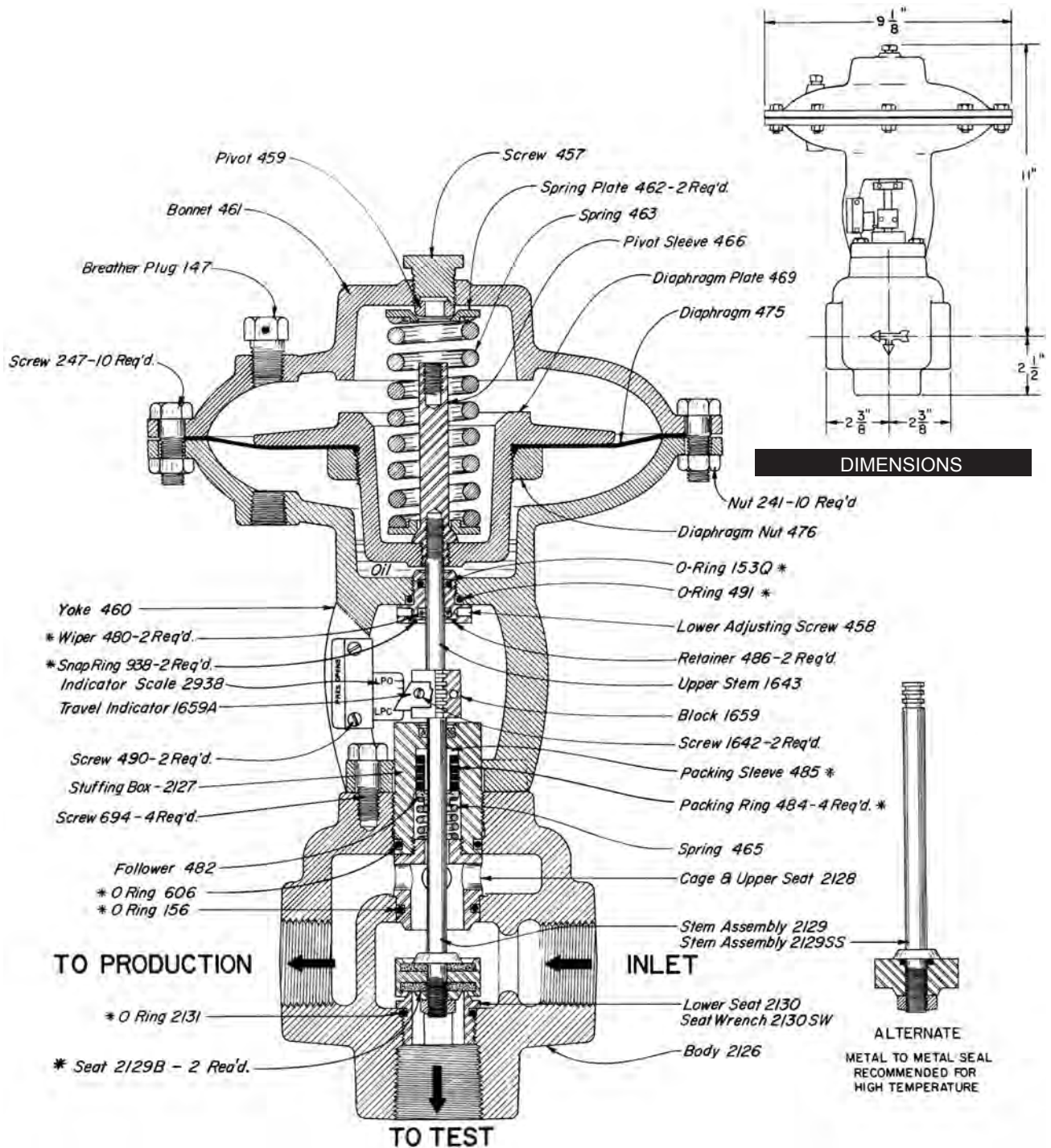
CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ESH	2" WELD.	2300 WD3W	3000	3000	RRG
ESI	2" SCR.D.	2300 SD3W	3000	3000	RRG

### NOTES:

Ductile topworks standard. All steel topworks available on request.

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

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**VALVES AVAILABLE:**

CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ESD	1" SCR.D.	1300 S3W-S-LPC	3000	3000	RFC
ESE	1" SCR.D.	1300 S3W-S-LPO	3000	3000	RFC

**NOTES:**

(For LPO conversion refer to Section E1, Conversion Instruction 1" Motor Valve)

Ductile topworks standard. All steel topworks available on request.

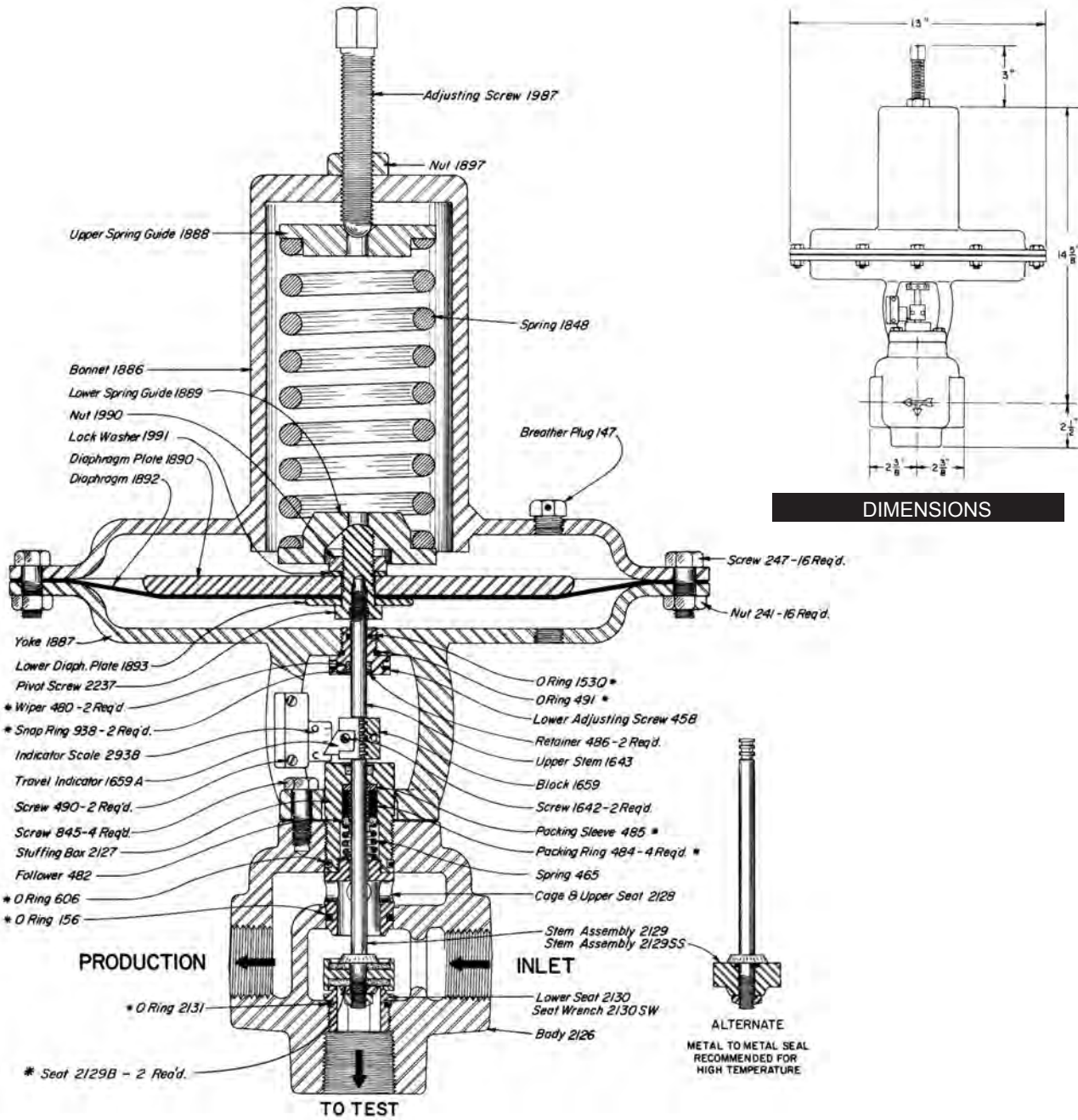
\*These are recommended spare parts and are stocked as repair kits.

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# 3 WAY MOTOR VALVES



1" HIGH PRESSURE (LOWER PORT CLOSED ONLY)  
STEEL



## VALVES AVAILABLE:

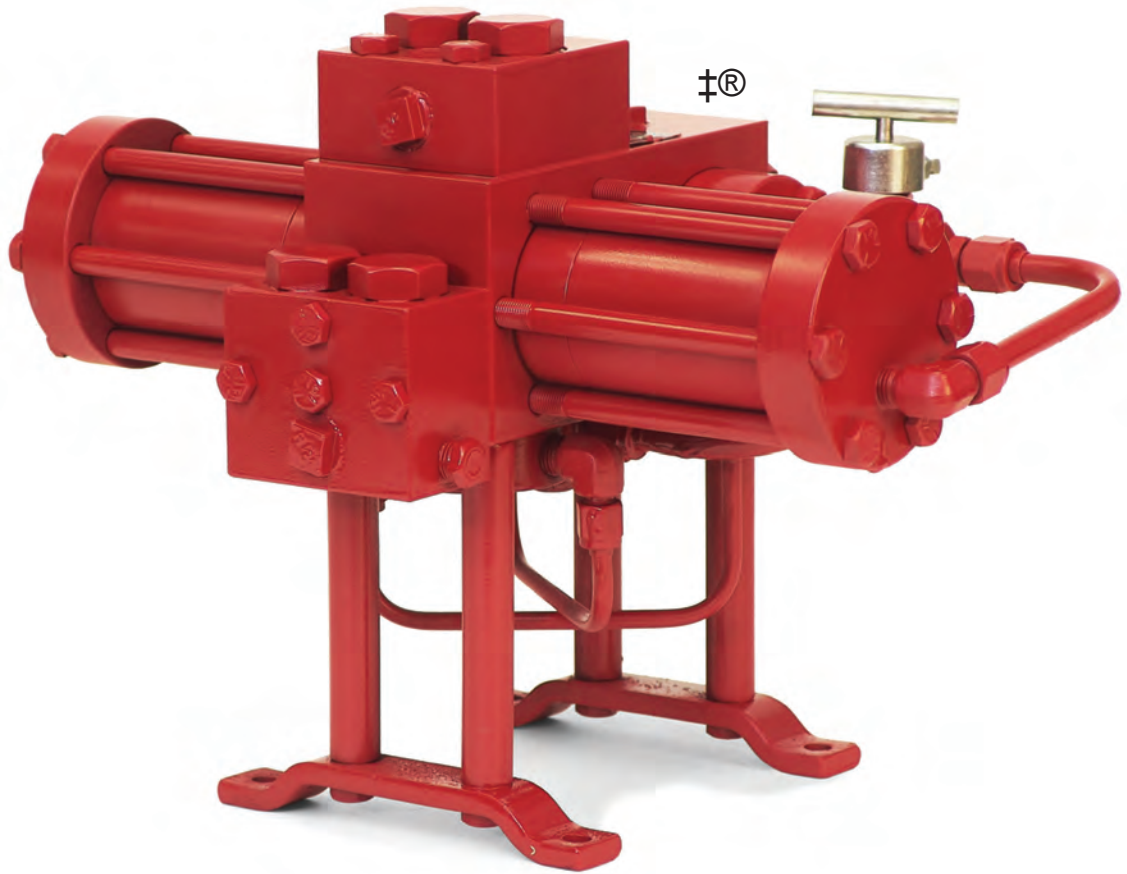
CAT. NO.	SIZE TYPE	MOTOR VALVES	OPER. PRES.	MAX W.P.	KIT
ESF	1" SCR.D.	1300-65-S3W-S-LPC	3000	3000	RFC

## NOTES:

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

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# GLYCOL PUMPS



**SECTION G**

# KIMRAY INC.®

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.  
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#### PRESSURE VOLUME "PV" PUMP

##### APPLICATION:

Circulating pump for gas glycol dehydrators  
 Circulating pump for gas amine desulphurizers  
 Operating pressure of 300 - 2000 psig.

Type	Max. Gallons Per Hour	Operating Pressure	Description of Operation	Parts List
1720PV	40	2000 psig Max.	Pg. 10.2	Pg. 10.17
4020PV	40	2000 psig Max.	Pg. 10.2	Pg. 10.17
9020PV	90	2000 psig Max.	Pg. 10.2	Pg. 10.19
21020PV	210	2000 psig Max.	Pg. 10.2	Pg. 10.21
45020PV	450	2000 psig Max.	Pg. 10.2	Pg. 10.23

#### SMALL CYLINDER "SC" PUMP

##### APPLICATION:

Circulating pump for gas glycol dehydrators  
 Circulating pump for gas amine desulphurizers  
 Operating pressure of 100 - 500 psig.

Type	Max. Gallons Per Hour	Operating Pressure	Description of Operation	Parts List
2020SC	20	500 psig Max.	Pg. 10.2	Pg. 10.18
5020SC	50	500 psig Max.	Pg. 10.2	Pg. 10.20
10020SC	100	500 psig Max.	Pg. 10.2	Pg. 10.22
20020SC	200	500 psig Max.	Pg. 10.2	Pg. 10.24

#### "PV" TO "SC" CONVERSION

ALL PUMPS Pg. 10.9

#### INSTALLATION, DIMENSIONS & CHARTS

Type	Installation	Circulation Rate	Dimensions	System Oper Parameters
1720PV	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.11
4020PV	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.12
9020PV	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.12
21020PV	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.13
45020PV	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.13
2020SC	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.14
5020SC	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.14
10020SC	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.15
20020SC	Pg. 10.7	Pg. 10.8	Pg. 10.8	Pg. 10.15

#### NEEDLE VALVES

Material	Parts List
Steel	Pg. 10.25

#### CHECK VALVE BLOCKS

##### APPLICATION:

Available with Check valve blocks for single or split discharge.

Material	Description of Operation	Parts List
Steel	Pg. 10.29	Pg. 10.30

#### GLYCOL FILTER CANISTER

##### APPLICATION:

For use with Kimray Glycol Pump to help prevent particle caused system wear

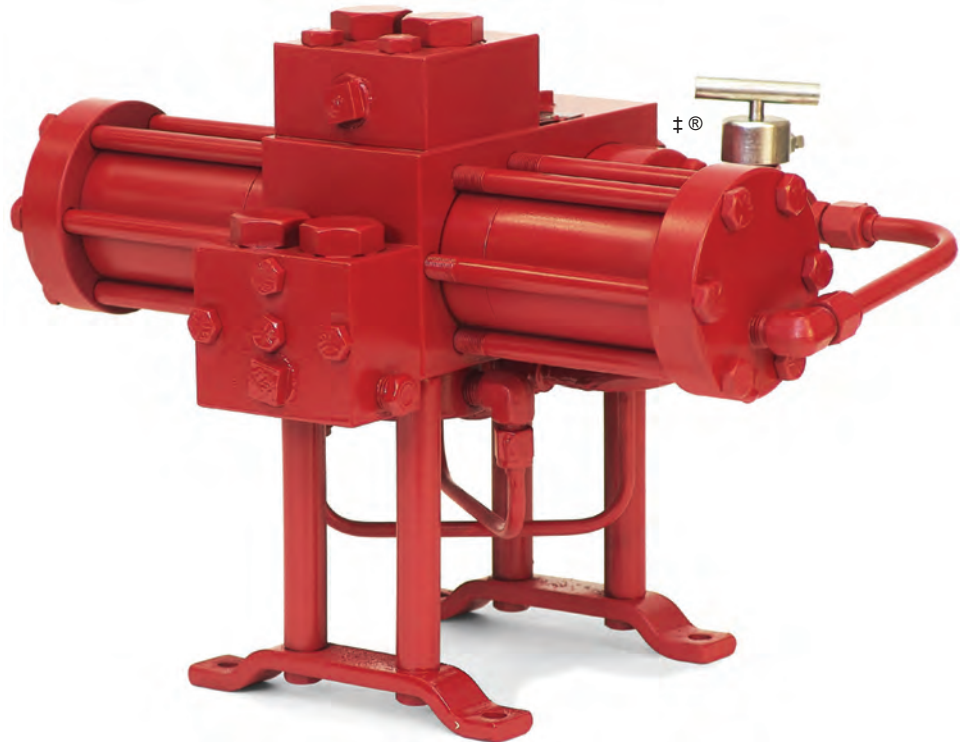
Material	Operating Pressure	Parts List	Installation & Dimensions
Steel	1500 psig Max.	Pg. 10.31	Pg. 10.32

**NOTES:**



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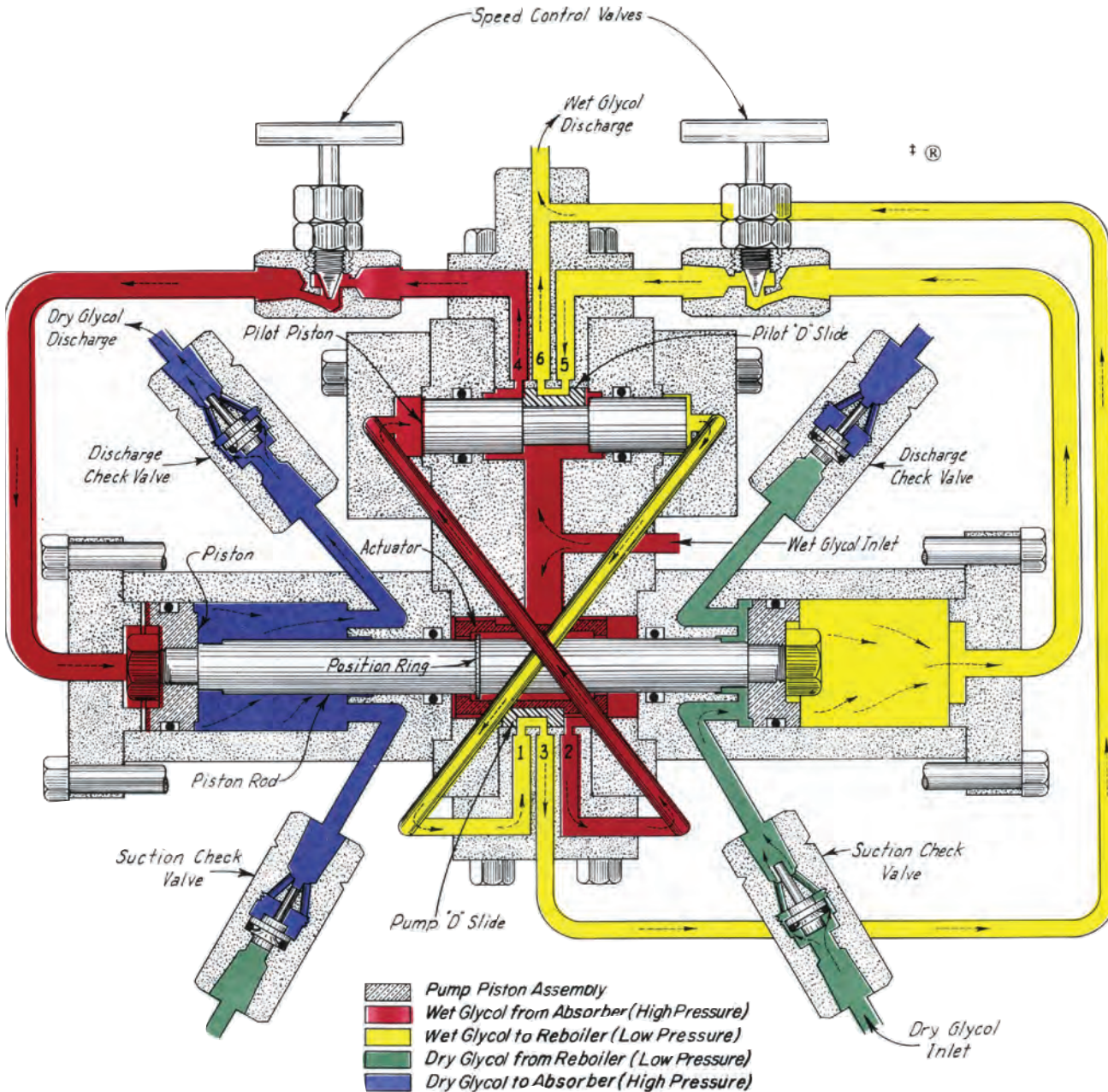
#### INTRODUCTION:

The Glycol Energy Exchange Pump, "Pressure Volume" or "PV-Series" Pump was developed in 1957. The initial consideration was a pump that would utilize the energy of the wet glycol at absorber pressure as a source of power. Within the confines of a system, energy can neither be created nor destroyed. Energy can, however, be stored, transferred, or changed from one form to another. The PV Series Pump transfers the energy available from the wet glycol, at absorber pressure, to an "equivalent" volume of dry glycol at reboiler pressure. In order to circulate the glycol, additional energy is needed to overcome friction losses within the pump and connecting piping.

This additional energy is supplied by gas at absorber pressure.

The pump was designed as double acting with a maximum working pressure of 2000 psig with a factor of safety of ten. Corrosion and wear dictated use of the best materials available. These materials include stainless steel, hard chrome plating, nylon, Teflon, stellite, and "O"-rings specially compounded for glycol service. The pump contains two basic moving parts, a Piston-Rod Assembly, and a Pilot Piston. Each actuates a three-way D-slide.

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**OPERATION:**

The Kimray glycol pump is double acting, powered by Wet Glycol and a small quantity of gas at absorber pressure (Red). (Yellow) denotes Wet Glycol and gas at atmosphere or low pressure. Dry Glycol (Blue) is being pumped to the absorber. (Green) is Dry Glycol suction from the reboiler.

Wet Glycol (Red) from the absorber flows through port #4 and is throttled through the SPEED CONTROL VALVE to the left end of the Pump Piston Assembly, moving this assembly from left to right. Dry Glycol (Blue) is being pumped from the left cylinder to the absorber while the right cylinder is being filled with Dry Glycol (Green) from the reboiler. At the same time Wet Glycol (Yellow) is discharging from the right end of the Pump Piston Assembly to a atmosphere or low pressure system.

As the Pump Piston Assembly nears the end of its stroke, the POSITION RING on the PISTON ROD contacts the right end of the ACTUATOR. Further movement

to the right moves the ACTUATOR and PUMP "D" SLIDE to uncover port #1 and communicate ports #2 and #3. This exhausts Wet Glycol (Red) to the right end of the PILOT PISTON and PILOT "D" SLIDE to be driven from right to left.

In its new position the PILOT "D" SLIDE uncovers port #5 and communicates ports #4 and #6. This exhausts Wet Glycol (Red) from the left end of the Pump Piston Assembly through ports #4 and #6 to the low pressure Wet Glycol (Yellow) system. Port #5 (which was communicated with port #6) now admits Wet Glycol (Red) through the right hand SPEED CONTROL VALVE to the right end of the Pump Piston Assembly.

The Pump Piston Assembly now starts the stroke from right to left. Follow above procedure reversing directions of flow..

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#### PRINCIPLE OF OPERATION:

Actions of each of the two basic parts of the pump are completely dependent upon the other. The pilot D-slide actuated by the Pilot Piston alternately feeds and exhausts absorber pressure to the power cylinders at opposite ends of the Piston-Rod Assembly. Likewise, the Pump D-slide actuated by the Piston-Rod Assembly alternately feeds and exhausts absorber pressure to opposite ends of the Pilot Piston.

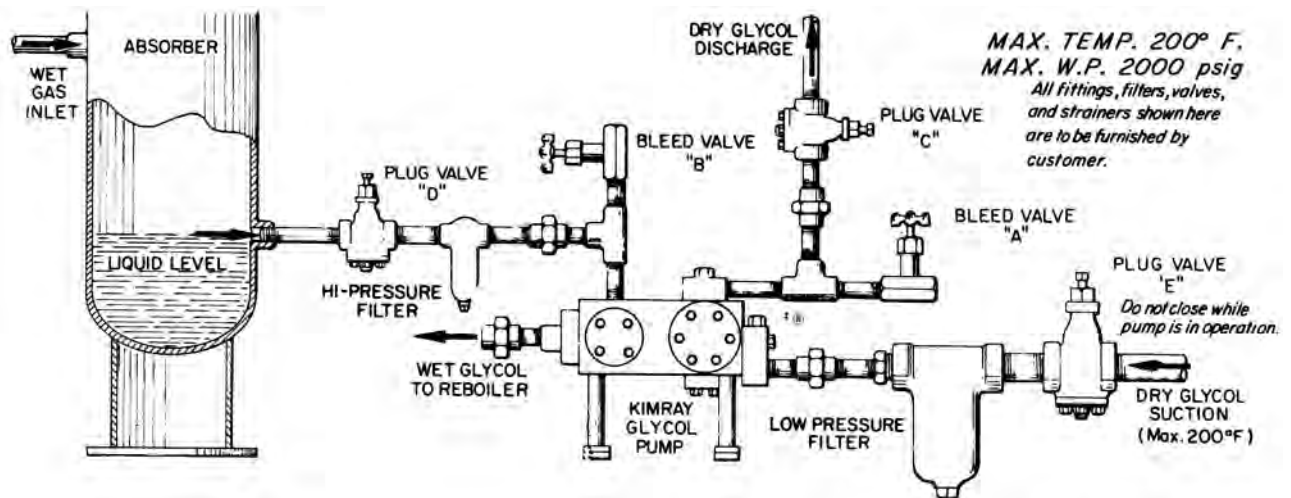
The force to circulate glycol within the dehydration system is supplied by absorber pressure acting on the area of the Piston Rod at its O-ring seals. The area of the Piston Rod is approximately 20 percent of that of the Piston. Neglecting pump friction and line losses, the resultant force is sufficient to produce a theoretical discharge pressure 25 percent greater than absorber pressure. The theoretical discharge pressure, for example, at 1500 psig absorber pressure would be 1875 psig. This theoretical "over-pressure" would develop against a blocked discharge line but is not sufficient to cause damage or create a hazard.

Approximately 25 to 30 psig pressure is required to overcome pump friction leaving the additional "over pressure" for line losses and circulation. It is recommended that these losses be held to approximately 10 percent of the absorber pressure or as noted in catalog.

Two Speed Control Valves are provided to regulate the flow of wet glycol and gas to and from the power cylinders. Reversing the direction of flow through the Speed Control Valves provides a flushing action which cleans the valve orifices.

If the wet glycol, returning to the pump from the absorber were to be completely fill the cylinder, no additional gas would be needed. However, the wet glycol will only occupy approximately 65 percent of the total volume of the cylinder and connecting tubing leaving 35 percent to be filled by gas from the absorber. This gas volume amounts to 1.7S.C.F. per gallon of dry glycol at 300 psig absorber pressure and 8.3S.C.F. at 1500 psig and may be considered as continuing power cost for pump operation. This gas can be utilized in the regeneration process of the dehydrator for "rolling" and or "stripping" purposes. It may also be recovered in a low pressure glycol gas separator and used to fire the reboiler pressure glycol gas separator and used to fire the reboiler.

By supplying some absorber gas to the cylinders, the wet glycol level is maintained at the wet glycol outlet connection on the absorber and eliminates the need of a liquid level controller and its attendant problems. Excess liquids such as hydrocarbons are removed from the absorber at approximately 55 percent of the pump rate, reducing the hazard of dumping a large volume of hydrocarbons into the reboiler as would be the case with a liquid level controller.



#### INSTALLATION:

A number of considerations should be made with regard to pump installation since it is the "heart" of a dehydration system. It is a moving mechanical device subject to wear and will ultimately need repair. Location of the pump is very important. Easy access to the pump for repair or exchange can save time and trouble.

Test connections (1/4" NPT with valve) located on the piping to and from the pump permit a fast means of trouble shooting pipe restrictions or blockage.

Filters, which are discussed later, should always be installed in the wet glycol piping between the absorber and pump and in the suction line to the pump, with provisions made for maintenance of the filters.

Suction piping should preferably be large enough to permit a positive feed to the pump. Feed pressure must be more than 4 or 5 inches of Hg vacuum to prevent pump cavitation.

Where two or more pumps are manifolded together, the total capacity must be considered in the piping design. Also, a manifold should be designed to provide each pump with its "Fairshare" of the wet glycol from the absorber. It is not necessary that the proportion be exact.

Pumps with lower "pumping ratios" are available to provide additional energy for pressures below 300 psig; but it is better not to use these pumps at pressures above 400 or 500 psig because of excess gas consumption. Conversion kits are available to change standard pumps to "SC" pumps with declining field pressures.

**HEAT EXCHANGERS:**

Sufficient heat exchange is necessary to reduce dry glycol suction temperature to at least 200°F, preferably to 150°F.

**SPLIT DISCHARGE CHECK VALVE BLOCK:**

Kimray Glycol Pumps are available with check valve blocks for split discharge to serve two absorbers on a dehydration unit. See page 10.29 for a description.

**VITON "O" RINGS:**

Viton "O" rings for all moving seals in the Kimray Glycol Pumps are available. Viton repair kits can be ordered for pumps already in operation or new pumps can be ordered with viton "O" rings at additional cost.

Viton "O" rings are recommended for use when liquid hydrocarbons are found in the gas, for CO<sub>2</sub> service or for elevated operating temperatures. Under normal conditions (without the above problems) viton "O" rings will not give as long of a service life in the pump as standard Buna-N "O" rings.

**SYSTEM PRESSURE DROPS:**

The Kimray Glycol Pumps are designed to operate by using the energy from the wet glycol and some additional energy in the form of gas at absorber pressure. Excessive pressure drops in the lines connecting the pump to the system can cause the pump to run erratically or stall. The following conditions should be designed into the system to assure proper pump performance:

**DRY GLYCOL SUCTION LINE:** Size the suction line, low pressure filter and heat exchanger such that the pump will have a positive pressure at the suction inlet when running at the maximum rated speed. This line may need to be larger than the pipe fitting on the suction check valve block. (See pipe connection sizes on page 10.28.)

**WET GLYCOL POWER LINE:** Recommended line size is the same as the size of the pipe connection for the given pump. (Page 10.28) The pressure drop across the high pressure filter is a factor in considering the total system pressure drop.

**DRY GLYCOL DISCHARGE LINE:** Recommended line size is the same as the size of the pipe connection for the given pump and the absorber should be full opening to the recommended line size.

**WET GLYCOL DISCHARGE LINE:** Recommended line size is the same as the size of the pipe connection for the given pump. (Page 10.28.) If a glycol gas separator is used, the pressure maintained on the separator must be considered in the total system pressure drop. Also, heat exchanger coils in accumulator tanks also add to this pressure drop.

**ISOLATING VALVES:** All plug, gate, or blocking valves should be full opening to the recommended line size of the given pump.

If a positive feed is supplied to the pump at the dry suction inlet, the total system pressure drop will be the sum of the following pressure drops:

1. The pressure drop between the absorber and the pump in the wet glycol line.

2. The pressure drop between the pump and the absorber in the dry glycol discharge line including any pressure required to open and establish full flow in any check valves.

3. The pressure drop between the pump and the reboiler (at atmospheric pressure) in the wet glycol discharge line. This includes the liquid head to the reboiler, heat exchanger coil, and/or the pressure maintained on a glycol separator.

The sum of these pressure drops gives the total "system pressure drop". The graphs on pages 10.11-10.15 give the maximum total system pressures and their effect on pump output. Exceeding the total allowable system pressure drop will cause the pump to run erratically or to stall.

To determine if a problem exists in an operating dehydration system, slowly open the speed control valves on the pump until it runs at the maximum recommended pump speed. (See graph page 10.8.) If the Pump cavitates before reaching the maximum pump speed, the suction line is restricted. If the pump will not run at the maximum rated speed, then there are probably restrictions in one or more of the other three connecting lines.

**FILTERS:**

Filters *should* be used on every dehydrator for protection of both the pump and reboiler. Many pumps are severely damaged in the first minutes or days of operation from flow line and vessel debris. Reboilers have been known to be filled with sand which had to first pass through the pump.

Filters should give protection from 25 to 150 micron particle sizes depending on the specific condition. The disc type, micron type, and sock type have all proven very satisfactory if they are properly maintained. Some metal filters are equipped with a cleaning device which should be operated daily or at least every few days as experience may dictate. Sock filters must be replaced at regular intervals. Preventative maintenance on these filters will save many dollars in major pump and reboiler repairs plus the reduction of costly down time.

A spring loaded by-pass on the filter is not recommended. It is better for the pump to stall due to lack of power than be exposed to dirt and grit from an open by-pass. Always install a high pressure filter between the absorber and the pump. A filter on the wet glycol discharge of the pump will protect the reboiler but does nothing for the pump. A low pressure filter on the pump suction protects against metallic particles from a new reboiler and its connecting piping. Filters will also keep the glycol free of heavy tars and residue from evaporated hydrocarbons and resinous compounds caused by polymerization of the glycol. Sock type filters are probably best for this type of filtration but should be changed rather frequently.

In addition to using filters it is often necessary to make a chemical analysis of the glycol, not only for pump protection but for better dehydration. Organic acids in glycol are produced from oxidation, thermal decomposition, and acid gases from the gas stream. These acids cause corrosion in the system, and dissolve the plating on pump parts in a short time. Glycol acidity should be maintained between a pH of 7 to 9. Alkaline amines are usually recommended to control the pH value because they will neutralize any acid gases present and are easily regenerated.

Another glycol contaminate which causes pump problems is salt. Salt water which continues to enter a dehydration system soon produces a super saturated condition in the reboiler. This results in salt deposits in the lines and in the pump as the hot glycol is cooled. A complete cleaning and washing of the entire system is required to remove the salt.

#### OPERATION:

A new pump or new dehydrator should be put into operation by first bringing the glycol circulation and operating temperature to an equilibrium condition by using 300 to 400 psig absorber pressure. This can be done with or without gas flow. If it is easier to start up under a no-flow condition, only enough gas need be supplied the absorber to maintain the pressure. In most instances the pump will pick up its prime without help and should do so in a few strokes. If the pump does not prime immediately, the dry glycol discharge should be opened to atmosphere until glycol discharges from both cylinders. When equilibrium has been established, the pump should be stopped and the absorber pressure increased for operation. Pump speed can then be reestablished to the desired rate.

The maximum operating temperature of the pump is limited by the moving "O"-ring seals and nylon D-slides. A maximum of 200 degrees is recommended. Packing life will be extended considerably at 150 degrees.

#### SYMPTOMS

1. The pump will not operate.
2. The pump will start and run until the glycol returns from the absorber. The pump then stops or slows appreciably and will not run at its rated speed.
3. The pump operates until the system temperature is normal then the pump speeds up and cavities.
4. The pump lopes or pumps on one side only.
5. Pump stops and leaks excessive gas from wet glycol discharge.
6. Erratic pump speed. Pump changes speed every few minutes.
7. Broken Pilot Piston.

Always stop the pump when the pump main gas flow is turned off. A pump which continues to circulate with no gas flow elevates the complete dehydrator temperature, and in time to reboiler temperature.

If a pump has been deactivated for several months, the check valves should be removed and inspected before attempting to operate the pump. The pump startup should be similar to that of a new pump by first bringing the system to equilibrium.

#### TROUBLE SHOOTING:

If a glycol pump has been operating in a clean system it is very likely that no major service will be required for several years. Only a yearly replacement of packing will be required. Normally the pump will not stop pumping unless some internal part has been bent, worn, or broken, or some foreign object has fouled the pump, or the system has lost its glycol.

A pump which has been running without glycol for some time should be checked before returning to normal service. Probably the pump will need at least new "O"-rings. The cylinders and piston rods may also have been scored from the "dry run"

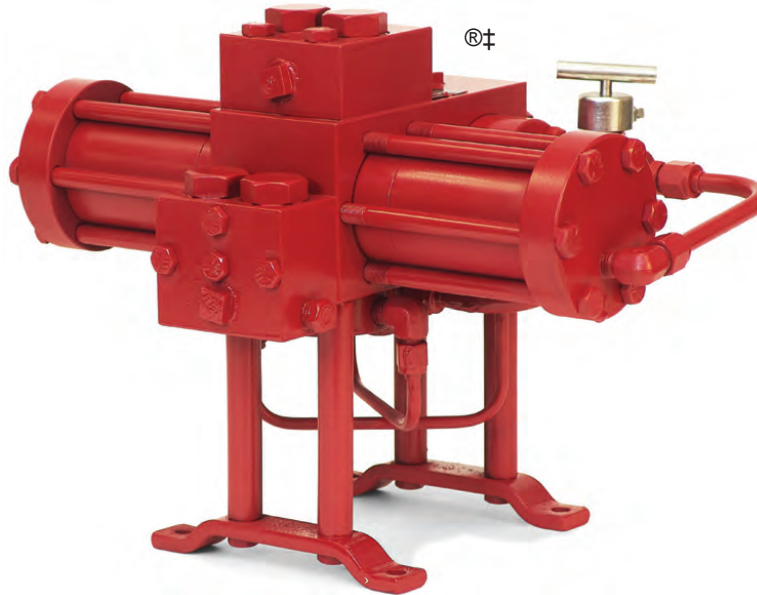
Following are some typical symptoms and causes. These are presented to assist in an accurate diagnosis of trouble.

#### CAUSES

1. One or more of the flow lines to the pump are completely blocked or the system pressure is too low for standard pumps (below 300 psig) use "SC" pumps below 300 psig
2. The wet glycol discharge line to the reboiler is restricted. A pressure gauge installed on the line will show the restriction immediately.
3. The suction line is too small and increase in temperature and pumping rate cavities the pump.
4. A leaky check valve, a foreign object lodged under a check valve or a leaky piston seal.
5. Look for metal chips or shavings under the pump D-slides.
6. Traps in the wet glycol power piping sends alternate slugs of glycol and gas to the pump.
7. Insufficient glycol to the Main Piston D-slide ports. Elevate the control valve end of the pump to correct.

# GLYCOL PUMPS

"PV" & "SC" SERIES



### PUMPS AVAILABLE:

"PV" SERIES GLYCOL PUMPS					
Catalog Number	Model Number	Capacity Gal. / Hr.		Working Pressure	
		Min.	Max.**	Min.	Max.
GAD	1720 PV	8	40	300	2000
GAB	4020 PV	12	40	300	2000
GAF	9020 PV	27	90	300	2000
GAH	21020 PV	66	210	400	2000
GAJ	45020 PV	166	450	400	2000

"SC" SERIES GLYCOL PUMPS					
Catalog Number	Model Number	Capacity Gal. / Hr.		Working Pressure	
		Min.	Max.**	Min.	Max.
GAC	2020 SC*	8	20	100	500
GAG	5020 SC*	12	50	100	500
GAI	10020 SC*	22	100	100	500
GAK	20020 SC*	60	200	100	500

\*\*Maximum output is affected by system pressure drops. See system operation parameter for maximum output curves.

MAXIMUM DESIGN PRESSURE FOR P.V. AND S.C. MODELS IS 2000 psig

### APPLICATIONS:

- Circulating pump for gas glycol dehydrators
- Circulating pump for gas amine desulphurizers

### FEATURES:

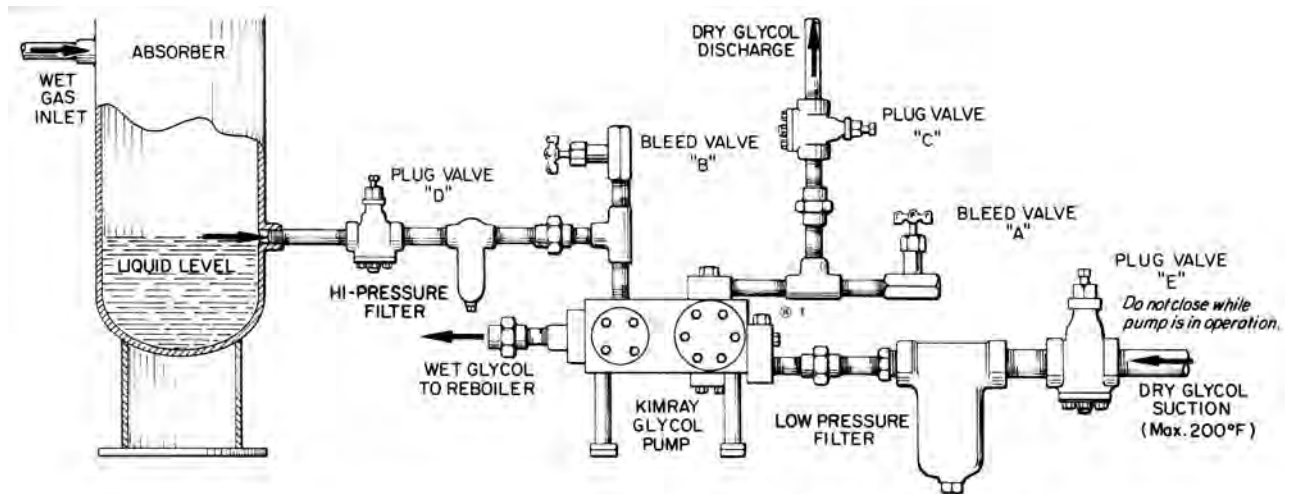
- Eliminates absorber liquid level controls
- No auxiliary power supply required
- Low gas consumption
- Completely sealed system prevents loss glycol
- No springs or toggles, only two moving assemblies
- Hydraulic "cushioned" check valves with removable seats of hardened stainless steel

### OPERATION:

Materials for the vital working parts have been selected for greatest wear resistance. These materials include stainless steel, hard chrome plating, satellite, nylon and teflon. Moving "O" Ring seals are compounded specifically for ethylene glycol service. A complete operational check is given each pump after assembly.

"O" Ring sealed check valve darts are standard in all except the model 315 PV. Teflon sealed darts are available. Capsule type ball checks are available for 1720 PV, 2015 SC and 4020 PV.

\*These pumps are designed for operating pressures between 100 and 500 psig maximum design pressure for all models is 1500 psig.



All fittings, filters, valves and strainers shown here are to be furnished by customer.

#### INSTALLATION:

For maximum pump life a high pressure filter should be installed in the **wet** glycol line between the absorber and pump. Also a low pressure filter or strainer is recommended for the dry glycol suction line between the accumulator and pump.

Adequate heat exchangers must be provided to keep the temperature of fluid flowing through the pump below 200°F.

The following filter and strainer line sizes are recommended minimum:

1720 PV	1/2" NPT
4020 PV & 2020 SC	1/2" NPT
9020 PV & 5020 SC	3/4" NPT
21020 PV & 10020 SC	1" NPT
45020 PV & 20020 SC	1 1/2" NPT

Bleed valves "A" and "B" are required for removing pressure from the pump to allow inspection and repair. Bleed valve "A" is also used for priming as described below. The plug valves and unions permit the pump and filters to be easily isolated or removed for inspection or repair.

Max. Temp. 200°F.  
Max. W.P. 2000 psig

#### OPERATING PROCEDURE:

1. Close both speed control valves, bleed valves "A", "B" and plug valve "C".
2. Open plug valves "D" and "E".
3. Pressure absorber to about 300 psig.
4. With plug valve "C" closed, open bleed valve "A".
5. Slowly open both speed control valves until pump is running about 1/3 rated max. strokes per minute. Count one stroke for each DISCHARGE of PUMP. When dry glycol discharges from valve "A" on each stroke, the pump is primed. Close valve "A" and open valve "C". Readjust speed control valves to 1/3 rated max. strokes per minute and continue operating pump until wet glycol returns from the absorber to the pump. This will be evidenced when the pump tries to meter liquid through the speed control valves instead of gas and causes the pump to slow down. Close both speed control valves.
6. Bring absorber to full operating pressure.
7. Adjust speed control valves for desired rate (see capacity chart).
8. Inspect and clean filters and strainers periodically.
9. For preventive maintenance, "O" Rings should be replaced annually. To check "O" Ring seal, close valve "C". If pump continues to run, seals should be replaced.

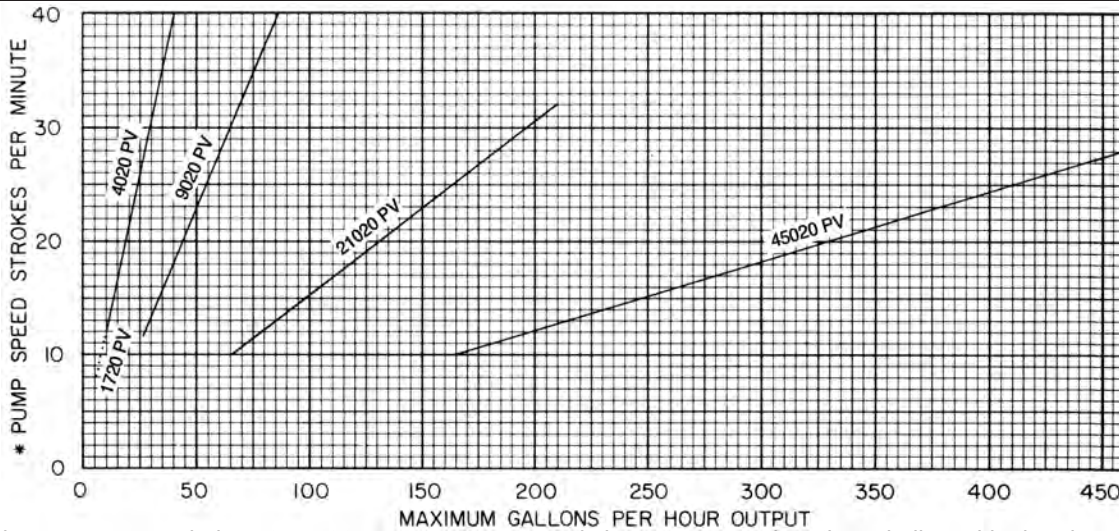
#### SYSTEM SHUTDOWN:

1. Close plug valve "D" Allow pump to stop running
2. Close plug valve "C" and "E"
3. Bleed pressure from bleed valve "A" and "B"

“PV” & “SC” SERIES  
CHARTS & DIMENSIONS

Model Number	Max. Cap		Size of Pipe Connections	Mounting Bolts	Approx. Weight	Max. Strokes Minute	Glycol Output Strokes/Gal.	Glycol Output Gal./Strokes
	G.P.M.	G.P.H.						
1720 PV	.67	40	1/2" N.P.T.	3/8" Dia.	66 Lbs.	40	59	0.017
4020 PV	.67	40	1/2" N.P.T.	3/8" Dia.	66 Lbs.	40	59	0.017
9020 PV	1.5	90	3/4" N.P.T.	1/2" Dia.	119 Lbs.	40	26.3	0.038
21020 PV	3.5	210	1" N.P.T.	1/2" Dia.	215 Lbs.	32	9	0.111
45020 PV	7.5	450	1 1/2" N.P.T.	1/2" Dia.	500 Lbs.	28	3.5	0.283
2020 SC	.33	20	1/2" N.P.T.	3/8" Dia.	66 Lbs.	55	147	0.0068
5020 SC	.83	50	3/4" N.P.T.	1/2" Dia.	119 Lbs.	50	52	0.019
10020 SC	1.67	100	1" N.P.T.	1/2" Dia.	215 Lbs.	48	25	0.040
20020SC	3.33	200	1 1/2" N.P.T.	1/2" Dia.	500 Lbs.	40	8.8	0.114

**CIRCULATION RATE GRAPH**

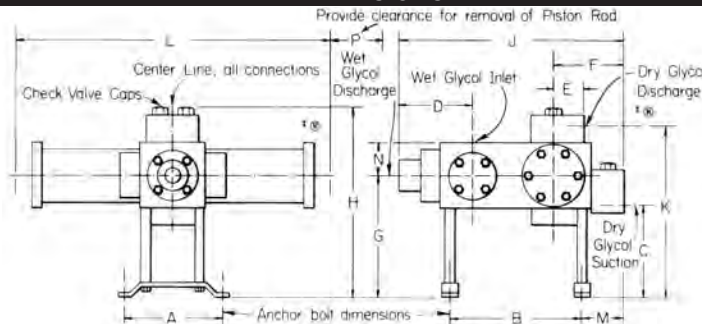


\* It is not recommended to attempt to run pumps at speeds less or greater than those indicated in the above graph.

**GAS CONSUMPTION**

Operating Pressure --p.s.i.g.	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Cut. Ft./Gallon @ 14.4 & 60°F.	1.7	2.3	2.8	3.4	3.9	4.5	5.0	5.6	6.1	6.7	7.2	7.9	8.3

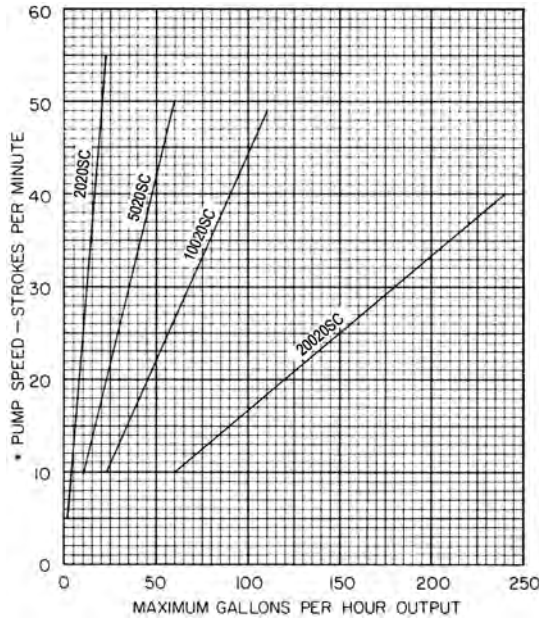
**DIMENSIONS**



Model Number “PV” Series “SC” Series	Dimensions, Inches													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
1720 PV	5 1/4	5 11/16	5 3/4	3 7/16	1 1/2	3 1/2	7 1/4	10 7/8	10 3/16	9 5/8	15	2 1/8	1 3/4	3
4020 PV & 2020 SC	5 1/4	5 11/16	5 3/4	3 7/16	1 1/2	3 1/2	7 1/4	10 7/8	10 3/16	9 5/8	15	2 1/8	1 3/4	3
9020 PV & 5020 SC	6 1/4	8 1/4 ± 1/8	6 3/8	5	1 3/4	4 1/4	8 3/4	13 1/4	13 7/8	11 3/4	20	2 1/2	2	3
21020 PV & 10020 SC	7 5/8	10 1/8 ± 1/8	7	5 3/8	2 1/4	5 3/4	9 1/4	14 3/4	16 5/8	13	24	3 3/16	2 1/2	4
45020 PV & 20020 SC	10 3/4	14 ± 1/8	9	6 5/8	2 5/8	6 1/2	11 3/8	19	21 1/8	16 3/8	34	3 3/4	3 1/2	6



### "PV" & "SC" SERIES SMALL BORE CYLINDERS



\* It is not recommended to attempt to run pumps at speeds less or greater than those indicated in the above graph.

#### GAS CONSUMPTION

Operating Pressure - psig	100	200	300	400
Cu. Ft./Gal. @ 14.4 & 60°F.	1.0	1.9	2.8	3.7

The "SC" (small cylinder) Series glycol pump was designed to extend the lower operating pressure of the "PV" Series pump downward from 300 psig to 100 psig. Due to increased gas consumption it is recommended to use the "PV" Series pumps at pressures greater than 400 psig.

Any Kimray "PV" Series glycol pump can be field converted to a "SC" Series pump of comparable size (see comparative table below). Likewise, "SC" Series pumps can be converted to "PV" Series pumps. The parts required for these conversions are stocked in kit form. To order conversion kits specify; (existing pump model) conversion kit to (converted pump model). Example: "4020 PV Conversion Kit to 2020 SC."

#### COMPARATIVE TABLE

"PV" Series Model No.	"SC" Series Model No.
1720-4020	2020 SC
9020	5020 SC
21020	10020 SC
45020	20020 SC

Physical dimensions of "SC" Series pumps are the same as the comparable "PV" Series pumps. See page 8.

#### PARTS REQUIRED TO CONVERT FROM "PV" TO "SC" SERIES

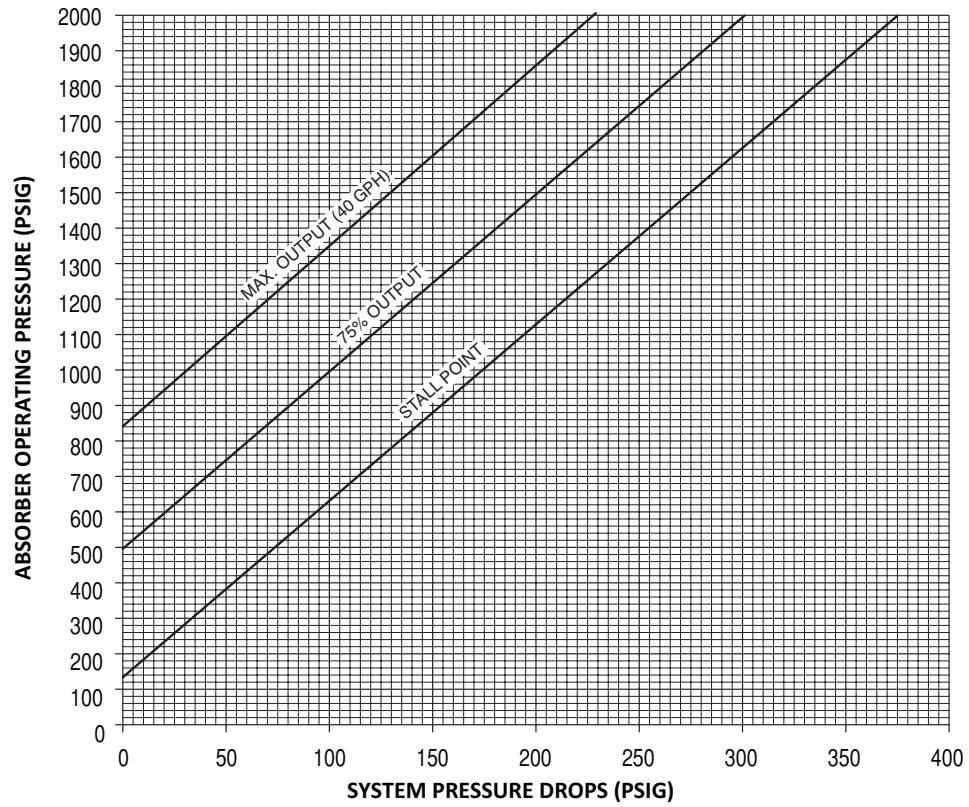
PART NAME	Quantity Required	PART NUMBER			
		4020 PV to 2020 SC	9020 PV to 5020 SC	21020 PV to 10020 SC	45020 PV to 20020 SC
Cylinder Liner	2	2108	2373	2412	‡1505
Piston	2	1506	776	1507	1508
Piston Seal Retainer	2	1509	1510	1511	1512
	2	156	773	774	329
Back-up Ring	4	1513	1457	1458	‡ 772
"O" Ring	2	154	154	155	1107
Lock Nut (Piston)	2	*	906	175	1140
Cylinder "O" Ring	2	773	774	329	

\*The piston is the nut for this model and is furnished with a socket head set screw.  
 ‡Full cylinder only.  
 ‡Model 20020 SC only, requires 8, No. 772 Back-up rings.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

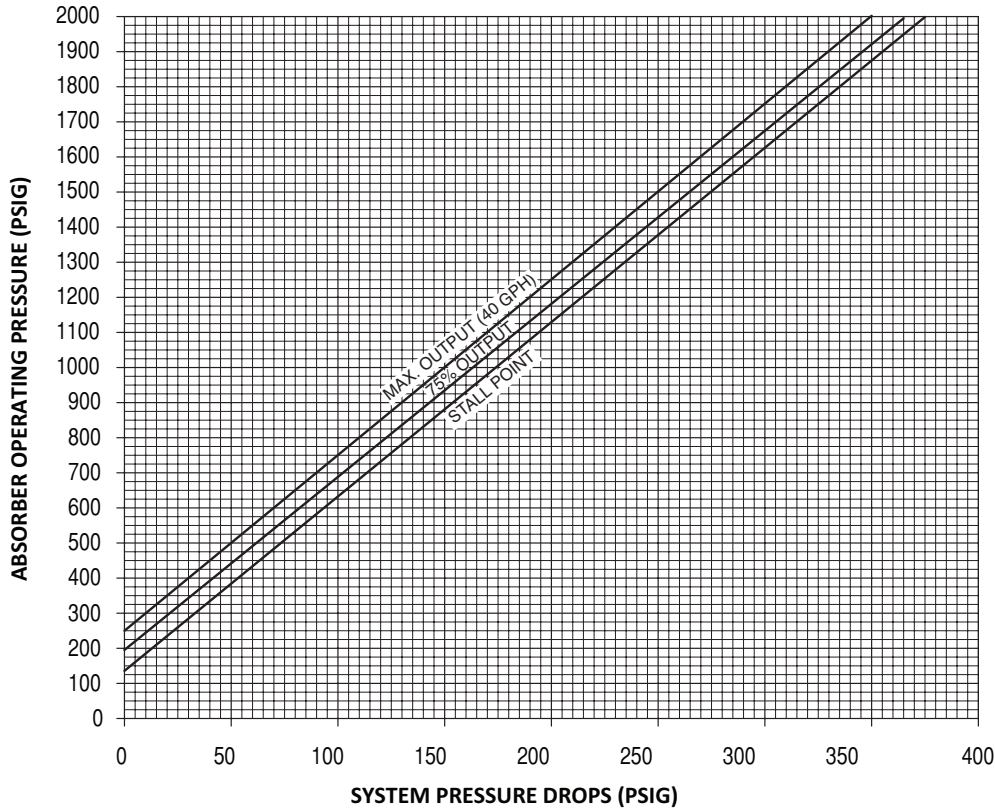


1720 PV Strokes/Minute Range 8-40

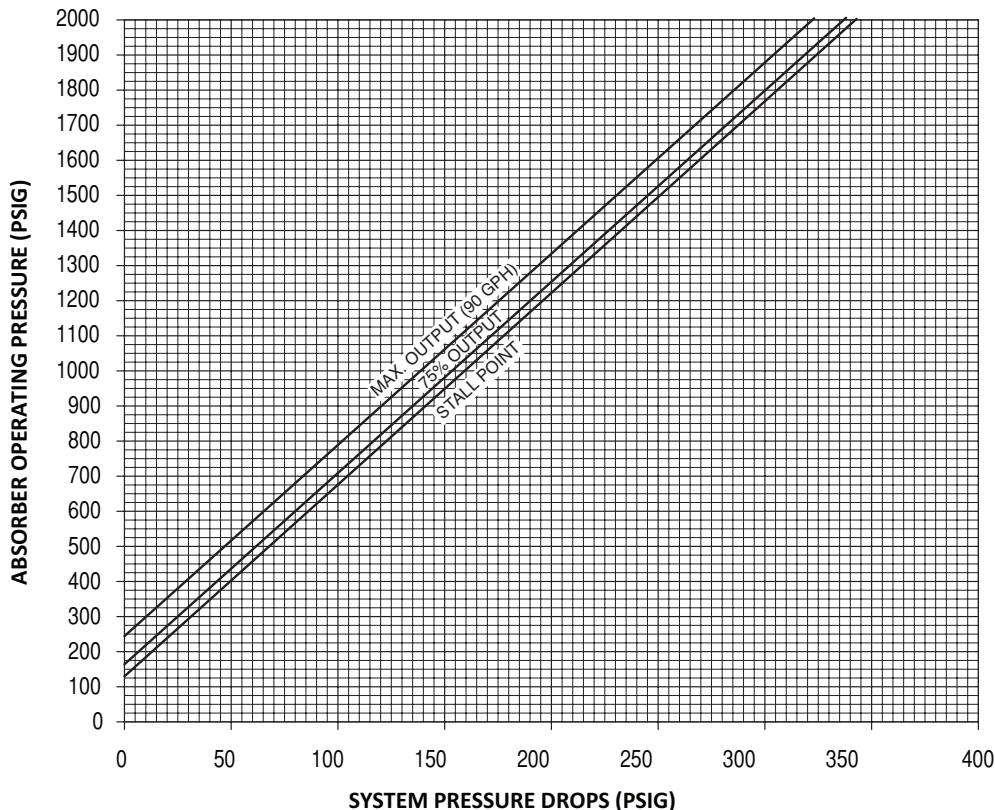
# GLYCOL PUMPS



## MODEL 4020 PV & 9020 PV PUMPS SYSTEM OPERATION PARAMETERS

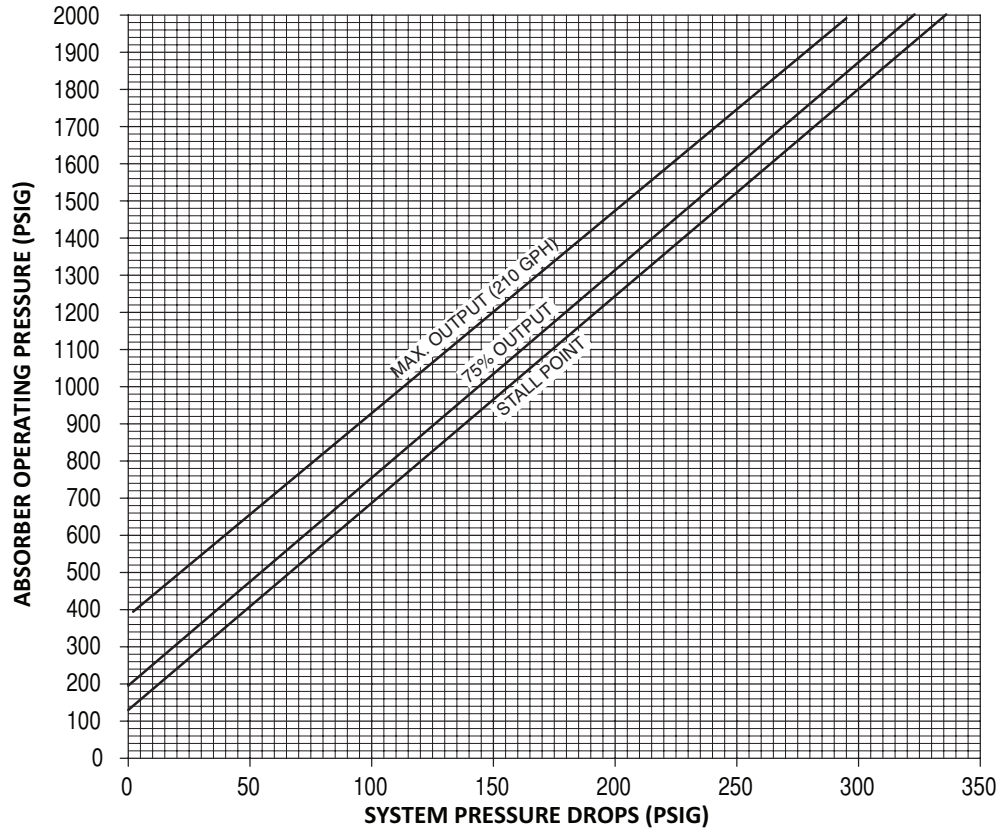


**4020 PV Strokes/Minute Range 12-40**

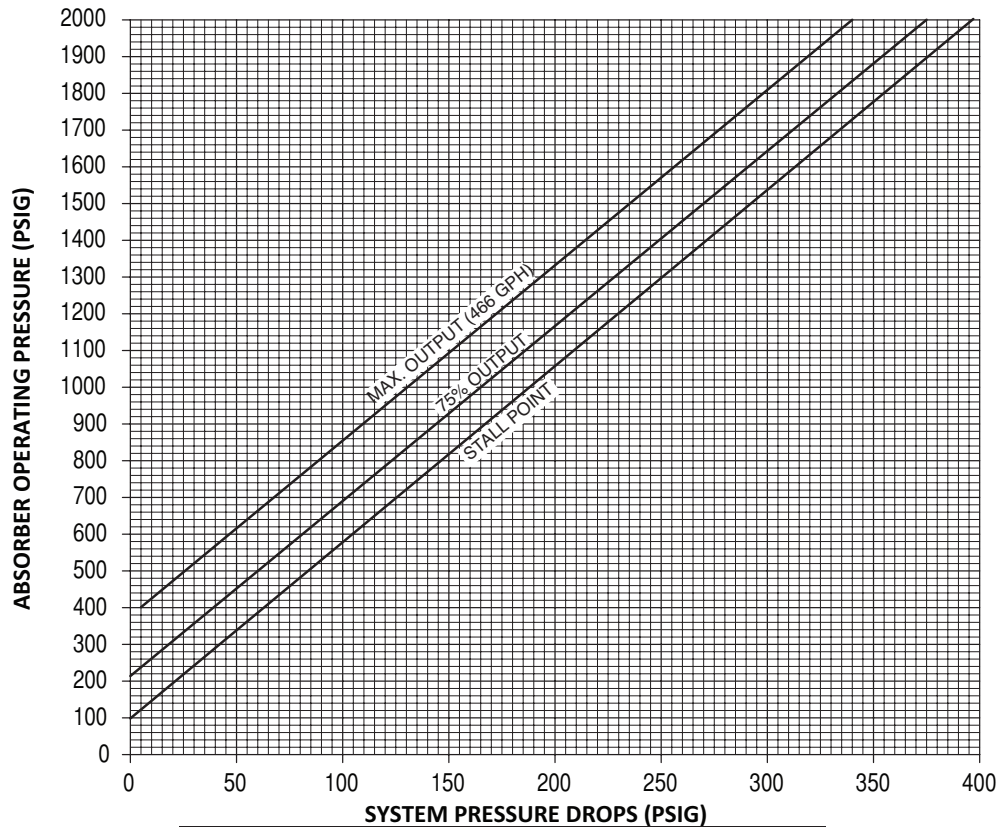


**9020 PV Strokes/Minute Range 12-40**

### MODEL 21020 PV & 45020 PV PUMPS SYSTEM OPERATION PARAMETERS



21020 PV Strokes/Minute Range 10-32

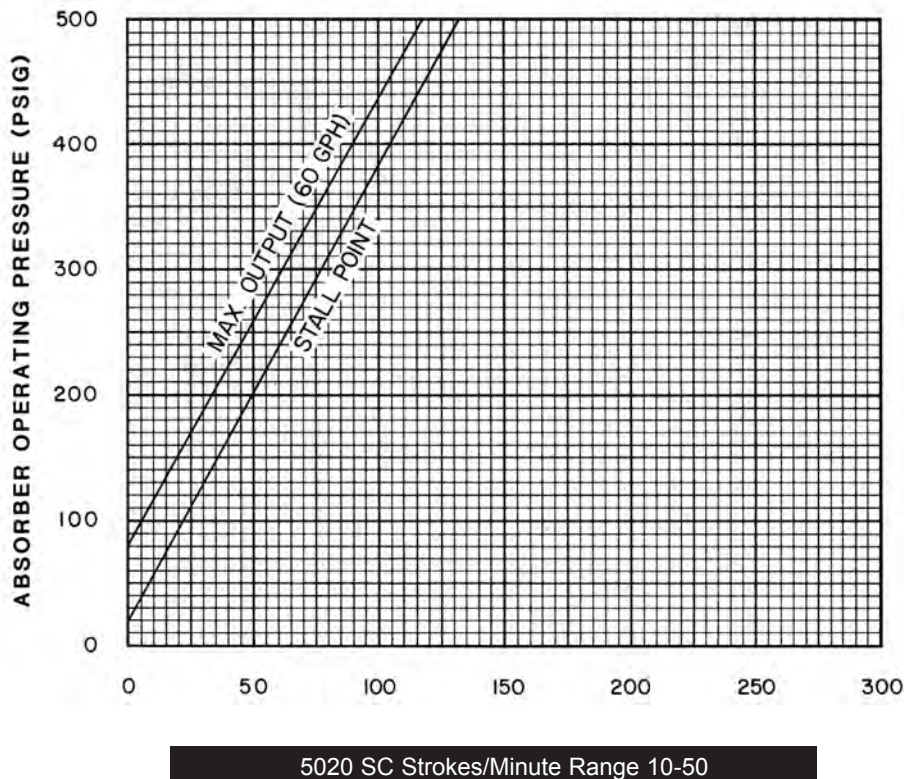
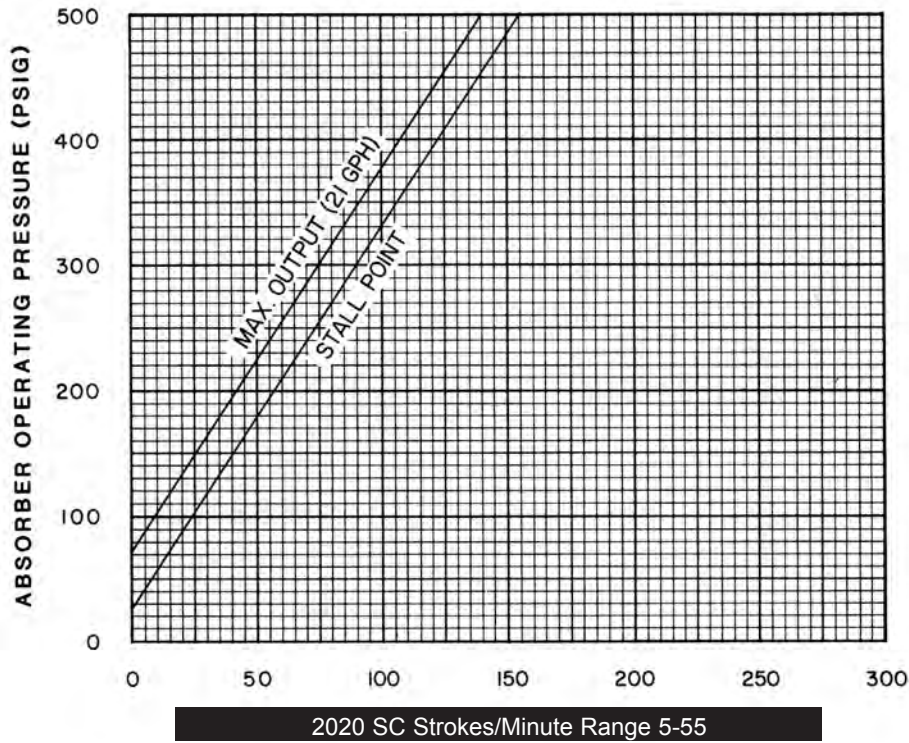


45020 PV Strokes/Minute Range 10-28

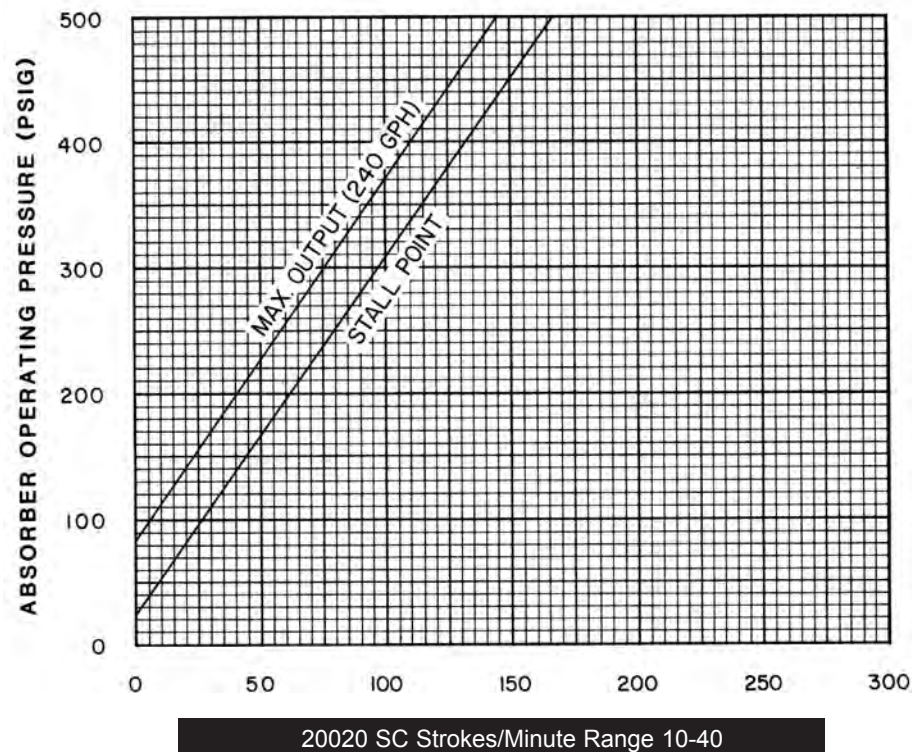
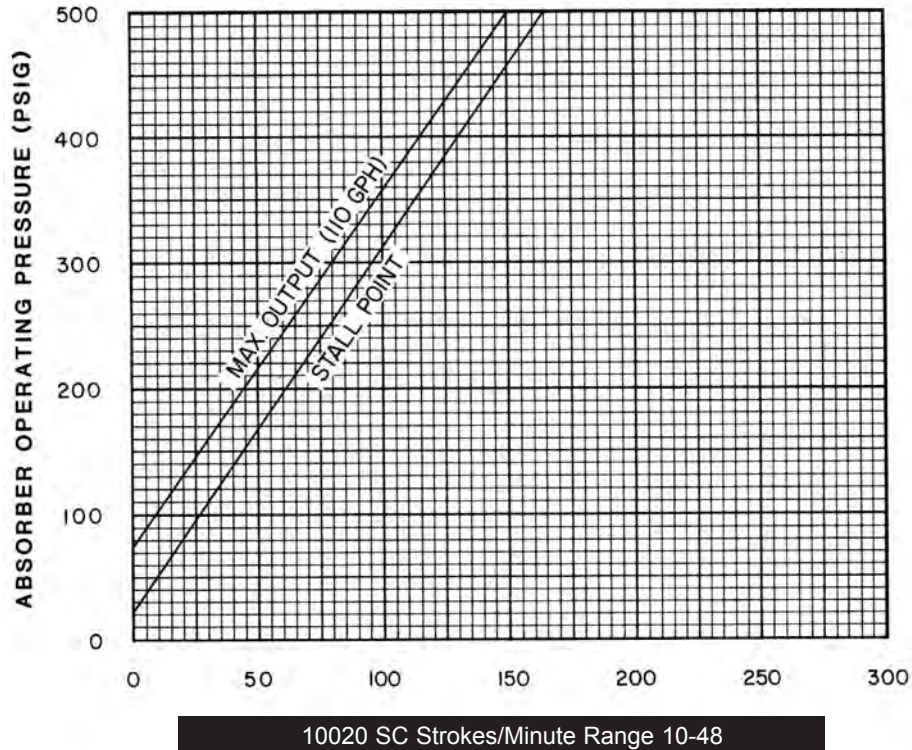
# GLYCOL PUMPS



## MODEL 2020 SC & 5020 SC PUMPS SYSTEM OPERATION PARAMETERS



SYSTEM PRESSURE DROPS (PSIG)



SYSTEM PRESSURE DROPS (PSIG)

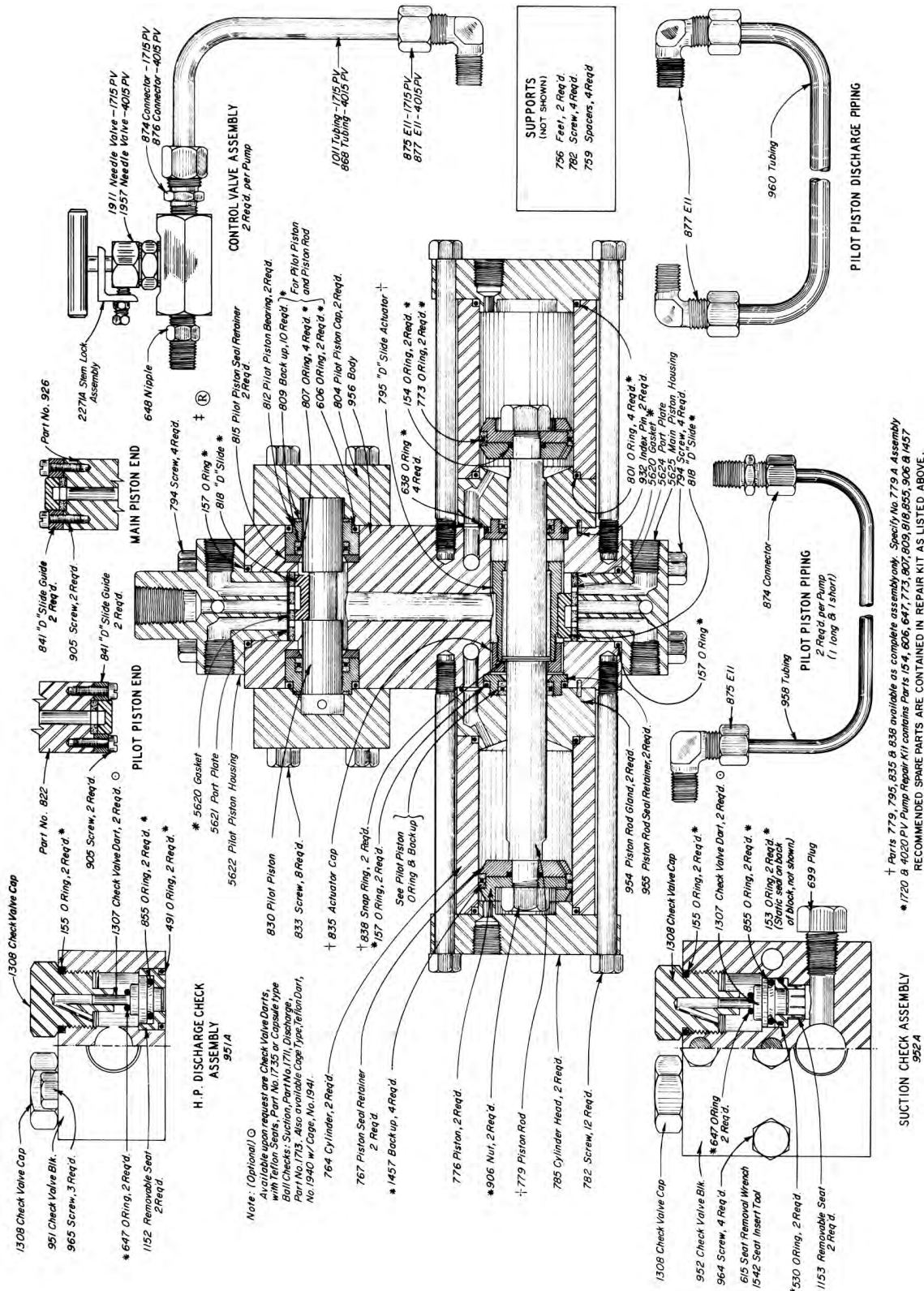
**NOTES:**



Kimray is an ISO 9001- certified manufacturer.



### MODEL 1720 PV & 4020 PV PUMP STEEL



#### PUMPS AVAILABLE:

CAT. NO.	TYPE	OPER. PRESS. MINIMUM	OPER. PRESS. MAXIMUM	REPAIR KIT
GAD	1720 PV	300	2000	RJB1
GAB	4020 PV	300	2000	RJB1

#### NOTES:

Kimray is an ISO 9001- certified manufacturer.

Current Revision:  
Change Logo

† Configuration of Glycol pump is a trademark of Kimray, Inc.  
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G:10.17  
Issued 1/13





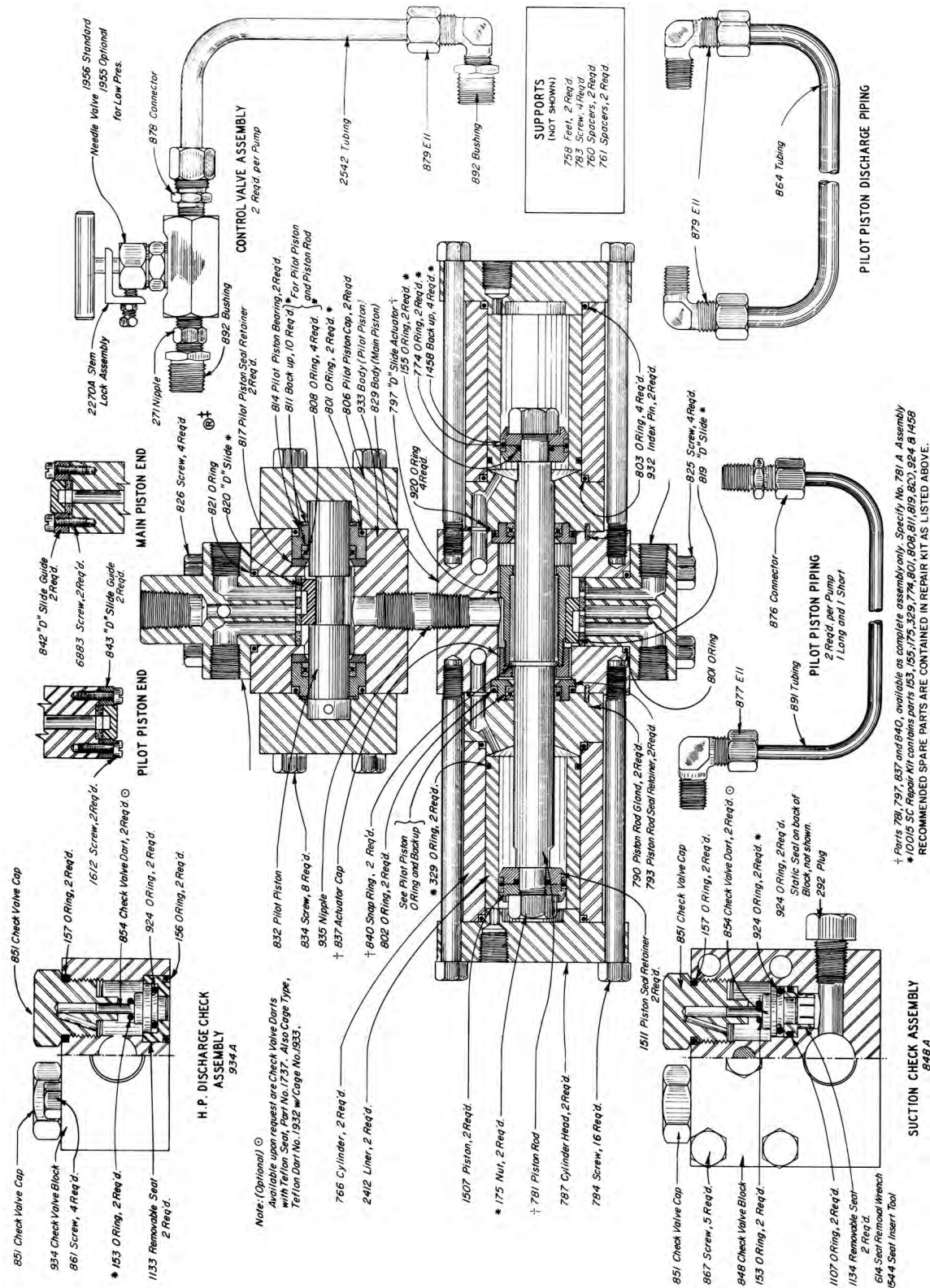




# GLYCOL PUMPS



## MODEL 10020 SC PUMP STEEL

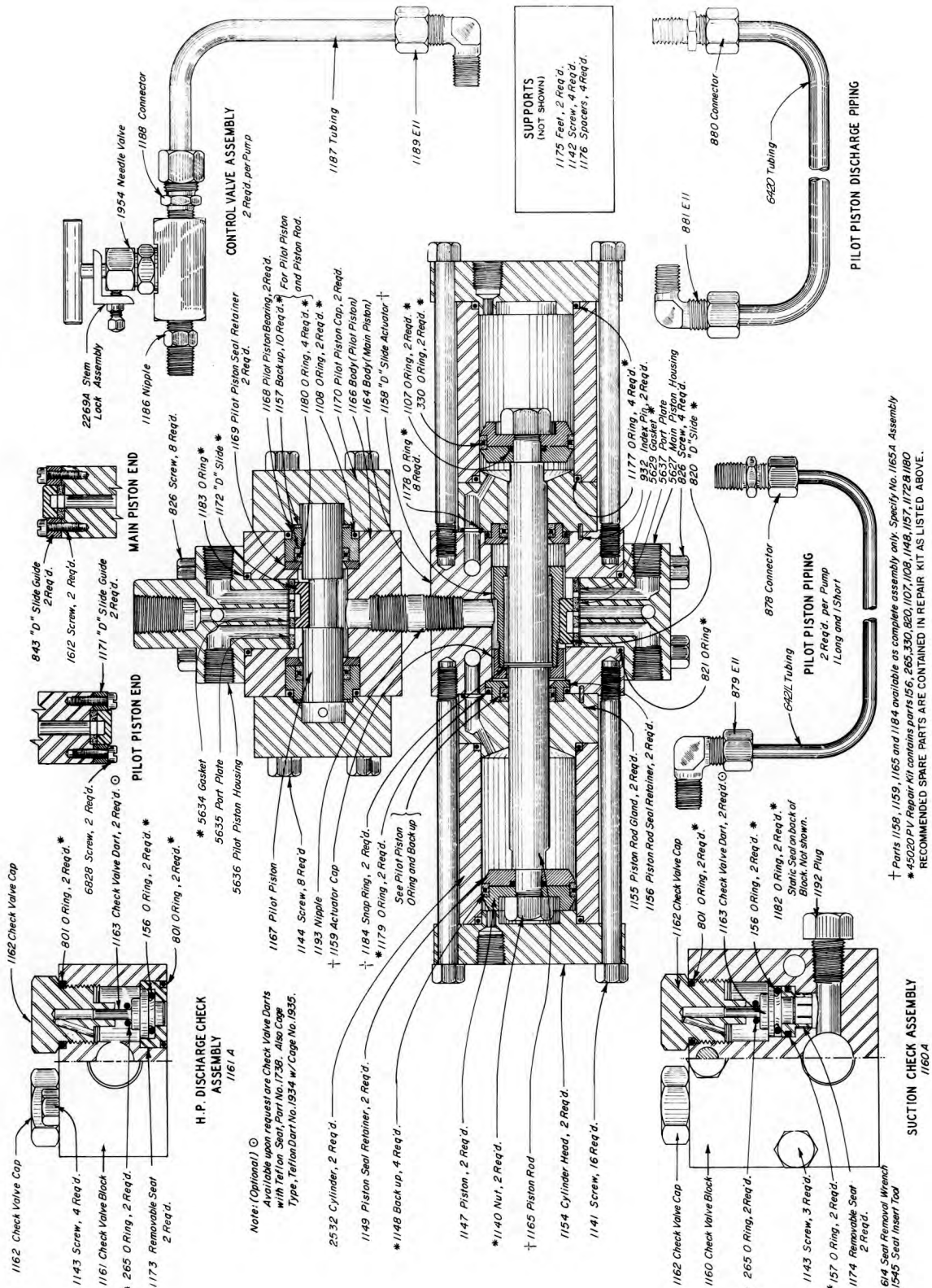


### PUMPS AVAILABLE:

CAT. NO.	TYPE	OPER. PRESS. MINIMUM	OPER. PRESS. MAXIMUM	REPAIR KIT
GAI	10020 SC	100	500	RJK1

### NOTES:

Kimray is an ISO 9001- certified manufacturer.



**PUMPS AVAILABLE:**

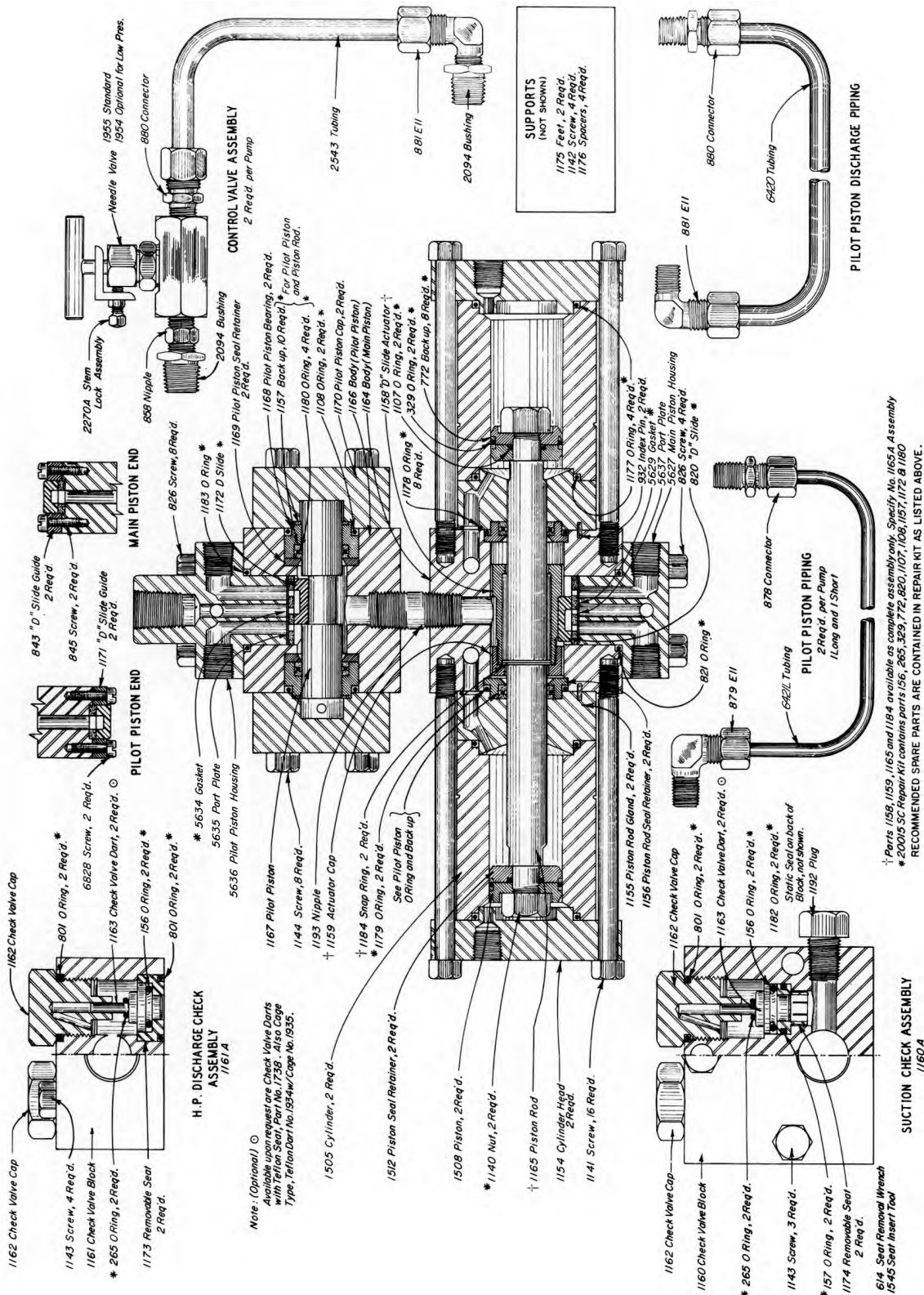
CAT. NO.	TYPE	OPER. PRESS. MINIMUM	OPER. PRESS. MAXIMUM	REPAIR KIT
GAJ	45020 PV	300	2000	RJL1

**NOTES:**

Kimray is an ISO 9001- certified manufacturer.

# GLYCOL PUMPS

## MODEL 20020 SC PUMP STEEL



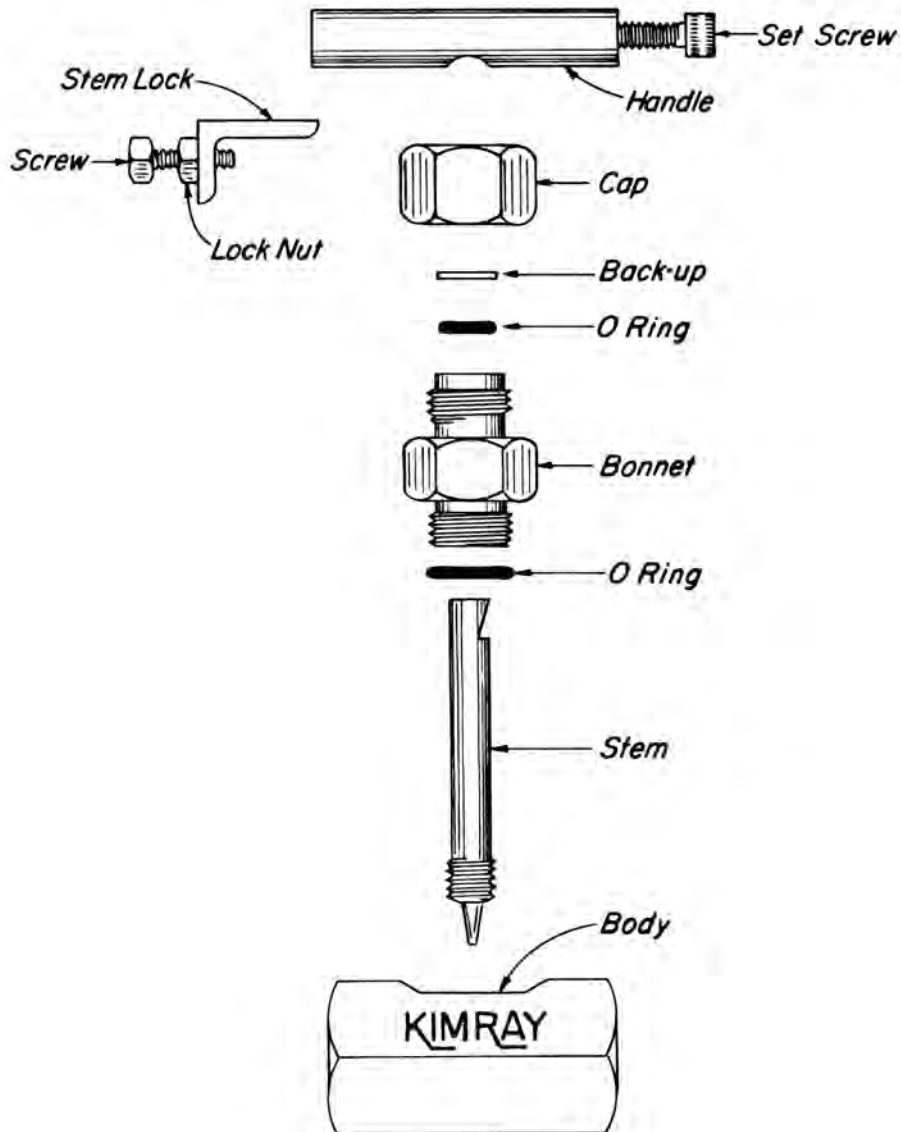
### PUMPS AVAILABLE:

CAT. NO.	TYPE	OPER. PRESS. MINIMUM	OPER. PRESS. MAXIMUM	REPAIR KIT
GAK	20020 SC	100	500	RJN1

### NOTES:

Kimray is an ISO 9001- certified manufacturer.





N.P.T. SIZE	VALVE NO.	ORIFICE SIZE	PUMP SIZE	BODY	BONNET	CAP	STEM	HANDLE	SET SCREW	BACK-UP	O-RING	O-RING	STEM LOCK	SCREW	LOCK NUT
TYPE 303 STAINLESS STEEL STANDARD ON ALL PUMPS EXCEPT 45020 PV PUMP															
1/8"	1603	1/16"	315	1603C	1603D	1603F	1603A	1603B	1964	1978	638	265	6746	6731	6732
1/4"	1911	1/16"	1720	1911A	1603D	1603F	1957A	1603B	1964	1978	638	265	6746	6731	6732
1/4"	1957	1/8"	4020	1957C	1603D	1603F	1957A	1603B	1964	1978	638	265	6746	6731	6732
3/8"	1956	3/16"	9020	1956C	1955D	1955F	1956A	1955B	1963	1979	153	2631	6747	6731	6732
1/2"	1955	9/32"	21020	1955C	1955D	1955F	1956A	1955B	1963	1979	153	2631	6747	6731	6732
CARBON STEEL STANDARD ON 45020 PV PUMP ONLY															
3/4"	1954	13/32"	45020	1954C	1954D	1954F	1954A	1954B	1962	1980	154	2131	6748	6731	6732
TYPE 316 STAINLESS STEEL - AVAILABLE ON SPECIAL ORDER AND EXTRA COST															
1/8"	1603S6	1/16"	315	1603C6	1603D6	1603F6	1603A	1603B	1964	1978	638	265	6746	6731	6732
1/4"	1911S6	1/16"	1720	1911A6	1603D6	1603F6	1957A	1603B	1964	1978	638	265	6746	6731	6732
1/4"	1957S6	1/8"	4020	1957C6	1603D6	1603F6	1957A	1603B	1964	1978	638	265	6746	6731	6732
3/8"	1956S6	3/16"	9020	1956C6	1955D6	1955F6	1956A	1955B	1963	1979	153	2631	6747	6731	6732
1/2"	1955S6	9/32"	21020	1955C6	1955D6	1955F6	1955A	1955B	1963	1979	153	2631	6747	6731	6732
3/4"	1954S6	13/32"	45020	1954C6	1954D6	1954F6	1954A	1954B	1962	1980	154	2131	6748	6731	6732

**NOTES:**

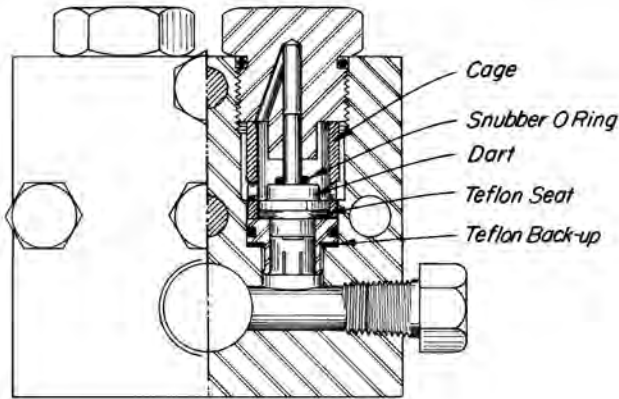


Kimray is an ISO 9001- certified manufacturer.

Cage and Teflon seat darts prevent spinning in Check Valve Blocks. Cage also acts as hold down for removable seat.

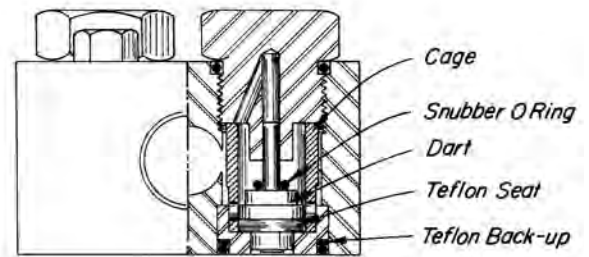
Snubber O Ring installed on stem portion of dart, decreases possibility of darts sticking in caps, snubs darts better, reduces spinning of dart and increases pump efficiency.

Installing Back-up below seats in Discharge Block allows more squeeze to O Ring, preventing leaks.



SUCTION CHECK ASSEMBLY

PART NUMBERS FOR INDICATED PUMPS						
PUMP SIZE	CAGE NO.	DART NO.	SUCTION BACK-UP	DIS. BACK-UP	SNUBBER O-RING	TEFLON DART W/O CAGE
1720 PV 2020 SC 4020 PV	1941	1940	1907	1666	647	1735
5020 SC 9020 PV	1938	1937	1908	1667	647	1736
10020 SC 21020 PV	1933	1932	1909	1668	153	1737
20020 SC 45020 PV	1935	1934	2445	1669	265	1738



DISCHARGE CHECK ASSEMBLY

### CHECK VALVE BLOCKS for SPLIT DISCHARGE

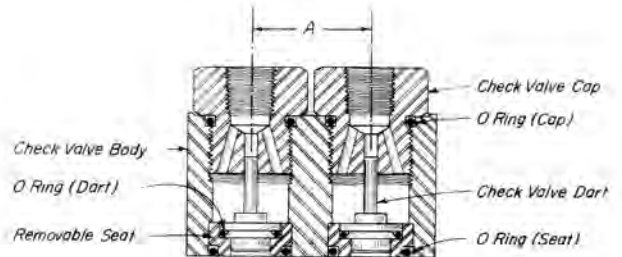
Kimray Glycol Pumps are available with check valve blocks for split discharge to serve two absorbers on a dehydration unit. On an original pump purchase there is no extra charge for this check block.

An accurately divided flow is assured since each absorber is served by one cylinder of the double acting pump.

For an installation of this type only one suction line is necessary. Also the high pressure wet glycol return may be manifolded through one filter or strainer to the pump.

When ordering any Kimray pump for this service, specify the pump number and service. For example: 4020 PV for "split discharge".

To order Check Valve Blocks for Split Discharge Assemblies add an "A" to the Check Valve Body number. Example: 1194A to order the assemblies with viton O Rings add a "V" to Check Valve Assemblies number; Example: 1194AV



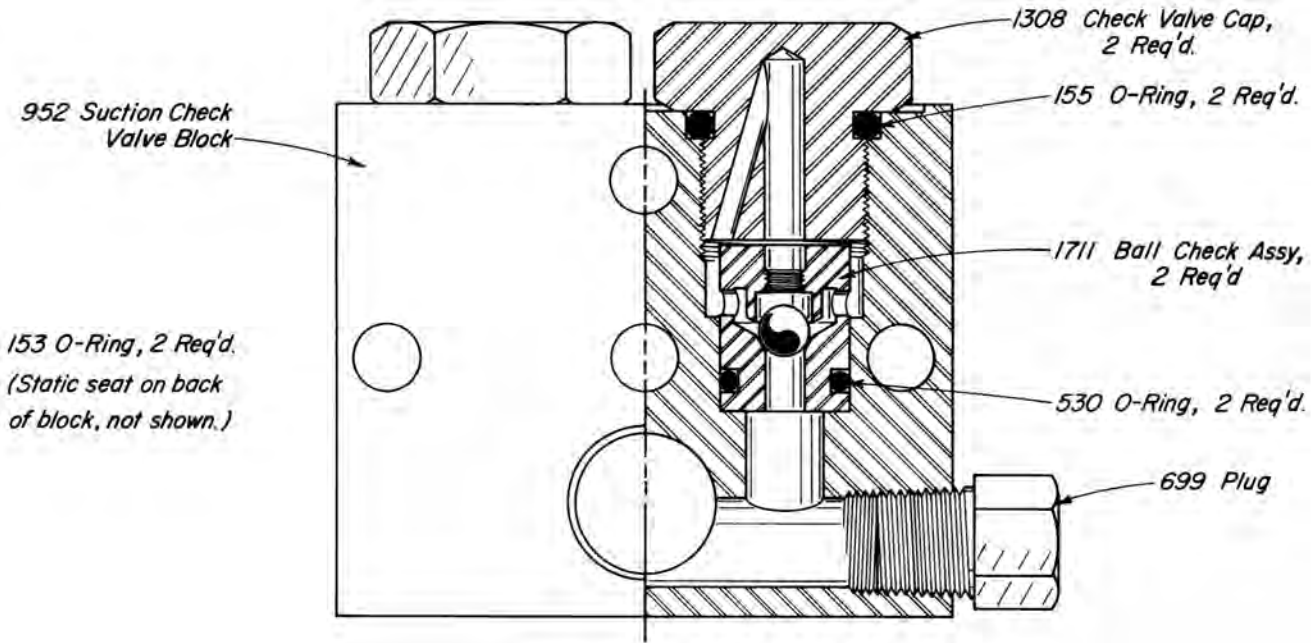
PART NUMBERS FOR INDICATED PUMPS						
PART NAME	QTY REQ'D	1720 PV	4020 PV and 2020 SC	9020 PV and 5020 SC	21020 PV and 10020 SC	45020 PV and 20020 SC
CHECK VALVE BODY	1	1194	1194	1195	1196	1197
"O" RING, SEAT	2	491	491	1151	156	801
REMOVABLE SEAT	2	1152	1152	1131	1133	1173
REV. REM. SEAT	2	1947	1947	1948	1949	1950
"O" RING, DART	2	855	855	154	924	156
DART	2	1307	1307	853	854	1163
"O" RING, CAP	2	155	155	156	157	801
CHECK VALVE CAP	2	1327	1327	1114	1199	1198
TAPPED HOLE SIZE	NPT	1/4	1/4	3/8	1/2	3/4
DIMENSION "A"	Inches	1 1/2	1 1/2	1 11/16	2 5/16	3

# GLYCOL PUMPS

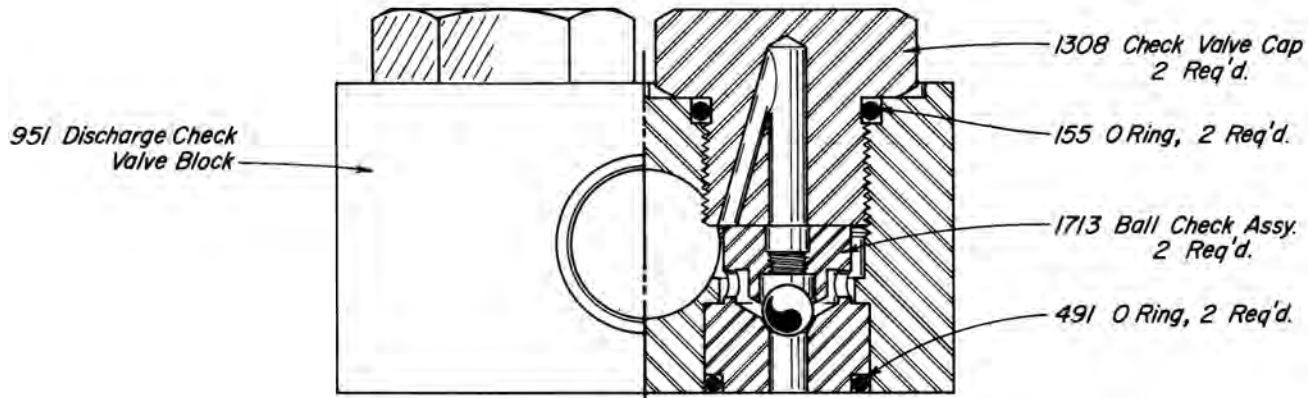


BALL CHECK VALVES for 2020 SC, 1720 PV & 4020 PV  
STEEL

## SUCTION CHECK VALVE ASSEMBLY with BALL CHECK VALVE



## DISCHARGE CHECK VALVE ASSEMBLY with BALL CHECK VALVE



### ASSEMBLIES AVAILABLE:

CAT. NO.	TYPE	CHECK VALVE ONLY
952E	SUCTION	1711
951E	DISCHARGE	1713

### NOTES:

Check Valve for Split Discharge with Ball Check Valves are available.

For easy removal of "Ball Checks" order "T" Wrench, Part Number 1827

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

For use with Kimray Glycol Pump to help prevent particle caused system wear.

#### FEATURES:

- Sock type filter
- In line filter removal
- 1/4" NPT Bleed Valve connection
- Hammer Union Cap
- Solid Mount
- 3/4" NPT inlet and outlet connections

#### TEMPERATURE RANGE:

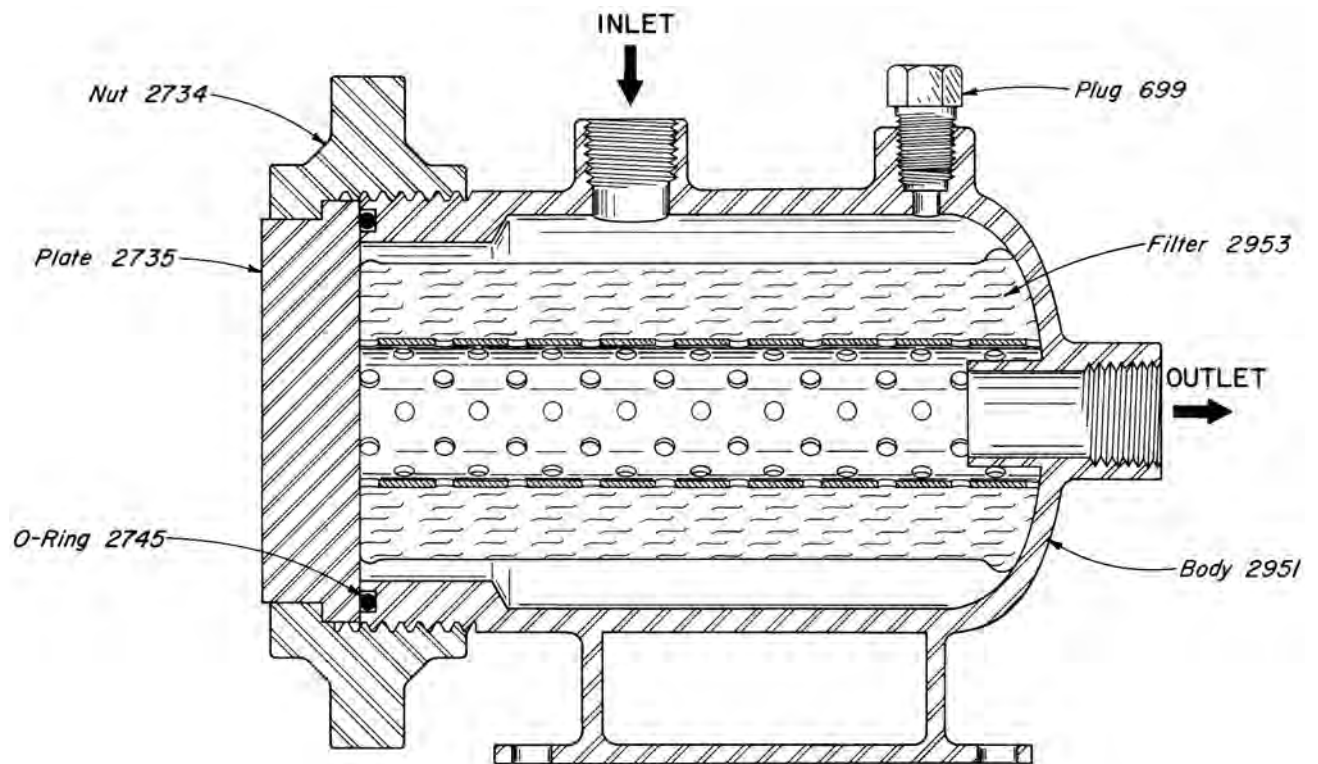
-20°F minimum to 650°F maximum

#### RECOMMENDED PUMPS:

- 4020PV
- 9020PV
- 2020SC
- 5020SC

#### DESCRIPTION:

The Kimray Glycol filter is used to filter particles of rust, sludge and debris from the glycol lines before the glycol reaches the pumping system. This allows the glycol pump to operate more freely and reduces pump wear. Filter itself is a disposable type that can be easily removed and replaced.



#### GLYCOL FILTER CANISTER AVAILABLE:

CAT NO.	DESCRIPTION	W.P.
YDB	GLYCOL FILTER CANISTER - STD	1500
2953	REPLACEMENT FILTER - STD	1500
YDBL18	GLYCOL FILTER CANISTER - 18 in	1500
2953L18	REPLACEMENT FILTER - 18 in	1500

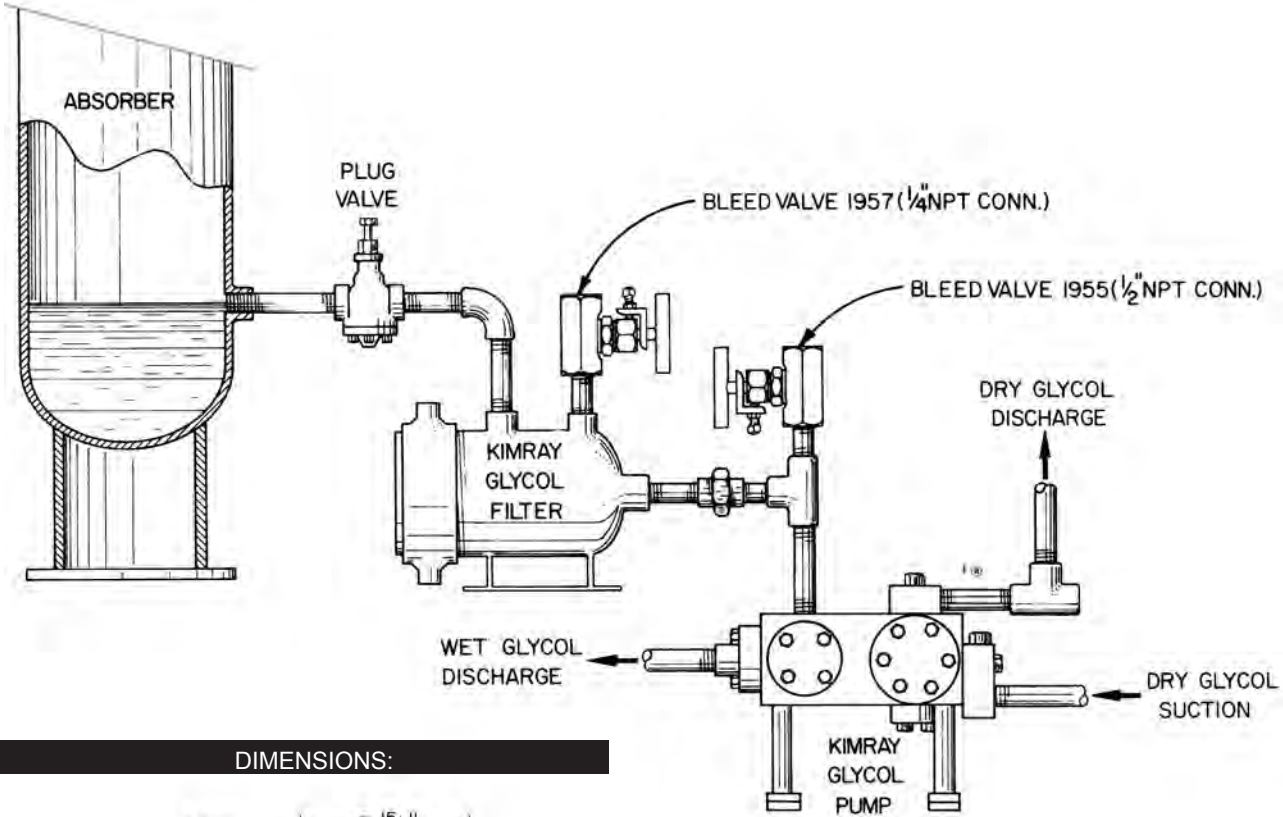
#### NOTES:

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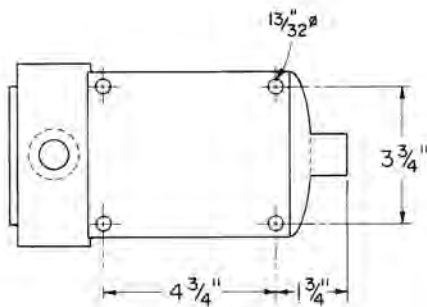
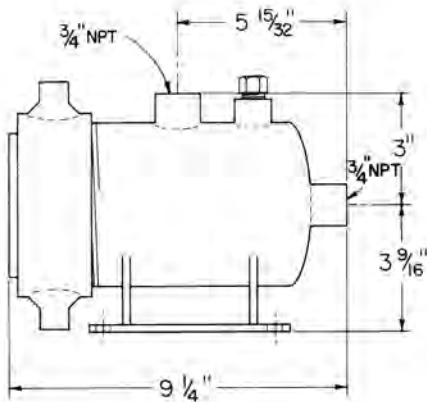
**GLYCOL FILTER CANISTER**

**INSTALLATION:**

The Kimray Glycol Filter Canister is installed between the Absorber and the Wet Glycol Inlet of the pump.



**DIMENSIONS:**



**NOTES:**

Bolts to attach the Kimray Glycol Filter to a particular unit are available as follows:

- 1" long, Part no. 380, 4 Req'd.
  - 2" long, Part no. 191, 4 Req'd.
  - 3" long, Part no. 1942, 4 Req'd.
- (These bolts require #241 nut, 4 Req'd.)

#### APPLICATIONS:

- Circulating pump for gas glycol dehydrators, gas amine units and other pumping applications.

#### FEATURES:

- No Gas Emissions
- No Packing
- Hydraulically Balanced Diaphragms
- Double-ended Shaft
- Stud Extenders for easy Head Installation
- Pulse-Free flow
- Direct or Belt Driven

#### SPECIFICATIONS:

- Capacity @ max. pressure:
 

rpm	gpm	l/min
1200	8.3	31.4
- RPM: 1200 max. - 200 min.
- Inlet: 250 psi max
- Connections:
  - Inlet: 1" NPT
  - Outlet: 3/4" NPT
- Temperature:
  - Max: 250° F (121.1° C)
  - Min: 40° F (4.4° C)
  - [contact factory for temperatures below 40° F (4.4° C)]
- Fluid End Material, Manifold : SA395 / SA479
- Elastomers: Aflas® and Viton®
- Oil Capacity: 2.75 quarts 2.60 Liters  
KIMRAY part No. 6928
- Weight (dry): 100 lbs (45.7 kg)
- Bi Directional Shaft Rotation

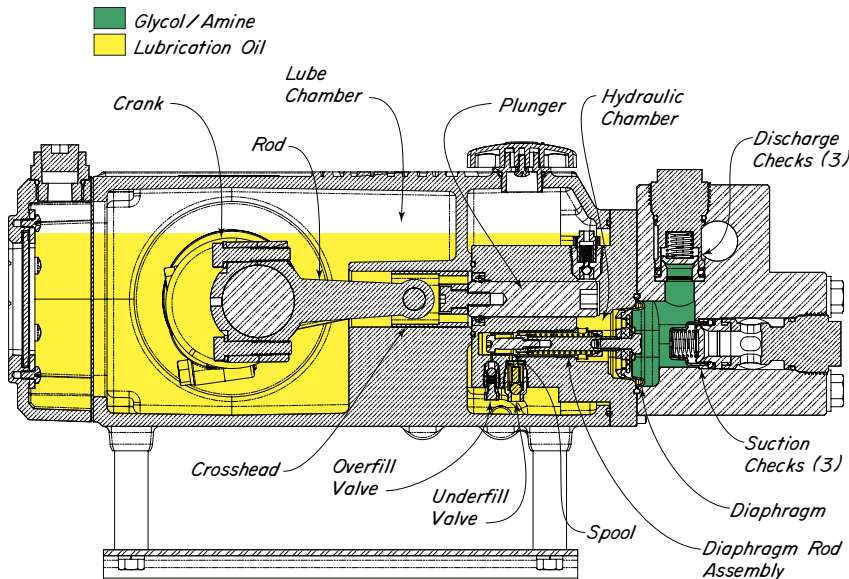
#### OPERATION:

The KIMRAY ELECTRIC GLYCOL PUMP is a uniquely designed hydraulically balanced diaphragm/plunger positive displacement pump. Power to the pump is provided by a properly sized and specified electric motor either directly connected or belt driven. PLUNGERS are utilized to energize DIAPHRAGMS which in turn pressurize glycol/amine solutions used in gas processing. The Plungers operate and are lubricated in clean oil isolated from the process fluids by DIAPHRAGMS. The DIAPHRAGMS are in contact with the hydraulic oil on one side and the glycol/amine solution and on the other side. KIMZOIL EGP1 is a hydraulic/lubrication oil designed for high end pump performance designed for this application. This design allows for the protection of the reciprocating pumping internals from the process fluids.

As shown in the diagram, the PLUNGER(S) are connected to the CROSSHEAD(s) and displace the oil (YELLOW) in the HYDRAULIC CHAMBER as they reciprocate. As the Plunger moves to the right on the pressure stroke, oil is displaced in the Hydraulic Chamber and forces the DIAPHRAGM(s) to move to the right. The Diaphragm movement displaces the glycol/amine solution (GREEN) on the opposing side of the Diaphragm and forces it through the DISCHARGE CHECK VALVE(s). During the pressure stroke, a small amount of oil (YELLOW) leaks past the clearance between the Plunger and cylinder.

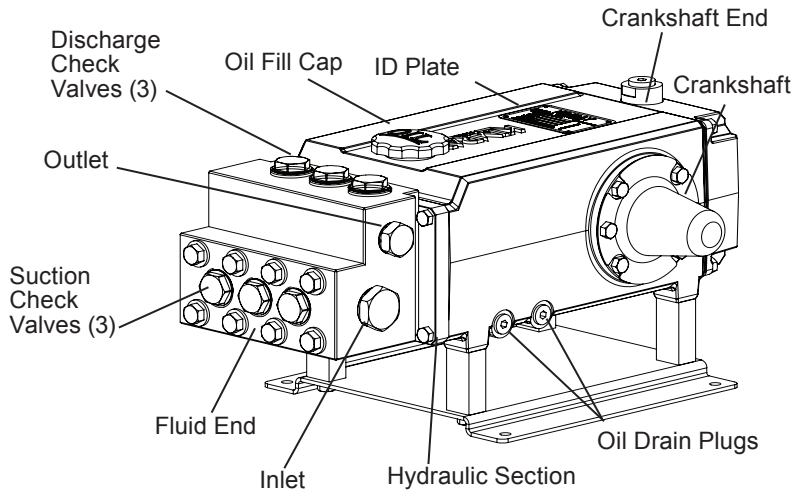
As the Plunger moves back on the suction stroke, the pressure drops in the Hydraulic Chamber and a small amount of oil is drawn in through the UNDER-FILL VALVE to replace the oil lost during the pressure stroke. The position of the Spool Valve regulates how much oil is drawn in. The SPOOL VALVE is positioned by the DIAPHRAGM ROD ASSEMBLY which is connected to the Diaphragm. The cycle then repeats.

When the Diaphragm moves too far forward, the Under-Fill port closes and the Over-Fill port opens. The Under-Fill Valve is a check valve that lets oil in during the suction stroke, but will not allow oil to leave. The OVER-FILL VALVE is a check valve that lets oil out during the pressure stroke, but prevents oil from coming in. The spool valve position opens the port to one of the two valves depending on the need for more or less oil.



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## Component Identification



### LOCATION:

Locate the pump as close to the fluid supply source as possible. Allow room for checking the oil level, changing the oil (two drain plugs on the bottom and back of pump), and removing the pump head components (inlet and discharge retainer plates, manifold, and related items).

### MOUNTING

The pump shaft can rotate in either direction. To prevent vibration, mount the pump and motor securely on a level rigid base. On a belt-drive system, align the sheaves accurately; poor alignment wastes horsepower and shortens the belt and bearing life. Make sure the belts are properly tightened, as specified by the belt manufacturer. On a direct-drive system, align the shafts accurately. Unless otherwise specified by the coupling manufacturer, maximum parallel misalignment should not exceed 0.015 in. (0.4 mm) and angular misalignment should be held to 1° maximum. Careful alignment extends life of the coupling, pump, shafts, and support bearings. Consult coupling manufacturer for exact alignment tolerances.

### PUMPS AVAILABLE:

CAT. NO.	TYPE	OPER. PRESS. MINIMUM	OPER. PRESS. MAXIMUM
GEA	50015 EV	0	1500

### REPAIR KITS AVAILABLE:

CAT. NO.	TYPE	MATERIAL
RZAV	CHECK VALVE REPAIR KIT	VITON
RZBV	COMPLETE REPAIR KIT	VITON
RZCV	DIAPHRAGM REPAIR KIT	VITON

### OIL AVAILABLE:

CAT. NO.	TYPE	CAPACITY QUARTS	CAPACITY LITERS
6928	EGP1 KIMZOIL	2.75	2.60

### ACCESSORIES

Consult installation drawing above for typical system components. Contact KIMRAY INC. or the distributor in your area for more details.

### IMPORTANT PRECAUTIONS

**Adequate Fluid Supply.** To avoid cavitation and premature pump failure, be sure that the pump will have an adequate fluid supply and that the inlet line will not be obstructed.

**Positive Displacement.** This is a positive-displacement pump. Install a relief valve downstream from the pump.

**Safety Guards.** Install adequate safety guards over all pulleys, belts, and couplings. Follow all codes and regulations regarding installation and operation of the pumping system.

**Shut-Off Valves.** Never install shut-off valves between the pump and discharge pressure regulator, relief valve, or in the regulator bypass line.

**Freezing Conditions.** Protect the pump from freezing. See also the Maintenance Section.

Consult the Factory for the following situations:

- Extreme temperature applications – above 250° F (82° C) or below 40° F (4.4° C)
- Viscous fluid applications above 100 Cps
- Chemical compatibility problems
- Hot ambient temperatures – above 110° F (43° C)
- Conditions where pump oil may exceed 200° F (93° C) because of a combination of hot ambient temperatures, hot fluid temperature, and full horsepower load — an oil cooler may be required
- Pump RPM less than 200

### CALCULATING REQUIRED HORSEPOWER (KW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor HP}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

\* HP/kW is required application power.

### ATTENTION!

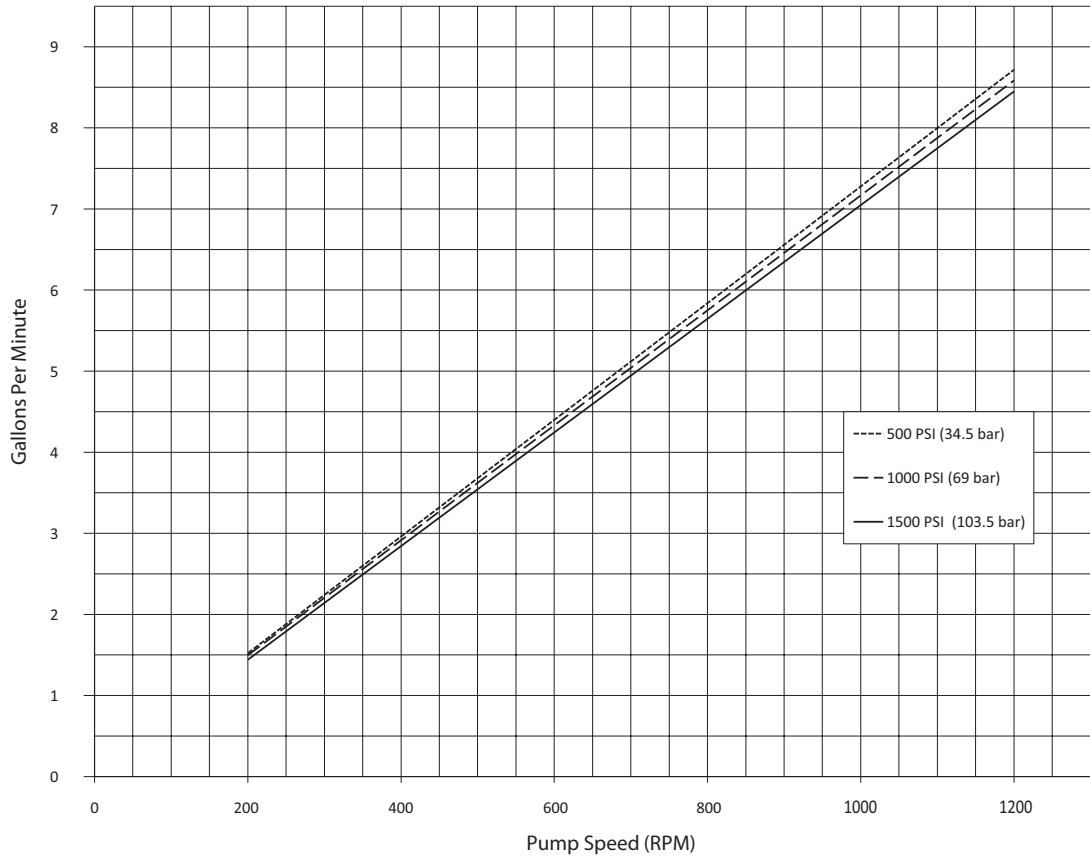
When sizing motors with variable speed drives (VFDs), it is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

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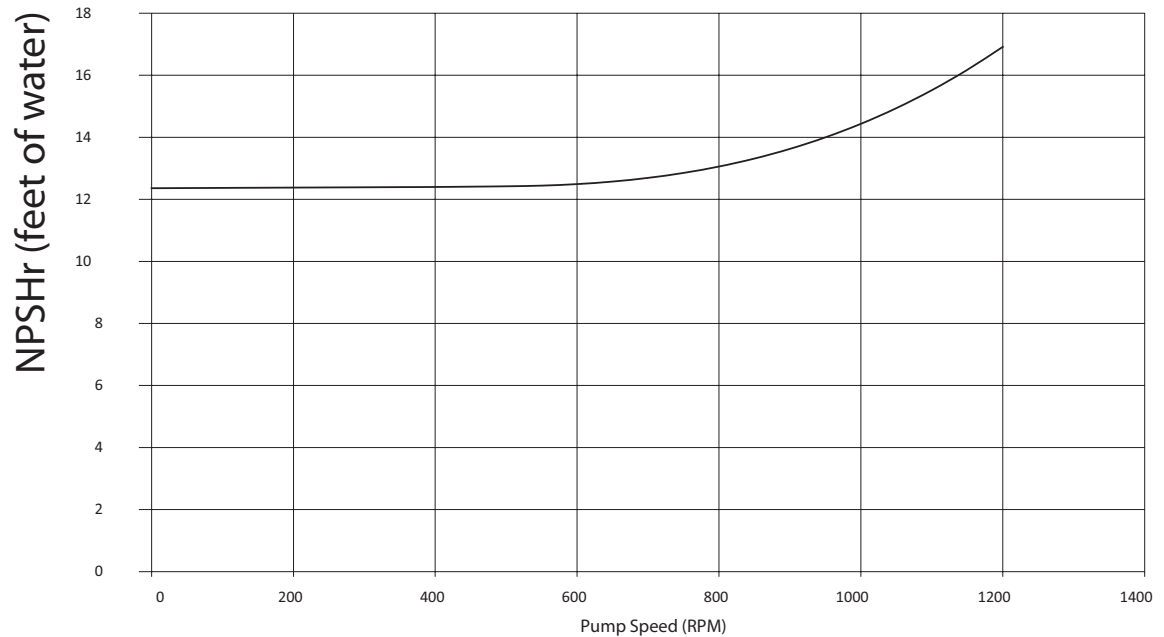
## Performance

50015 EV Performance



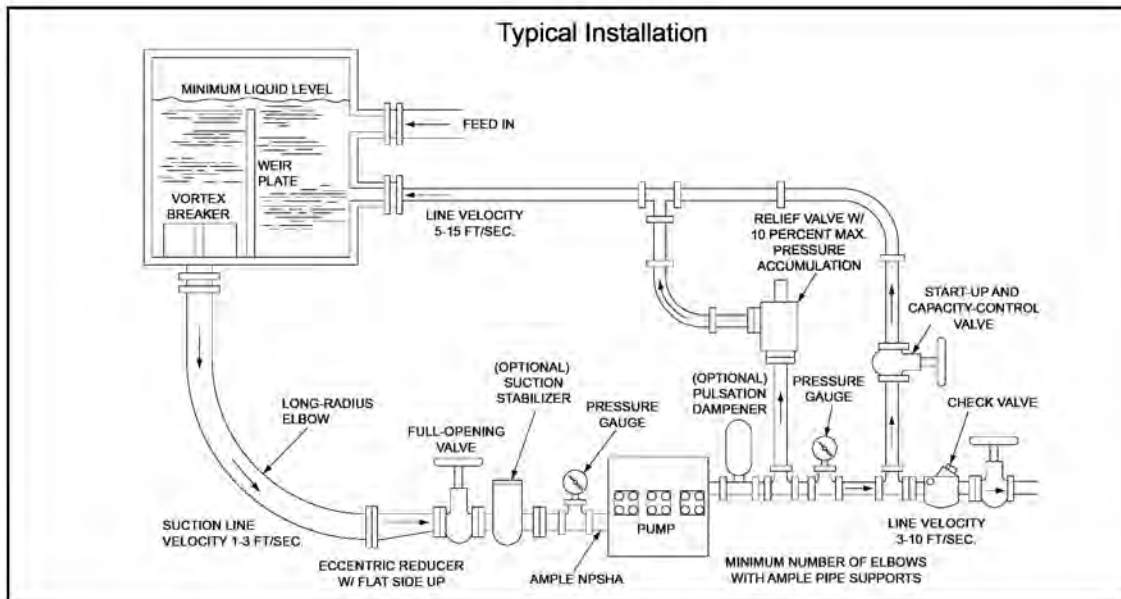
## Net Positive Suction Head – NPSHr

Net Positive Suction Head (NPSHr)



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## ELECTRIC PUMPS INSTALLATION



### INLET PIPING (Suction Feed)

**CAUTION:** When pumping at temperatures above 250° F (121.1° C), use a pressure-feed system. Install drain cocks at any low points of the suction line, to permit draining in freezing conditions. Provide for permanent or temporary installation of a vacuum gauge to monitor the inlet suction. To maintain maximum flow, vacuum at the pump inlet should not exceed 7 in. Hg at 70° F (180 mm Hg at 21° C). **Do not supply more than one pump from the same inlet line if possible.**

#### Supply Tank

Use a supply tank that is large enough to provide time for any trapped air in the fluid to escape. The tank size should be at least twice the maximum pump flow rate. Isolate the pump and motor stand from the supply tank, and support them separately. Install a separate inlet line from the supply tank to each pump. Install the inlet and bypass lines so they empty into the supply tank below the lowest water level, on the opposite side of the baffle from the pump suction line. If a line strainer is used in the system install it in the inlet line to the supply tank. To reduce aeration and turbulence, install a completely submerged baffle plate to separate the incoming and outgoing liquids. Install a vortex breaker in the supply tank, over the outlet port to the pump. Place a cover over the supply tank, to prevent foreign objects from falling into it.

#### Hose and Routing

Size the suction line at least one size larger than the pump inlet, and so that the velocity will not exceed 1-3 ft/sec (0.3 to 0.9 m/s):  
 For pipe in inches: Velocity (ft/sec) = 0.408 x GPM/Pipe ID2  
 For pipe in mm: Velocity (m/sec) = 21.2 x LPM/Pipe ID2  
 Keep the suction line as short and direct as possible. Use flexible hose and/or expansion joints to absorb vibration, expansion, or contraction. If possible, keep suction line level. Do not have any high points collecting vapor unless high points are vented. To reduce turbulence and resistance, do not use 90° elbows. If turns are necessary in the suction line, use 45° elbows or arrange sweeping curves in the flexible inlet hose. If a block valve is used, be sure it is fully opened so that the

flow to the pump is not restricted. The opening should be at least the same diameter as the inlet plumbing ID. Do not use a line strainer or filter in the suction line unless regular maintenance is assured. If used, choose a top loading basket. It should have a free-flow area of at least three times the free-flow area of the inlet. Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.

### INLET PIPING (Pressure Feed)

Provide for permanent or temporary installation of a vacuum/pressure gauge to monitor the inlet vacuum or pressure. Pressure at the pump inlet should not exceed 250 psi (17 bar); if it could get higher, install an inlet pressure reducing regulator. Do not supply more than one pump from the same inlet line.

### INLET CALCULATIONS

#### Acceleration Head

Calculating the Acceleration Head  
 Use the following formula to calculate acceleration head losses. Subtract this figure from the NPSHa, and compare the result to the NPSHr of the Hydra-Cell pump.

$$H_a = (L \times V \times N \times C) \div (K \times G)$$

where:

H<sub>a</sub> = Acceleration head (ft of liquid)

L = Actual length of suction line (ft) — not equivalent length

V = Velocity of liquid in suction line (ft/sec) [V = GPM x (0.408 ÷ pipe ID<sup>2</sup>)]

N = RPM of crank shaft

C = Constant determined by type of pump — use 0.066 for the EV50015 Hydra-Cell pumps

K = Constant to compensate for compressibility of the fluid — use: 1.4 for de-aerated or hot water; 1.5 for most liquids; 2.5 for hydrocarbons with high compressibility

G = Gravitational constant (32.2 ft/sec<sup>2</sup>)

#### Friction Losses

Calculating Friction Losses in Suction Piping

When following the above recommendations (under "Inlet Piping") for minimum hose/pipe I. D. and maximum length, frictional losses in the suction piping are negligible (i.e., H<sub>f</sub> = 0) if you are pumping a water-like fluid.

When pumping more-viscous fluids such as lubricating oils, sealants, adhesives, syrups, varnishes, etc., frictional losses in the

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suction piping may become significant. As Hf increases, the available NPSH (NPSHa) will decrease, and cavitation will occur. In general, frictional losses increase with increasing viscosity, increasing suction-line length, increasing pump flow rate, and decreasing suction-line diameter. Changes in suction-line diameter have the greatest impact on frictional losses: a 25% increase in suction-line diameter cuts losses by more than two times, and a 50% increase cuts losses by a factor of five times. Consult the factory before pumping viscous fluids.

#### Minimizing Acceleration Head and Frictional Losses

To minimize the acceleration head and frictional losses:

- Keep inlet lines less than 6 ft (1.8 m) or as short as possible
- Use at least 1-1/2 in. (38.1 mm) I.D. inlet hose
- Use suction hose (low-pressure hose, non collapsing) for the inlet lines
- Minimize fittings (elbows, valves, tees, etc.)
- **Use a suction stabilizer on the inlet.**

#### Net Positive Suction Head

NPSHa must be equal to or greater than NPSHr. If not, the pressure in the pump inlet will be lower than the vapor pressure of the fluid — and cavitation will occur.

#### Calculating the NPSHa

Use the following formula to calculate the NPSHa:

$$NPSHa = P_t + H_z - H_f - H_a - P_{vp}$$

where:

$P_t$  = Atmospheric pressure

$H_z$  = Vertical distance from surface liquid to pump center line  
(if liquid is below pump center line, the  $H_z$  is negative)

$H_f$  = Friction losses in suction piping

$H_a$  = Acceleration head at pump suction

$P_{vp}$  = Absolute vapor pressure of liquid at pumping temperature

#### NOTES:

- In good practice, NPSHa should be 2 ft greater than NPSHr
- All values must be expressed in feet of liquid

#### Atmospheric Pressure at Various Altitudes

Altitude (ft)	Pressure (ft of H <sub>2</sub> O)	Altitude (ft)	Pressure (ft of H <sub>2</sub> O)
0	33.9	1500	32.1
500	33.3	2000	31.5
1000	32.8	5000	28.2

## DISCHARGE PIPING

#### Hose and Routing

Use the shortest, most-direct route for the discharge line.

Select pipe or hose with a working pressure rating of at least 1.5 times the maximum system pressure. EXAMPLE: Select a 1500 psi W.P.-rated hose for systems to be operated at 1000 psi-gauge pressure.

Use flexible hose between the pump and rigid piping to absorb vibration, expansion or contraction.

Support the pump and piping independently. Size the discharge line so that the velocity of the fluid will not exceed 7-10 ft/sec (2-3 m/sec):

For pipe in inches: Velocity (ft/sec) = 0.408 x GPM/Pipe ID<sup>2</sup>

For pipe in mm: Velocity (m/sec) = 21.2 x LPM/Pipe ID<sup>2</sup>

#### Pressure Relief

**Install a pressure relief valve in the discharge line.** Bypass pressure must not exceed the pressure limit of the pump.

Size the relief valve so that, when fully open, it will be large enough to relieve the full capacity of the pump without over-pressurizing the system.

Locate the valve as close to the pump as possible and ahead of any other valves.

Adjust the pressure relief valve to no more than 10% over the maximum working pressure of the system. Do not exceed the manufacturer's pressure rating for the pump or relief valve.

Route the bypass line to the supply tank. See the diagram showing a typical installation at the beginning of the Installation Section.

If the pump may be run for a long time with the discharge closed and fluid bypassing, install a thermal protector in the bypass line (to prevent severe temperature buildup in the bypassed fluid).

**CAUTION: Never install shutoff valves in the bypass line or between the pump and pressure relief valve.**

Install a pressure gauge in the discharge line.

## BEFORE INITIAL START-UP

Before you start the pump, be sure that:

- Pump is stored at a temperature between 40-180 F (4.4-82.2 C) for a minimum of 24 hours before start up.
- All shutoff valves are open, and the pump has an adequate supply of fluid.
- All connections are tight.
- The oil level is within the marking on the dipstick. Add oil as needed.
- The relief valve on the pump outlet is adjusted so the pump starts under minimum pressure.
- All shaft couplings or drive pulleys have adequate safety guards.

## INITIAL START-UP

1. Pump must be at or above 40 F (4.4 C) for 24 hours prior to starting.
2. Open the bypass line start-up and capacity-control valve so the pump may be started against negligible discharge pressure.
3. Turn on power to the pump motor.
4. Check the inlet pressure or vacuum. To maintain maximum flow, inlet vacuum must not exceed 7 in. Hg at 70° F (180 mm Hg at 21° C). Inlet pressure must not exceed 250 psi (17 bar).
5. Listen for any erratic noise, and look for unsteady flow. If the pump does not clear, refer to the Troubleshooting Section.
6. If the system has an air lock and the pump fails to prime:
  - a. Turn off the power.
  - b. Remove the pressure gauge from the tee fitting at the pump outlet (see installation diagram).

**NOTE: Fluid may come out of this port when the plug is removed. Provide an adequate catch basin for fluid spillage, if required. Fluid will come out of this port when the pump is started, so we recommend that you attach adequate plumbing from this port so fluid will not be sprayed or lost. Use high-pressure-rated hose and fittings from this port. Take all safety precautions to assure safe handling of the fluid being pumped.**

- c. Jog the system on and off until the fluid coming from this port is air-free.
  - d. Turn off the power.
  - e. Remove the plumbing that was temporarily installed, and reinstall the pressure gauge or plug.
7. Adjust the bypass line valve to the desired operating pressure. Do not exceed the maximum pressure rating of the pump.
  8. After the system pressure is adjusted, verify the safety relief valve setting by closing the bypass line valve until the relief valve opens.

**NOTE: Fluid may come out of the safety relief valve. Provide an adequate catch basin for fluid spillage. Take all safety precautions to assure safe handling of the spillage.**

9. Reset the bypass line valve to obtain the desired system pressure.
10. Provide a return line from the relief valve to the supply tank, similar to the bypass line.

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## ELECTRIC PUMPS MAINTENANCE

**NOTE:** The numbers in parentheses are the Reference Numbers on the exploded view illustrations found in this manual and in the Parts Manual.

### DAILY

Check the oil level and the condition of the oil with the pump turned off. The oil level should be within the marking on the dipstick. Add oil as needed.  
Use KIMZOIL EGP1 Electric Glycol Pump Oil (Kimray part no. 6928) for the application.

**CAUTION:** If you are losing oil but don't see any external leakage, or if the oil becomes discolored and contaminated, one of the diaphragms (41) may be damaged. Refer to the Fluid-End Service Section. Do not operate the pump with a damaged diaphragm.

**CAUTION:** Do not leave contaminated oil in the pump housing or leave the housing empty. Remove contaminated oil as soon as discovered, and replace it with clean oil.

### PERIODICALLY

Change the oil after the first 500 hours of operation, and then according to the guidelines below.

Hours Between Oil Changes @ Various  
Process Fluid Temperatures

Pressure	RPM	<150°F	<200°F	<250°F
		(32°C)	(60°C)	(82°C)
<1000 psi (69 bar)	<800	6,000	4,500	3,000
	<1200	4,000	3,000	2,000
<1500 psi (100 bar)	<800	4,000	3,000	2,000
	<1200	2,000	1,500	1,000

**NOTE:** Minimum oil viscosity for proper hydraulic end lubrication is 16-20 cST (80-100 SSU) at 212°F (100°C).

**NOTE:** Use of an oil cooler is recommended when process fluid and/or hydraulic end oil exceeds 200°F (93°C).

When changing oil, remove both drain plugs (13) at the bottom of the pump so all oil and accumulated sediment will drain out.

**CAUTION:** Do not turn the drive shaft while the oil reservoir is empty.

Check the inlet pressure or vacuum periodically with a gauge. If vacuum at the pump inlet exceeds 7 in. Hg (180 mm Hg), check the inlet piping system for blockages. If the pump inlet is located above the supply tank, check the fluid supply level and replenish if too low.

**CAUTION:** Protect the pump from freezing. Refer also to the "Shutdown Procedure".

### SHUTDOWN PROCEDURE DURING FREEZING TEMPERATURES

Take all safety precautions to assure safe handling of the fluid being pumped. Provide adequate catch basins for fluid drainage and use appropriate plumbing from drain ports, etc., when flushing the pump and system with a compatible anti-freeze.

### PUMP STORAGE

**CAUTION:** If the pump is to be stored more than six months take the following steps to protect against corrosion:

1. Change crankcase oil.
2. Change oil behind diaphragms.
3. Remove suction and discharge valves and drain pump of all liquids. Use compressed air to dry inside passageways of manifold.
4. Apply light film of clean oil or corrosion inhibitor to all inside passageways of manifold.
5. Clean and dry valves and seats. Apply light film of clean oil or corrosion inhibitor to valves and seats.
6. Reinstall valves with new o-rings.
7. Plug suction and discharge ports to protect against dirt and moisture.
8. Store pump in clean and dry location.
9. Every month of storage rotate crankshaft 4 to 6 times.

**CAVITATION**

- Inadequate fluid supply because:
  - Inlet line collapsed or clogged
  - Clogged line strainer
  - Inlet line too small or too long
  - Air leak in inlet line
  - Worn or damaged inlet hose
  - Suction line too long
  - Too many valves and elbows in inlet line
- Fluid too hot for inlet suction piping system
- Air entrained in fluid piping system
- Aeration and turbulence in supply tank
- Inlet vacuum too high (refer to “Inlet Calculations” paragraph)

**Symptoms of Cavitation**

- Excessive pump valve noise
- Premature failure of spring or retainer
- Volume or pressure drop
- Rough-running pump
- Premature failure

**DROP IN VOLUME OR PRESSURE**

A drop in volume or pressure can be caused by one or more of the following:

- Air leak in suction piping
- Clogged suction line or suction strainer
- Suction line inlet above fluid level in tank
- Inadequate fluid supply
- Pump not operating at proper RPM
- Relief valve bypassing fluid
- Worn pump valve parts
- Foreign material in inlet or outlet valves
- Loss of oil prime in cells because of low oil level
- Ruptured diaphragm
- Cavitation
- Warped manifold from overpressurized system
- O-rings forced out of their grooves from overpressurization
- Air leak in suction line strainer or gasket
- Cracked suction hose
- Empty supply tank
- Excessive aeration and turbulence in supply tank
- Worn and slipping drive belt(s)
- Worn spray nozzle(s)
- Cracked cylinder

**PUMP RUNS ROUGH**

- Worn pump valves
- Air lock in outlet system
- Oil level low
- Wrong weight of oil for cold operating temperatures (change to lighter weight)
- Cavitation
- Air in suction line
- Restriction in inlet/suction line
- Hydraulic cells not primed after changing diaphragm
- Foreign material in inlet or outlet valve
- Damaged diaphragm
- Fatigued or broken valve spring

**PREMATURE FAILURE OF DIAPHRAGM**

- Frozen pump
- Puncture by a foreign object
- Elastomer incompatible with fluid being pumped
- Pump running too fast
- Excess pressure
- Cavitation
- Aeration or turbulence in supply tank

**VALVE WEAR**

- Normal wear from high-speed operation
- Cavitation
- Abrasives in the fluid
- Valve incompatible with corrosives in the fluid
- Pump running too fast

**LOSS OF OIL**

- External seepage
- Rupture of diaphragm
- Frozen pump
- Worn shaft seal
- Oil drain plug or fill cap loose
- Valve plate and manifold bolts loose

**PREMATURE FAILURE OF VALVE SPRING OR RETAINER**

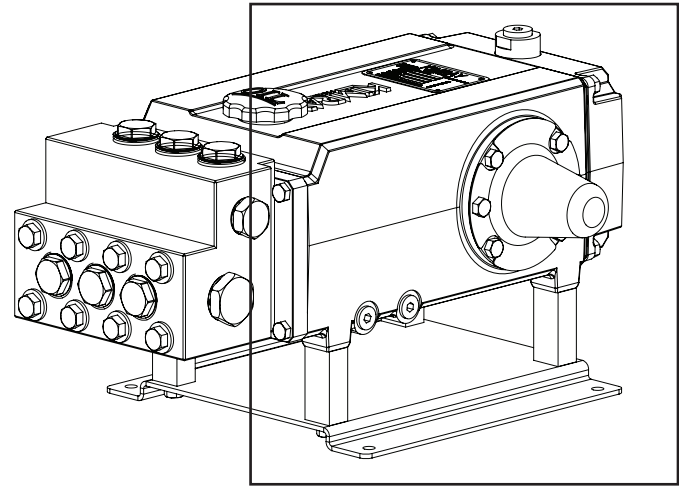
- Cavitation
- Foreign object in the pump
- Pump running too fast
- Spring/retainer material incompatible with fluid being pumped
- Excessive inlet pressure

# GLYCOL PUMPS



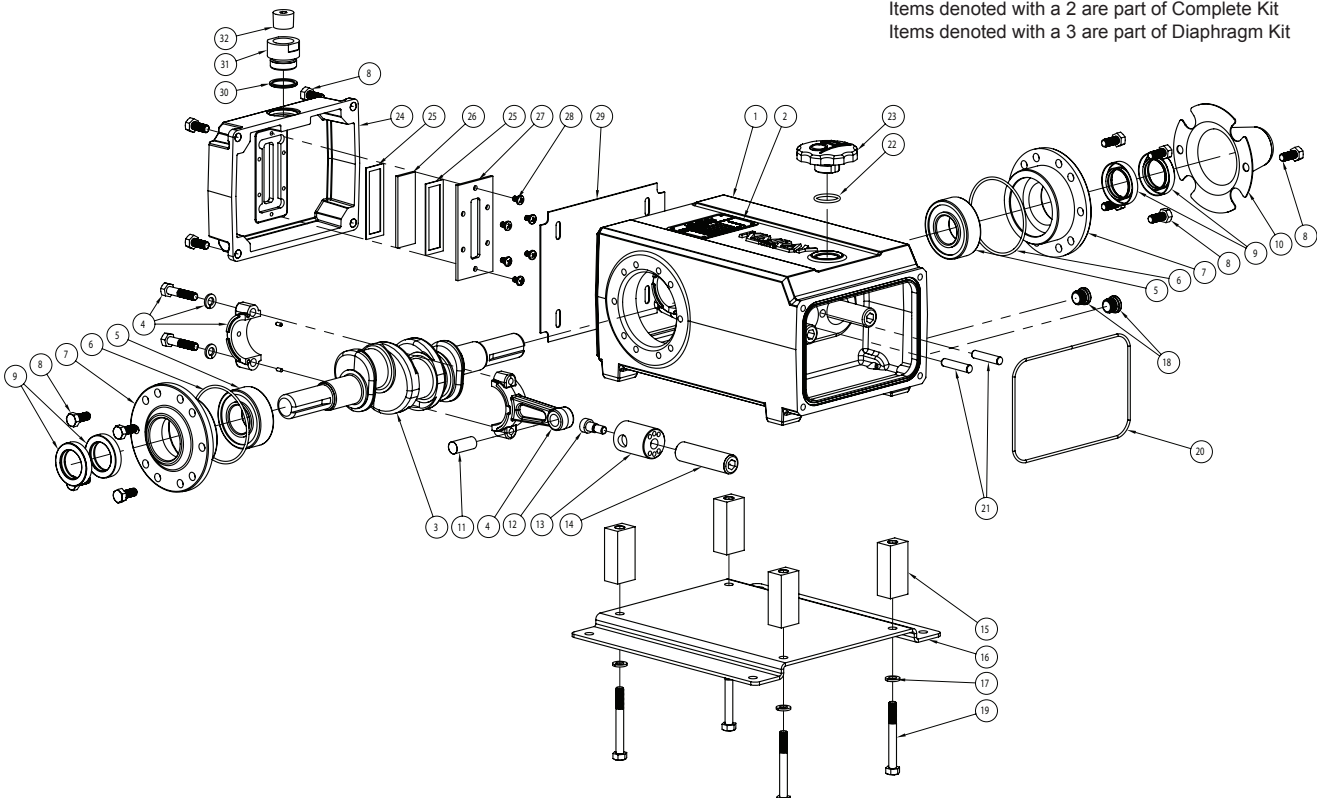
## ELECTRIC PUMPS STEEL

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	KIT
1	189-401-02	CRANKCASE, T9, MACHINING	1	
2	189-511	PLATE, DATA	1	
3	172-102-02	CRANKSHAFT, FINISHED	1	
4	189-509	ROD, CONNECTING, ASSEMBLED	3	
	189-507	ROD, FRONT CONNECTING	1	
	189-508	ROD, REAR CONNECTING	1	
	189-510	PIN, DOWEL .125	2	
	189-522	SCREW, 5/16-18 UNC-2A X 1.375, HHCS	2	
	C22-014-2000	WASHER, M8 SPLIT LOCK	2	
5	172-004	BEARING, SPHERICAL ROLLER, 22206	2	
6	N10-073-2110	O-RING, BUNA, -150	2	
7	189-545	MACHINING, BEARING CARRIER	2	
8	189-525	SCREW, 5/16-18 UNC-2A, HHCS	14	
9	F20-031-2110	SEAL, BUNA	4	
10	189-500	COVER, CRANKSHAFT	1	
11	189-054	PIN, WRIST	3	
12	189-528	SCREW, SHOULDER, 5/16-18 UNC-2A, SHCS	3	
13	189-437	CROSSHEAD	3	
14	189-431	PLUNGER, .787	3	
15	189-520	SPACER, BASE PLATE 256 TC	4	
16	189-502-01	BRACKET, MOUNTING	1	
17	C22-014-2000	WASHER, M8 SPLIT LOCK	4	
18	189-032	PLUG, 3/8 SAE, STEEL	2	2
19	189-521	SCREW, 5/16-18 UNC-2B X 2.75, HHCS	4	
20	D15-037-2110	O-RING, VITON, -164	1	2
21	D03-026-2210	PIN, DOWEL, 5/16"	2	
22	D10-080-21XX	MATRIX, .862 ID X .103 WIDE O-RING	1	
23	189-595-XX	ASSY, METAL OIL CAP	1	
	189-590-XX	BASE, OIL CAP	1	
	189-591-XX	TOP, OIL CAP	1	
	189-595	SCREW, PHMS 0.164-32x0.375x0.375-S	1	

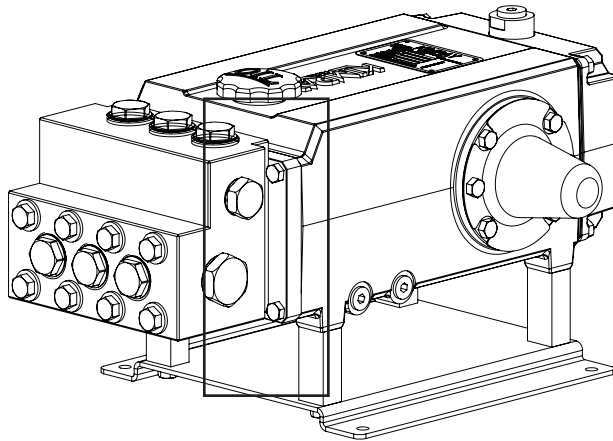


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	KIT
24	189-560-02	COVER, LEVEL SWITCH	1	
25	189-553	GASKET	2	
26	189-552	GLASS, SIGHT	1	
27	189-556	FRAME, SIGHTGLASS	1	
28	189-565	SCREW, 10-24 PAN HEAD	6	
29	189-564	GASKET, REAR COVER, K9	1	
30	C63-026-2118	O-RING, C62 REGULATOR BODY, -119	1	2
31	189-561	ADAPTER, INTERNAL FLOAT SWITCH	1	
32	189-313	PLUG, 1/2 INCH NPT	1	

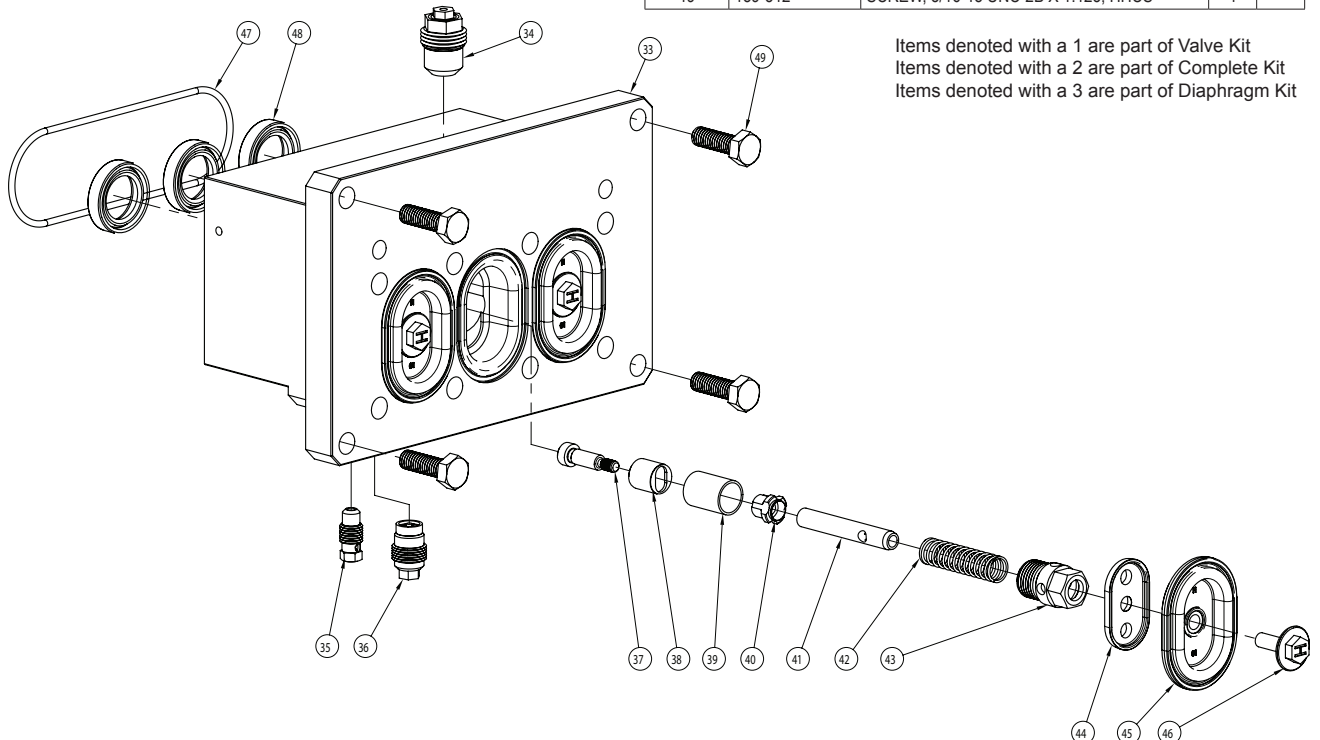
Items denoted with a 1 are part of Valve Kit  
 Items denoted with a 2 are part of Complete Kit  
 Items denoted with a 3 are part of Diaphragm Kit



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	KIT
33	189-403	PLATE, DIAPHRAGM, MACHINED BILLET 9L	2	
34	177-906	CARTRIDGE, AIR BLEED VALVE	3	2
	177-119	PLUG, AIR BLEED	1	
	172-016	BALL, 3/16 DIAMETER	1	
	172-017	SEAT, AIR BLEED, 12L14	1	
	172-118	PIN, AIR BLEED	1	
	172-061	SPRING, OVERFILL VALVE	1	
	172-119	RETAINER, AIR BLEEDER	1	
35	177-905	CARTRIDGE, OVERFILL VALVE	3	2
	177-017	OVERFILL SEAT	1	
	172-016	BALL, 3/16 DIAMETER	1	
	172-061	SPRING, OVERFILL VALVE	1	
	177-018	RETAINER, OVERFILL SPRING	1	
36	177-904	CARTRIDGE, UNDERFILL VALVE	3	2
	177-160	SEAT, UNDERFILL	1	
	172-161	CAGE, UNDERFILL	1	
	172-061	SPRING, OVERFILL VALVE	1	
	177-075	PIN, STOP	1	
	D25-015-3010	BALL, .250 DIA. ALLOY STEEL	1	
	189-594	CLIP, RETAINING	1	
37	189-451	SCREW, #10-24 UNC-2B x .625, SHSS	3	2
38	189-429	VALVE, SPOOL, HOLLOW	3	2
39	189-317	STOP, SPOOL	3	2
40	189-316	WASHER, GUIDE	3	2
41	189-452	ROD, BIAS SPRING, TAPERED	3	2
42	189-558	SPRING, BIAS	3	2
43	189-141	RETAINER, BIAS SPRING	3	2
44	189-454	CLAMP, DIAPHRAGM, 9L	3	2
45	189-125-02	DIAPHRAGM, INSERT MOLDED, 9L	3	2 & 3
	189-125	DIAPHRAGM, 9L	1	
	189-315	INSERT, DIAPHRAGM, UNDERSIZED, 9L	1	
46	177-141-01	SCREW, DIAPHRAGM FOLLOWER	3	2
47	D03-073-213	O-RING, Viton, -153	1	2
48	189-438	SEAL, SHAFT	3	
49	189-512	SCREW, 5/16-18 UNC-2B X 1.125, HHCS	4	

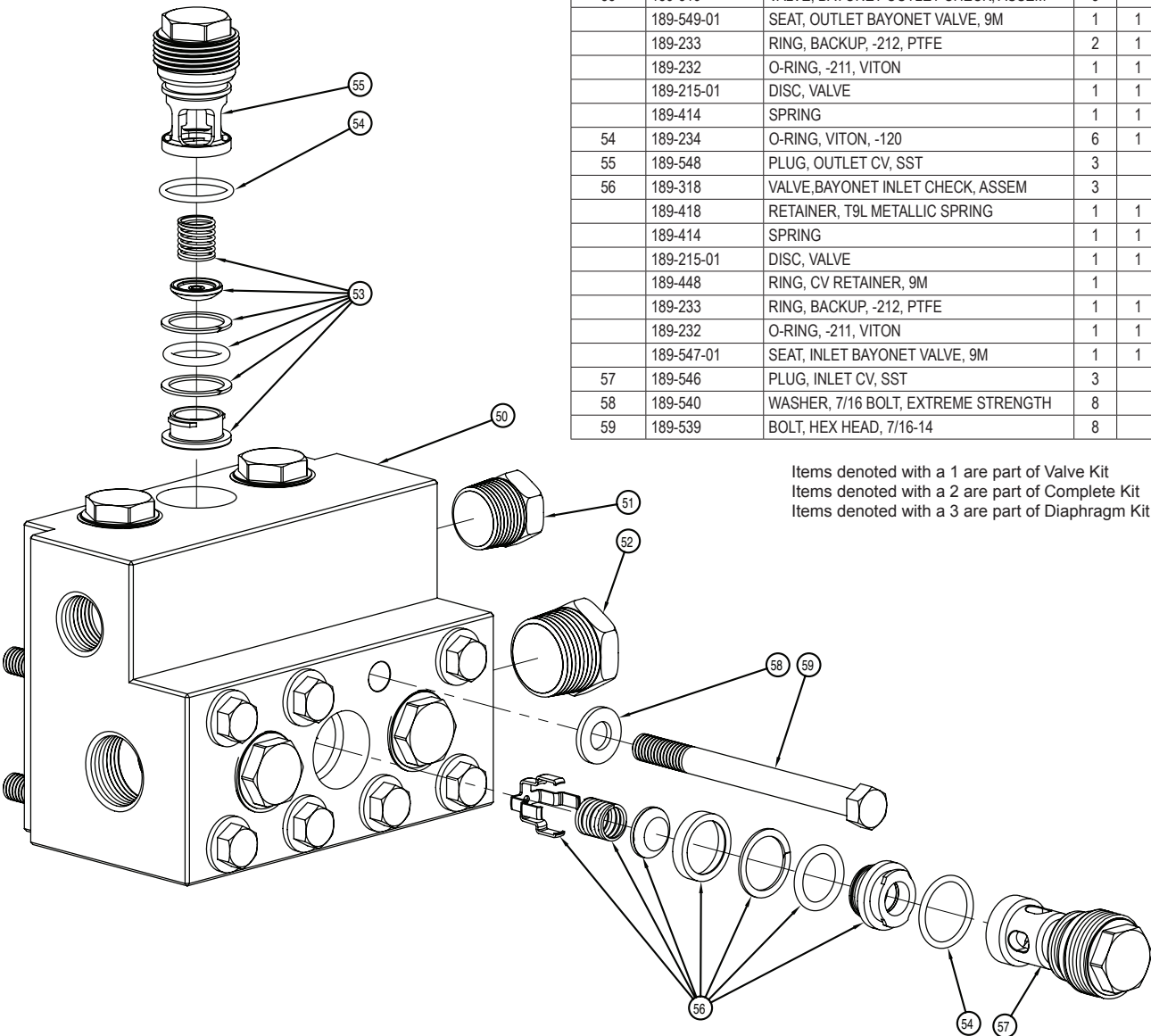
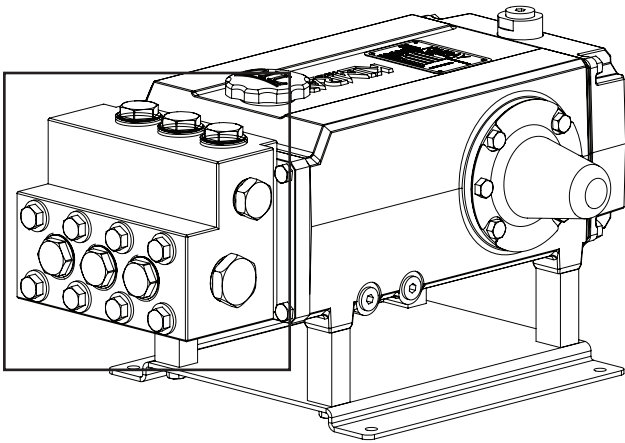


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 Items denoted with a 2 are part of Complete Kit  
 Items denoted with a 3 are part of Diaphragm Kit

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# GLYCOL PUMPS

ELECTRIC PUMPS  
STEEL

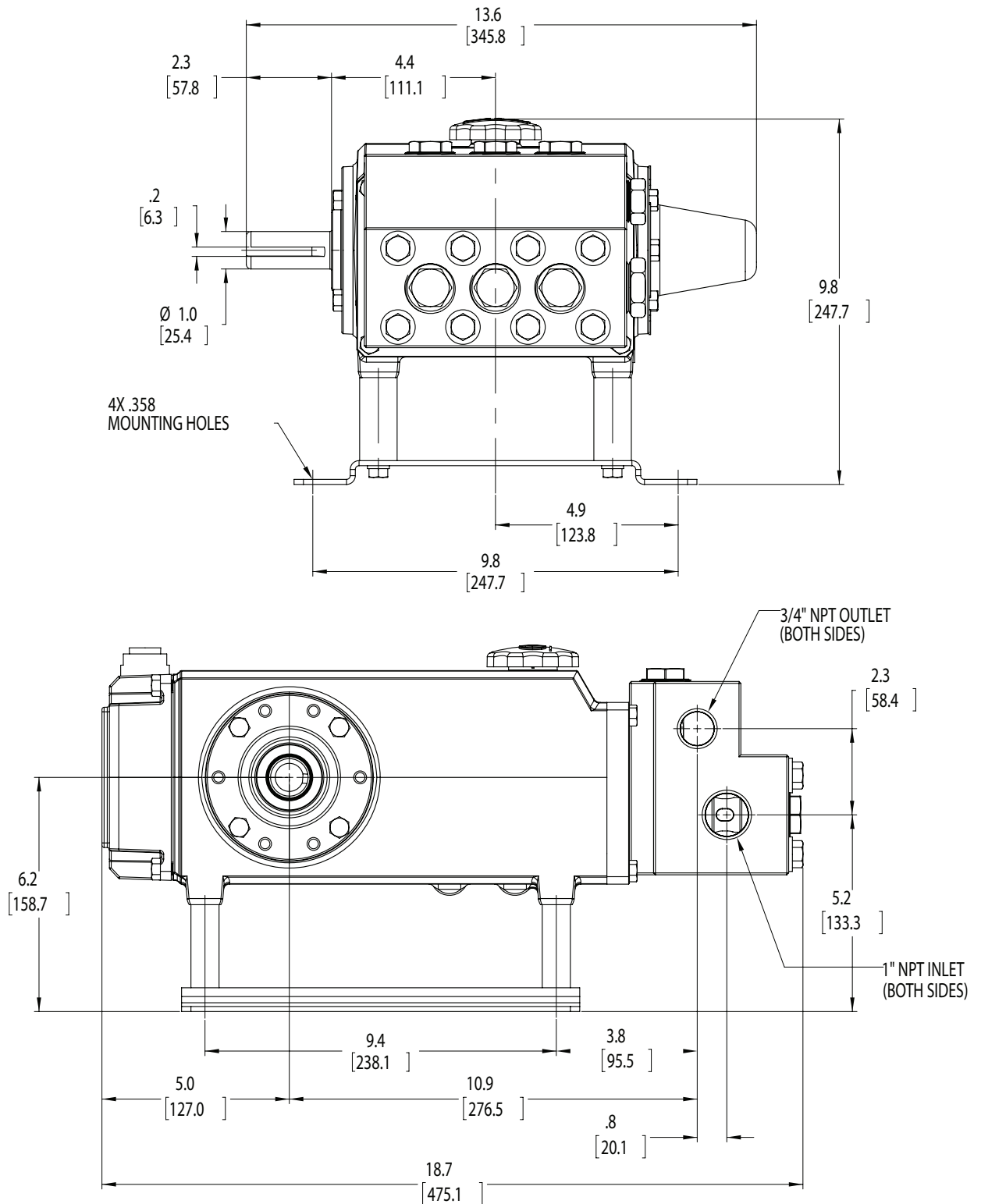


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	KIT
50	189-406-XX	MANIFOLD, K9L MACHINED	1	
51	189-311	PLUG, 3/4 NPT SST	1	
52	189-312	PLUG, 1 NPT SST	1	
53	189-319	VALVE, BAYONET OUTLET CHECK, ASSEM	3	
	189-549-01	SEAT, OUTLET BAYONET VALVE, 9M	1	1
	189-233	RING, BACKUP, -212, PTFE	2	1
	189-232	O-RING, -211, VITON	1	1
	189-215-01	DISC, VALVE	1	1
	189-414	SPRING	1	1
54	189-234	O-RING, VITON, -120	6	1
55	189-548	PLUG, OUTLET CV, SST	3	
56	189-318	VALVE, BAYONET INLET CHECK, ASSEM	3	
	189-418	RETAINER, T9L METALLIC SPRING	1	1
	189-414	SPRING	1	1
	189-215-01	DISC, VALVE	1	1
	189-448	RING, CV RETAINER, 9M	1	
	189-233	RING, BACKUP, -212, PTFE	1	1
	189-232	O-RING, -211, VITON	1	1
	189-547-01	SEAT, INLET BAYONET VALVE, 9M	1	1
57	189-546	PLUG, INLET CV, SST	3	
58	189-540	WASHER, 7/16 BOLT, EXTREME STRENGTH	8	
59	189-539	BOLT, HEX HEAD, 7/16-14	8	

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 Items denoted with a 2 are part of Complete Kit  
 Items denoted with a 3 are part of Diaphragm Kit

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# GLYCOL PUMPS



## ELECTRIC PUMPS STEEL

### FLOAT SWITCH

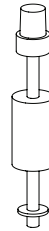
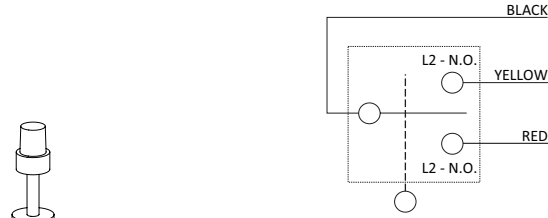
#### FUNCTION / PURPOSE:

The FLOAT SWITCH is installed in the rear cover of the pump and is used to detect HIGH or LOW oil level in the crank case.

#### INSTALLATION DESCRIPTION

Install by removing the adapter and conduit plug from the pump rear cover, secure the switch into the adapter and reinstall the assembly into the rear cover.

PART NUMBER	DESCRIPTION
6926	500EV FLOAT SWITCH ASSY



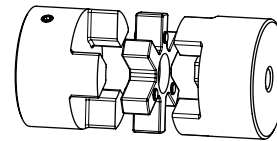
CONTACT RATING	SWITCHING VOLTAGE	MAX CURRENT LOAD	
		AMPS AC	AMPS DC
SPT 20 VA	0-30	.4	.3
	120	.17	.13
	240	.08	.06

### SHAFT COUPLINGS

#### FUNCTION / PURPOSE:

The SHAFT COUPLINGS join the motor and pump shafts with an elastomeric cushion. A properly sized coupling is required for each shaft. Additionally, a spider cushion installs between the two couplings.

PART NUMBER	DESCRIPTION
6902	BUNA COUPLING SPIDER
6900	Ø 1.000" BORE COUPLING
6917	Ø 1.375" BORE COUPLING
1901	Ø 1.625" BORE COUPLING



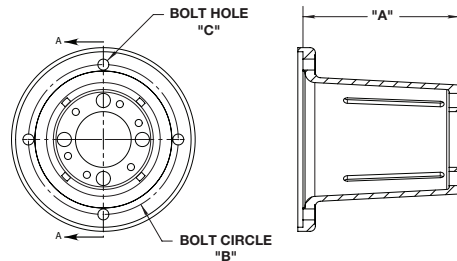
### C-FACE MOTOR ADAPTER

#### FUNCTION / PURPOSE:

The MOTOR ADAPTER rigidly connects and aligns the pump and motor together for direct-drive applications. The adapter also serves as a protective guard around the spinning shafts.

PART NUMBER	DESCRIPTION	NEMA FRAME SIZE
GKF	50015 EV MOTOR ADAPTER KIT	213T / 215T
GKG	50015 EV MOTOR ADAPTER KIT	254T / 256T

INCLUDES MOUNTING HARDWARE

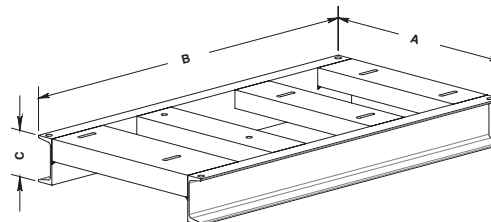


FRAME SIZE	A	B	C
213T/215T	6.100"	7.250"Ø	.531"Ø
254T/256T	7.600"	7.250"Ø	.531"Ø

### SKID

PART NUMBER	DESCRIPTION	NEMA FRAME SIZE
GKH	50015 EV SKID KIT	213T / 215T
GKI	50015 EV SKID KIT	254T / 256T

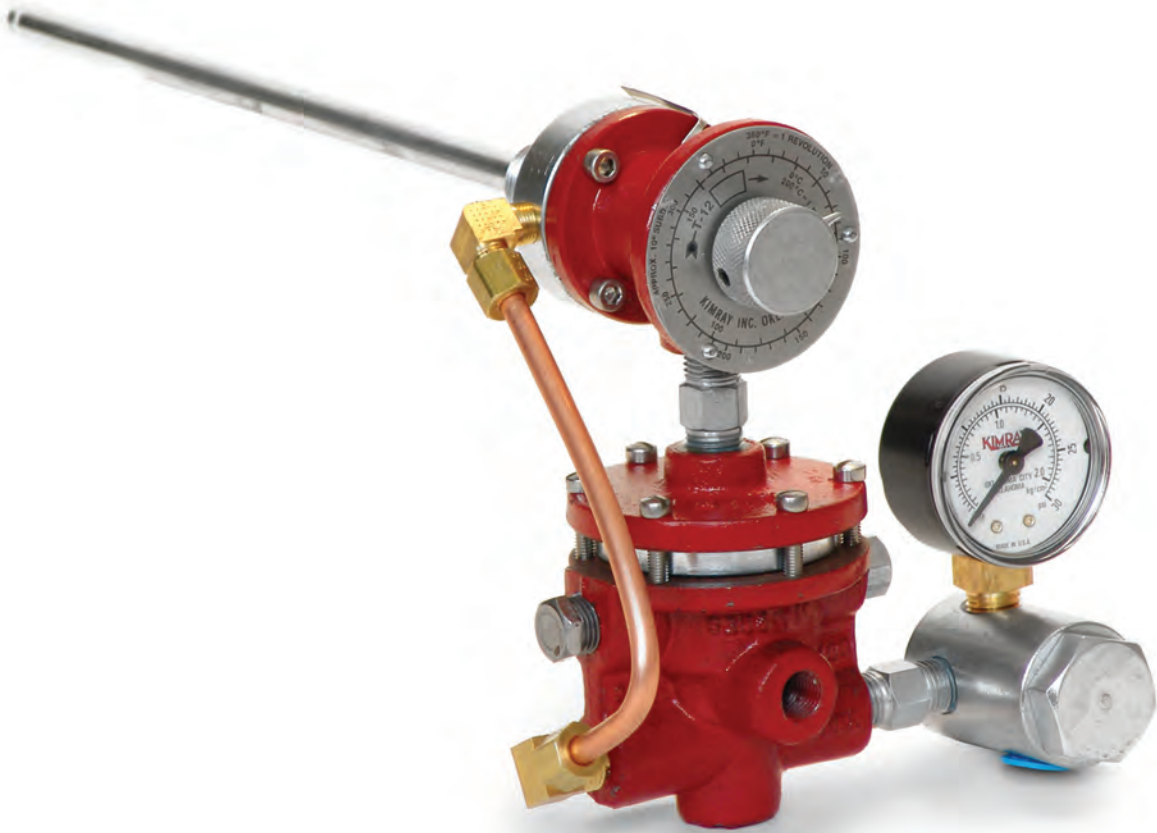
INCLUDES MOUNTING HARDWARE



FRAME SIZE	A	B	C
213T/215T	19 11/64"	29 1/2"	4"
254T/256T	35 5/16"	19 5/32"	4"

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# TEMPERATURE CONTROLLERS



# KIMRAY INC.®

SECTION H

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.  
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**THERMOSTATS**

Kimray thermostats are pneumatic pilots designed to signal on a set or varying temperature ranging from 30°F to 750°F. This signal opens or closes a diaphragm operated motor valve. These thermostats can also be used for controlling a set temperature in direct and indirect heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls and salt bath heaters.

**THERMOSTATS**

BASE ASSEMBLIES .....	10.1
5-30 lb. signal varies within set temperature range.	
SNAP ACTION THERMOSTATS .....	20.1
5-30 lb. On-Off signal at set point temperature.	
THROTTLE ACTION THERMOSTATS .....	30.1
5-30 lb. signal varies within narrow set temperature range.	
“TC” TEMPERATURE CONTROLLER .....	40.1
1 inch line, 125-0 lb. signal decreases with temperature rise.	
HIGH or LOW TEMPERATURE SHUT-DOWN .....	50.1
5-30 lb. signal change at set point.	
Must be manually reset to original condition.	
HIGH TEMPERATURE PILOT GUARD .....	60.1
5-30 lb. signal is Off when no flame is sensed.	

**CAPACITY CHARTS**

3 PG PILOT CAPACITY .....	70.1
BURNER VALVE CAPACITY .....	70.2

**ACCESSORIES**

BURNER VALVES .....	80.1
1 inch diaphragm operated motor valves suitable for burner supply gas control.	
THERMOMETER WELLS .....	90.1
For thermometer removal without vessel pressure loss.	
GAS SAMPLER PROBES .....	95.1
For gas sample retrieval from center of pipe.	
SEPARABLE SOCKETS .....	100.1
Increases working pressure of thermostats from 500 to 7,000 psig.	

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

TEMPERATURE:

+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum fluids, Sea Water

### HSN (HNBR)

TEMPERATURE:

-15° to +300° F  
-26° to +149° C

APPLICATION:

Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

FLUID / GAS:

Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

TEMPERATURE:

-40° to +400° F  
-20° to +204° C

APPLICATION:

Chemically Inert Elastomer Best in static Do not use at low temps

FLUID / GAS:

Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline, Diesel, Fuel Oil Systems

DO NOT USE WITH:

Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol, Amines, Sodium hydroxide solutions

### EP (EPDM)

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 (P)

TEMPERATURE:

-40° to +220° F  
-40° to +104° C

APPLICATION:

High abrasion resistance Seats, Diaphragms

FLUID / GAS:

Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane, butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

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

#### ACTION:

Indirect throttle; Pilot Output Pressure (Yellow) decreases with temperature rise.

Direct semi-throttle; Pilot Output Pressure (Yellow) increases with temperature rise.

#### APPLICATION:

Used to control a set temperature in heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15	max. without Separable Socket
4000	281.23	max. with Separable Socket
7000	492.15	max. with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents

#### TEMPERATURE RANGE:

T 12, T 18, T 24, T 36	-30°F minimum to 400°F maximum
	-34°C minimum to 204°C maximum

#### SUPPLY PRESSURE:

5 to 30 psig
.35 to 2.11 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

T 12	- 1.75 psig/°F, .22 kg/cm <sup>2</sup> /°C
T 18	- 2.50 psig/°F, .31 kg/cm <sup>2</sup> /°C

#### OPERATION:

These Thermostat Base Assemblies consist of a STAINLESS TUBE for monitoring the changing temperature, which is connected by a Low Expansion Alloy Rod to a DIAPHRAGM or BELLOWS ASSEMBLY. The differential pressure across the Diaphragm or Bellows combined with changes in the length of the STAINLESS TUBE throttle a PILOT PLUG seat. The PILOT PLUG consists of two stainless balls rigidly connected together. The seat at BALL 1 is the Supply Pressure inlet (Violet to Yellow). The seat at BALL 2 is the pressure vent (Yellow to Atmosphere).

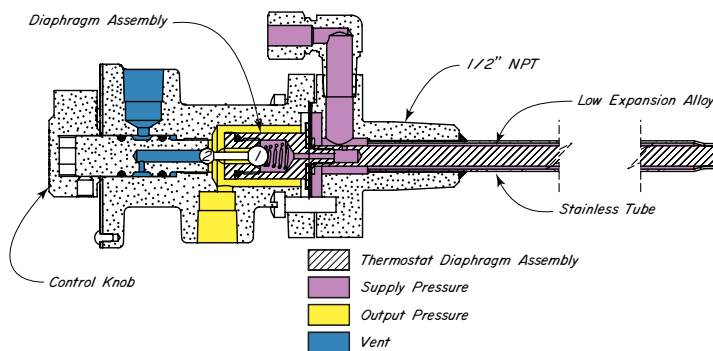
Assume the set temperature of the Thermostat is above that of the system. The vent at BALL 2 is closed and the inlet at BALL 1 is open. Output Pressure (Yellow) is being sent to any Pilot or Motor Valve.

As the temperature rises in the system, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Violet to Yellow) and open the seat at BALL 2 (Yellow to Atmosphere). Output Pressure (Yellow) decreases to cause the desired Pilot or Motor Valve action.

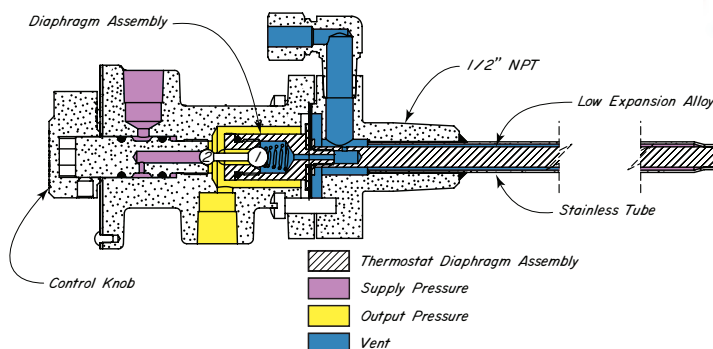
As the temperature decreases, the action is reversed to increase Output Pressure (Yellow).

By reversing the Vent and Supply lines, the Thermostat can be made to act in a direct snap mode, Pilot Output Pressure increases with temperature rise. Pilot output vents with temperature decrease

#### INDIRECT ACTION



#### DIRECT ACTION

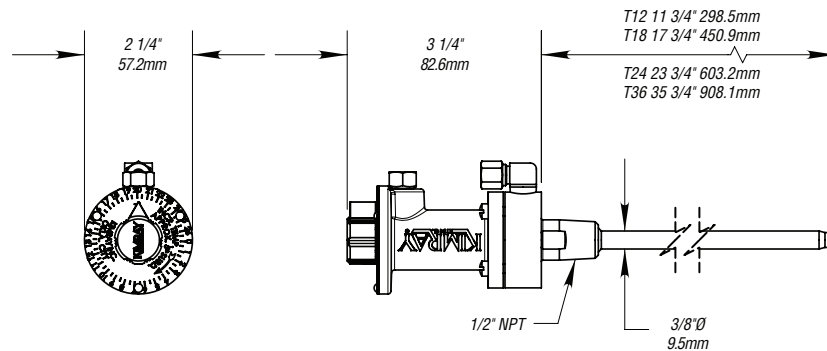
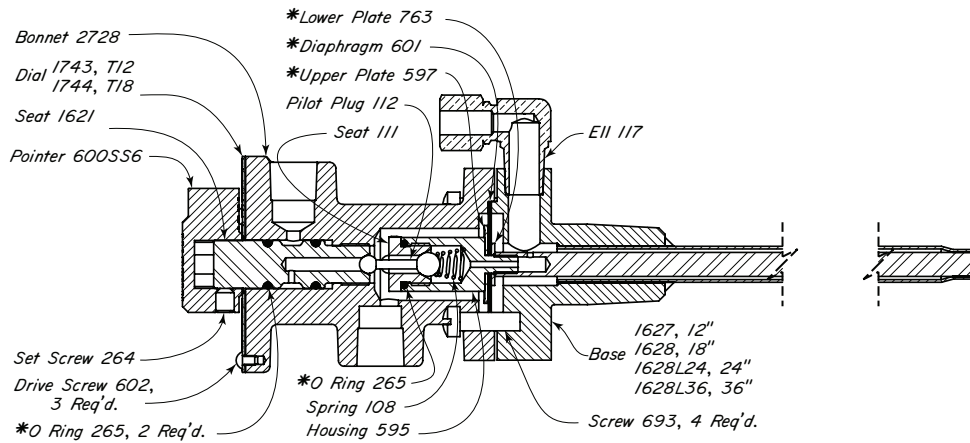


Kimray is an ISO 9001- certified manufacturer.

# TEMPERATURE CONTROLLERS



## LOW TEMPERATURE BASE ASSEMBLIES DUCTILE IRON



### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAA	T 12	400	204	RLB
HAB	T 18	400	204	RLB
HAC	T 24	400	204	RLB
HAD	T 36	400	204	RLB

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

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#### ACTION:

Indirect throttle; Pilot Output Pressure (Yellow) decreases with temperature rise.

Direct semi-throttle; Pilot Output Pressure (Yellow) increases with temperature rise.

#### APPLICATION:

Used to control a set temperature in heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15	max. without Separable Socket
4000	281.23	max. with Separable Socket
7000	492.15	max. with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents

#### TEMPERATURE RANGE:

HT 12, HT 18	-30°F minimum to 750°F maximum
	-34°C minimum to 399°C maximum

#### SUPPLY PRESSURE:

5 to 30 psig
.35 to 2.11 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

HT 12	- 2.50 psig/°F, .31 kg/cm <sup>2</sup> /°C
HT 18	- 3.75 psig/°F, .47 kg/cm <sup>2</sup> /°C

#### OPERATION:

These Thermostat Base Assemblies consist of a STAINLESS TUBE for monitoring the changing temperature, which is connected by a Low Expansion Alloy Rod to a DIAPHRAGM or BELLOWS ASSEMBLY. The differential pressure across the Diaphragm or Bellows combined with changes in the length of the STAINLESS TUBE throttle a PILOT PLUG seat. The PILOT PLUG consists of two stainless balls rigidly connected together. The seat at BALL 1 is the Supply Pressure inlet (Violet to Yellow). The seat at BALL 2 is the pressure vent (Yellow to Atmosphere).

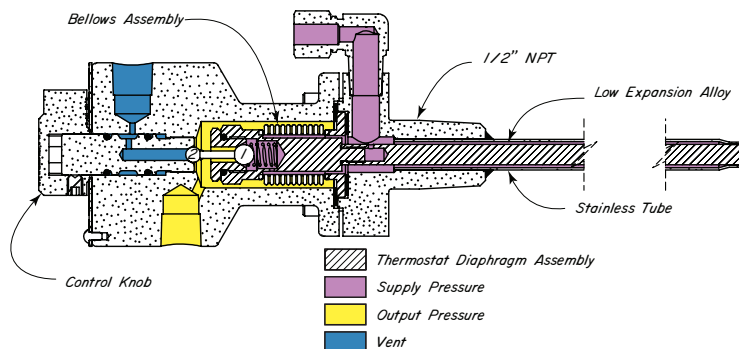
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As the temperature rises in the system, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Violet to Yellow) and open the seat at BALL 2 (Yellow to Atmosphere). Output Pressure (Yellow) decreases to cause the desired Pilot or Motor Valve action.

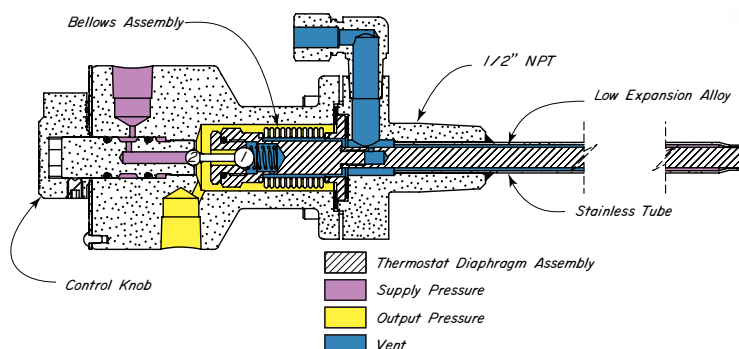
As the temperature decreases, the action is reversed to increase Output Pressure (Yellow).

By reversing the Vent and Supply lines, the Thermostat can be made to act in a direct snap mode, Pilot Output Pressure increases with temperature rise. Pilot output vents with temperature decrease

#### INDIRECT ACTION



#### DIRECT ACTION

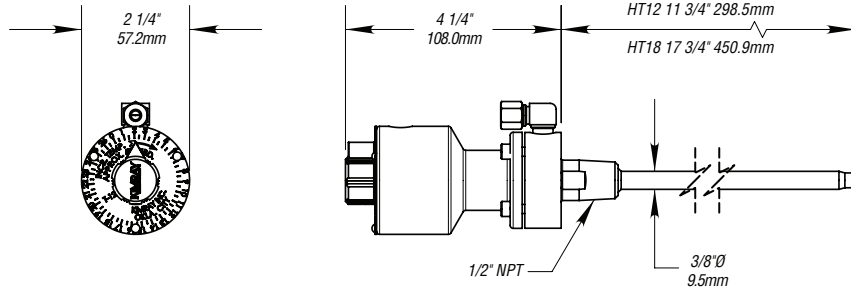
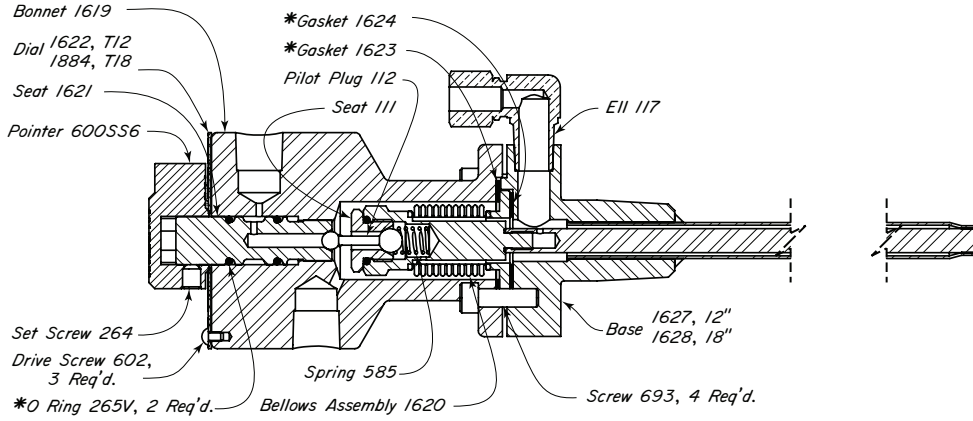


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# TEMPERATURE CONTROLLERS



## HIGH TEMPERATURE BASE ASSEMBLIES STEEL



### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HBA	HT 12	750	399	RLQ
HBB	HT 18	750	399	RLQ

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Direct snap; Pilot Output Pressure “snaps on” with temperature rise.

#### APPLICATION:

Used to control temperature in indirect and direct heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

T 12S, T 18S	-30°F minimum to 400°F maximum -34°C minimum to 204°C maximum
HT 12S, HT 18S	-30°F minimum to 750°F maximum -34°C minimum to 399°C maximum

#### OPERATION:

These Thermostats each consist of an Indirect Acting Throttle Base Assembly which is connected to a 3 PS Pilot providing a Direct Snap Output Signal. The 3 PS Pilot also acts as an amplifier increasing the sensitivity of the Base Assembly.

Assume the set temperature of the Thermostat is above the temperature of the system being controlled. As the system temperature rises, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Violet to Red) and open the seat at BALL 2 (Red to Atmosphere). As Variable Pressure (Red) decreases, the 3 PS Pilot Diaphragm Assembly moves upward to close the seat at BALL 4 (Yellow to Atmosphere) and open the seat at BALL 3 (Violet to Yellow). Increasing Pilot Output Pressure (Yellow) helps move the 3 PS Pilot Diaphragm Assembly upward and thereby produces a “snap on” pilot action. Output Pressure (Yellow) is sent to cause the desired Pilot or Motor Valve action.

As the system temperature decreases, Variable Pressure (Red) increases, the Pilot Diaphragm Assembly is forced downward to close the seat at Ball 3 (Violet to Yellow) and open the seat at BALL 4 (Yellow to Atmosphere). Venting of Pilot Output Pressure (Yellow) permits the Pilot Diaphragm Assembly to move downward more rapidly, producing a “snap off” pilot action. Output Pressure (Yellow) is vented causing the desired Pilot or Motor Valve action.

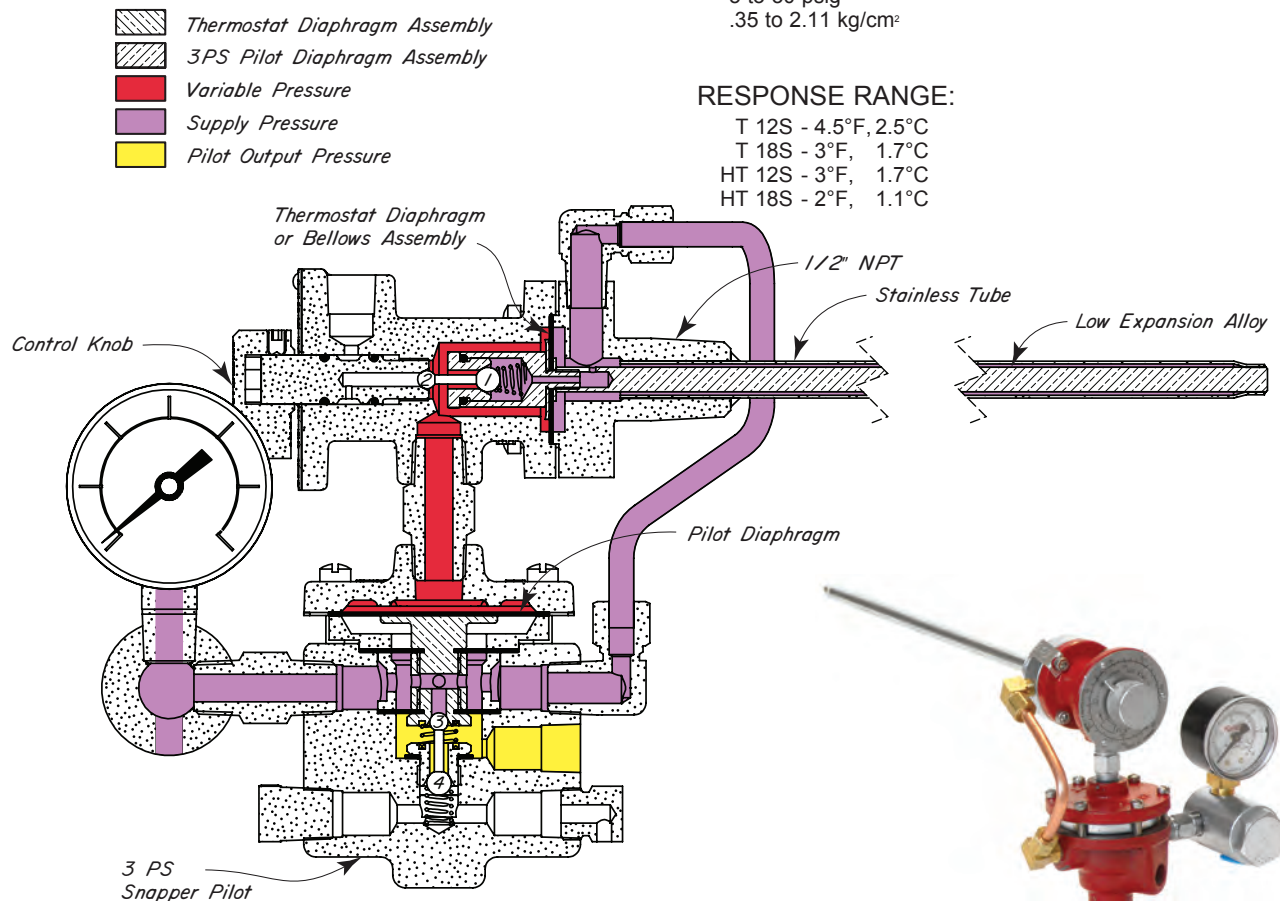
The 112 SMT is the recommended Motor Valve for this thermostat configuration. Refer to “Burner Valves” in the Table of Contents for more information.

#### SUPPLY PRESSURE:

5 to 30 psig
.35 to 2.11 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

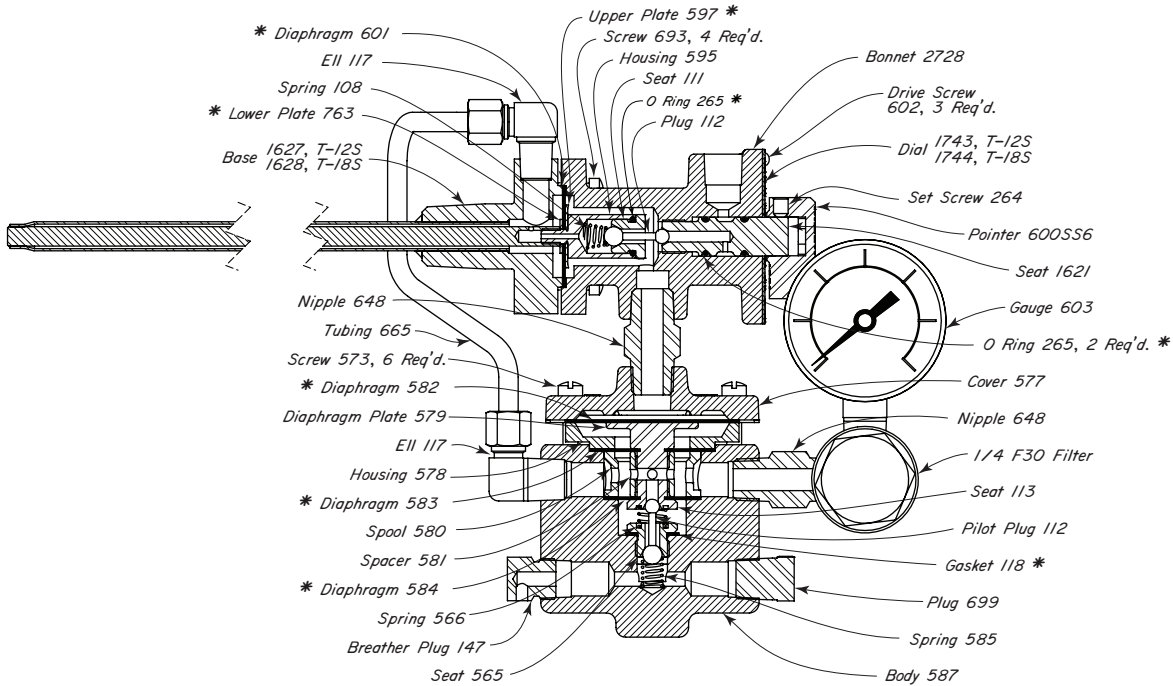
T 12S	- 4.5°F, 2.5°C
T 18S	- 3°F, 1.7°C
HT 12S	- 3°F, 1.7°C
HT 18S	- 2°F, 1.1°C



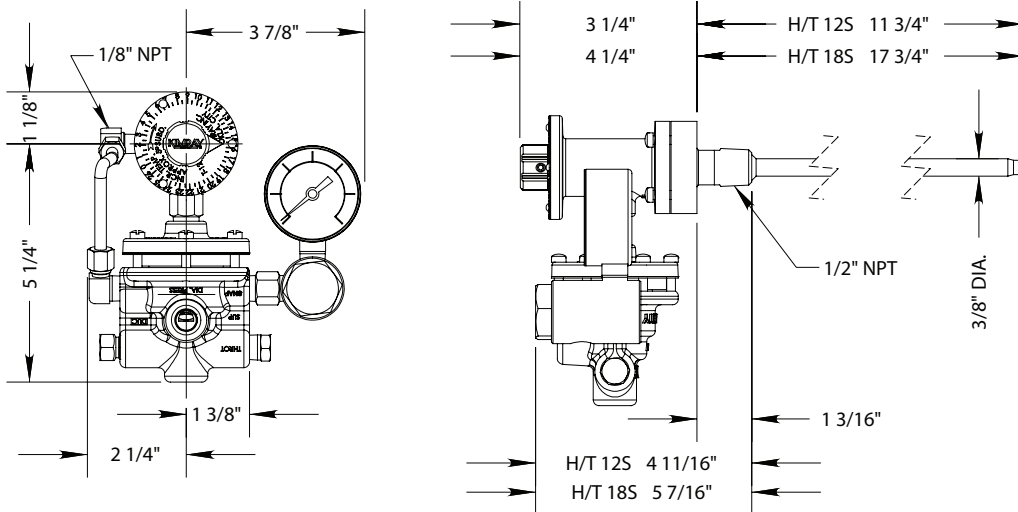
# TEMPERATURE CONTROLLERS



## DIRECT SNAP THERMOSTAT DUCTILE IRON or STEEL



### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

### THERMOSTATS AVAILABLE:

HAG	T 12S	400	204	RLA
HAH	T 18S	400	204	RLA
HBG	HT 12S	750	399	RLR
HBH	HT 18S	750	399	RLR

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

For parts reference of the High Temperature Base Assemblies for HT 12S and HT 18S, refer to "Base Assemblies" in Table of Contents.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Indirect snap; Pilot Output Pressure “snaps off” with temperature rise.

#### APPLICATION:

Used to control temperature in indirect and direct heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

-30°F minimum to 400°F maximum  
-34°C minimum to 204°C maximum

#### OPERATION:

This Thermostat consists of a Direct Acting Semi-throttle Base Assembly which is connected to a 3 PS Pilot producing an Indirect Snap Output Signal. The 3 PS Pilot also acts as an amplifier increasing the sensitivity of the Base Assembly.

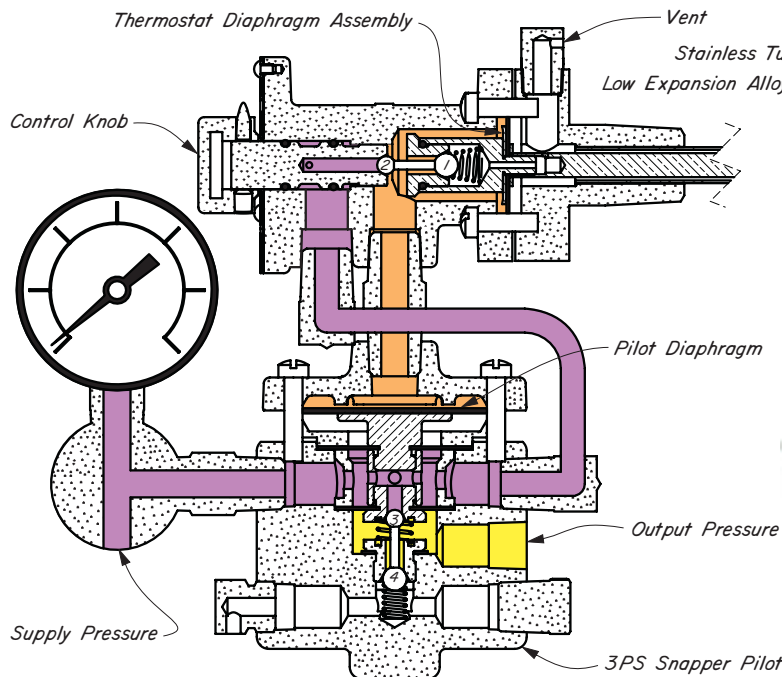
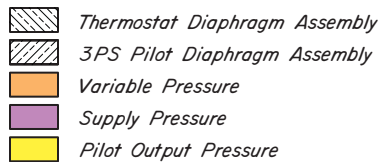
Assume the set temperature of the Thermostat is above that of the system being controlled and Pilot Output Pressure (Yellow) is being sent to any Pilot or Motor Valve. As the system temperature rises, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm Assembly in a direction to first close the seat at BALL 1 (Orange to Atmosphere) and open the seat at BALL 2 (Violet to Orange). As Variable Pressure (Orange) increases, the 3 PS Pilot Diaphragm Assembly moves downward to close the seat at BALL 3 (Violet to Yellow) and open the seat at BALL 4 (Yellow to Atmosphere).

Venting of Pilot Output Pressure (Yellow) helps move the 3 PS Pilot Diaphragm Assembly downward and thereby produces a “snap off” action of the pilot to cause the desired Pilot or Motor Valve action.

As Variable Pressure (Orange) decreases due to decreasing system temperature, the Pilot Diaphragm Assembly is forced upward to close the seat at BALL 4 (Yellow to Atmosphere) and open the seat at BALL 3 (Violet to Yellow). Increasing Pilot Output Pressure (Yellow) permits the Pilot Diaphragm Assembly to move upward more rapidly, producing a “snap on” pilot action. This action allows a Motor Valve to open fully.

#### SUPPLY PRESSURE:

5 to 30 psig  
.35 to 2.11 kg/cm<sup>2</sup>

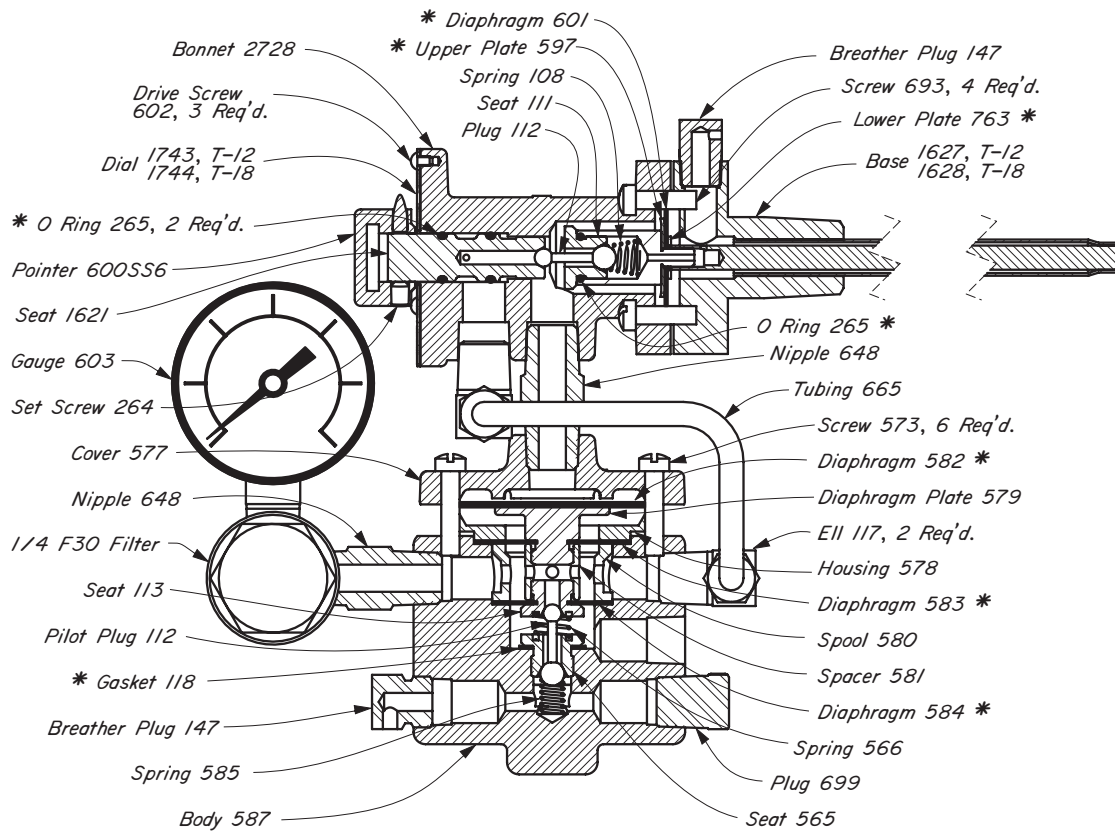


Kimray is an ISO 9001- certified manufacturer.

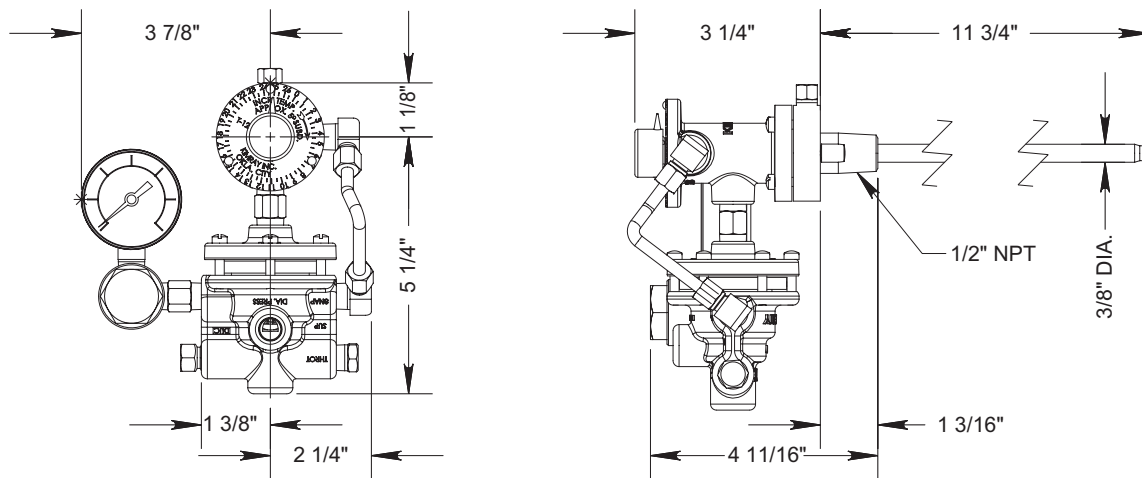
# TEMPERATURE CONTROLLERS



## INDIRECT SNAP THERMOSTAT DUCTILE IRON



### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAU	T 12 DAS	400	204	RLN
HAX	T 18 DAS	400	204	RLN

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Indirect throttle; Pilot Output Pressure (Yellow) decreases with temperature rise.

#### APPLICATION:

For temperature control of indirect heaters, emulsion treaters, reboilers, steam generators, heat exchangers cooler shutter controllers, and salt bath heaters.






#### WORKING PRESSURE (sensing element):

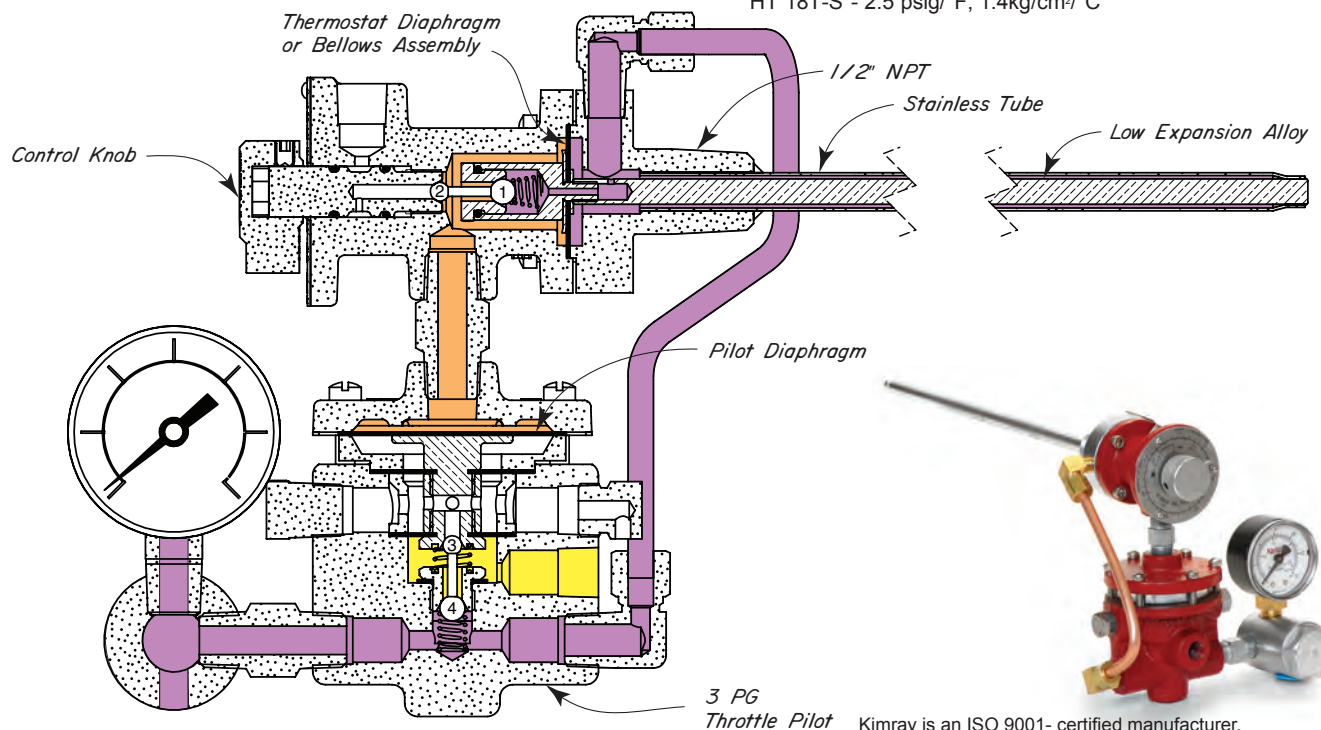
psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

T 12T, T 18T	-30°F minimum to 400°F maximum -34°C minimum to 204°C maximum
HT 12T, HT 18T	-30°F minimum to 750°F maximum -34°C minimum to 399°C maximum
HT 12T-S, HT 18T-S	-30°F minimum to 750°F maximum -34°C minimum to 399°C maximum

-  Thermostat Diaphragm Assembly
-  3PG Pilot Diaphragm Assembly
-  Variable Pressure
-  Supply Pressure
-  Pilot Output Pressure



#### OPERATION:

These Thermostats each consist of a Base Assembly sending an indirect throttle signal to operate a 3 PG Pilot. The 3 PG Pilot is connected as a throttle pilot and amplifies this signal increasing the sensitivity of the Base Assembly.

Assume the set temperature of the Thermostat is above the temperature of the system being controlled and Output Pressure (Yellow) is being sent to a Pilot or Motor Valve.

As the system temperature rises, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Violet to Orange) and open the seat at BALL 2 (Orange to Atmosphere). As Variable Pressure (Orange) decreases the 3 PG Pilot Diaphragm Assembly moves upward to close the seat at BALL 4 (Violet to Yellow) and open the seat at BALL 3 (Yellow to Atmosphere). Pilot Output Pressure (Yellow) is vented for the desired Pilot or Motor Valve action.

As the system temperature decreases, the action is reversed to increase Pilot Output Pressure (Yellow).

Due to the low modulating characteristic of a Motor Valve, the action of this controller will not be a true throttle action but will have a tendency to over ride the control point. The 112 SMT-T is the recommended Motor Valve for this thermostat configuration. Refer to "Burner Valves" in the Table of Contents for more information.

The 3 PG Pilot may be used for snap service when connected as a snapper pilot. For snap connection of the 3 PG Pilot refer to catalog section "Y".

#### SUPPLY PRESSURE:

5 to 30 psig  
.35 to 2.11 kg/cm<sup>2</sup>

#### RESPONSE RANGE:

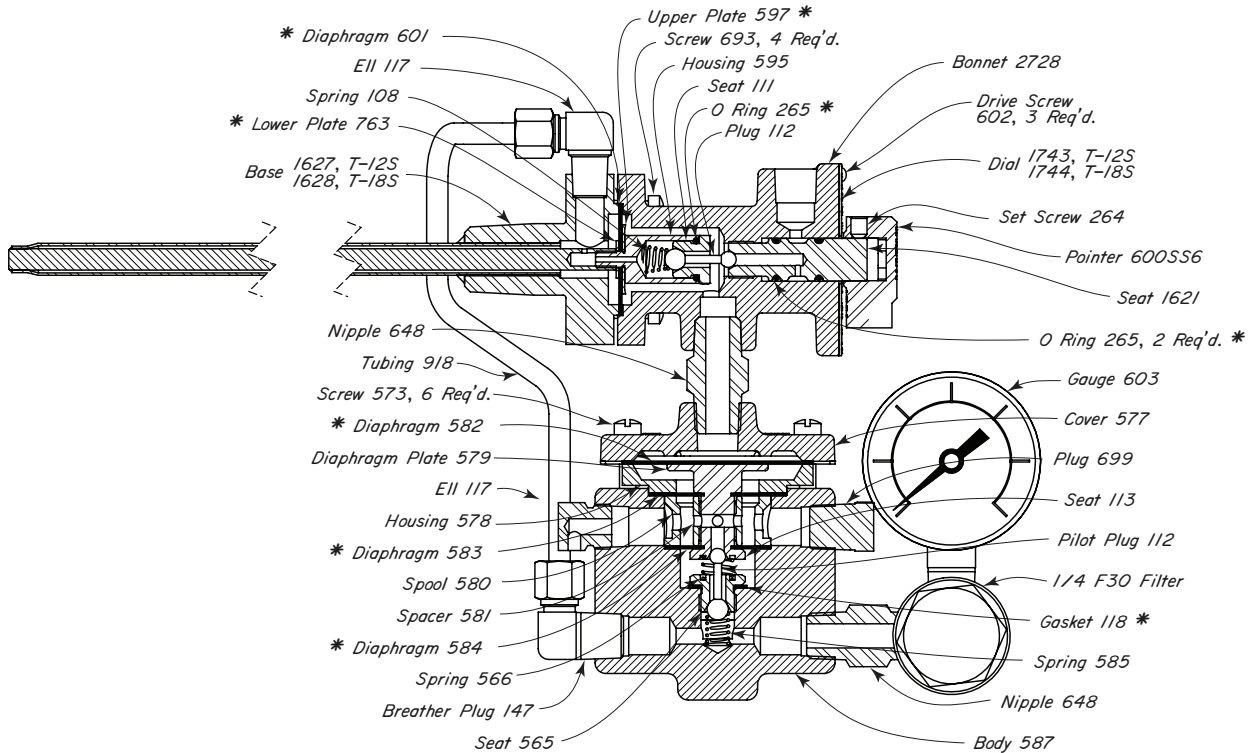
T 12T	-5 psig/°F, 2.8kg/cm <sup>2</sup> /°C
T 18T	-3.5 psig/°F, 1.9kg/cm <sup>2</sup> /°C
HT 12T	-3.5 psig/°F, 1.9kg/cm <sup>2</sup> /°C
HT 18T	-2.5 psig/°F, 1.4kg/cm <sup>2</sup> /°C
HT 12T-S	-3.5 psig/°F, 1.9kg/cm <sup>2</sup> /°C
HT 18T-S	-2.5 psig/°F, 1.4kg/cm <sup>2</sup> /°C

Kimray is an ISO 9001- certified manufacturer.

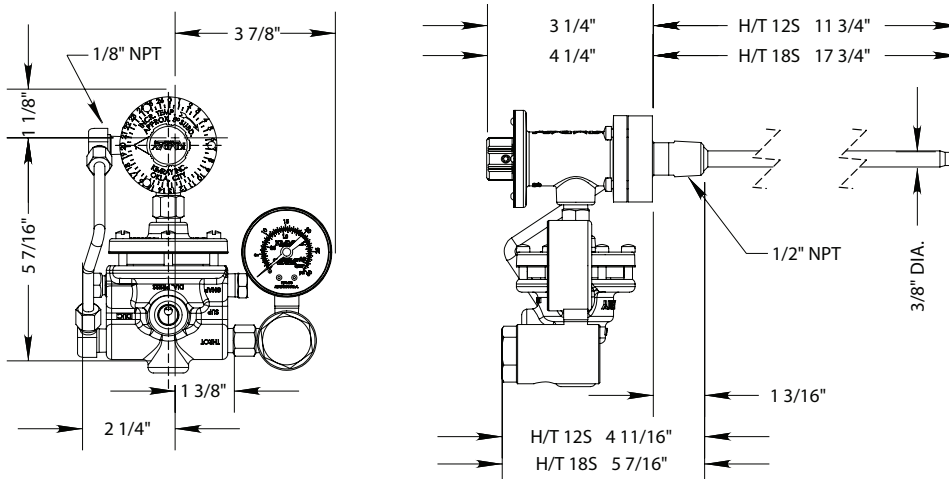
# TEMPERATURE CONTROLLERS



## INDIRECT THROTTLE THERMOSTAT DUCTILE IRON or STEEL



### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAI	T 12T	400	204	RLA
HAJ	T 18T	400	204	RLA
HBI	HT 12T	750	399	RLR
HBJ	HT 18T	750	399	RLR

### NOTES:

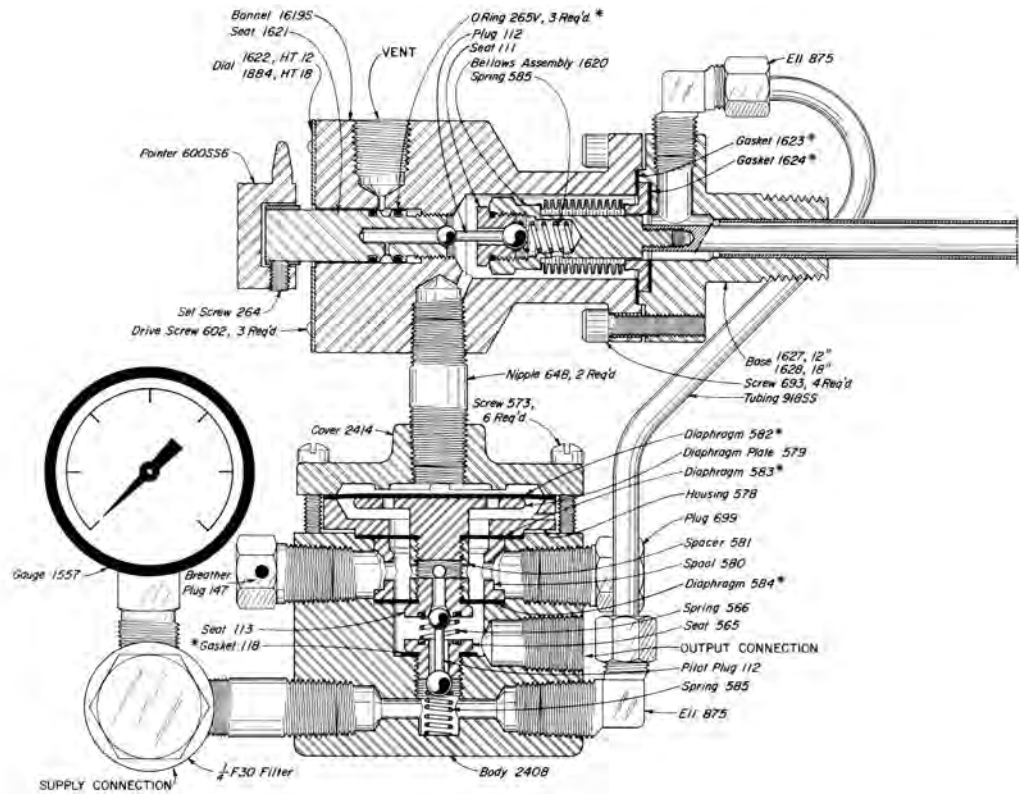
\*These are recommended spare parts and are stocked as repair kits.

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

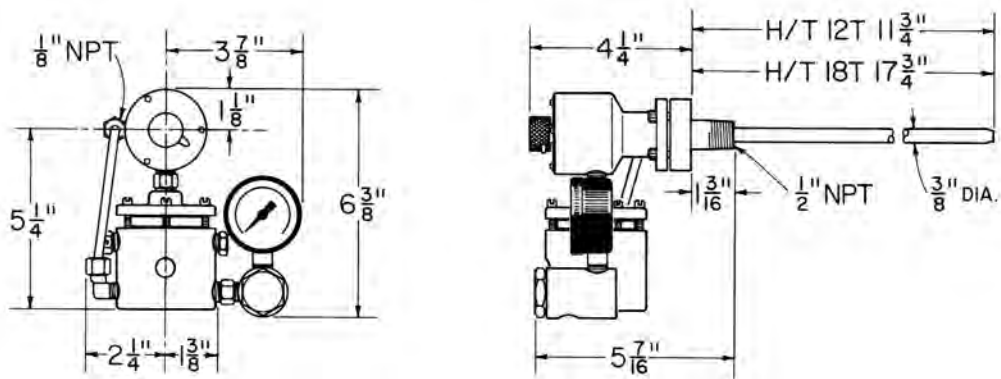
For HT 12T and HT 18T High Temperature Base Assembly parts, refer to "Base Assemblies" in Table of Contents.

Kimray is an ISO 9001- certified manufacturer.





#### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

#### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HBP	HT 12T-S	750	399	RLR
HBR	HT 18T-S	750	399	RLR

#### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Direct throttle; Pilot Output Pressure (Yellow) increases with temperature rise.

#### APPLICATION:

For temperature control in indirect and direct heaters, emulsion treaters, reboilers, steam generators, heat exchangers cooler shutter controllers, and salt bath heaters.

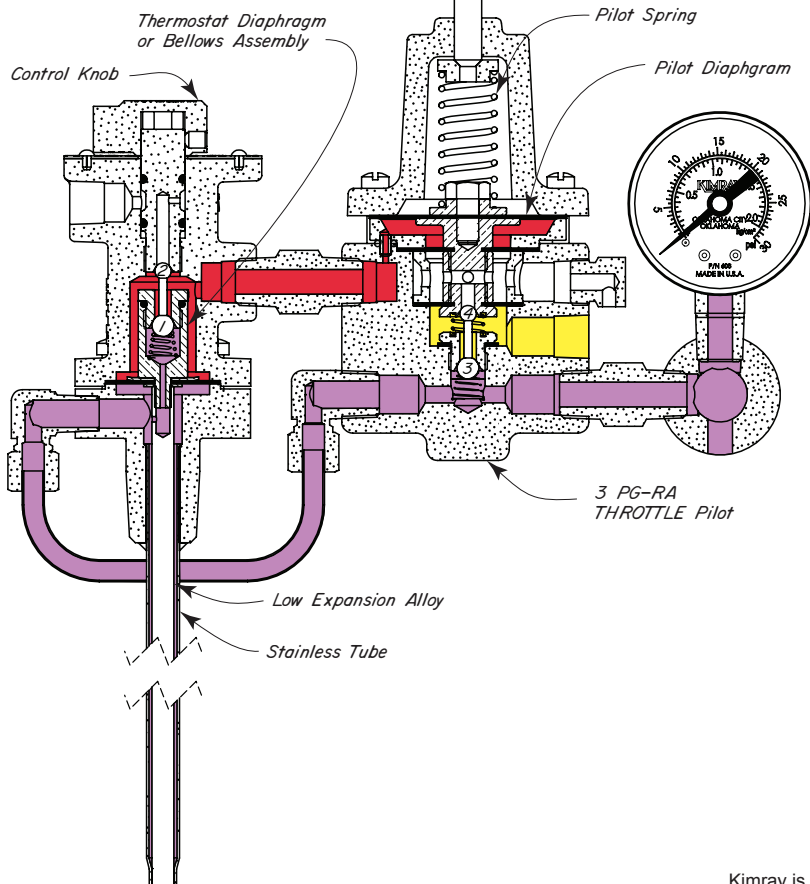
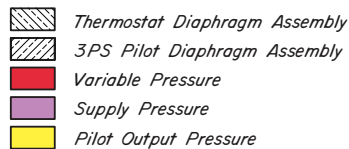
#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents

#### TEMPERATURE RANGE:

T 12DA, T 18TDA	-30°F minimum to 400°F maximum -34°C minimum to 204°C maximum
HT 12TDA, HT 18TDA	-30°F minimum to 750°F maximum -34°C minimum to 399°C maximum



#### OPERATION:

These Thermostats consist of Indirect throttle action Base Assemblies connected to a 3 PGRA which reverses and amplifies the signal to provide direct throttle action.

Assume the set temperature of the Thermostat is above the temperature of the system being controlled. Then the seats at BALLS 1 and 4 are open. The seats at BALL 2 and 3 are closed.

As the system temperature rises, the STAINLESS TUBE increases in length, moving the Thermostat Diaphragm (or Bellows) Assembly so as to first close the seat at BALL 1 (Violet to Red) and open the seat at BALL 2 (Red to Atmosphere). As the Controlled Variable Pressure (Red) decreases, the PILOT SPRING forces the Pilot Diaphragm Assembly downward closing the seat at BALL 4 (Yellow to Atmosphere) and opening the seat at BALL 3 (Violet to Yellow). This increases the Pilot Output Pressure (Yellow).

As the system temperature decreases the action of the controller is reversed, decreasing the Pilot Output Pressure (Yellow).

Pilot Output Pressure (Yellow) may be connected to any type of diaphragm controller such as a 3-way motor valve on the heat exchanger of a low temperature separation unit.

#### SUPPLY PRESSURE:

5 to 25 psig
.35 to 1.75 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

T 12TDA - 3 psig/°F,	.38 kg/cm <sup>2</sup> /°C
T 18TDA - 4 psig/°F,	.50 kg/cm <sup>2</sup> /°C
HT 12TDA - 5 psig/°F,	.63 kg/cm <sup>2</sup> /°C
HT 18TDA - 6 psig/°F,	.76 kg/cm <sup>2</sup> /°C

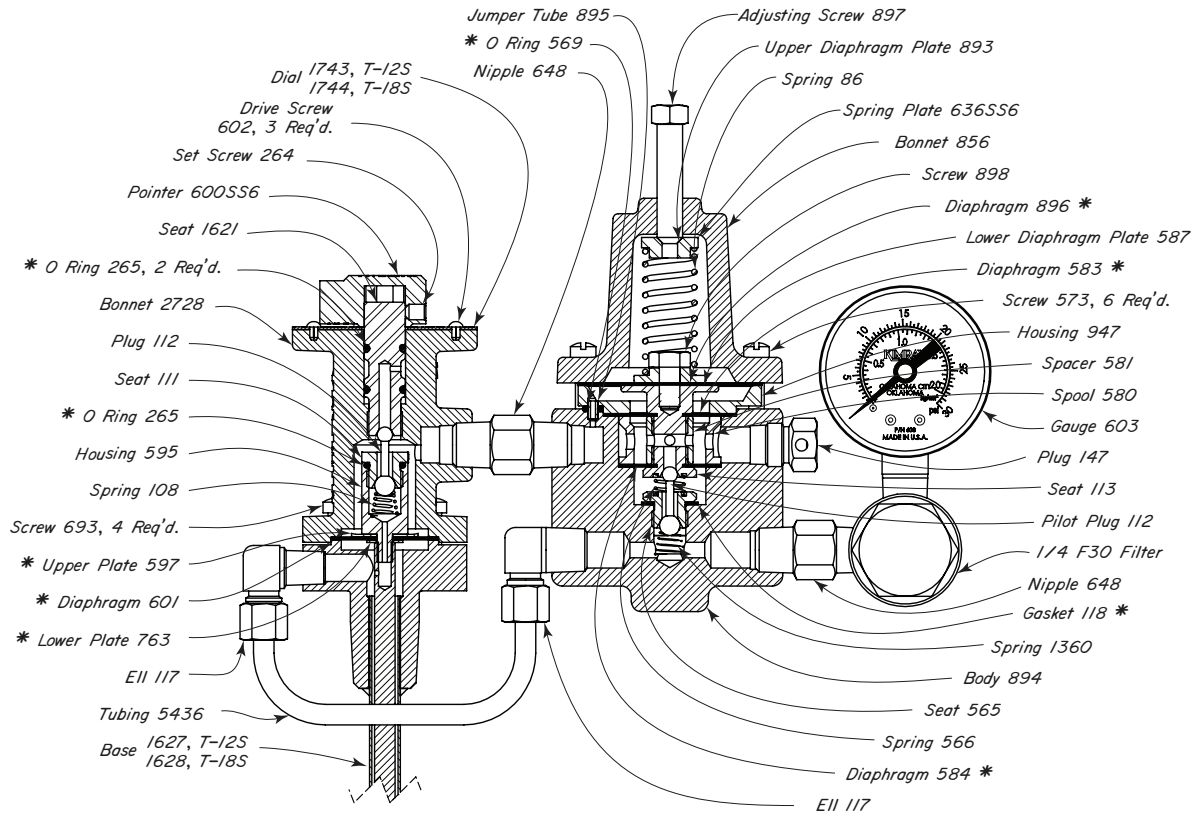


Kimray is an ISO 9001- certified manufacturer.

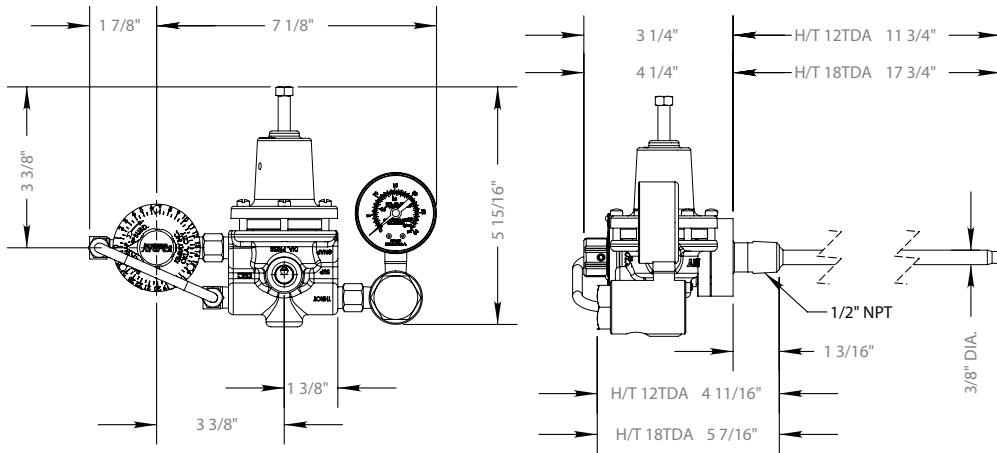
# TEMPERATURE CONTROLLERS



## DIRECT THROTTLE THERMOSTAT DUCTILE IRON or STEEL



### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAK	T 12TDA	400	204	RLK
HAL	T 18TDA	400	204	RLK
HBK	HT 12TDA	750	399	RLX
HBL	HT 18TDA	750	399	RLX

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

For HT 12TDA and HT 18TDA Thermostat Base Assembly parts, refer to "Base Assemblies" in Table of Contents.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Direct semi-throttle; Pilot Output Pressure (Yellow) increases with temperature rise.

#### APPLICATION:

For temperature control in indirect and direct heaters, emulsion treaters, reboilers, steam generators, heat exchangers cooler shutter controllers, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

- 30°F minimum to 400°F maximum
- 34°C minimum to 204°C maximum

#### OPERATION:

These Thermostats consist of Direct Acting Base Assembly sending a direct semi-throttle signal to a 3 PG Pilot. The 3 PG Pilot is connected as a throttle pilot and amplifies this signal increasing the sensitivity of the Base Assembly.

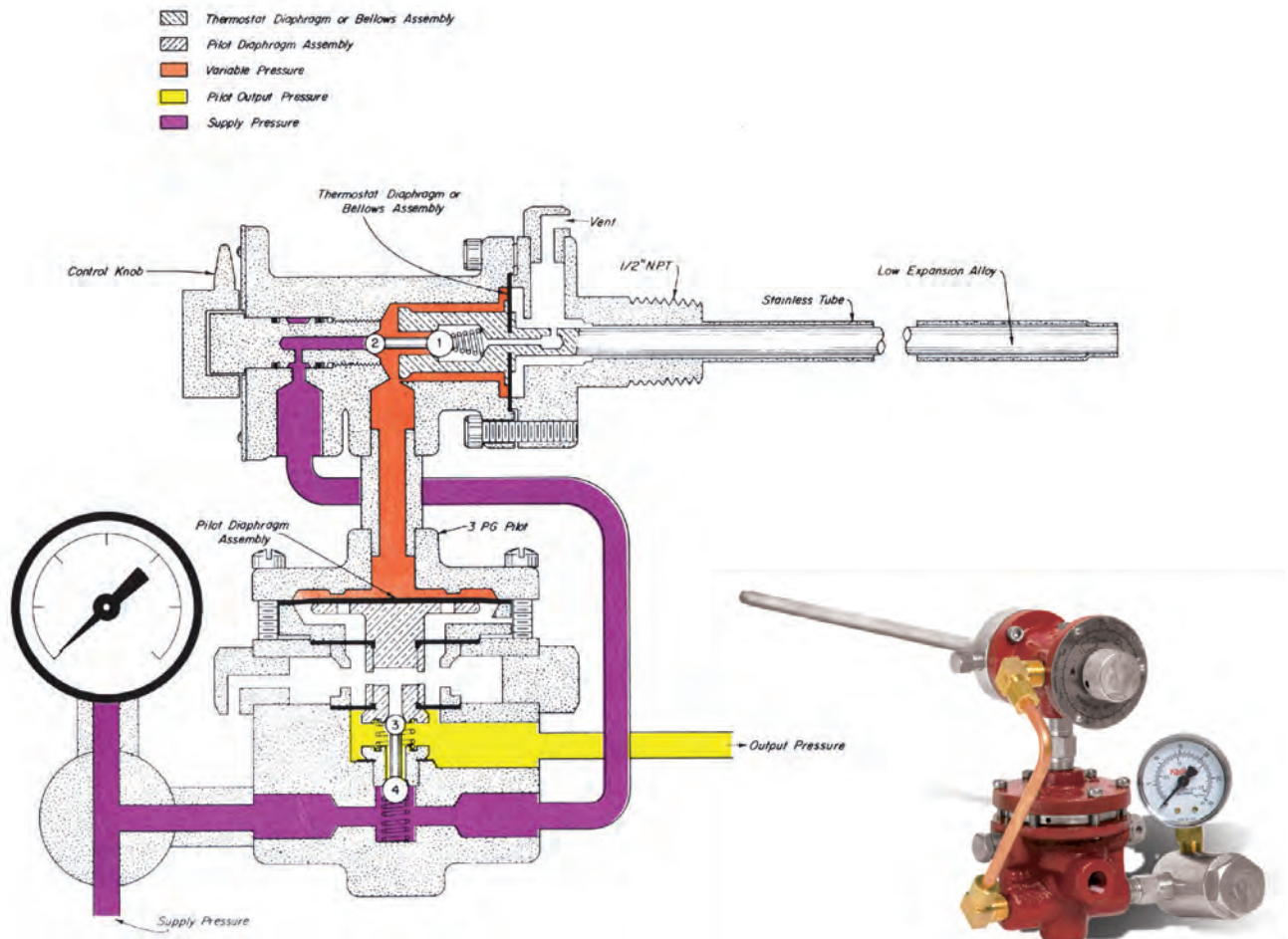
Assume the set temperature of the Thermostat is above that of the system. The inlet at BALL 2 (Violet to Orange) is closed and the vent BALL 1 (Orange to Atmosphere) is open, the vent BALL 3 (Yellow to Atmosphere) is open, and the inlet BALL 4 (Violet to Yellow) is closed. Output Pressure (Yellow) is vented to atmosphere, no signal is sent to a Pilot or Motor Valve.

As the temperature rises in the system, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm Assembly in a direction to first close the seat at BALL 1 (Orange to Atmosphere) and open the seat at BALL 2 (Violet to Orange). As Variable Pressure (Orange) increases, the 3 PG Pilot Diaphragm Assembly moves downward to close the seat at BALL 3 (Yellow to Atmosphere) and open the seat at BALL 4 (Violet to Yellow). Output Pressure (Yellow) is sent to cause the desired Pilot or Motor Valve action.

As the temperature in the system lowers, Variable Pressure (Orange) is vented moving the 3 PG Pilot Diaphragm Assembly upward to close the seat at BALL 4 (Violet to Yellow) and open the vent at BALL 3 (Yellow to Atmosphere). The Output Pressure (Yellow) is vented.

#### SUPPLY PRESSURE:

- 5 to 30 psig
- .35 to 2.11 kg/cm<sup>2</sup>

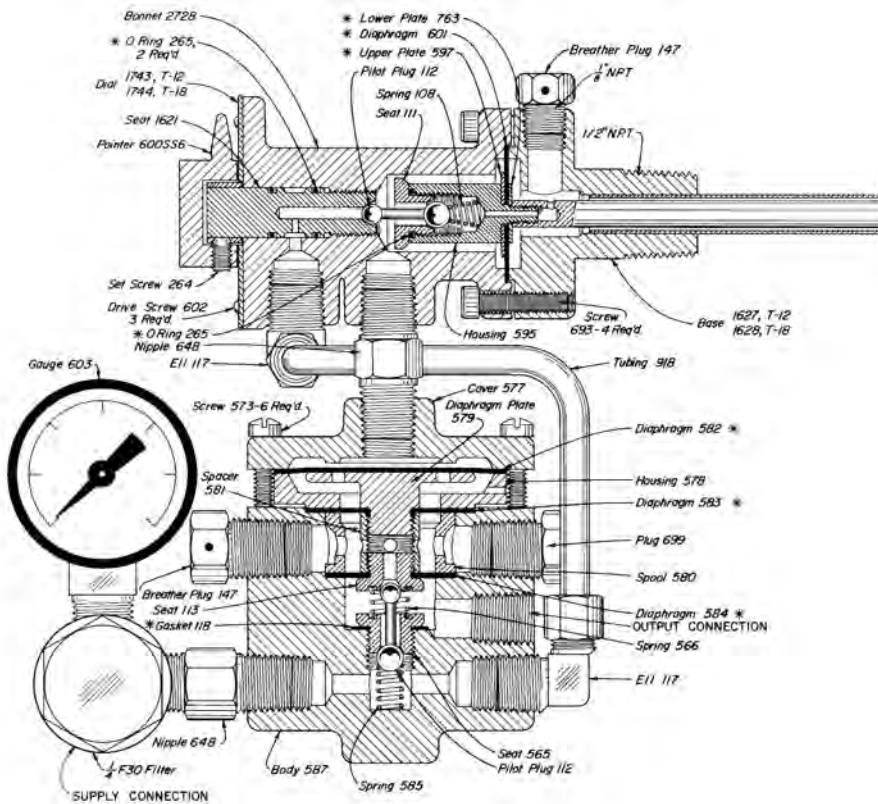


Kimray is an ISO 9001- certified manufacturer.

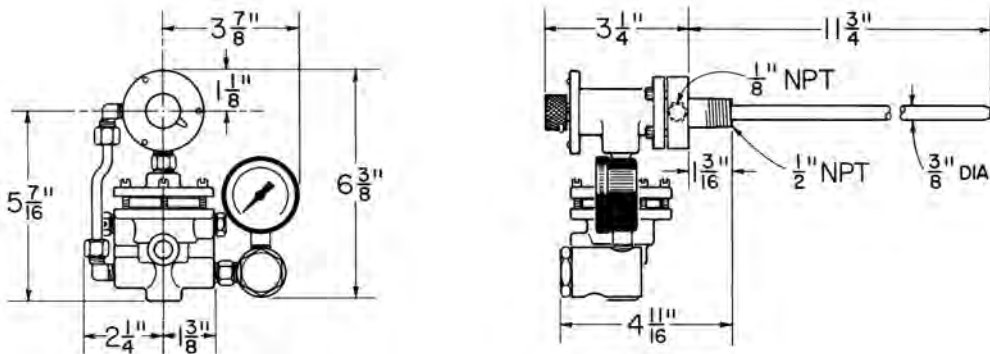
# TEMPERATURE CONTROLLERS



## DIRECT SEMI-THROTTLE THERMOSTAT DUCTILE IRON



### DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

#### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAS	T 12DAT	400	204	RLO

#### NOTES:

\*These are recommended spare parts and are stocked as repair kits. To order repair kit, specify; "T12DAT Repair Kit, RLO."

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Indirect throttle; Pilot Output Pressure (Yellow) decreases with temperature rise.

#### APPLICATION:

Used to control temperature in indirect heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

TC 12, TC 18	-30°F minimum to 400°F maximum -34°C minimum to 204°C maximum
HTC 12, HTC 18	-30°F minimum to 750°F maximum -34°C minimum to 399°C maximum

#### OPERATION:

These Controllers consist of an Indirect Throttle Action Base Assembly operating a 1" Pressure Opening Motor Valve. A Filter Pop Valve is provided as a relief valve in the event the Upstream or Supply Pressure (Red) gets to high for the Base Assembly to control.

Assume the set temperature of the Thermostat is above the temperature of the system being controlled and the Motor Valve is open. When the Motor Valve is open, the Output Pressure (Yellow) under the the Motor Valve Diaphragm opposes the spring.

As the temperature rises in the system, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Red to Yellow) and open the seat at BALL 2 (Yellow to Atmosphere). As the Output Pressure (Yellow) decreases, the spring on the Motor Valve Stem Assembly moves the inner valve toward a closed position.

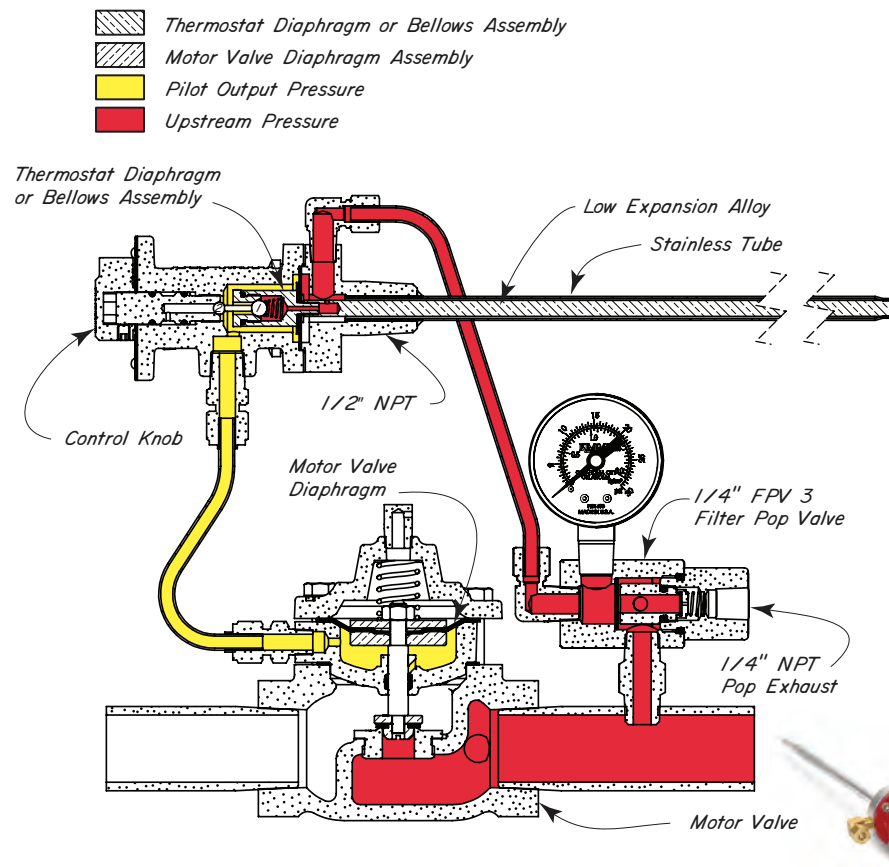
As the temperature decreases, the action is reversed to increase the Output Pressure (Yellow) and move the inner valve to an open position.

#### SUPPLY PRESSURE:

5 to 5 psig
.35 to 1.75 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

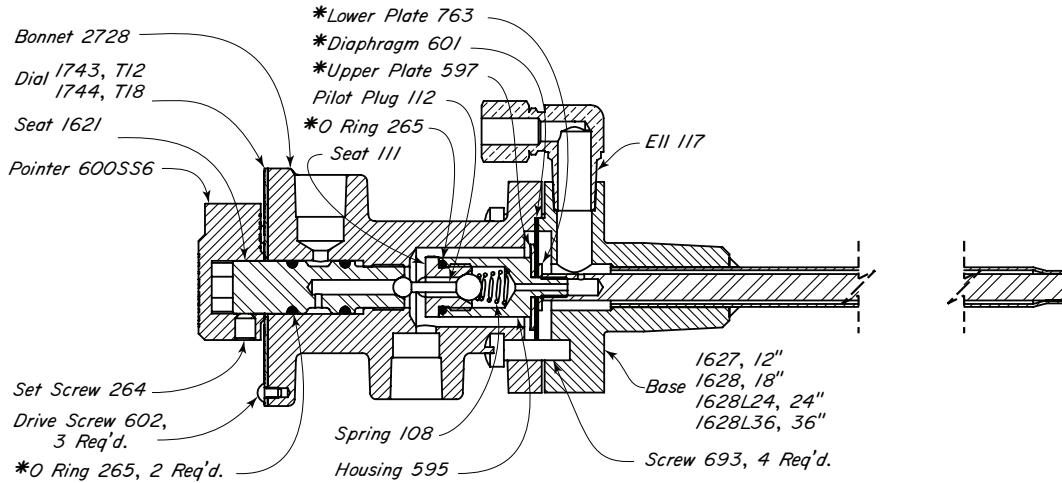
TC 12 - 2.5° F, 1.4°C
TC 18 - 1.75° F, 1.0°C
HTC 12 - 2.0° F, 1.1°C
HTC 18 - 1.5° F, .8°C



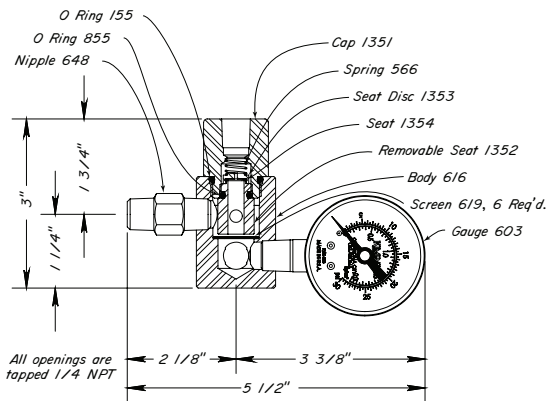
Kimray is an ISO 9001- certified manufacturer.

"TC" THROTTLE  
DUCTILE IRON or STEEL

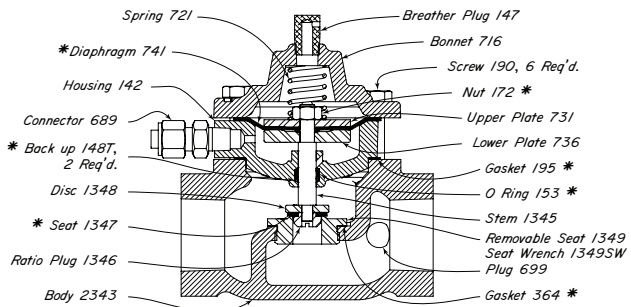
1" TC 12/18 500 lbs. W.P.



FILTER-POP VALVE 1/4 FPV 3



112 SMT DAB CAST IRON 125 lbs. W.P.



CONTROLLERS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAE	1TC 12	400	204	RLD
HAF	1TC 18	400	204	RLD
HBE	1HTC 12	750	399	RLE
HBF	1HTC 18	750	399	RLE

NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

For parts reference of the High Temperature Base Assemblies for HTC 12 and HTC 18, refer to "Base Assemblies" in Table of Contents.

Kimray is an ISO 9001- certified manufacturer.



### INDIRECT HIGH TEMPERATURE SHUT-DOWN

#### ACTION:

Indirect; Pilot Output Pressure (Yellow) decreases with temperature rise.

#### APPLICATION:

For temperature controlled system shutdown until manually reset.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket

Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

#### TEMPERATURE RANGE:

T 12M, T 18M	-30°F minimum to 400°F maximum
	-34°C minimum to 204°C maximum
HT 12M, HT 18M	-30°F minimum to 750°F maximum
	-34°C minimum to 399°C maximum

#### OPERATION:

These Thermostats consist of Base Assemblies sending an Indirect Throttle signal to a 3 PGM Pilot. The 3 PGM pilot is connected so that once the Output Pressure (Yellow) is vented, it must be manually reset to resume service.

Assume the set temperature of the Thermostat is above the temperature of the system being controlled and Pilot Output Pressure (Yellow) is being sent to any Pilot or Motor Valve.

As the system temperature rises, the STAINLESS TUBE increases in length to move the Thermostat Diaphragm (or Bellows) Assembly in a direction to first close the seat at BALL 1 (Yellow to Red) and open the seat at BALL 2 (Red to Atmosphere). As Variable Pressure (Red) decreases, the 3 PGM Pilot Diaphragm Assembly moves upward to close the seat at BALL 4 (Violet to Yellow) and open the seat at Ball 3 (Yellow to Atmosphere). Output Pressure (Yellow) decreases to cause the desired Pilot or Motor Valve action.

Once the Output Pressure (Yellow) has been vented, the Thermostat is shut down until the temperature of the system is below the set temperature and the RESET LEVER is used to reset the Pilot. If desired the RESET LEVER can also be used to manually vent Output Pressure (Yellow) and shut-down the thermostat.

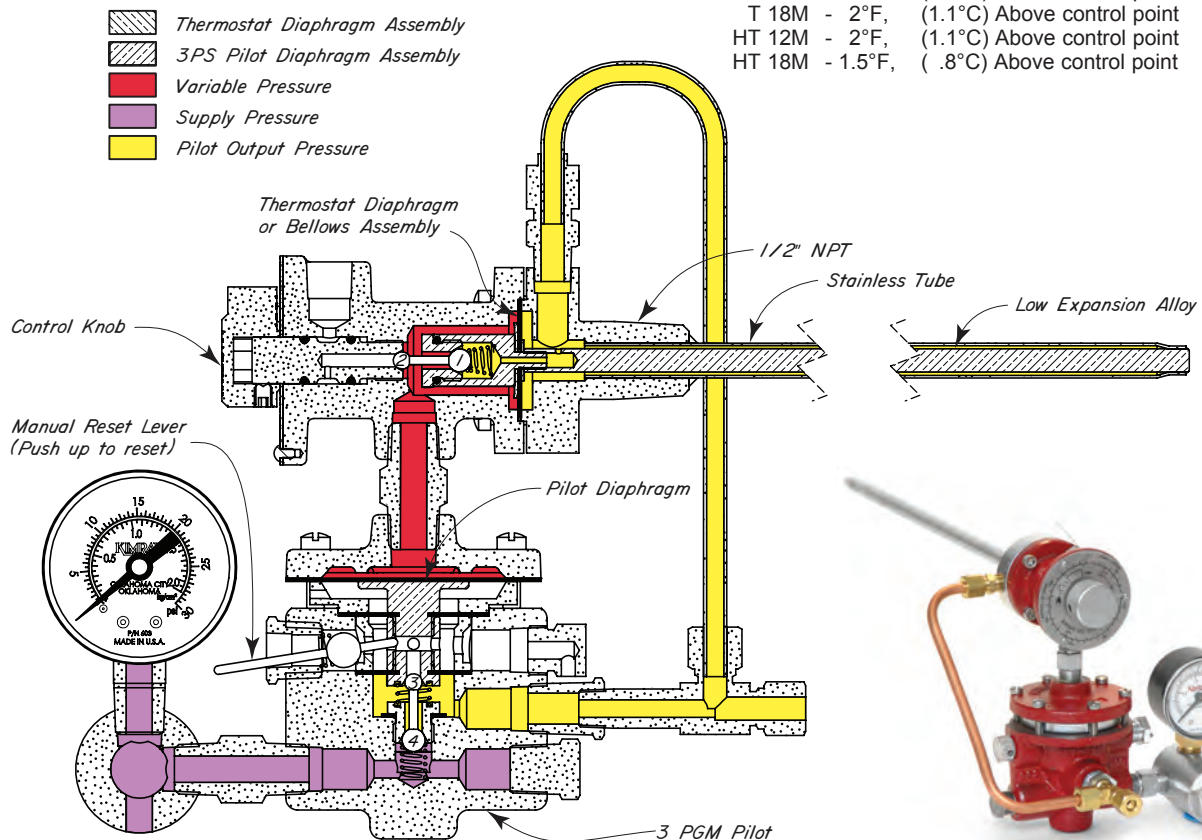
The 112 SMT-T is the recommended Motor valve for this thermostat configuration. Refer to "Burner Valves" in Table of Contents for more information.

#### SUPPLY PRESSURE:

5 to 30 psig
.35 to 2.11 kg/cm <sup>2</sup>

#### RESPONSE RANGE:

T 12M	- 3°F, (1.7°C)	Above control point
T 18M	- 2°F, (1.1°C)	Above control point
HT 12M	- 2°F, (1.1°C)	Above control point
HT 18M	- 1.5°F, (.8°C)	Above control point

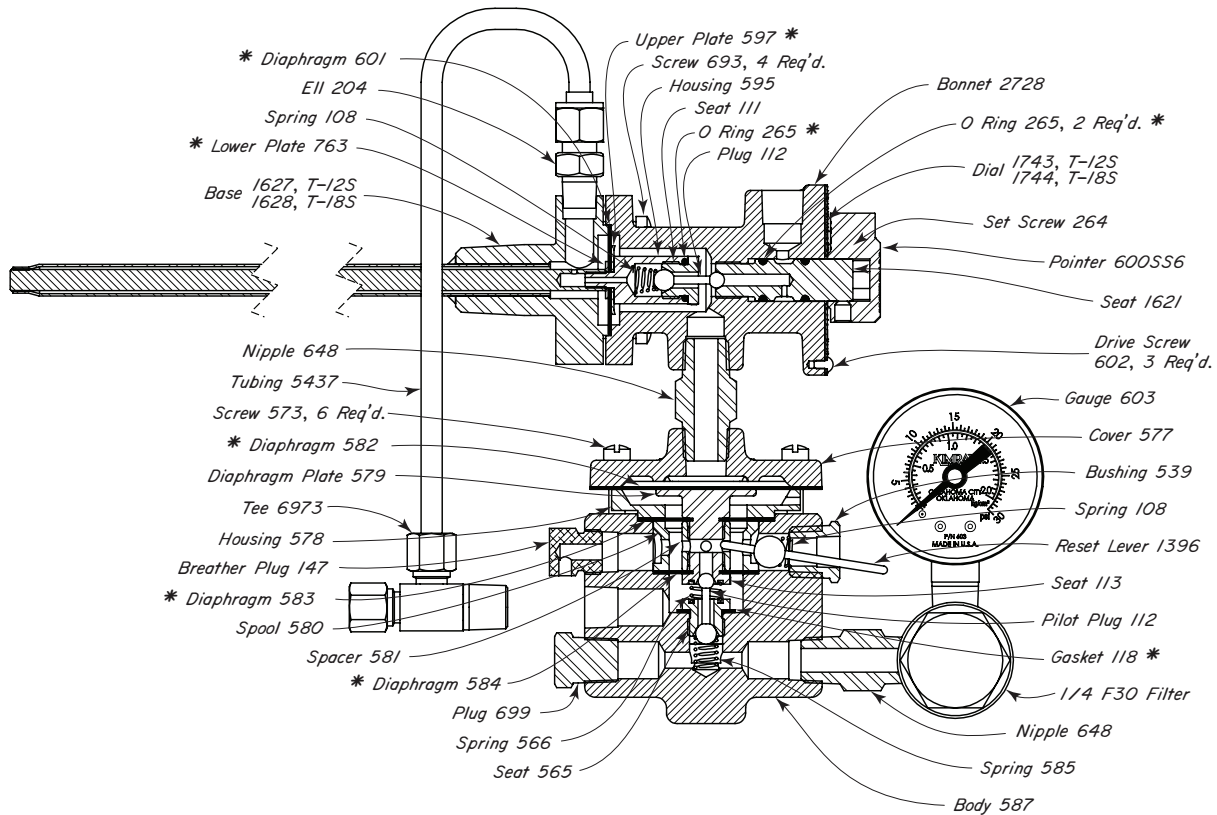


Kimray is an ISO 9001- certified manufacturer.

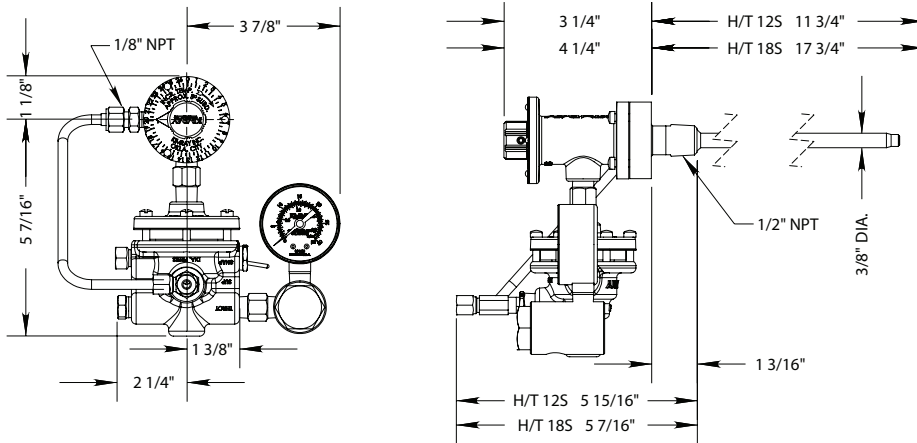
# TEMPERATURE CONTROLLERS



INDIRECT HIGH TEMPERATURE SHUT-DOWN  
DUCTILE IRON or STEEL



## DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

### THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAM	T 12M	400	204	RLF
HAN	T 18M	400	204	RLF
HBM	HT 12M	750	399	RLT
HBN	HT 18M	750	399	RLT

### NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

For HT 12M and HT 18M High Temperature Base Assembly parts, refer to "Base Assemblies" in Table of Contents.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Direct; Pilot Output Pressure (Yellow) increases with temperature rise.

#### APPLICATION:

For temperature controlled system shutdown until manually reset.

#### WORKING PRESSURE (sensing element):

psig	kg/cm <sup>2</sup>	
500	35.15 max.	without Separable Socket
4000	281.23 max.	with Separable Socket
7000	492.15 max.	with Special Separable Socket






Separable Socket is an extra price item and must be ordered separately, if desired. To order Separable Sockets refer to Table of Contents.

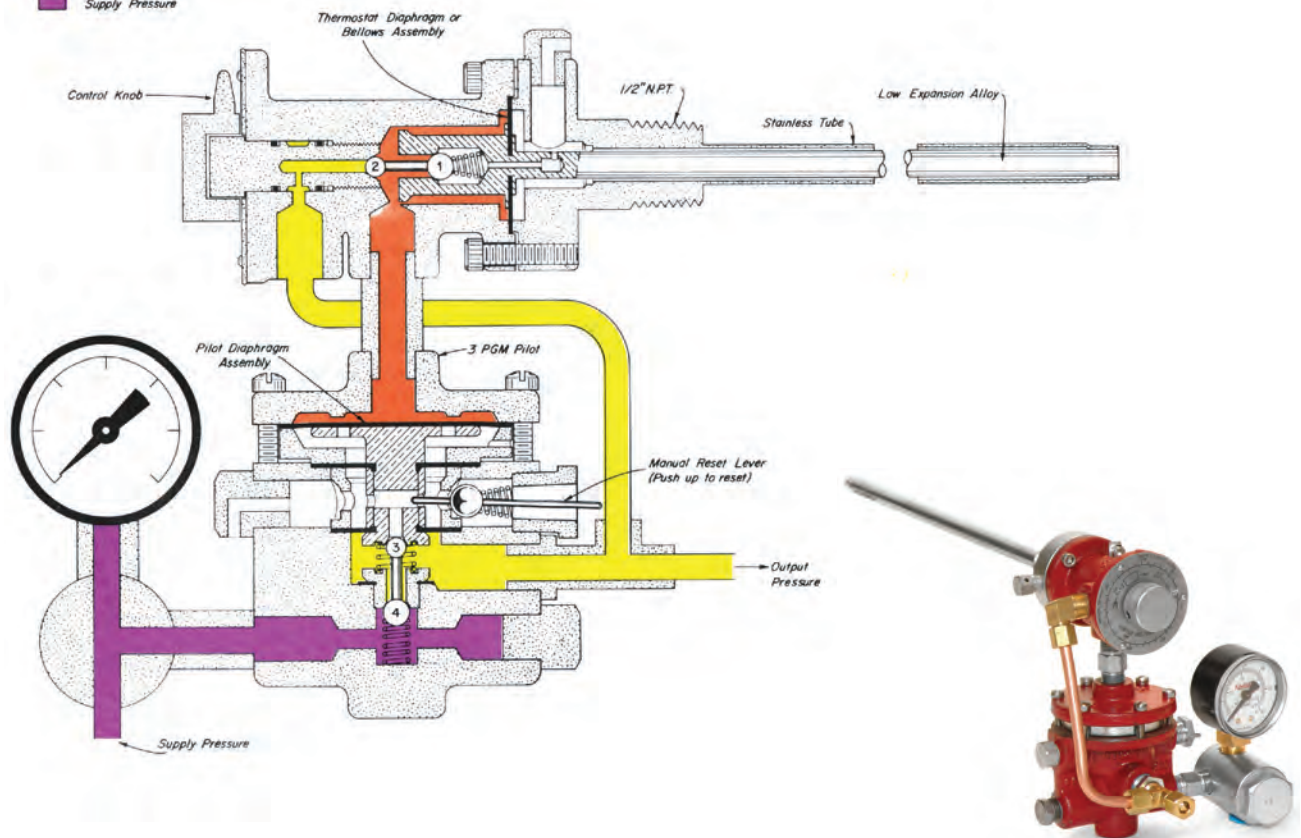
#### TEMPERATURE RANGE:

- 30°F minimum to 400°F maximum
- 34°C minimum to 204°C maximum

#### SUPPLY PRESSURE:

- 5 to 30 psig
- .35 to 2.11 kg/cm<sup>2</sup>

-  Thermostat Diaphragm or Bellows Assembly
-  Pilot Diaphragm Assembly
-  Variable Pressure
-  Pilot Output Pressure
-  Supply Pressure



#### OPERATION:

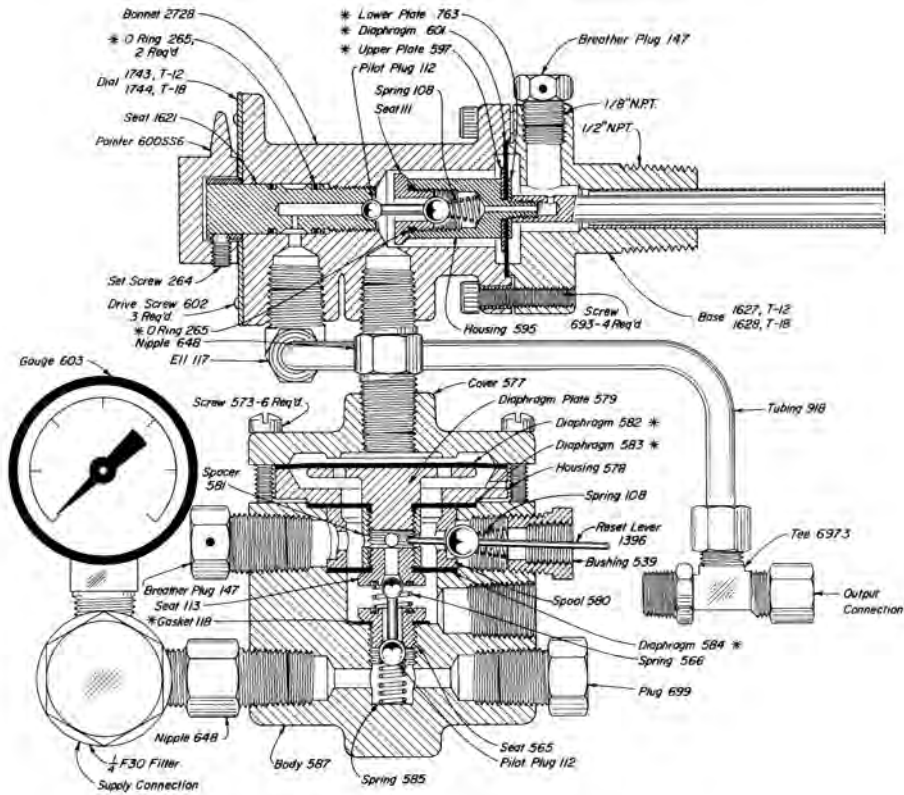
This Thermostat consists of a Direct Action Base Assembly sending a signal to a 3 PGM Pilot. The 3 PGM Pilot is connected so that once the Output Pressure (Yellow) is vented, it must be manually reset to resume service.

Assume the set temperature of the Thermostat is below that of the system. The vents at BALL 1 (Orange to Atmosphere) and BALL 3 (Yellow to Atmosphere) are closed. The Inlets at BALL 2 (Yellow to Orange) and BALL 4 (Violet to Yellow) are open. Output Pressure (Yellow) is being sent to any Pilot or Motor Valve.

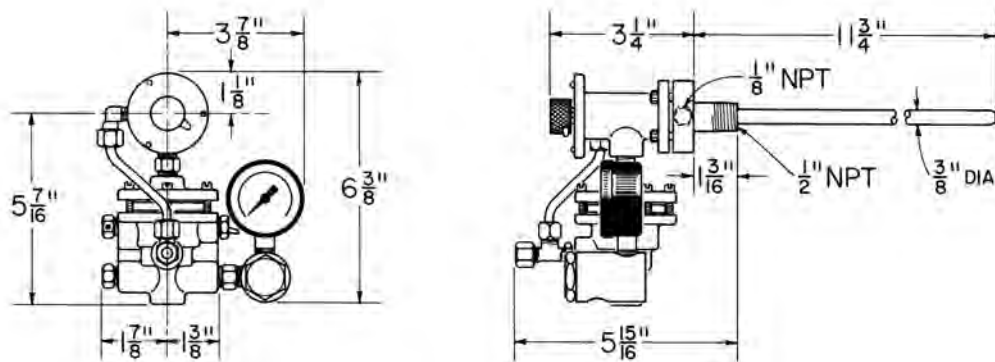
As the temperature decreases in the system, the STAINLESS TUBE decreases in length to move the Thermostat Diaphragm Assembly in a direction to first close the seat at BALL 2 (Yellow to Orange) and open the seat at BALL 1 (Orange to Atmosphere). Venting Variable Pressure (Orange) moves the 3 PG Pilot Diaphragm Assembly upward to close the seat at BALL 4 (Violet to Yellow) and open the seat at BALL 3 (Yellow to Atmosphere). Output Pressure (Yellow) decreases to cause the desired Pilot or Motor Valve action.

Once the Output Pressure (Yellow) has been vented the Thermostat is shut-down until the temperature of the system is above the set temperature and the RESET LEVER is used to reset the Pilot. If desired the RESET LEVER can also be used to manually vent Output Pressure (Yellow) and shut-down the thermostat.

DIRECT LOW TEMPERATURE SHUT-DOWN  
DUCTILE IRON



DIMENSIONS



ALL TAPPED OPENINGS ARE 1/4" NPT EXCEPT AS NOTED.

THERMOSTATS AVAILABLE:

CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HAT	T 12DAM	400	204	RLP

NOTES:

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

Separable Sockets are available at extra cost, refer to Table of Contents for ordering.

Kimray is an ISO 9001- certified manufacturer.

#### ACTION:

Direct action; Pilot Output Pressure (Yellow) increases with temperature rise. As long as the temperature is above the set point, the output will remain at supply pressure. If the pilot flame goes out, the pressure decreases and drops to zero.

#### APPLICATIONS:

Used as a Pilot safety shutdown or as a high stack temperature shutdown.

#### TEMPERATURE RANGE:

-30°F minimum to 2100°F maximum  
-34°C minimum to 1149°C maximum

#### SUPPLY PRESSURE:

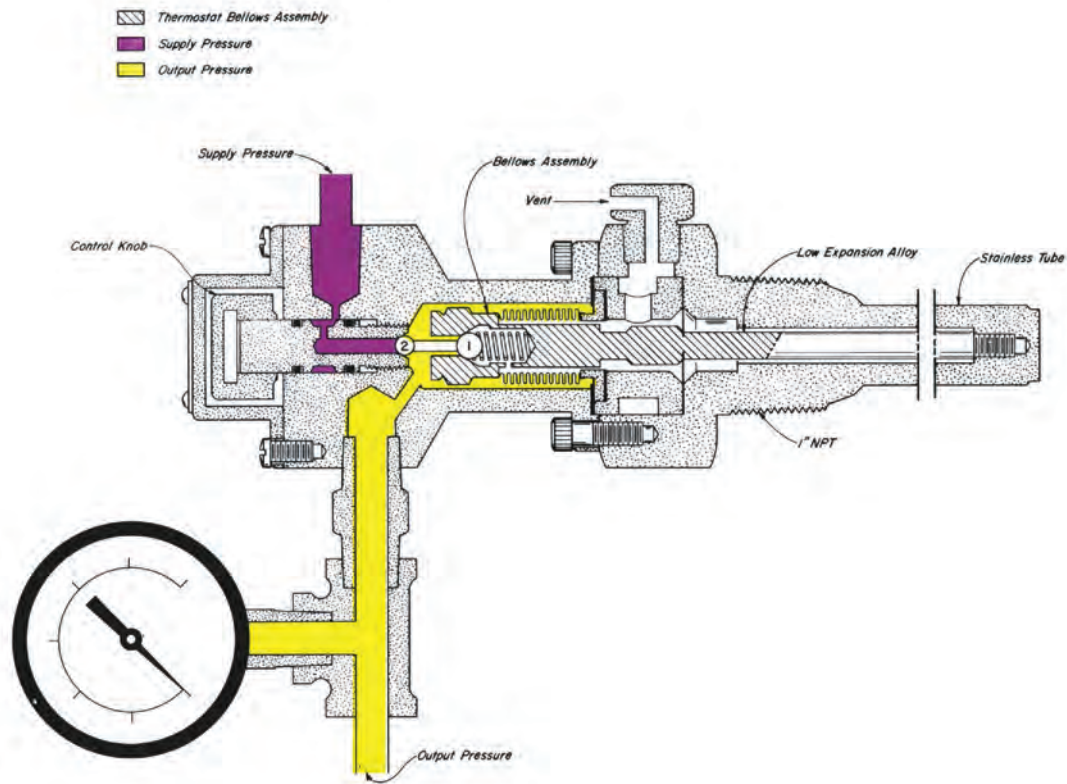
5 psig minimum to 30 psig maximum.

#### OPERATION:

This Thermostat consists of a STAINLESS TUBE for monitoring the pilot flame, which is connected by a Low Expansion Alloy Rod to a BELLOWS ASSEMBLY. The changes in the length of the STAINLESS TUBE operate a PILOT PLUG seat. The PILOT PLUG consists of two stainless balls rigidly connected together. The seat at BALL 1 is the Output Pressure vent (Yellow to Atmosphere). The seat at BALL 2 is the Supply Pressure inlet (Violet to Yellow).

Assume the set point on the HT 12PG is above the temperature of the system. The vent at BALL 1 is open and the inlet at BALL 2 is closed. Output Pressure (Yellow) is at 0 psig or vented.

As the temperature rises in the system, the STAINLESS TUBE or outer tube increases in length to move the Thermostat Bellows Assembly in a direction to first close the seat at BALL 1 (Yellow to Atmosphere) and open the seat at Ball 2 (Violet to Yellow). Output Pressure (Yellow) increases, opening a safety valve which was blocking gas supply for the burner and pilot light system.

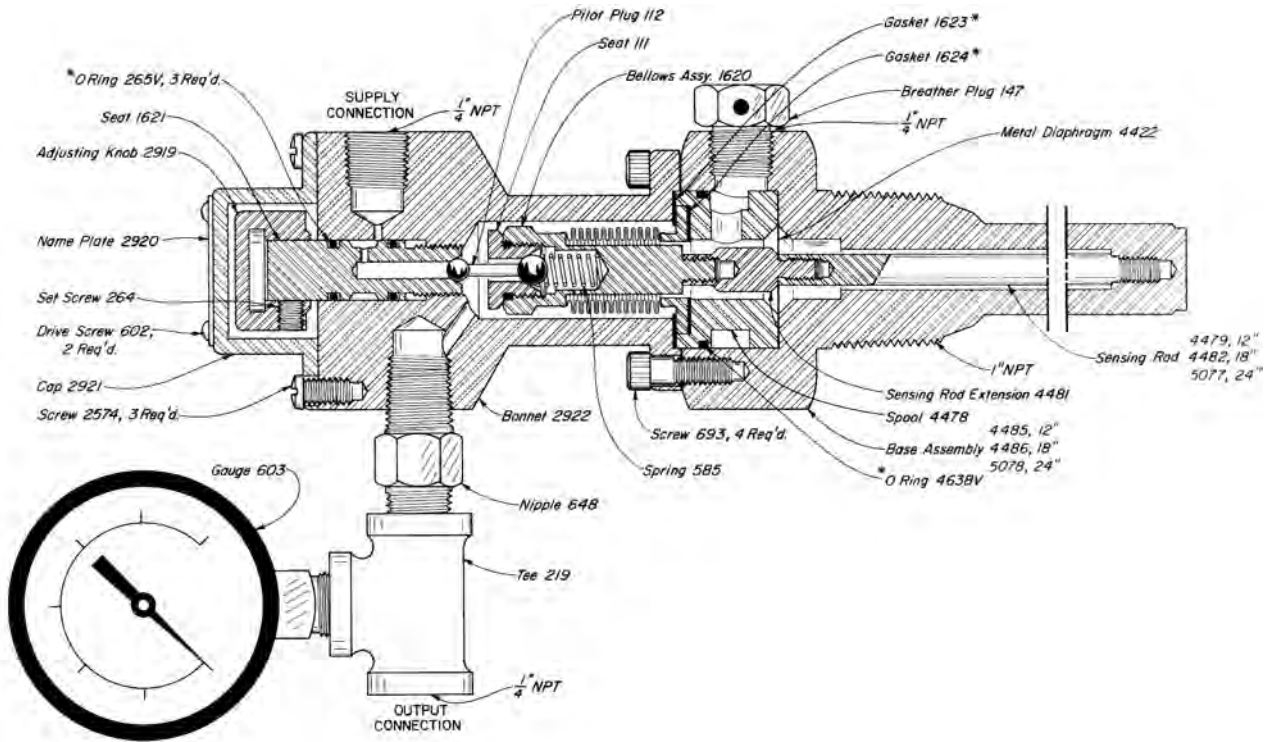


Kimray is an ISO 9001- certified manufacturer.

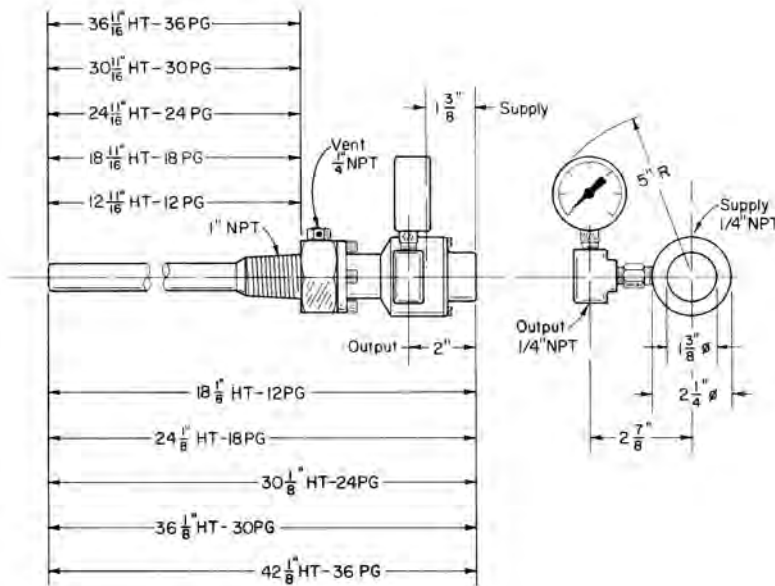
# TEMPERATURE CONTROLLERS



## HIGH TEMPERATURE PILOT GUARD STEEL



### DIMENSIONS



### PILOT GUARDS AVAILABLE:

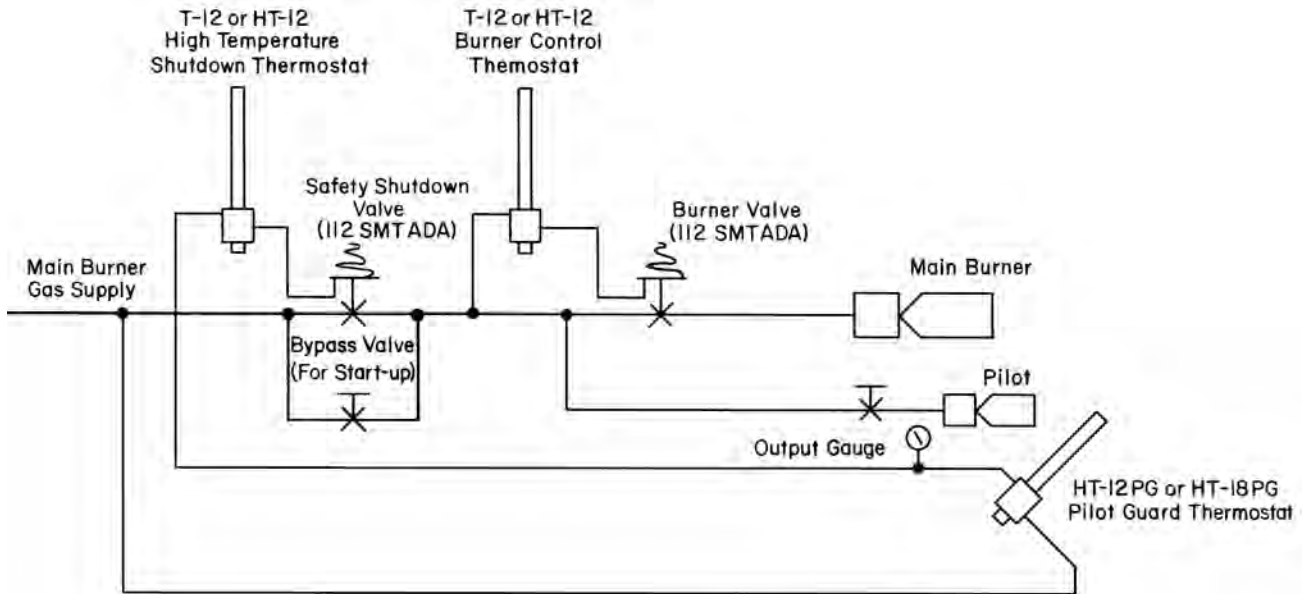
CAT. NO.	BASE ASSEMBLY	MAX. TEMP. °F	MAX. TEMP. °C	REPAIR KIT
HBT	HT 12 PG	2100	1149	RLQ
HBV	HT 18 PG	2100	1149	RLQ
HBV	HT 24 PG	2100	1149	RLQ
HBW	HT 30 PG	2100	1149	RLQ
HBX	HT 36 PG	2100	1149	RLQ

### NOTES:

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

A 1" NPT mounted collet for adjusting the HT 12 PG pilot guard for optimum sensing of the pilot flame is available. To order specify Cat. No. "YDE".

Kimray is an ISO 9001- certified manufacturer.



#### INSTALLATION:

It is recommended that a separate (Pressure Opening) safety valve (burner and pilot shutdown) valve be controlled by the HT 12PG. A bypass valve around this safety valve is recommended to assist during start up and restart. The bypass valve allows pilot lighting with no output from the pilot guard (cold start). After the pilot has heated the thermostat, the HT 12PG output pressure will hold the safety valve open and the bypass should be closed. If the bypass valve is omitted, the HT 12PG must be reset each time the unit is restarted.

Because of the high temperature of the pilot flame, the probe should only be placed in the outer most region of the pilot flame. The probe should not be put in the main burner flame.

Once the pilot guard has been installed, it is necessary to fine tune the set point to allow for rapid shutdown. Since each system's heat losses, mounting positions, etc. are different, there is not preset set point. By following the Start-up & Adjustment Procedure, the pilot guard can be tuned to each system for rapid system shutdown in the event of flame loss.

#### START UP & ADJUSTMENT PROCEDURE:

1. Open the bypass valve around the safety valve. If the bypass valve is omitted, proceed to step 2.
2. Adjust the HT 12PG for an output gauge pressure reading of approximately 50% of the supply pressure. (Counterclockwise to increase pressure and clockwise to decrease pressure).
3. Light the pilot light according to the standard procedures taking all necessary safety precautions.
4. Watch the output gauge. As the temperature increases, the pressure on the output gauge will rise upward. As this occurs, readjust the HT 12PG control knob to maintain an output pressure of approximately 50% of the supply pressure.

(Adjust the control knob clockwise to decrease the output pressure).

5. Continue the process in step 4 until little change in the pressure reading on the output gauge is observed. (This time interval could be 15-20 minutes or longer). This process adjusts the HT 12PG to the maximum pilot flame temperature and insures a rapid system shutdown if the pilot flame goes out.
6. When the output pressure stabilizes, the control knob can be turned counterclockwise for 100% output pressure. The HT 12PG is now set. Close the bypass valve.
7. The burner system should now be cycled. Occasionally, drafting occurs during the burner cycle and cools down the HT 12PG enough for shutdown. If this occurs, turn the control knob counterclockwise approximately 1/8 of a turn at a time, until drafting will not cause a system shutdown.
8. Should the system ever shutdown, it is necessary to determine what caused the shutdown. If a cooling effect, due to drafting occurred, readjust the control knob counterclockwise approximately 1/8 of a turn at a time, until drafting will not cause a system shutdown.
9. To restart after shutdown, open the bypass valve and light the pilot. When the output pressure of the HT 12PG reaches 100% of the supply pressure, the system is operating and the bypass valve must be closed. If the bypass valve has been omitted, repeat steps 2-8.

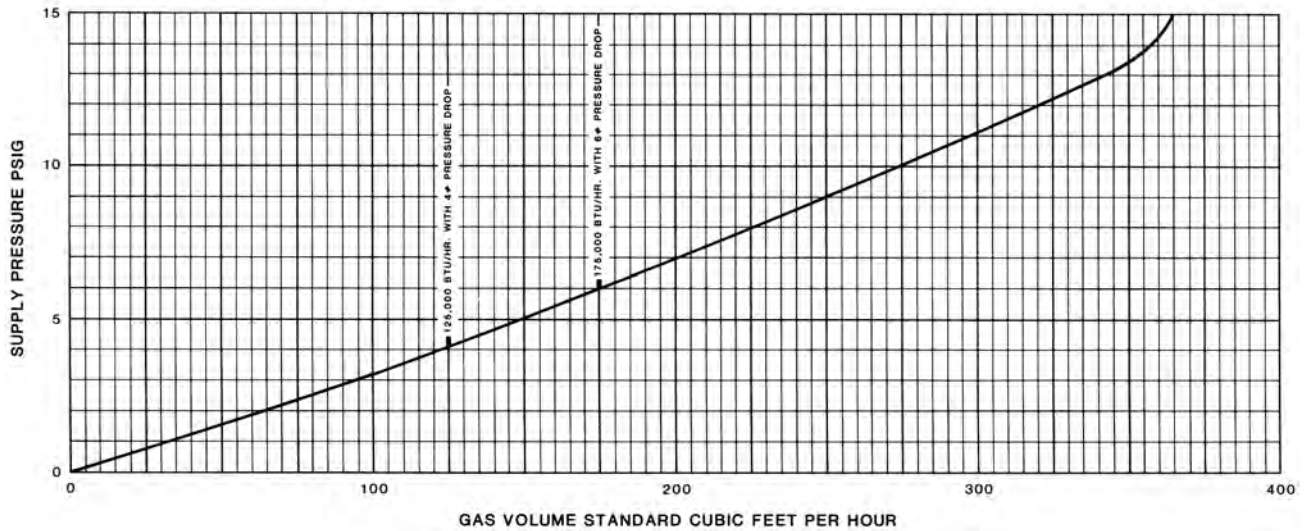
**NOTES:**



Kimray is an ISO 9001- certified manufacturer.



#### 3 PG CAPACITY CHART

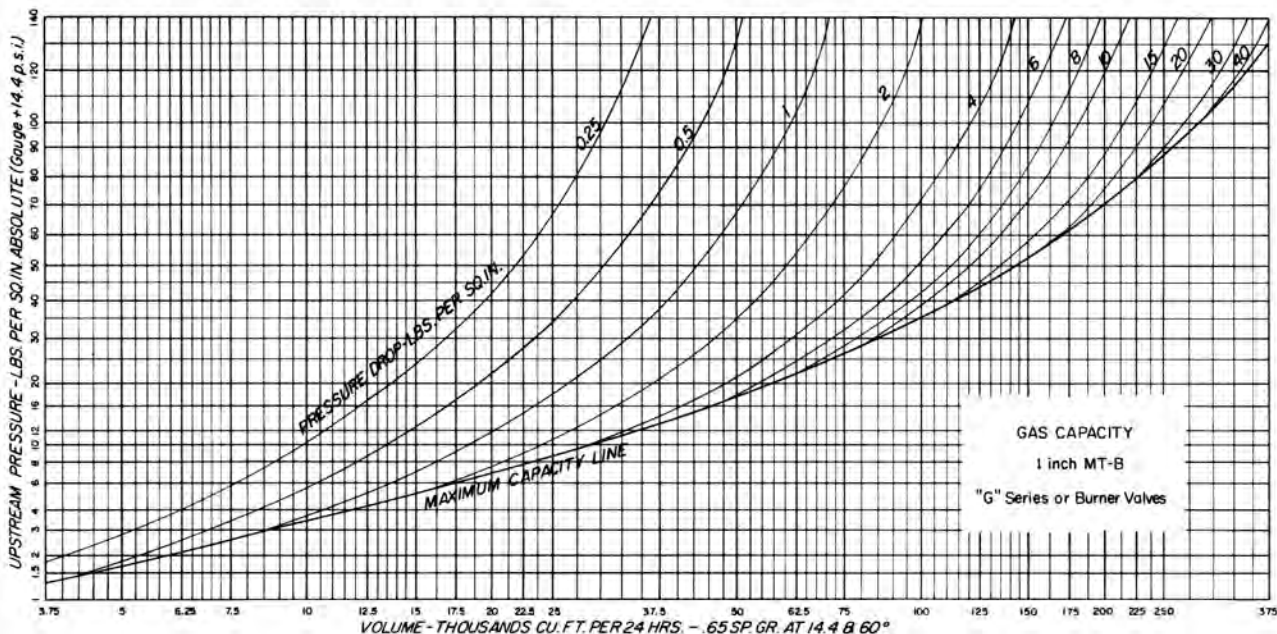
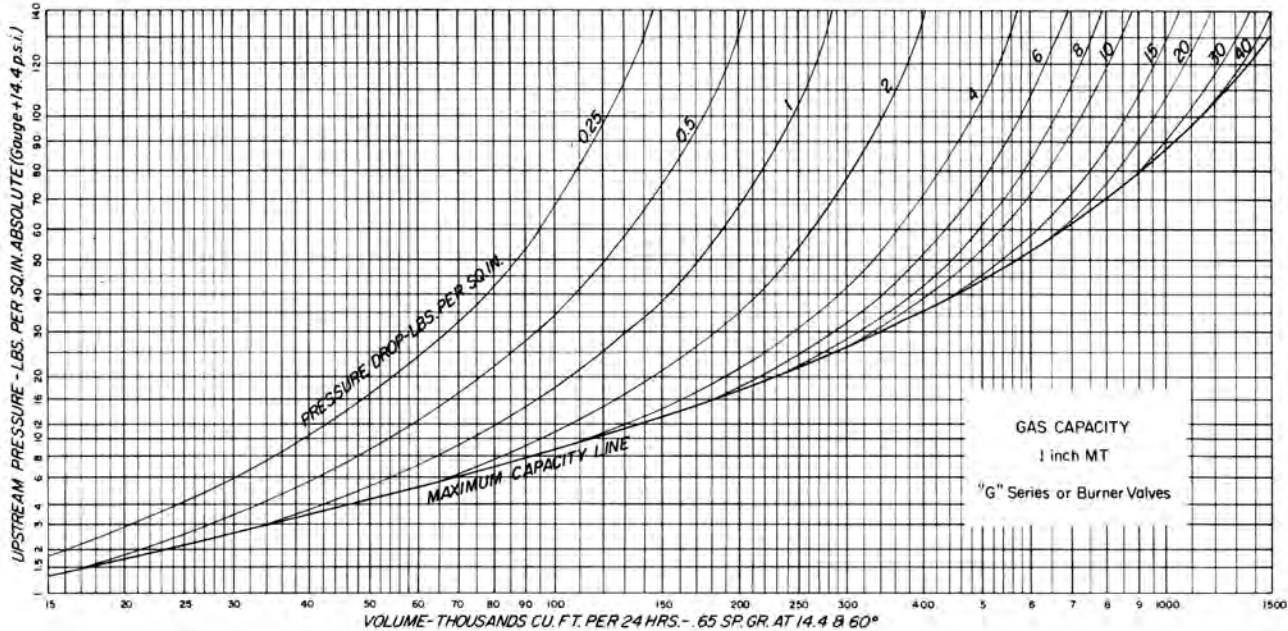


Gas capacities are based on the SUPPLY PRESSURE taken immediately upstream the pilot in a wide open position.

**HOW TO USE THE CHART:** Locate SUPPLY PRESSURE at left of chart. Project the SUPPLY PRESSURE horizontally to the curve and read the VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{65}{G}}$   
:where G equals specific gravity of gas.

BURNER VALVE CAPACITY CHART



Gas capacities are based on pressure taken immediately upstream and downstream from the regulator in a wide open position.

Critical flow exists across the orifice of the valve when the downstream absolute pressure is approximately half of the upstream absolute pressure. Any decrease in downstream pressure will not increase the flow through the valve. Critical flow conditions on the charts are represented by the MAXIMUM CAPACITY LINE.

HOW TO USE CHARTS: Locate UPSTREAM PRESSURE

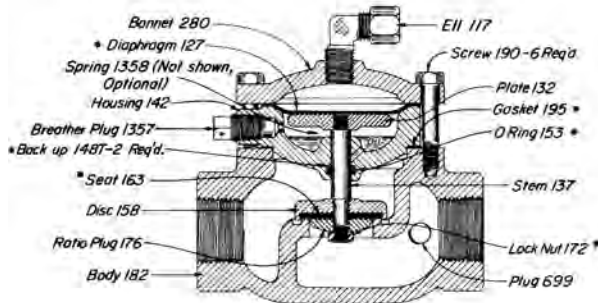
at left of chart. Follow horizontally across to PRESSURE DROP (upstream minus downstream pressure). Read VOLUME directly below. If the horizontal projection of the upstream pressure does not intersect the given pressure drop, flow is critical. In this case project UPSTREAM PRESSURE horizontally to the MAXIMUM CAPACITY LINE and read VOLUME directly below.

\*For gravity correction multiply above capacities by  $\sqrt{\frac{.65}{G}}$   
:where G equals specific gravity of gas.

#### 112 SMT

##### APPLICATION:

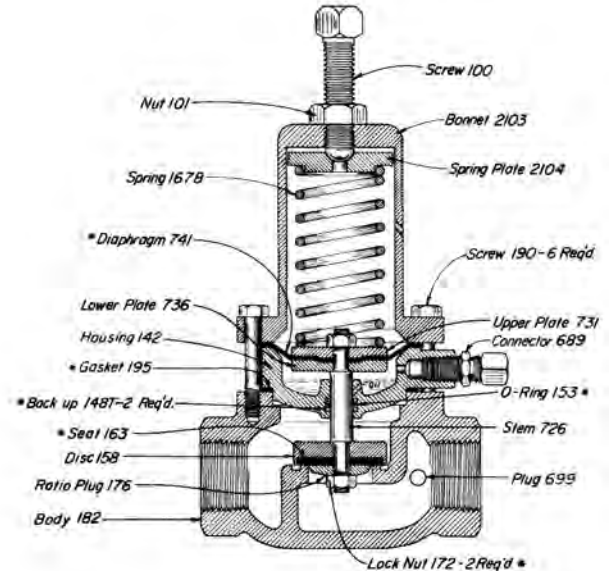
As a pressure closing burner valve for snap action service.



#### 112 SMT ADA

##### APPLICATION:

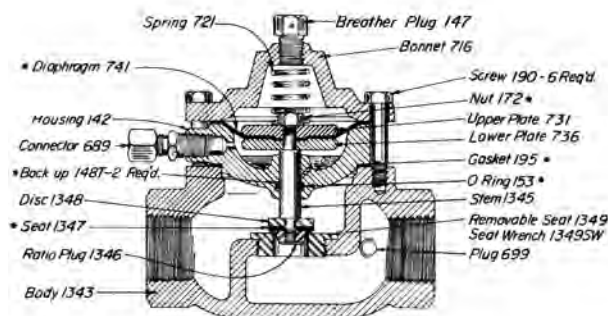
As a pressure opening burner valve for throttling or snap action service and where manifold pressures do not exceed 40 psi.



#### 112 SMT DAB

##### APPLICATION:

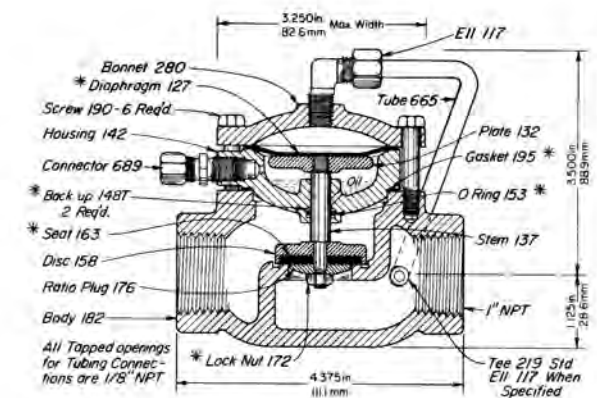
As a pressure opening or pressure closing burner valve where a reduced inner valve is desired and manifold pressures do not exceed 25 psi.



#### 112 SMT T

##### APPLICATION:

As a pressure opening burner valve for throttling action service or shut in against pressures up to 300 psi. For safety valve (130 SMT-T).



#### THRU VALVES AVAILABLE:

CAT. NO.	SIZE TYPE	BURNER VALVE	OPER. PRES.	MAX W.P.	KIT
ABC	1" SCR.D.	112 SMT ADA	40	175	RGS
EMB	1" SCR.D.	112 SMT	175	175	RCM
EMB3	1" SCR.D.	112 SMT DAB	30-40	175	RHE
EMY	1" SCR.D.	112 SMT-T	175	175	RCM

#### NOTES:

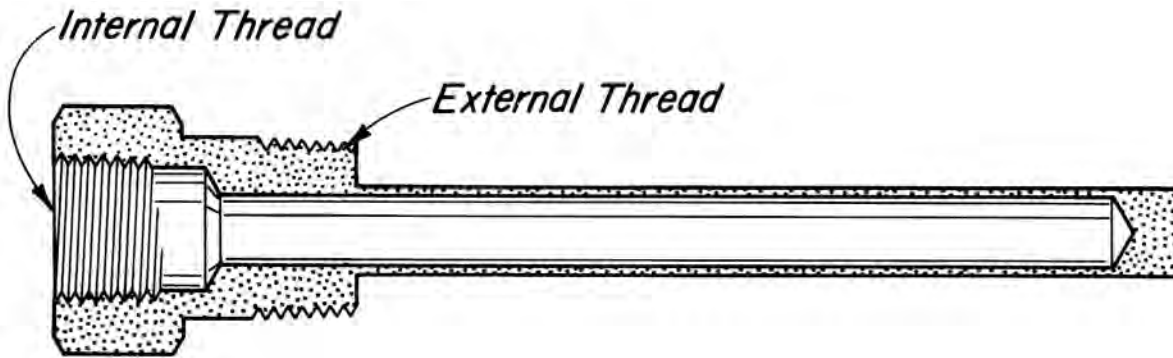
\*These are recommended spare parts and are stocked as repair kits. To order repair kit, specify; 1" MT-T Repair Kit.

For other Motor Valves refer to catalog section E2

# TEMPERATURE CONTROLLERS



THERMOMETER WELLS  
304 SS & 316 SS STEEL



## THERMOWELLS AVAILABLE:

PART NO.	EXTERNAL THREAD	INTERNAL THREAD	LENGTH
4498L2SS6	1/2" NPT	1/4" NPT	2"
4499L2SS6	1/2" NPT	1/2" NPT	2"
4500L4SS6	1/2" NPT	1/4" NPT	4"
4501L4SS6	1/2" NPT	1/2" NPT	4"
2994 <sup>^</sup>	3/4" NPT	1/2" NPT	5 1/2"
4502L6SS6	1/2" NPT	1/4" NPT	6"
4231 <sup>^</sup>	1/2" NPT	1/2" NPT	6"
4503L6SS6	1/2" NPT	1/2" NPT	6"
4232 <sup>^</sup>	3/4" NPT	1/2" NPT	6"
4504L8SS6	1/2" NPT	1/4" NPT	8"
4505L8SS6	1/2" NPT	1/2" NPT	8"
4506L10SS6	1/2" NPT	1/4" NPT	10"
4507L10SS6	1/2" NPT	1/2" NPT	10"
4508L12SS6	1/2" NPT	1/4" NPT	12"
4509L12SS6	1/2" NPT	1/2" NPT	12"
4509L18SS6	1/2" NPT	1/2" NPT	18"

## NOTES:

### APPLICATION:

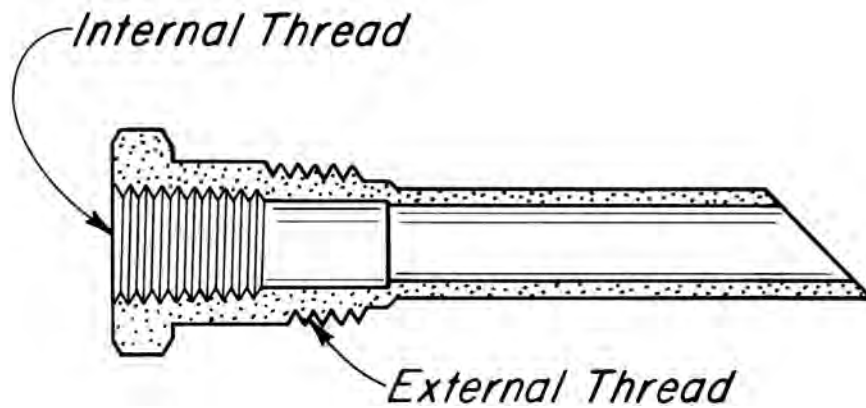
Allows thermometer removal for maintenance without losing vessel pressure.

1000 TO 4000<sup>^</sup> lbs. W.P.

<sup>^</sup>One piece construction



Kimray is an ISO 9001- certified manufacturer.



### PROBES AVAILABLE:

PART NO.	EXTERNAL THREAD	INTERNAL THREAD	LENGTH
4229SS6 <sup>^</sup>	1" NPT	1/2" NPT	3 3/16"
4538L2SS6	1/2" NPT	1/4" NPT	3 3/8"
4541L6SS6	1/2" NPT	1/4" NPT	5 1/2"

### NOTES:

#### APPLICATIONS:

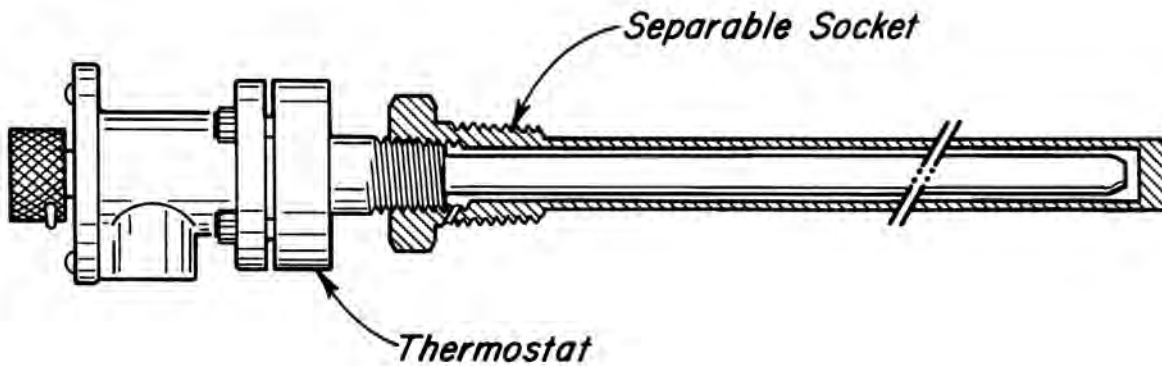
For use in retrieving a sample of gas from the center of the pipe.

<sup>^</sup>ONE PIECE CONSTRUCTION



Kimray is an ISO 9001- certified manufacturer.

SEPARABLE SOCKETS  
STEEL & 316 SS STEEL



**SOCKETS AVAILABLE:**

CAT. NO.	MALE THD. SIZE, NPT	MODEL NUMBER	MATERIAL	MAX W.P.	
				psig	kg/cm <sup>2</sup>
HCA	1"	SS-4	STL	4,000	281.23
HCB	1"	SS-6	STL	4,000	281.23
HCC	1"	SS-12	STL	4,000	281.23
HCD	1"	SS-18	STL	4,000	281.23
HCE	1"	SS-12SS	SS6	4,000	281.23
HCF	1"	SS-18SS	SS6	4,000	281.23
HCG <sup>a</sup>	1"	S-SS-12SS	SS6	7,000	492.15
HCH	3/4"	3/4SS-12	STL	4,000	281.23
HCI	3/4"	3/4SS-18	STL	4,000	281.23
HCJ	3/4"	3/4SS-12SS	SS6	4,000	281.23
HCK	3/4"	3/4SS-18SS	SS6	4,000	281.23
HCL	3/4"	3/4SS-4	STL	4,000	281.23
HCM	3/4"	3/4SS-6	STL	4,000	281.23
HCMSS6	3/4"	3/4SS-6SS	SS6	4,000	281.23
HCN	1"	SS-6SS	SS6	4,000	281.23
HCP	3/4"	SS-4SS	SS6	4,000	281.23
HCR <sup>a</sup>	3/4"	S-SS-12SS	SS6	5,000	351.53
HCS <sup>a</sup>	1"	S-SS-6SS	SS6	7,000	492.15
HCX	1"	SS-18	STL	4,000	281.23

**NOTES:**

**APPLICATION:**  
Increases working pressure of Thermostat Sensing Element. All Separable Sockets are filled with high temperature grease. Allows Thermostat removal without losing vessel pressure.

<sup>a</sup>One piece construction



Kimray is an ISO 9001- certified manufacturer.

# PILOTS & ACCESSORIES



# KIMRAY

INC. ®

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.  
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#### SIGNAL PILOTS

Kimray signal pilots enhance a pneumatic or mechanical signal providing a reversed, multiplied, volume boosted or on-off signal pressure to operate motor valves, burners or dump valves.

<b>SNAP</b> _____	10.1
Change and reverse a varying pneumatic signal to an On-Off signal of the same or higher pressure. 3 PS	
<b>THROTTLE</b> _____	20.1
Multiply and volume boost a pneumatic signal. 3 PG and 3 PGA	
<b>MANUAL RESET</b> _____	40.1
Output is blocked and downstream vented when monitored pressure goes to zero. 3 PM	
<b>MANUAL RELAY</b> _____	50.1
Manual control pilot that blocks and bleeds output pressure when released. 3 PGMR	
<b>THROTTLE REVERSE</b> _____	60.1
Reverse and multiply varying pneumatic signal. 3 PGRA	
<b>THROTTLE PRESSURESTAT</b> _____	70.1
Reverse and multiply varying pneumatic signal with adjustable output pressure. 3 PGP	
<b>BISTABLE</b> _____	80.1
Two temporary pneumatic signals operate pilot. One to turn output on, one to turn output off. 3 PGB	
<b>RELAY</b> _____	90.1
Used to switch 0 to 300 psig signal with 20 to 30 psig signal. 30 PGR	
<b>MECHANICAL</b> _____	100.1
Mechanically operated signal pilot. 3 PM	
<b>PRIORITY SIGNAL RELAY</b> _____	110.1
By-pass a normal pneumatic signal with a higher priority signal. 4 POR	

#### CONTROL PILOTS

Kimray control pilots operate motor valves in pneumatic systems of up to 1500 psig working pressure. In each Kimray control pilot an upstream or downstream pressure is used to operate a remotely installed motor valve. The Kimray design incorporates a variety of standard and custom configurations applicable to most control systems.

<b>PRESSURE REDUCING</b> _____	150.1
Supply a set downstream pressure from a greater upstream pressure, 0-1500 psig. 12/30 PG PR and 30 HPG PR-D, 50 PG and 150 PG.	
<b>PRESSURE DIFFERENTIAL</b> _____	170.1
Maintain a constant pressure differential between upstream and downstream pressures, 0-300 psig. 12/30 PG PD and 100/200/400 PDC.	
<b>LIQUID DIFFERENTIAL PRESSURE</b> _____	180.1
Maintain a constant differential pressure between a wet gas upstream pressure and a liquid or gas sensed pressure (requires auxiliary dry supply gas if sensed pressure is wet), 0-300 psig. 30 PG LDP-D	

**FLOATLESS LIQUID LEVEL CONTROLLER** \_\_\_\_\_ 190.1  
Controls 0 to 30 feet of water in vessels up to 125 psig. supply a signal to open or close a diaphragm operated motor valve.

**PRESSURE REDUCING TO ATMOSPHERE** \_\_\_\_\_ 195.1  
Regulate .5 oz. to 20 psig from a greater upstream pressure, 125 psig. 12 PG OPRA

#### ACCESSORIES

<b>FILTERS</b> _____	200.1
Removes particulates from the gas line, 300 psig. F 30	
<b>FILTER POP VALVES</b> _____	210.1
Provides a small pressure relief at 30 psig. FPV 3	
<b>DRIP POTS</b> _____	220.1
Collects condensation for removal from pressure lines, 0-4000 psig. DP 30/200/400	
<b>CHECK VALVES</b> _____	230.1
An in line check valve to prevent reverse flow, 1500 psig. CV 15	
<b>SUPPLY GAS REGULATORS</b> _____	240.1
Gas pressure reducing instrument regulators, 4000 psig.	
<b>PNEUMATIC SOLENOID</b> _____	250.1
For electrical control of a pneumatic pressure used to open and close a motor valve.	
<b>MAGNELATCH SOLENOID</b> _____	260.1
Used to operate a valve by using an electrical current pulse of 0.02 milliseconds duration.	
<b>AIR MOTOR</b> _____	270.1
Provides mechanical movement from pneumatic pressure, 125 psig. 455/-AL	
<b>COMPANION FLANGE SETS</b> _____	280.1
Provides installation of flanged valves in a threaded piping system, 125 psig.	

**SENSE LINE PROTECTOR** \_\_\_\_\_ 290.1  
An adjustable, self-resetting, pressure limiting device to protect instrumentation from over pressurization.

## ELASTOMERS

### AFLAS® is a trade mark of Asahi Glass Co

TEMPERATURE:  
+30° to +500° F  
0° 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, H<sub>2</sub>S, Steam, Petroleum  
fluids, Sea Water

### HSN (HNBR)

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

APPLICATION:  
Crude Oil & Gas Production w/ H<sub>2</sub>S CO<sub>2</sub>

FLUID / GAS:  
Crude Oil & Gas H<sub>2</sub>S, CO<sub>2</sub>, 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)

### TEFLON (T)

TEMPERATURE:  
-40° to +400° F  
-20° to +204° C

APPLICATION:  
Chemically Inert Elastomer Best in static Do not use at  
low temps

FLUID / GAS:  
Almost All Chemicals

### 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 (CO<sub>2</sub>), Propane, Gasoline,  
Diesel, Fuel Oil Systems

DO NOT USE WITH:  
Hot Water, Not preferred for wet H<sub>2</sub>S, Methyl Alcohol,  
Amines, Sodium hydroxide solutions

### EP (EPDM)

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 (P)

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

APPLICATION:  
High abrasion resistance Seats, Diaphragms

FLUID / GAS:  
Crude Oil gas and Water, Sour Gas (CO<sub>2</sub>), propane,  
butane, fuel, mineral oil and grease

### POLYACRYLATE (H)

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

#### APPLICATIONS:

Any system in which it is desired to change and reverse a varying pneumatic signal to an Output signal of the same or higher pressure (up to 4:1).

#### FEATURES:

- Pneumatic snap action
- No dead center
- Reverse Action

#### SUPPLY PRESSURE:

5 to 30 psig

#### VARIABLE PRESSURE (input signal):

- 0 - 10 psig minimum
- 0 - 30 psig maximum

#### VARIABLE PRESSURE SNAPPING RANGE:

- Depends on Supply Pressure
- Approximately 2 - 7 psig at 30 psig

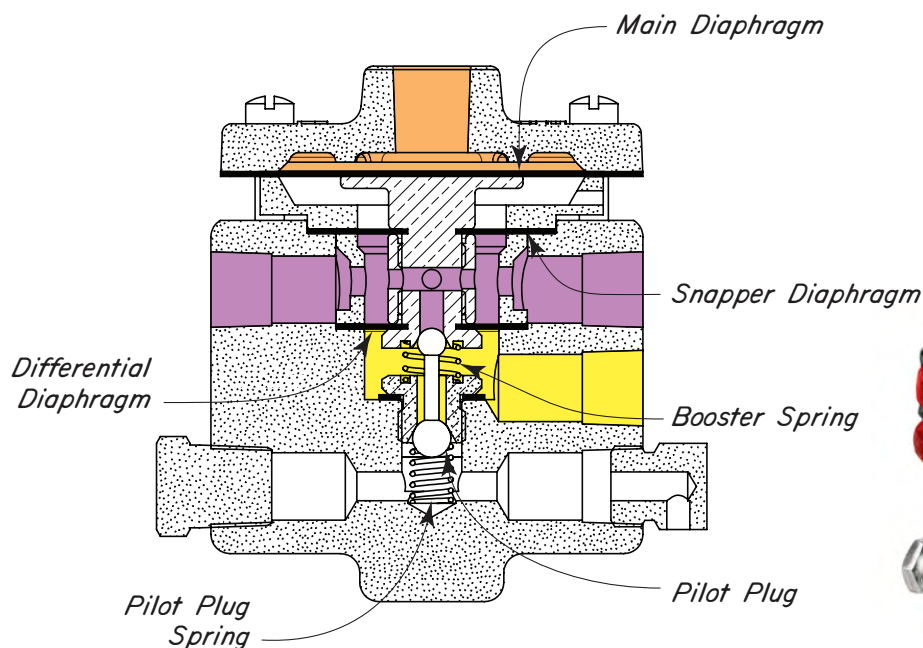
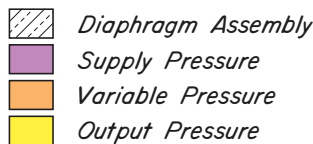
#### OUTPUT PRESSURE:

0 psig or Supply Pressure

#### OPERATION:

Assume Variable Pressure (Orange) is at a minimum and the Diaphragm Assembly in an up position. An increase in Variable Pressure (Orange) on the MAIN DIAPHRAGM sufficient to overcome load of the BOOSTER SPRING plus the force of Supply Gas Pressure (Violet) on the full area of the SNAPPER DIAPHRAGM, the Diaphragm Assembly starts to move down. The upper seat, which is the Supply Gas inlet (Violet to Yellow), closes first. The PILOT PLUG SPRING holds the upper ball against its seat while a further downward movement opens the lower seat which is the pressure vent (Yellow to Atmosphere). Decreasing Output Pressure (Yellow) accelerates the downward movement of the Diaphragm Assembly to produce a sudden opening of the pressure vent.

In order to reverse the above action, Variable Pressure (Orange) must be reduced so that the downward force on the MAIN DIAPHRAGM is less than the upward force on the BOOSTER SPRING plus Supply Gas Pressure (Violet) acting on the difference in areas of the SNAPPER and DIFFERENTIAL DIAPHRAGMS. With upward movement of the Diaphragm Assembly the pressure vent (Yellow to Atmosphere) closes first. The PILOT PLUG SPRING holds the lower ball against its seat while a further upward movement of the Diaphragm Assembly opens the Supply Gas Pressure inlet (Violet to Yellow). As Output Pressure (Yellow) increases pressure across the DIFFERENTIAL DIAPHRAGM is reduced, loading the Diaphragm Assembly in an up direction. The accelerated upward movement of the Diaphragm Assembly produces a sudden opening of the Supply Gas Pressure inlet (Violet to Yellow).

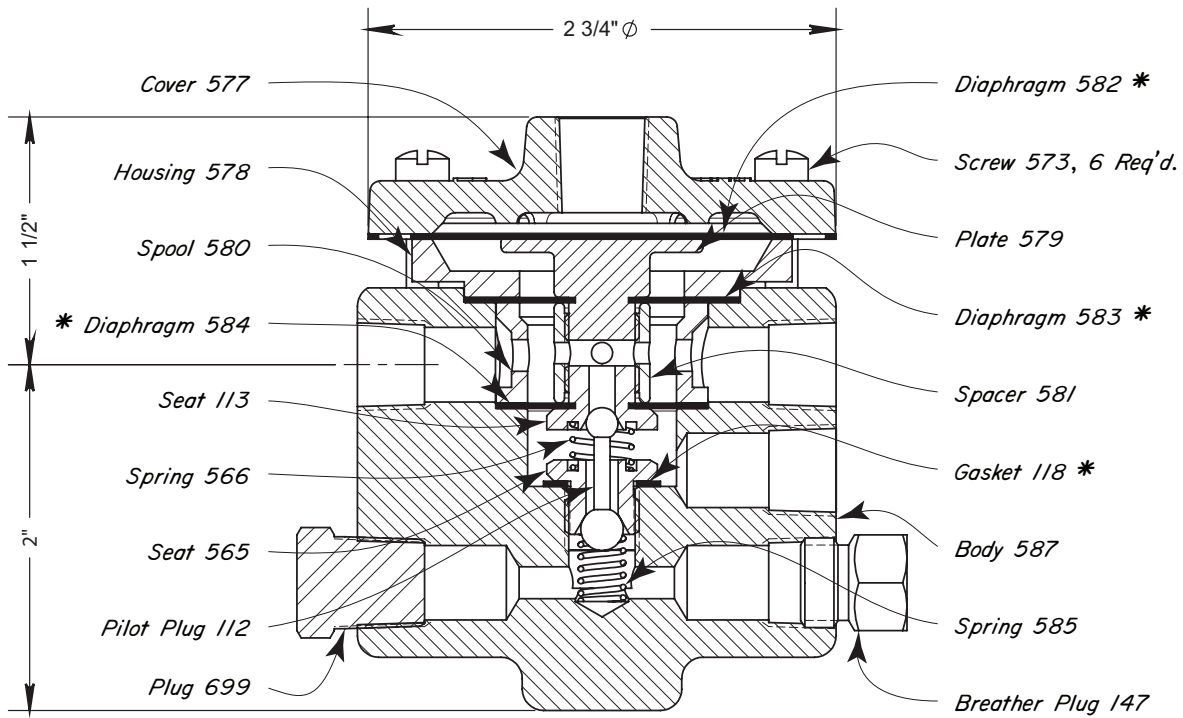


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# PILOTS AND ACCESSORIES



3 PS SNAP PILOTS  
CAST IRON



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAG	3 PS	30	30	RMA

**NOTES:**

For steel and stainless steel, see 3 PG, this section.  
 All openings are tapped 1/4" N.P.T.  
 \*These parts are recommended spare parts and are stocked as repair kits.

#### APPLICATIONS:

Any system in which it is desired to multiply and volume boost a pneumatic signal to a large motor valve or similar equipment. Amplification of the input pneumatic signal is approximately 4:1.

#### FEATURES:

- Pneumatic throttle
- Direct action
- Field reversible
- (See 3 PS for snap action)

#### SUPPLY PRESSURE:

5 to 30 psig

#### VARIABLE PRESSURE:

0 to 30 psig

#### OUTPUT PRESSURE:

- Snap - 0 psig or Supply Pressure
- Throttle - Variable (0 - 30 psig)

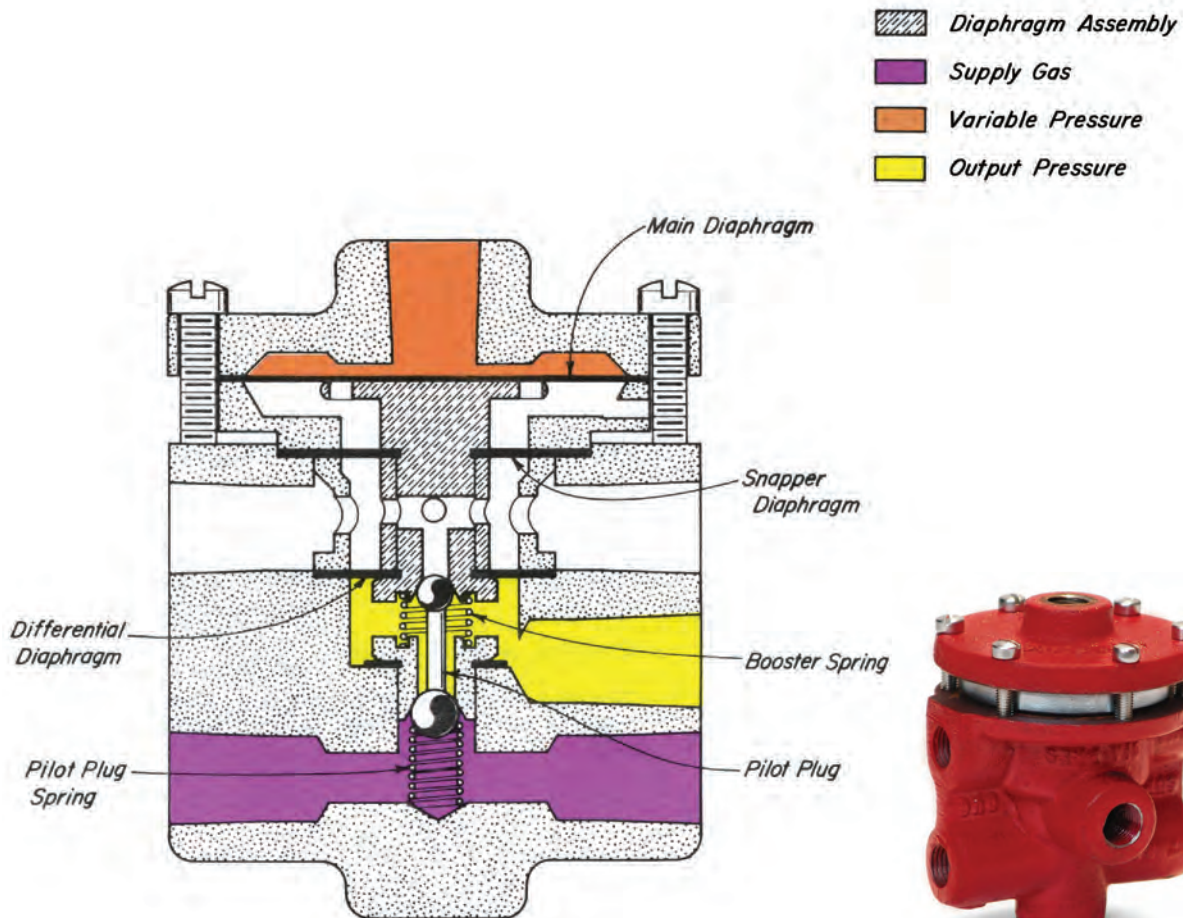
#### OPERATION (Described for Throttle Action):

Variable Pressure (Orange) acting on the MAIN DIAPHRAGM is the actuating force of the pilot. The counteracting force is the Output Pressure (Yellow) acting on the DIFFERENTIAL DIAPHRAGM plus the BOOSTER SPRING. When Variable Pressure (Orange) is zero, the Diaphragm Assembly is held in an up position by the BOOSTER SPRING. As Variable Pressure (Orange) increases slightly to overcome the load of the BOOSTER SPRING, the Diaphragm Assembly moves downward to first close the upper seat which is the pressure vent (Yellow to Atmosphere). The lower seat, which is the Supply Gas inlet (Violet to Yellow), has not yet opened, so both seats are closed with the PILOT PLUG. If Variable Pressure (Orange) increases still further, the Supply Gas inlet (Violet to Yellow) opens to increase the Output Pressure (Yellow) only sufficiently to balance the added Variable Pressure (Orange) acting on the MAIN DIAPHRAGM.

With the Diaphragm Assembly in a balanced position any increase or decrease in Variable Pressure (Orange) will produce a proportional change in Output Pressure (Yellow) by opening either the Supply Gas inlet or the Output Pressure vent to re-establish the balance.

The 3 PG Pilot is actually a pressure multiplier and volume booster. Output pressure (Yellow) is approximately 4 times the Variable Pressure (Orange). Output Pressure (Yellow) accurately follows small changes in Variable Pressure (Orange) to properly position motor valves, etc. for throttling control.

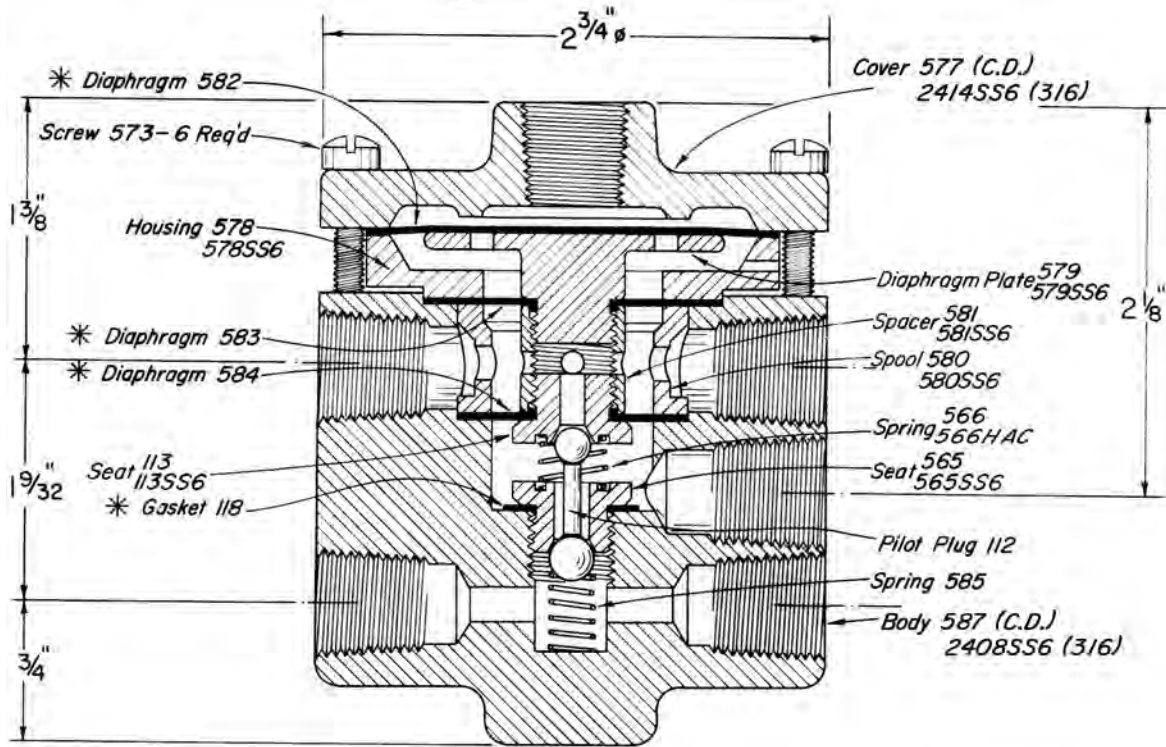
For Snap Service, the 3 PG Pilot operates as described for the 3 PS Pilot on Page 40.1.



# PILOTS AND ACCESSORIES



3PG THROTTLE PILOTS  
DUCTILE / STEEL / 316SS



### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAE	3 PG	30	30	RMA
YAE1	3 PG-S	30	30	RMA
YAGSS6	3 PG-SS6	30	30	RMA

### NOTES:

May be used as a 3 PS by reversing the supply and vent connections.

All openings are tapped  $1/4$ " N.P.T.

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

#### APPLICATION:

Any system in which it is necessary to volume boost a pneumatic signal to a large motor valve or similar equipment.  
As a volume amplifier for controls with a small feed volume.

#### FEATURES:

Volume boosts a pneumatic signal without a corresponding pressure boost (1:1 Output Pressure vs. Variable Pressure)  
Direct Action  
Pneumatic Throttle

#### SUPPLY PRESSURE:

5 to 30 psig

#### VARIABLE PRESSURE:

2 to 30 psig

#### OUTPUT PRESSURE:

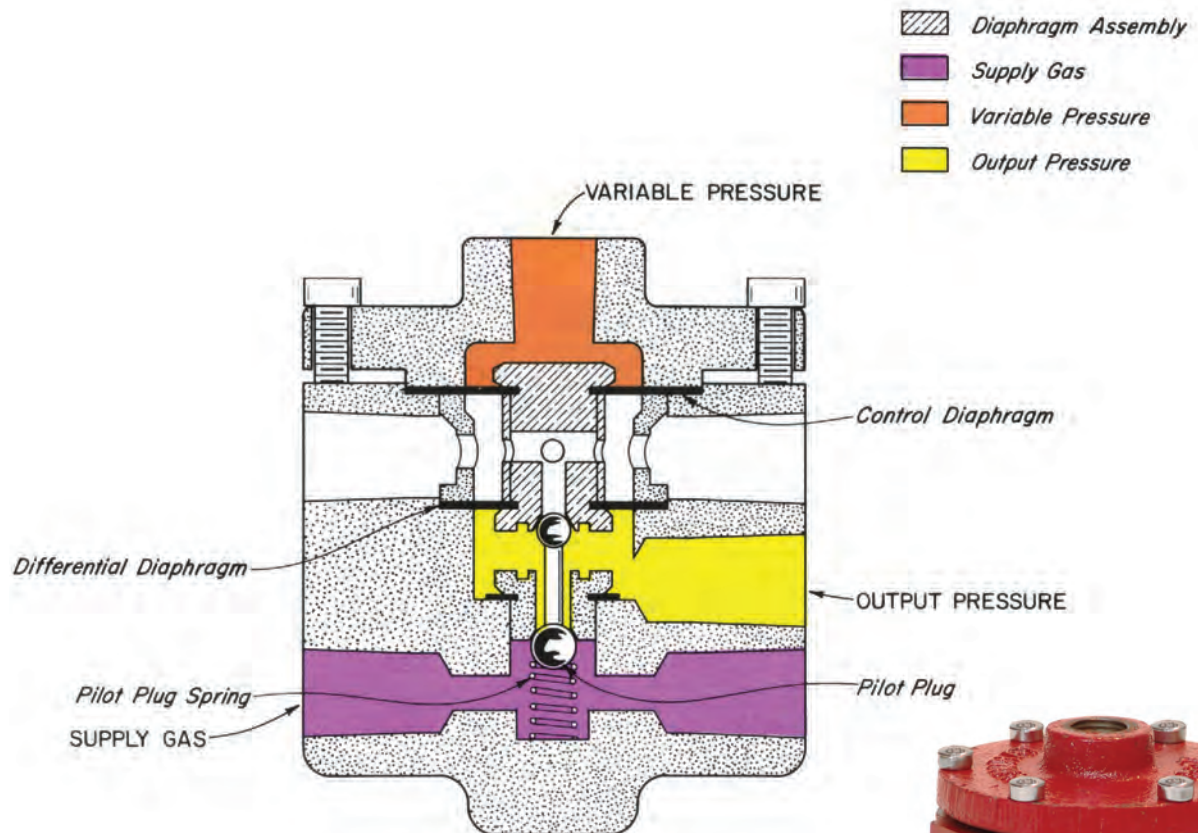
Variable, 2 to 30 psig

#### OPERATION (Described for Throttle Action):

Variable Pressure (Orange) acting on the CONTROL DIAPHRAGM is the actuating force on the pilot. The counteracting force is the Output Pressure (Yellow) acting on the DIFFERENTIAL DIAPHRAGM. When Variable Pressure (Orange) is zero, the weight of the Diaphragm Assembly forces the upper seat, which is the pressure vent (Yellow to Atmosphere), closed. The lower seat, which is the Supply Gas inlet (Violet to Yellow), is slightly opened. This results in an approximate Output Pressure (Yellow) of 2 psig. If Variable Pressure (Orange) increases, the Supply Gas inlet (Violet to Yellow) opens to increase the Output Pressure (Yellow) only sufficiently to balance the added Variable Pressure (Orange) acting on the CONTROL DIAPHRAGM.

With the Diaphragm Assembly in a balanced position, any increase or decrease in Variable Pressure (Orange) will produce a proportional change in Output Pressure (Yellow) by opening either the Supply Gas inlet (Violet to Yellow) or the Output Pressure vent (Yellow to Atmosphere) to re-establish the balance.

The 3 PGA Pilot is actually a volume booster. Output Pressure (Yellow) is approximately 1 to 1 of Variable Pressure (Orange). Output Pressure (Yellow) accurately follows small changes in Variable Pressure (Orange) to properly position motor valves, etc. for throttling control.

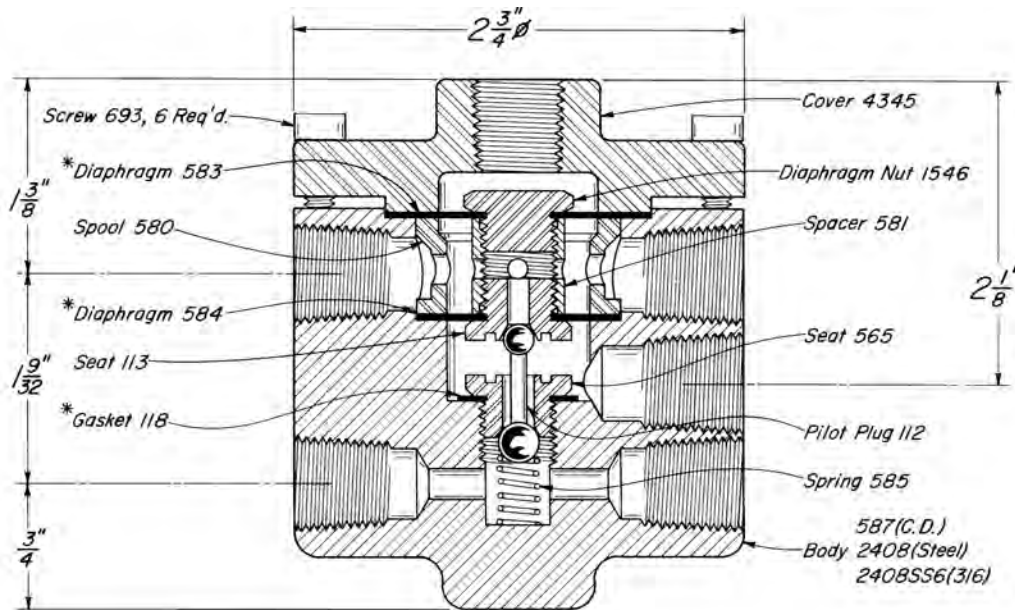


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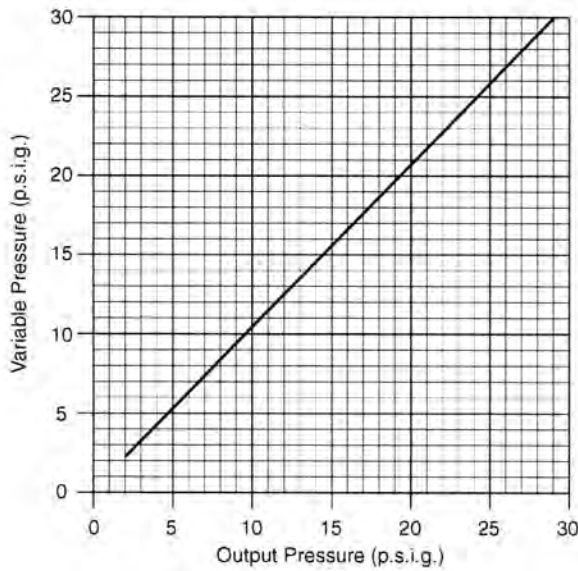
# PILOTS AND ACCESSORIES



3PGA THROTTLE PILOTS  
DUCTILE / STEEL / 316SS



RESPONSE GRAPH



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAJ	3 PGA	30	30	RMA

**NOTES:**

All openings are tapped  $\frac{1}{4}$ " N.P.T.  
\*These parts are recommended spare parts and are stocked as repair kits.



#### APPLICATION:

Any system where a 3 Way Valve is to be monitored and system supply is to be vented if a preset limit is exceeded.

#### FEATURES:

- Intermittent bleed pilot 3 Way Valving
- Manual reset
- Provides "tattle-tell" signal when preset limit is exceeded
- Rapid venting action
- Direct acting

#### SUPPLY PRESSURE:

5 to 30 psig

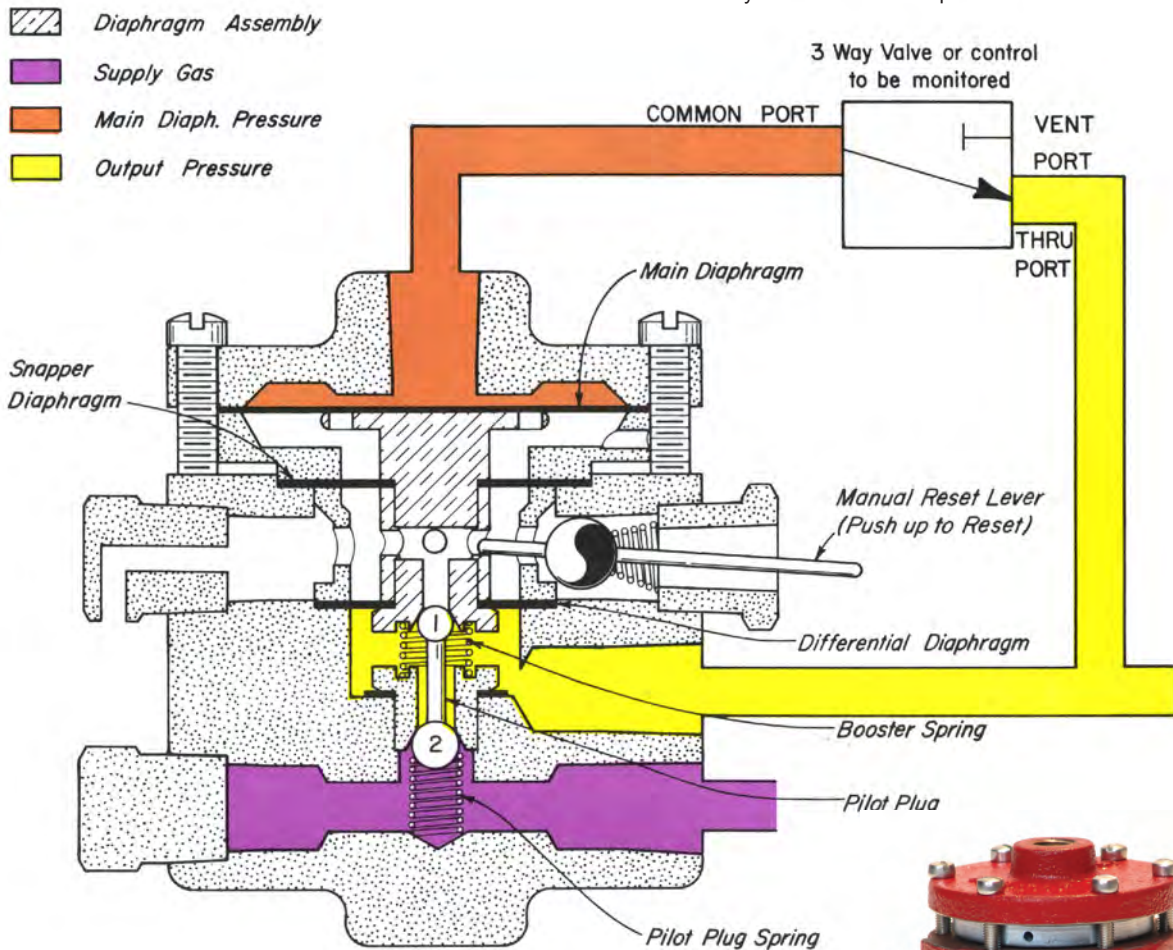
#### OUTPUT PRESSURE:

0 psig or Supply Pressure

#### OPERATION:

Assume that the 3 Way Valve to be monitored is "ON." When Supply Pressure (Violet) is connected, Ball 2 of the PILOT PLUG is against the lower seat and prevents Supply Pressure (Violet) from reaching the Output (Yellow).

The Diaphragm Assembly is held in a UP position by the BOOSTER SPRING. The upper seat and Ball 1 of the PILOT PLUG are separated allowing the Output Pressure (Yellow) to be vented. When the Reset Lever is manually raised, the upper seat is closed and the lower seat is opened allowing the Output Pressure (Yellow) to increase. This increase is transferred to the MAIN DIAPHRAGM through the 3 Way Valve and holds the Diaphragm Assembly down allowing the Output Pressure (Yellow) to equalize with the Supply Pressure (Violet). The 3 PGM is now "LOCKED" on and the Output Pressure (Yellow) equals the Supply Pressure (Violet). If the Output Pressure (Yellow) is interrupted by the 3 Way Valve and the Main Diaphragm Pressure (Orange) is vented through the 3 Way Valve, the Diaphragm Assembly will be pushed up by the BOOSTER SPRING and the Output Pressure (Yellow) is vented through the upper seat of the 3 PGM. The 3 Way Valve must be reset to "ON" and then the Reset Lever of the 3 PGM must be manually raised to resume operation.

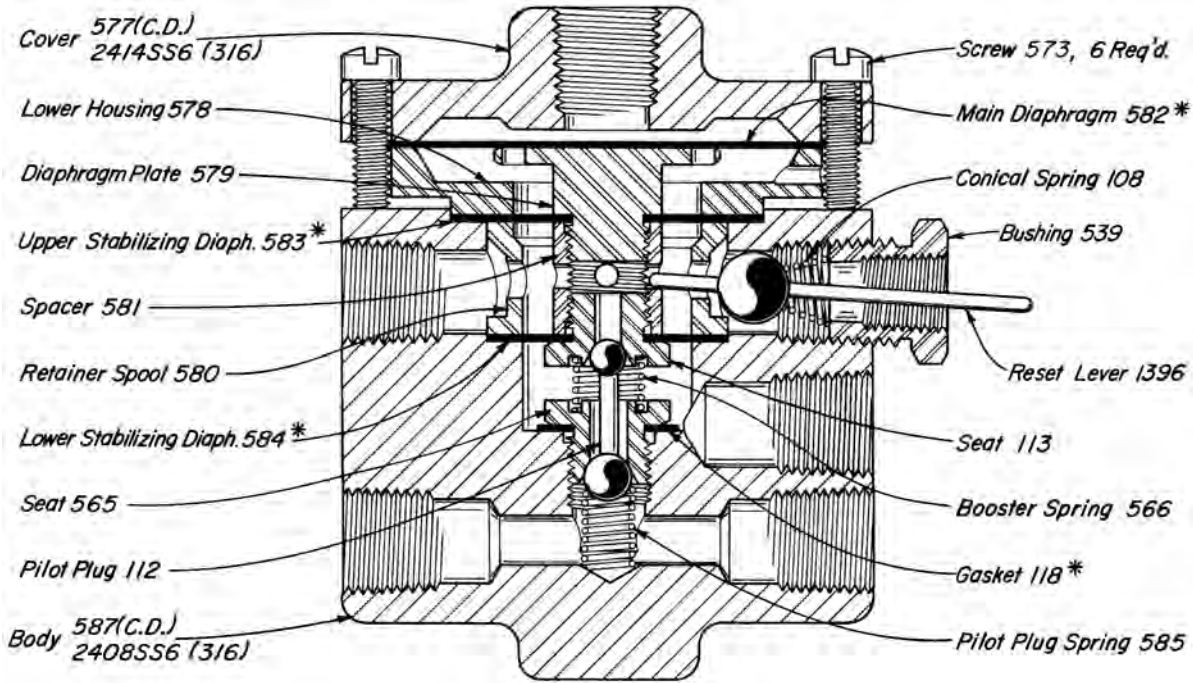


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# PILOTS AND ACCESSORIES



3 PGM MANUAL RESET PILOTS  
DUCTILE IRON / STEEL



## PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAF	3 PGM	30	30	RMC
YAF1	3 PGM-S	30	30	RMC

## NOTES:

All openings are tapped 1/4" N.P.T.

For dimensions refer to PG. 20.2 this section

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

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#### APPLICATION:

Manually sends a control signal to open or close a valve using a palm button. Supply is blocked and control signal bled to vent when released.

#### FEATURES:

- Direct acting
- Mounting bolts for bracket mounting
- Controls a relatively high pressure (300 psig) with minimal manual effort.

#### SUPPLY PRESSURE:

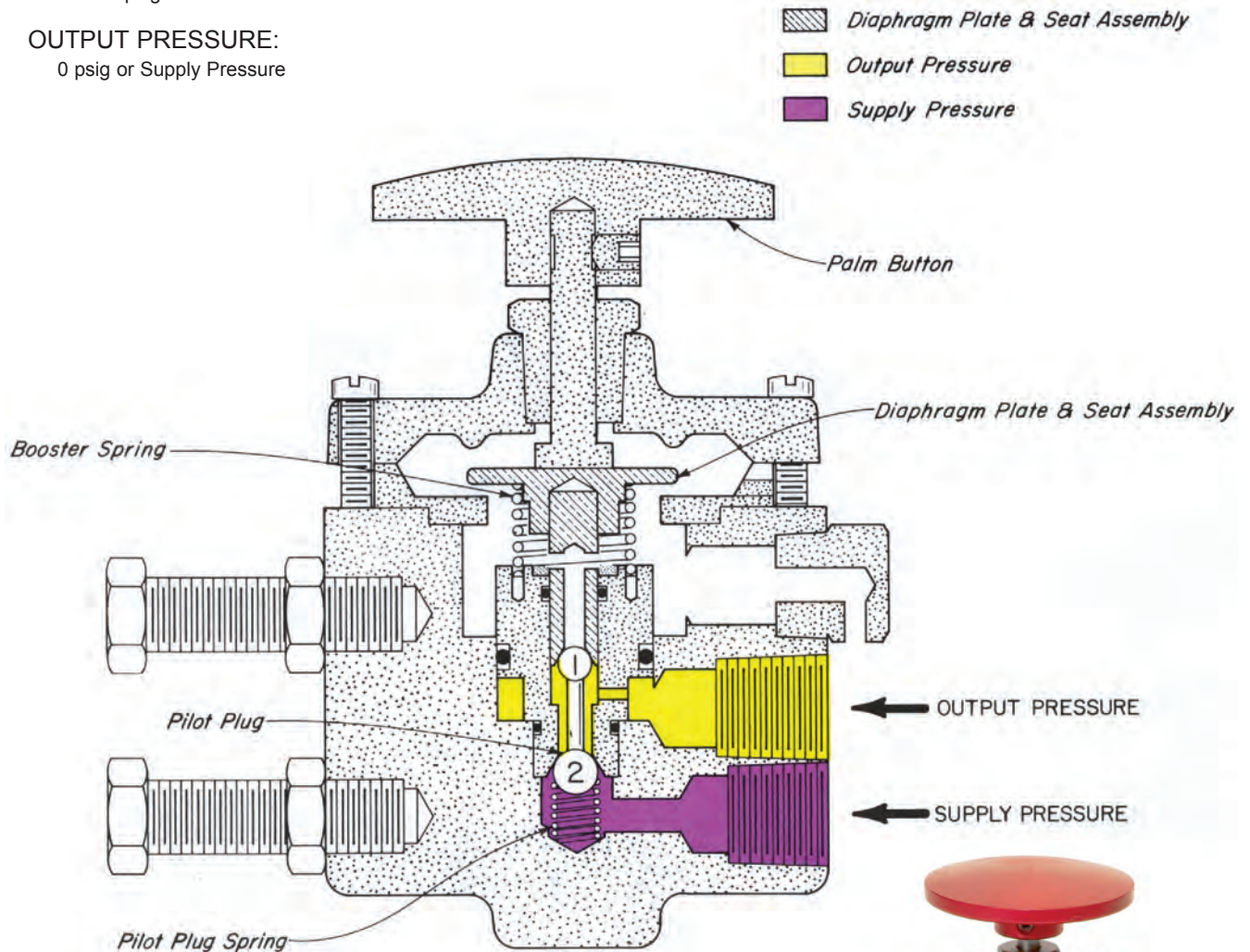
0 to 30 psig

#### OUTPUT PRESSURE:

0 psig or Supply Pressure

#### OPERATION:

Manually depressing the PALM BUTTON causes the DIAPHRAGM PLATE and SEAT ASSEMBLY to close the upper seat with Ball 1 of the PILOT PLUG. This blocks the vent, further movement opens the lower seat at Ball 2 of the PILOT PLUG and communicates Supply Pressure to the Output. Releasing the PALM BUTTON reverses the action and allows the PILOT PLUG SPRING to close the lower seat with Ball 2 removing the Supply Pressure from the Output. The BOOSTER SPRING then opens the seat at Ball 1, bleeding the Output Pressure through the vent.

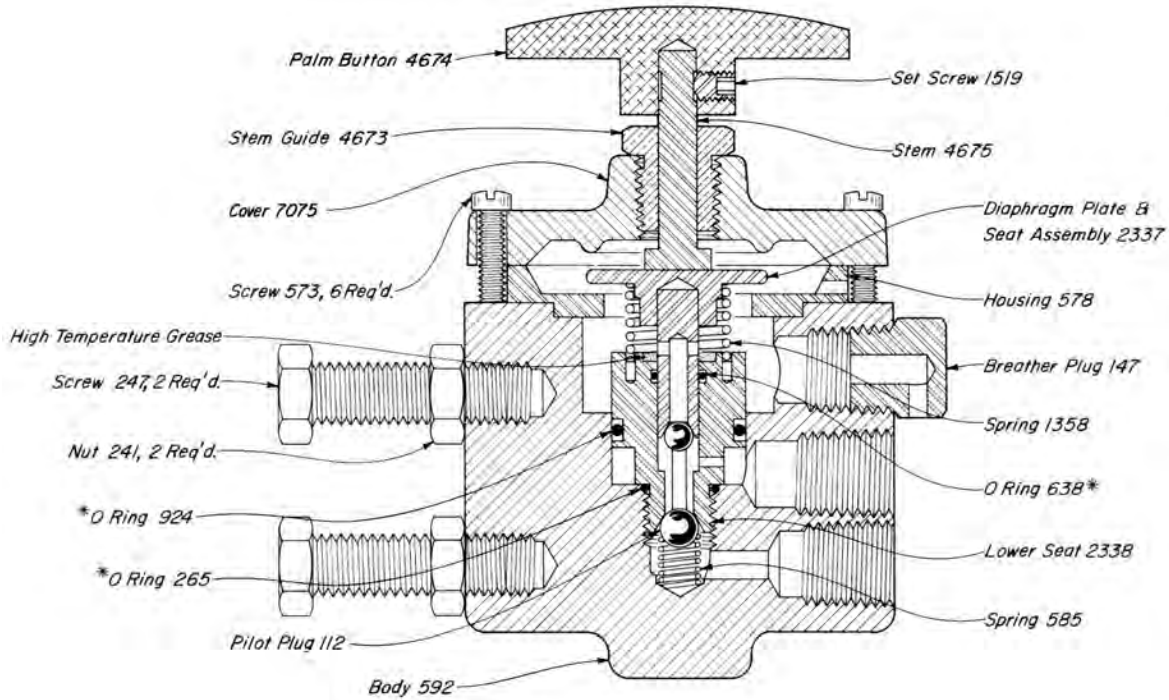


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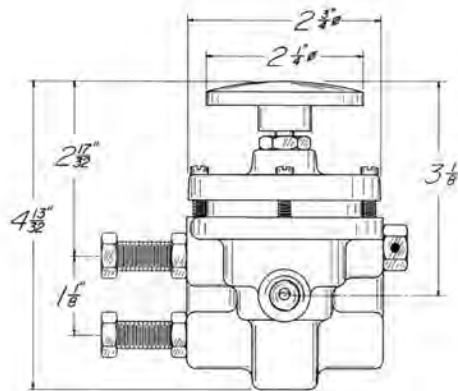
# PILOTS AND ACCESSORIES



## 30 PGMR MANUAL RELAY PILOT DUCTILE IRON



### DIMENSIONS



#### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAL	30 PGMR-D	300	300	RMP

#### NOTES:

All openings are tapped  $\frac{1}{4}"$  N.P.T.

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

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#### APPLICATION:

Any system in which it is desired to reverse and multiply a varying pneumatic signal.

#### FEATURES:

- Intermittent bleed pilot
- Reverse acting
- Throttle action
- Adjustable Steam Pressure

#### SUPPLY PRESSURE:

5 to 30 psig

#### OUTPUT PRESSURE:

0 to 20 psig  
Adjustable Steam Pressure

#### VARIABLE PRESSURE (input signal):

0 to 12 psig  
30 psig maximum

#### PRESSURE RATIO:

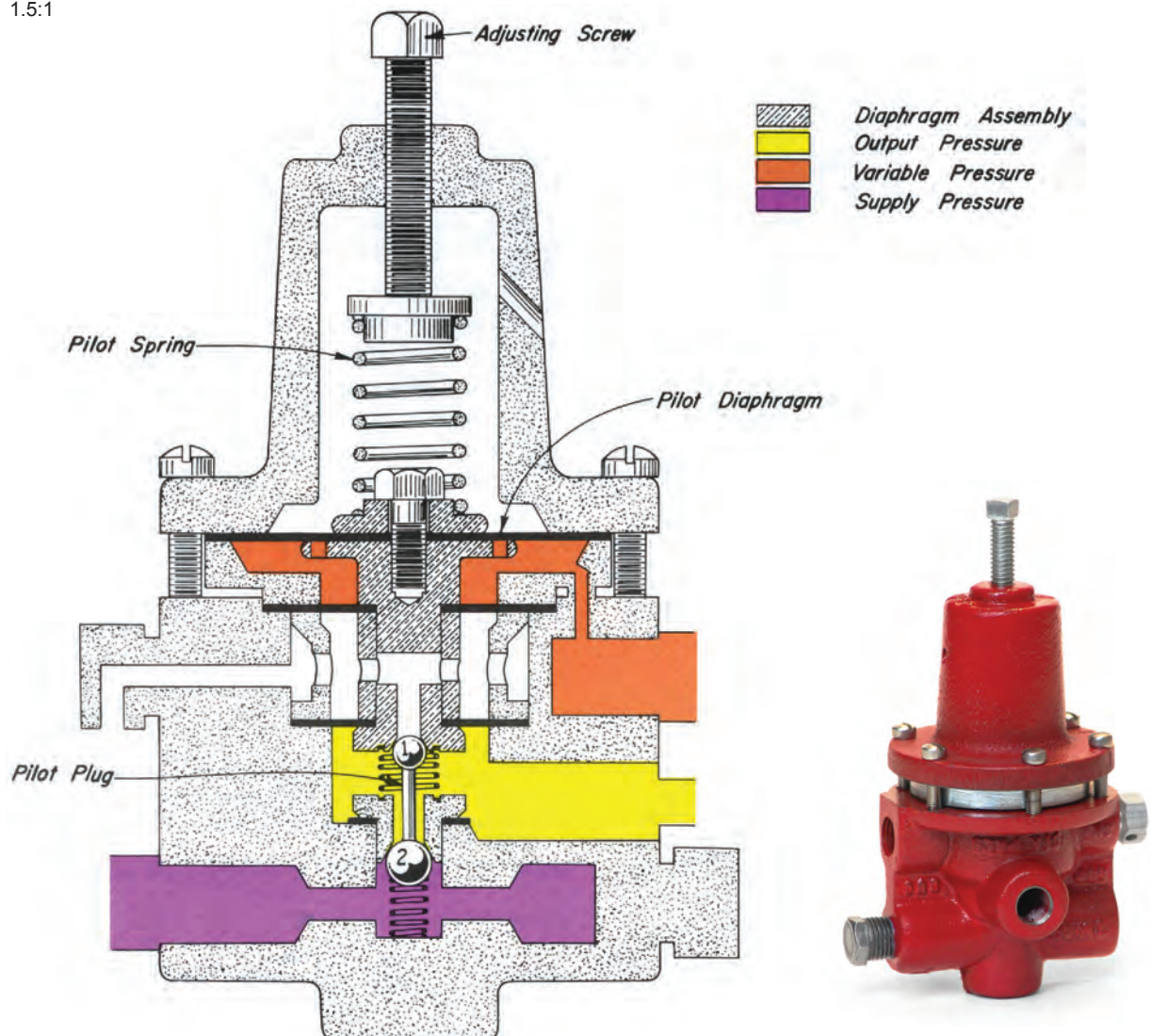
(Orange to Yellow)  
1.5:1

#### OPERATION:

The PILOT SPRING loads the upper side of the Diaphragm Assembly and is opposed by the Variable Pressure (Orange) acting under the PILOT DIAPHRAGM and by the Output Pressure (Yellow).

Assume the PILOT SPRING is compressed with the ADJUSTING SCREW set for a desired Variable Pressure (Orange). With the Variable Pressure (Orange) to low, the PILOT SPRING holds the Diaphragm Assembly down, closing the upper seat at Ball 1 (Yellow to Atmosphere) and opening the lower seat at Ball 2 (Violet to Yellow). As the Variable Pressure (Orange) increases to the set pressure, the Diaphragm Assembly moves upward against the PILOT SPRING to first close the lower seat at Ball 2 (Violet to Yellow) and then open the upper seat at Ball 1 (Yellow to Atmosphere). In this position the Supply Pressure (Violet) inlet is closed and the Output Pressure (Yellow) is vented to atmosphere.

PILOT SPRING #86 is furnished as standard. A heavier spring (Part #692) can be furnished on special order, to raise the Variable Pressure (Orange) from 12 psig to 30 psig.

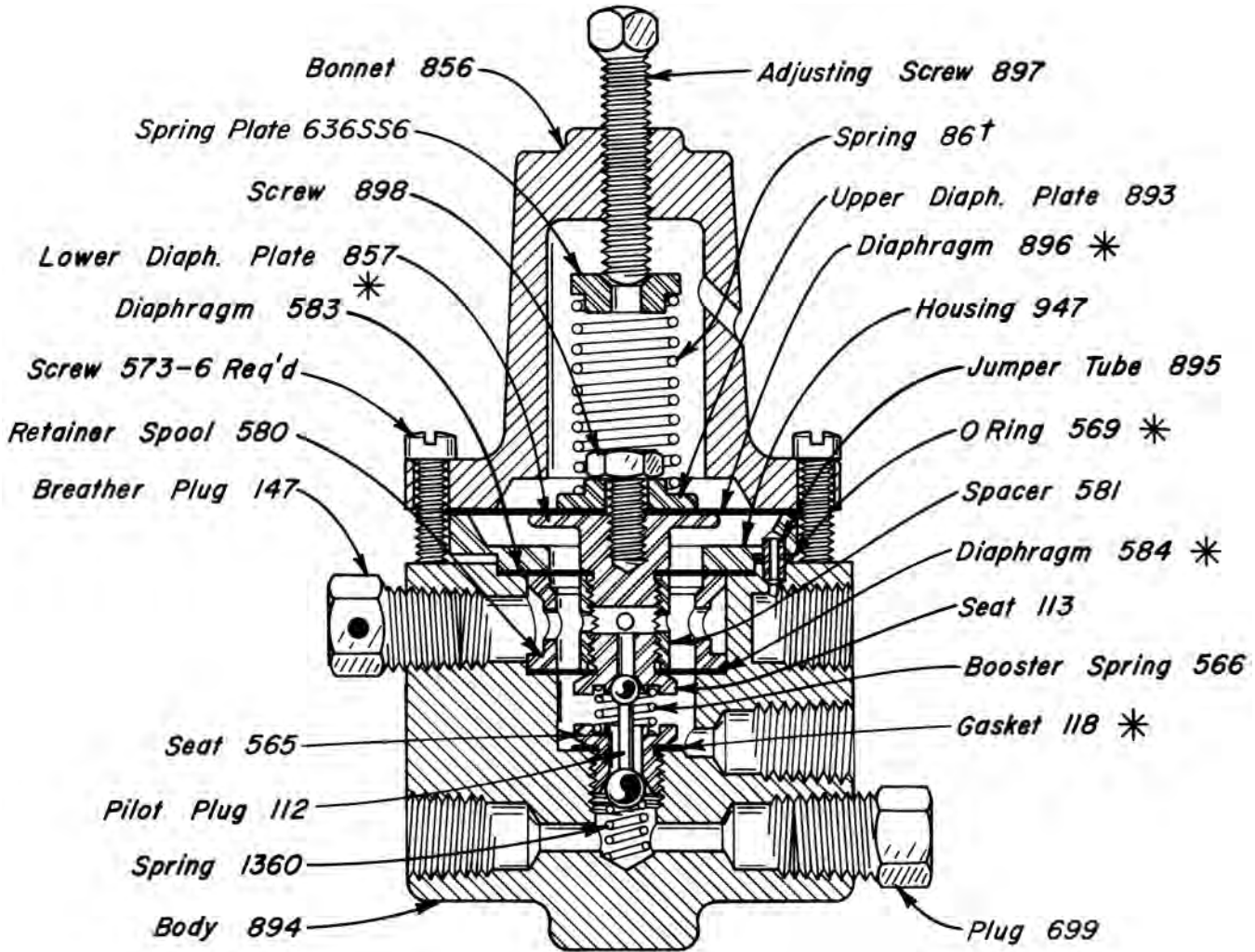


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# PILOTS AND ACCESSORIES



## 3 PGRA THROTTLE-REVERSE PILOT CAST IRON



### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAH	3 PGRA	30	30	RML

### NOTES:

†692 heavy spring available upon request.  
 For dimensions refer to Pg. 70.2 of this section.  
 All openings are tapped 1/4" N.P.T.  
 \*These parts are recommended spare parts and are stocked as repair kits.

#### APPLICATION:

Direct firing of small steam generators by controlling flow of gas through the pilot to the burner. Approximate capacity of pilot is 360 SCFH with 15 psig supply pressure.

Pressure control of larger steam generators by regulating flow of gas through a motor valve. Motor valves are shown and described in Sections E-2 and E-3.

#### FEATURES:

- Intermittent bleed pilot
- Reverse acting
- Throttle action
- Adjustable Steam Pressure

#### SUPPLY PRESSURE:

5 to 30 psig

#### OUTPUT PRESSURE:

0 to 20 psig  
Adjustable Steam Pressure

#### STEAM PRESSURE:

15 psig maximum

#### STEAM TEMPERATURE:

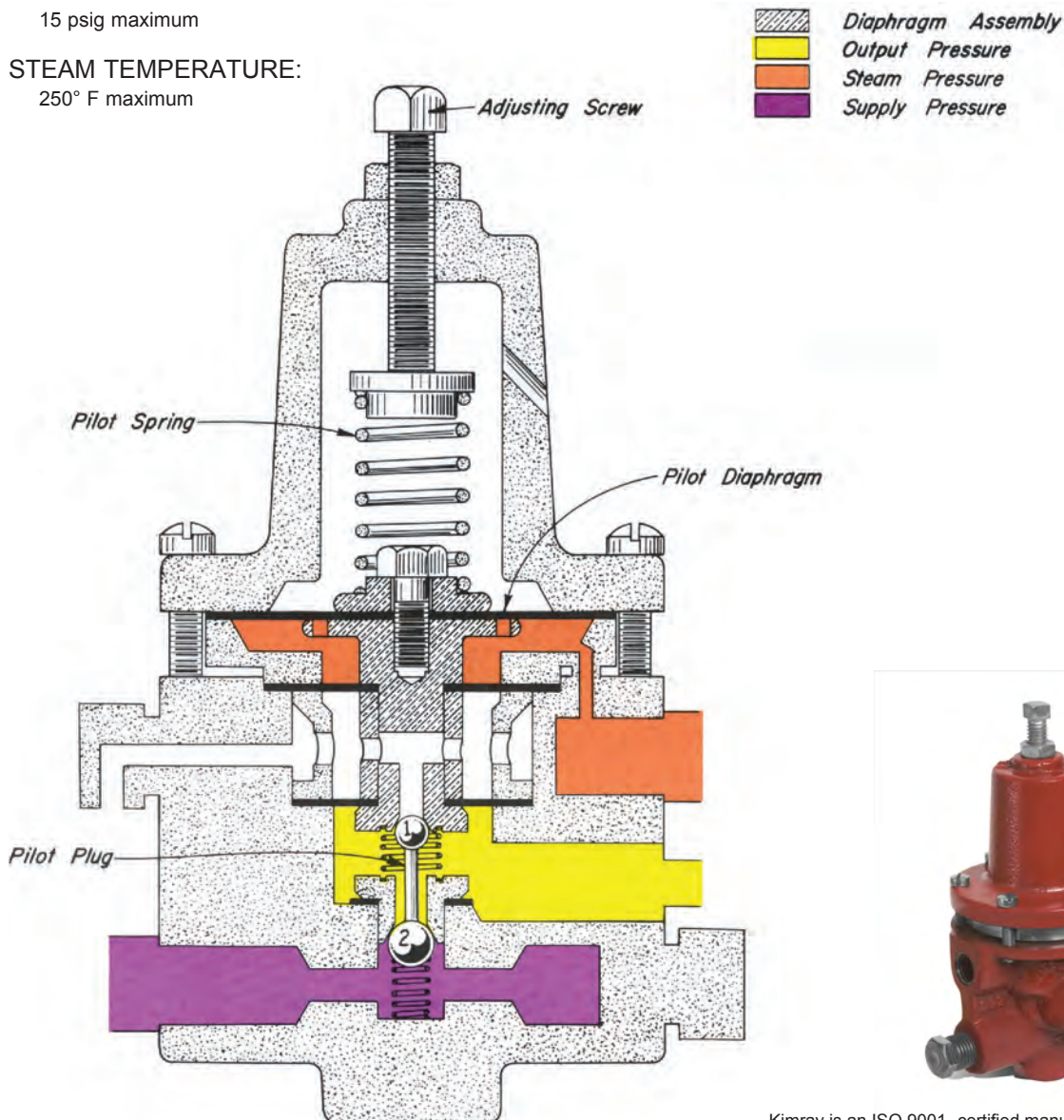
250° F maximum

#### OPERATION:

The PILOT SPRING loads the upper side of the Diaphragm Assembly and is opposed on the under side by the Steam Pressure (Orange) and the Output Pressure (Yellow).

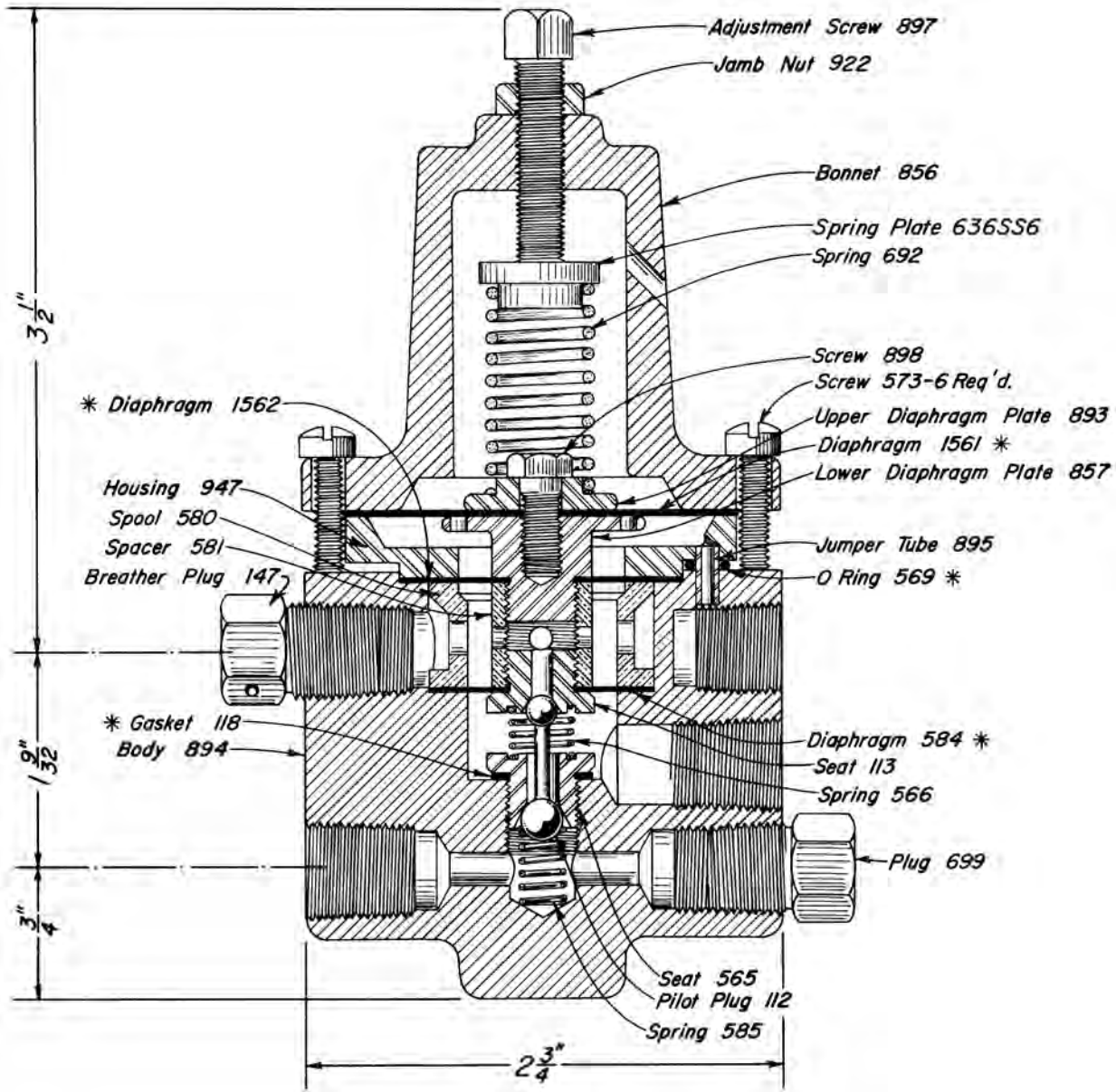
Assume the PILOT SPRING is compressed with the ADJUSTING SCREW set for a desired Steam Pressure (Orange). With the Steam Pressure (Orange) too low, the PILOT SPRING holds the Diaphragm Assembly down, closing the upper seat at Ball 1 (Yellow to Atmosphere) and opening the lower seat at Ball 2 (Violet to Yellow). As the Steam Pressure (Orange) increases to the set pressure, the Diaphragm Assembly moves upward against the PILOT SPRING to first close the lower seat at Ball 2 (Violet to Yellow) and then open the upper seat at Ball 1 (Yellow to Atmosphere).

The 3 PGP PRESSURESTAT may be used to fire small steam generators directly by connecting the Output Pressure (Yellow) to the burner. For larger units the Output Pressure (Yellow) can be used to operate a diaphragm motor valve installed in the burner manifold piping. See Sections E-2 and E-3 for applicable motor valves.



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3 PGP PRESSURESTAT  
CAST IRON



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAA	3 PGP	30	30	RMM

**NOTES:**

All openings are tapped 1/4" N.P.T.

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



#### APPLICATION:

Any system where two temporary pressure signals are available. One signal to turn "ON" the pilot and one signal to turn "OFF" the pilot.

#### FEATURES:

- Bistable operation
- Temporary signal will turn "ON" or "OFF"
- Intermittent bleed pilot
- Semi-snap action

#### SUPPLY PRESSURE:

20 to 30 psig

#### OUTPUT PRESSURE:

0 psig or Supply Pressure

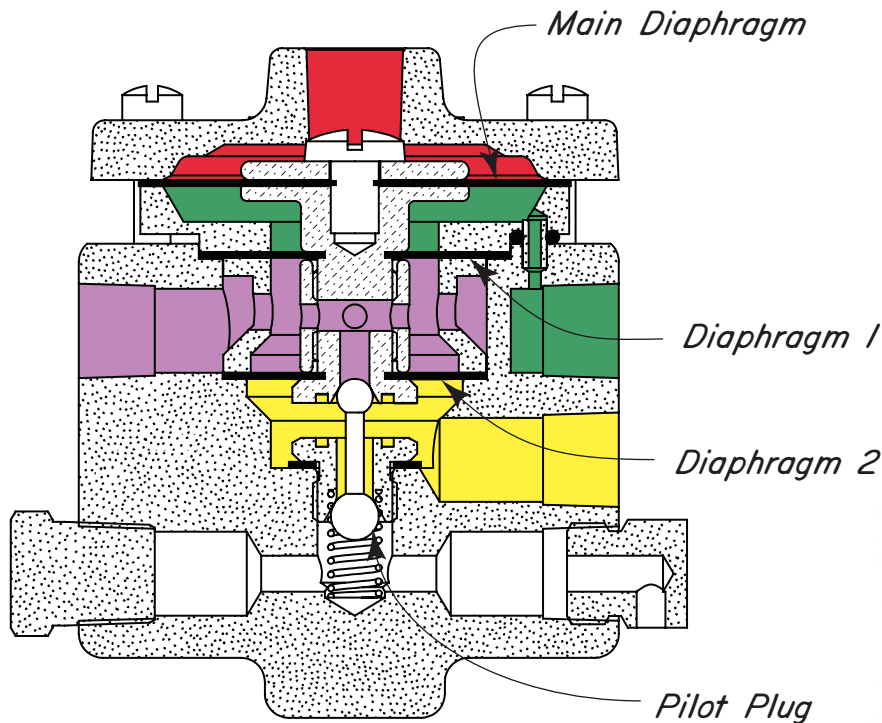
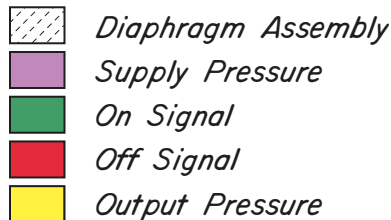
#### ON/OFF SIGNAL:

20 to 30 psig

#### OPERATION:

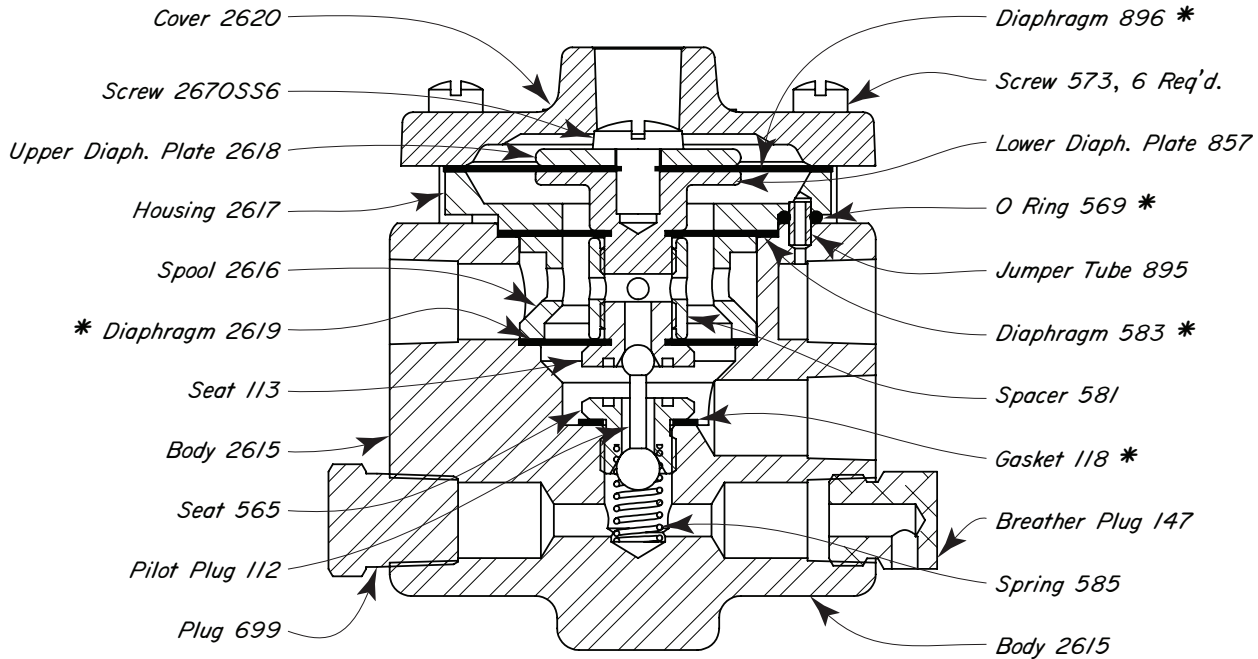
Assume that when the Supply Pressure (Violet) is applied, the upper seat Ball 1 is closed and the lower seat Ball 2 is opened.

Output Pressure (Yellow) is vented to atmosphere. Since Diaphragm 2 is larger than Diaphragm 1, the Diaphragm Assembly is held down and the Output Pressure (Yellow) remains vented to atmosphere. When an "ON" signal (Green) is applied to the Main Diaphragm, the Diaphragm Assembly is forced upward, closing the lower seat and opening the upper seat. When the Supply Pressure (Violet) equalizes with the Output Pressure (Yellow), the Supply Pressure on Diaphragm 1 then holds the Diaphragm Assembly in the up position and the "ON" signal (Green) can be removed. When an "OFF" signal (Red) is applied to the Main Diaphragm, the Diaphragm Assembly is forced downward, closing the upper seat and opening the lower seat. This vents the Output Pressure (Yellow to Atmosphere). The "OFF" signal (Red) can now be removed and the pilot will remain in the "OFF" position. If the 3 PGB is "ON" when the Supply Pressure (Violet) is applied, an "OFF" signal applied to the Main Diaphragm will turn the 3 PGB "OFF."



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**3 PGB BISTABLE PILOT  
CAST IRON**



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAH1	3 PGB	30	30	RME

**NOTES:**

All openings are tapped 1/4" N.P.T.

NOTE: For dimensions refer to pg. 10.2 of this section

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

#### APPLICATION:

Any system where a 0 to 300 psig signal must be switched using a 20 to 30 psig signal.

#### FEATURES:

- Intermittent bleed pilot 3 Way Valving
- Up to 300 psig supply
- 20 to 30 psig ON/OFF signal
- Direct acting

#### SUPPLY PRESSURE:

0 to 300 psig

#### OUTPUT PRESSURE:

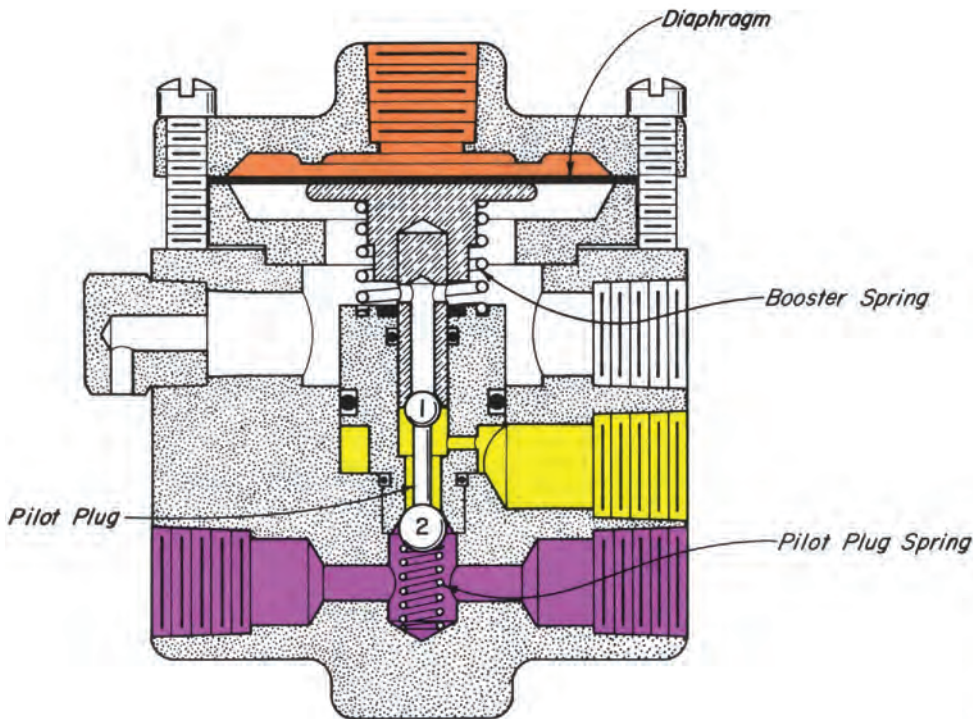
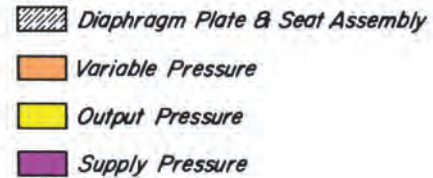
0 psig or Supply Pressure

#### VARIABLE PRESSURE:

20 to 30 psig

#### OPERATION:

With the Variable Pressure (Orange) on the Main Diaphragm at a minimum, the Booster Spring lifts the Diaphragm Plate and Seat Assembly closing the lower seat Ball 2 and opening the upper seat Ball 1, venting the Output Pressure (Yellow to Atmosphere). With an increase in Variable Pressure (Orange) sufficient to overcome the Booster Spring, the Diaphragm Plate and Seat Assembly will be moved downward and the upper seat will be closed. As the Variable Pressure (Orange) continues to increase, the lower seat will be opened communicating Supply Pressure (Violet) to Output Pressure (Yellow). When the Variable Pressure (Orange) is decreased to a minimum, the Booster spring will raise the Diaphragm Plate and Seat Assembly, closing the lower seat (Violet to Yellow) and opening the upper seat (Yellow to Atmosphere), reducing the Output Pressure (Yellow to Atmospheric Pressure).

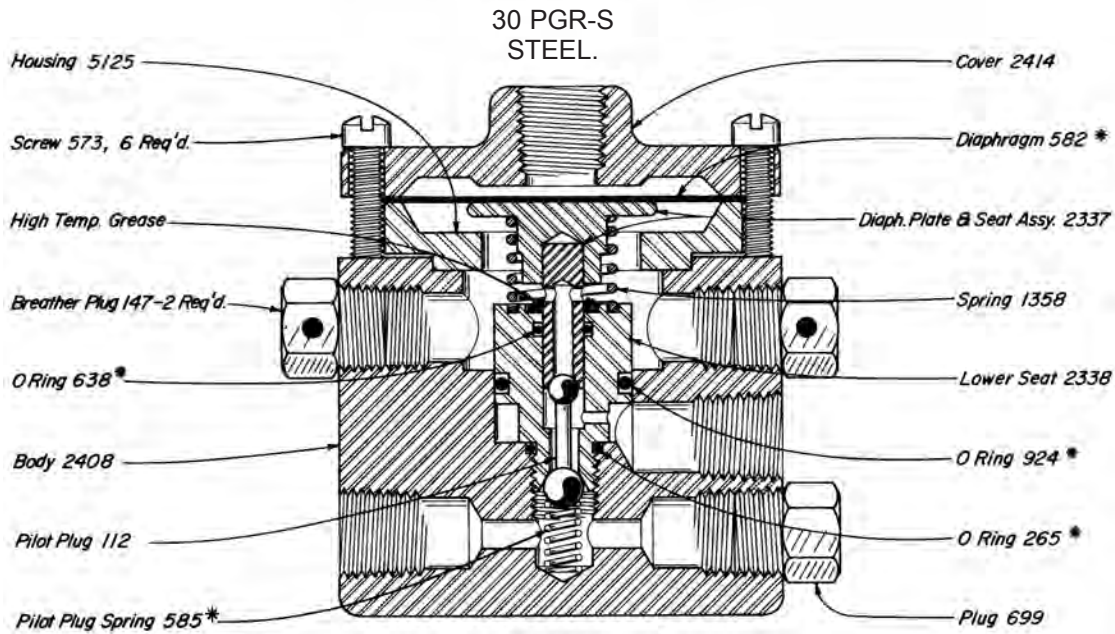
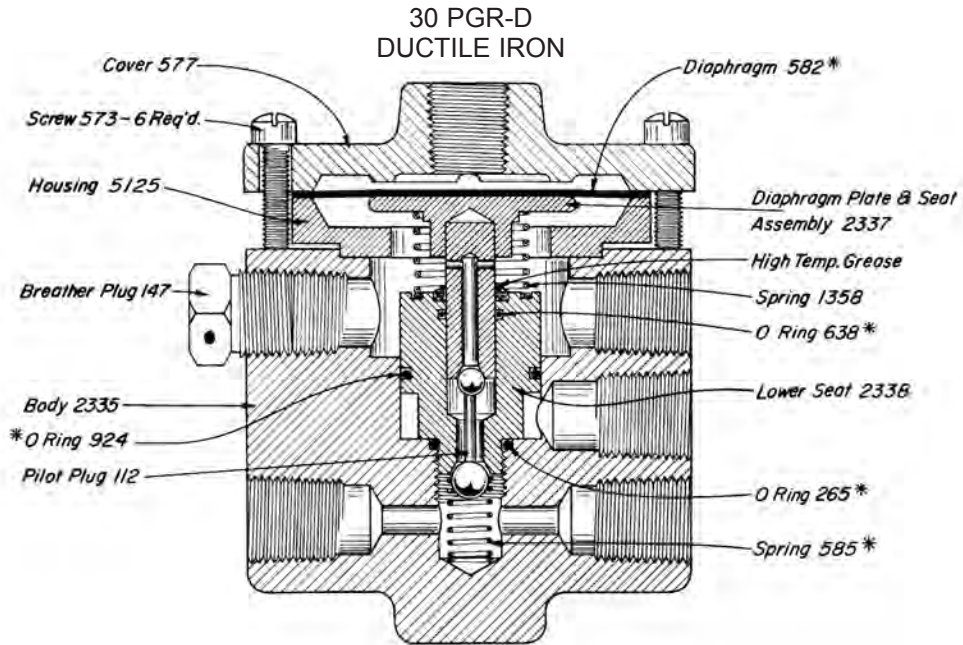


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# PILOTS AND ACCESSORIES



30 PGR RELAYS  
DUCTILE IRON / STEEL



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YAI	30 PGR-D	300	300	RMY
YAI1	30 PGR-S	300	300	RMY

**NOTES:**

All openings are tapped 1/4" N.P.T.  
 NOTE: For dimensions refer to Pg. 20.2 this section.  
 \*These parts are recommended spare parts and are stocked as repair kits.

#### APPLICATIONS:

On oil and gas separators, water knockouts and similar equipment where motor valves are required.

Where a pneumatic signal is desired from mechanical movements such as a float.

#### FEATURES:

- Direct float operated
- Snap or throttle action
- Field reversible
- Controls any motor valve requiring up to 30 psig diaphragm pressure.

#### SUPPLY PRESSURE:

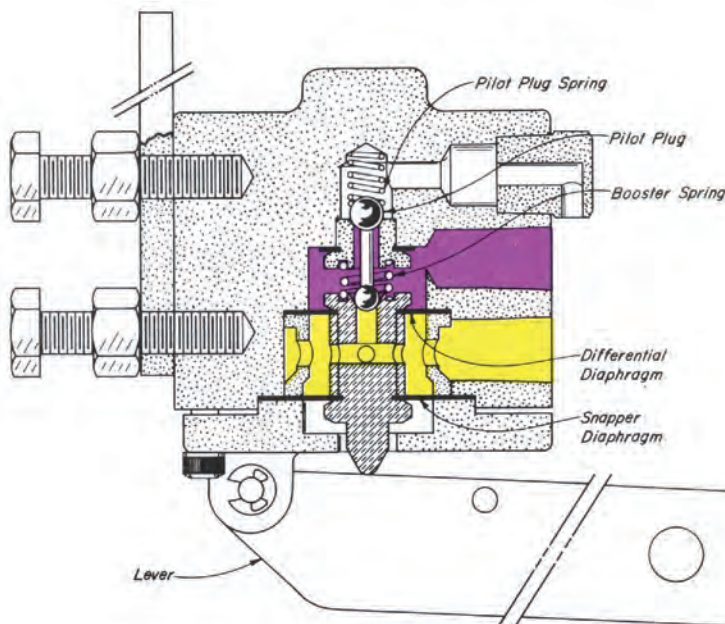
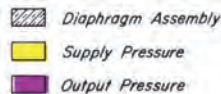
5 to 30 psig

#### OPERATION:

Assume the Diaphragm Assembly is held in an up position by an outside float arm connected to the pilot LEVER with a turnbuckle. Such an arrangement is shown in the 3 PM installation photograph, lower right-hand corner. The BOOSTER SPRING together with Supply Pressure (Violet), acting on the difference in areas of the SNAPPER and DIFFERENTIAL DIAPHRAGMS, forces the Diaphragm Assembly against the LEVER. With a downward movement of the LEVER the upper seat, which is the pressure vent (Yellow to Atmosphere), closes first. The PILOT PLUG SPRING holds the upper ball against its seat while a further downward movement of the LEVER opens the Supply Pressure inlet (Violet to Yellow). As Output Pressure (Yellow) increases, pressure across the DIFFERENTIAL DIAPHRAGM is reduced, loading the DIAPHRAGM ASSEMBLY in a down direction. The accelerated downward movement of the DIAPHRAGM ASSEMBLY produces a sudden opening of the Supply Pressure inlet (Violet to Yellow).

In order to reverse the above action, the upward force of the LEVER on the Diaphragm Assembly must be greater than the force of the BOOSTER SPRING plus Supply Pressure (Violet) acting on the full area of the SNAPPER DIAPHRAGM. As the Diaphragm Assembly moves up, the Supply Pressure inlet is closed first. The PILOT PLUG SPRING holds the lower ball against its seat while a further upward movement of the LEVER opens the pressure vent (Yellow to Atmosphere). Decreasing Output Pressure (Yellow) accelerates the upward movement of the Diaphragm Assembly to produce a sudden opening of the pressure vent. The sudden changes in Output Pressure (Yellow) caused by movements of the LEVER, snap actuates any motor valve to which it is connected.

For throttling Service, connect Supply Pressure (Violet) to opening marked "THROT" on the pilot body. This will require changing the pivot on the LEVER or reversing the motor valve action. The supply gas connection for snap service becomes the exhaust for throttling service.



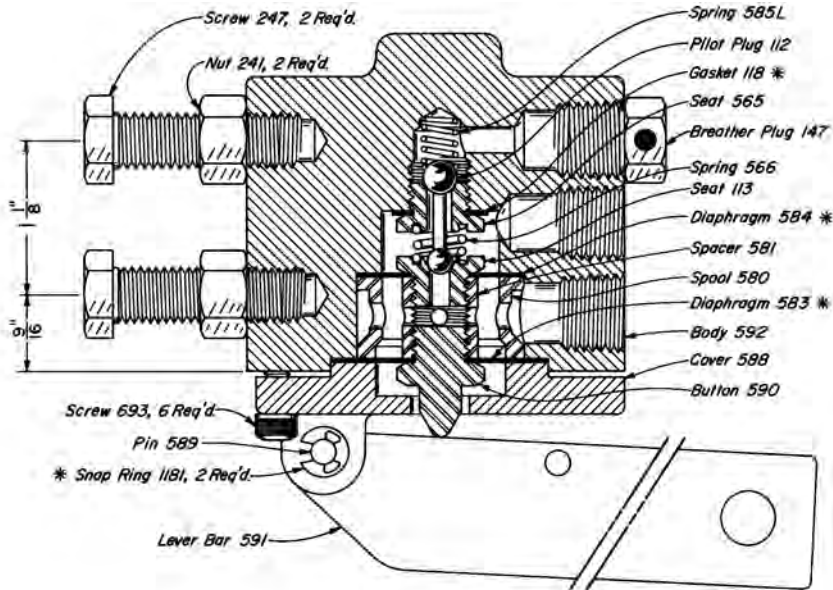
Float operated, 3 PM Pilot mounted on Kimray 8" Float Opening Cover.

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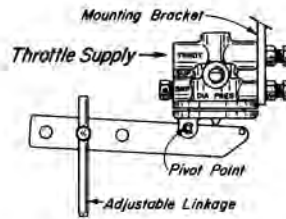
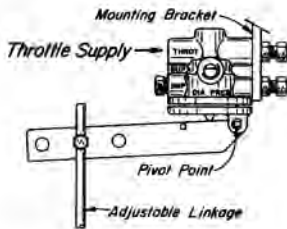
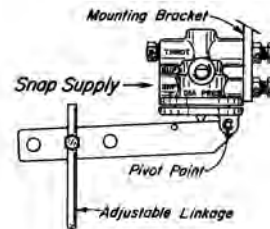
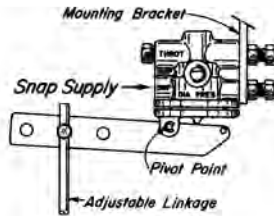
# PILOTS AND ACCESSORIES



## 3 PM MECHANICAL PILOT CAST IRON



### INSTALLATION



ROD MOVEMENT	OUTPUT
Up	Supply Pressure
Down	Vented

ROD MOVEMENT	OUTPUT
Up	Vented
Down	Supply Pressure

#### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
CDA	3 PM	30	30	RMN

#### MOUNTING BRACKETS AVAILABLE: Order separate

FLOAT OPENING	MOUNTING BRACKET
612 TOB	903
812 TOB	904
1012 TOB	681
50 TOB-D	3035
25 TOB-D	3035
8" HUTA	3035
26 WA/26DM	1856

\*These parts are recommended spare parts and are stocked as repair kits. Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

- Shut-in relay
- Remote shut-in relay
- Signal priority sensor
- Automatic shut-down relay
- Signal interruption

#### SPECIFICATIONS:

- Connections - 1/4" N.P.T.
- Max. Body design pressure - 300 psig
- Max. Inlet pressure Port 1 - 40 psig
- Max. Inlet pressure Port 2 - 40 psig
- Max. Operating temperature - 150°F.
- Pressure required at Port 2 to override the pressure at Port 1 - 20 psig or 70% of the pressure at Port 1 (whichever is greater).

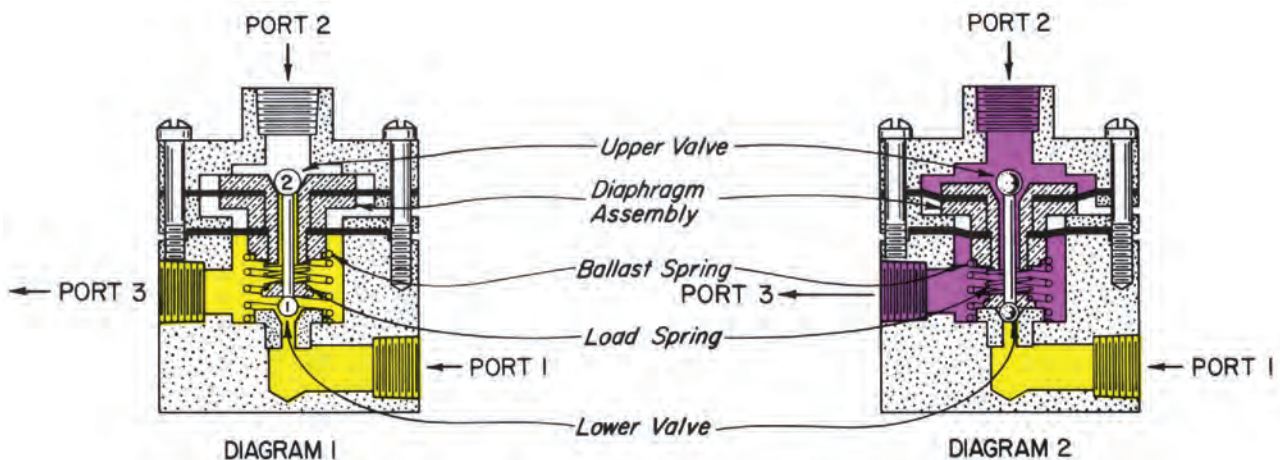
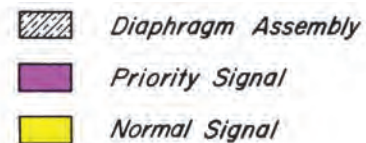
#### MATERIALS:

- Body - Anodized aluminum
- Springs - Steel, (Zinc plated)
- Diaphragms - Buna-N
- Valve Element - 316 S.S.
- Valve Seats - 303 S.S.
- (Other material available on request)

#### OPERATION:

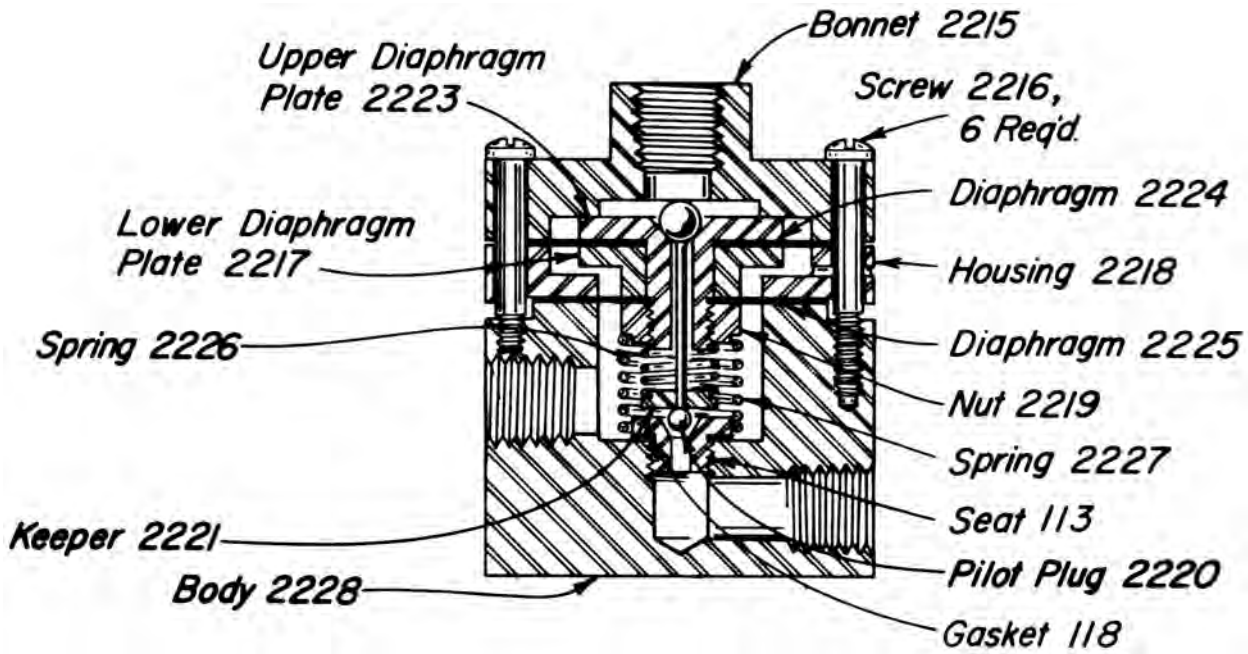
Assume there is no pressure at Port 2 (see diagram 1). The BALLAST SPRING will raise the DIAPHRAGM ASSEMBLY, lifting Ball 1 and opening the LOWER VALVE. The LOAD SPRING will cause Ball 2 to close the UPPER VALVE. The Normal Signal (Yellow) at Port 3 will be the pressure at Port 1. The pressure at Port 1 can be a constant pressure or a variable pressure.

When pressure is applied at Port 2 (See diagram 2), the DIAPHRAGM ASSEMBLY moves downward. This causes Ball 1 to close the LOWER VALVE. As the DIAPHRAGM ASSEMBLY continues to move down, it compresses the LOAD SPRING and unseats Ball 2 in the UPPER VALVE. This allows the Priority Signal (Violet) from Port 2 to be transmitted to Port 3, the Priority Signal (Violet) at Port 2 should be a pressure of 20 to 40 psig. When the Priority Signal (Violet) at Port 2 is reduced below 1 psig the relay will reset to the original position with Port 1 communicated to Port 2.

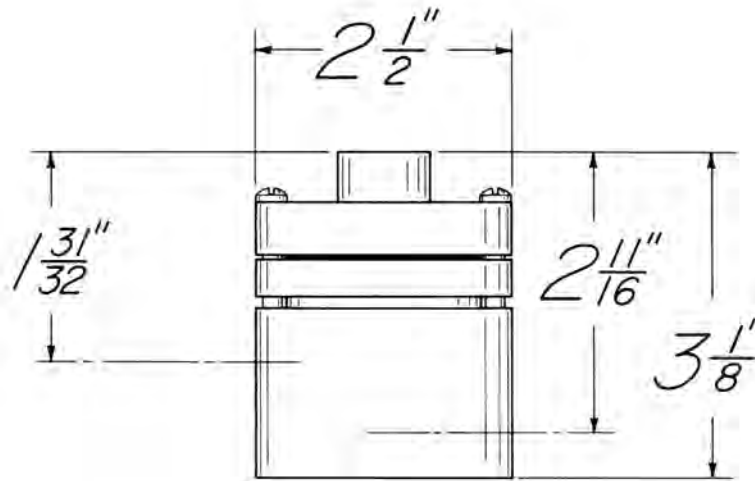


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4 POR PRIORITY SIGNAL RELAY  
ALUMINUM



PILOT DIMENSIONS



PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
YBA	4 POR	40	40	

NOTES:

All openings are tapped 1/4" N.P.T.



#### FEATURES:

- Single Adjusting Screw
- Accurate control
- Proportional control
- Intermittent bleed pilot construction
- Indirect or Direct Action
- Remote Installation
- 2500 psig operating pressure

#### PRESSURE RANGE:

50 PG	75-500 psig
75 PG	75-750 psig
150 PG	125-1500 psig
250 PG	200-2500 psig

#### SUPPLY PRESSURE:

20 & 30 psig

#### SENSITIVITY:

	SENSE PRESS CHANGE (psig)	OUTPUT PRESS CHANGE (psig)
50 PG	1 psig	1.6 psig
75 PG	1 psig	1.6 psig
150 PG	1 psig	1 psig
250 PG	1 psig	0.75 psig

#### ADJUSTMENT:

	SET POINT CHANGE (psig)
50 PG	20 psig / 1 TURN
75 PG	20 psig / 1 TURN
150 PG	40 psig / 1 TURN
250 PG	60 psig / 1 TURN

#### APPLICATION:

Pilot may be installed as Back Pressure Regulator with a Pressure Closing Motor Valve.

Pilot may be used as a pressure monitor that provides an output signal when the sense pressure falls below the set pressure, or when the signal goes above the set pressure.

Pilot may be used as a Pressure Reducing Regulator with a Pressure Opening Motor Valve.

#### OPERATION:

The DIAPHRAGM ASSEMBLY and the Bellows Assembly are the only moving units in the pilot. The PILOT PLUG consist of two stainless balls rigidly connected together. The upper seat of the PILOT PLUG is the vent for the Modulated Output Pressure (Yellow to Atmosphere). The lower seat of the PILOT PLUG is the Supply Pressure inlet to the Modulated Output (Violet to Yellow).

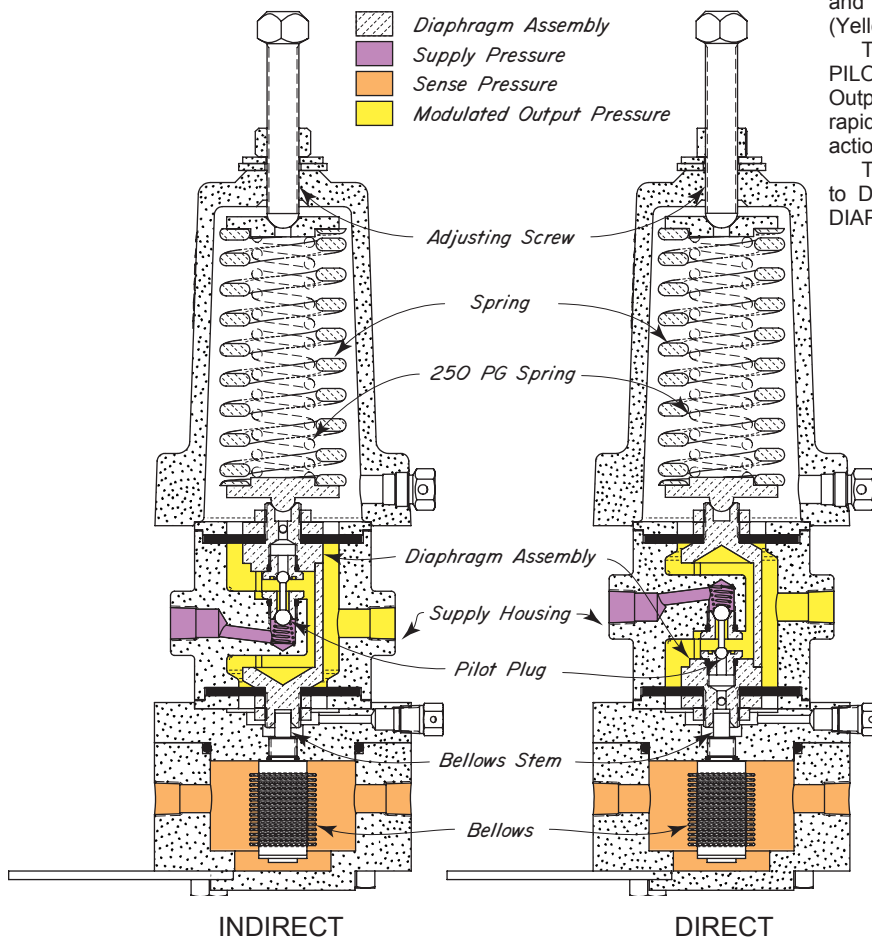
The SPRING in the bonnet loads the upper side of the DIAPHRAGM ASSEMBLY and is opposed at the opposite end by the BELLOWS STEM. The BELLOWS STEM is actuated by the SENSE PRESSURE (Orange) acting on the outside of the BELLOWS.

Assume the SPRING is compressed with the ADJUSTING SCREW for a set pressure greater than the Sense Pressure (Orange). The DIAPHRAGM ASSEMBLY is forced downward by the SPRING. The upper seat of the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat of the PILOT PLUG (Violet to Yellow) is opened. This allows Supply Pressure (Violet) to provide a Modulated Output Pressure (Yellow).

As the Sense Pressure (Orange) increases to the set pressure, the BELLOWS begins to contract, moving the BELLOWS STEM upward against the DIAPHRAGM ASSEMBLY. This compresses the SPRING and closes the lower seat (Violet to Yellow) and opens the vent for the Modulated Output Pressure (Yellow) to decrease.

The intermittent bleed, three-way valve action of the PILOT PLUG against its seat adjusts the Modulated Output Pressure (Yellow) in and the set pressure. The rapid but stable repositioning produces a true throttling action.

The action of the pilot may be changed from Indirect to Direct by inverting the SUPPLY HOUSING and the DIAPHRAGM ASSEMBLY.

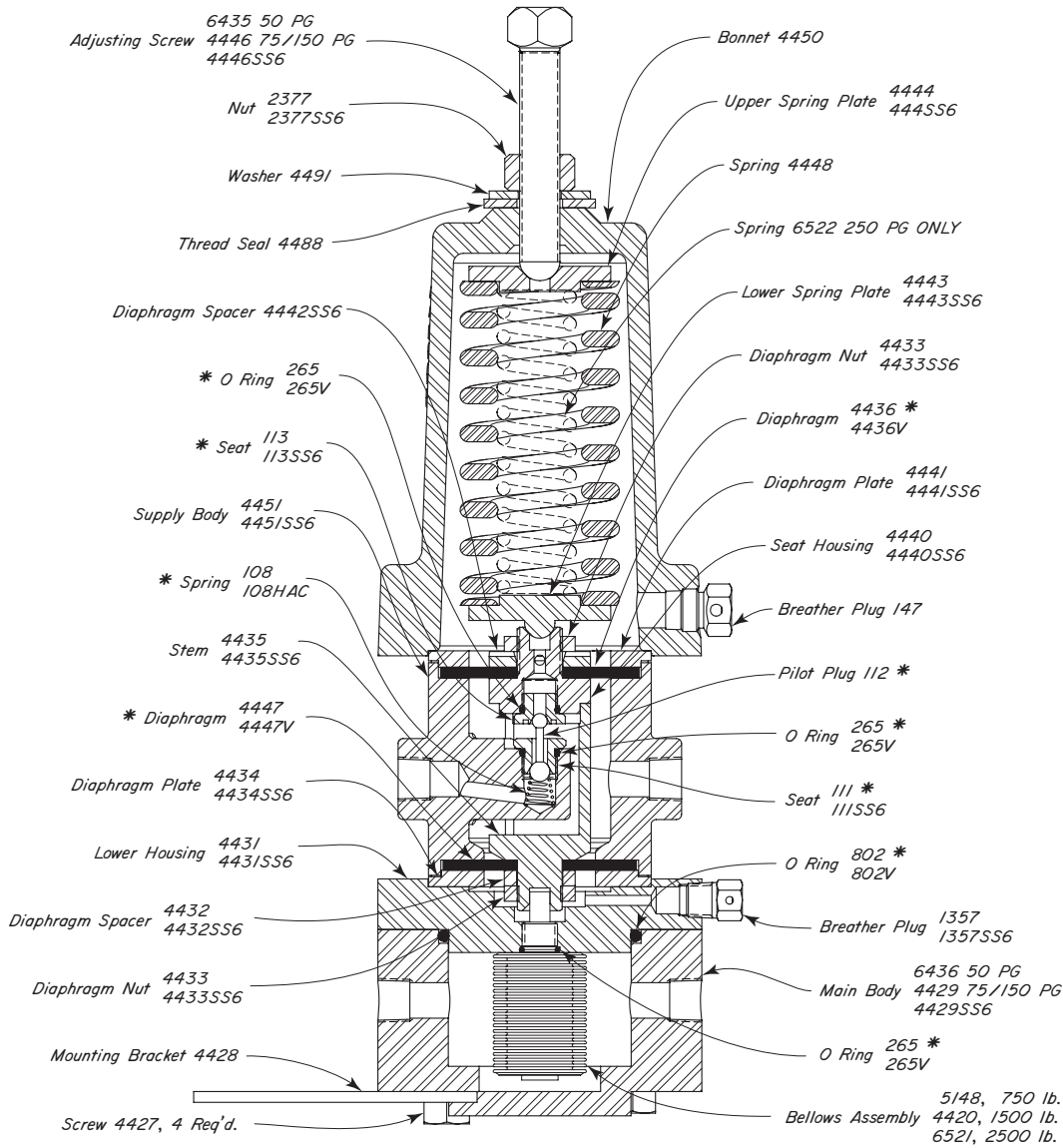


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# PILOTS AND ACCESSORIES



50 / 75 / 150 / 250 PG PILOTS  
STEEL / SS6



## PILOTS AVAILABLE:

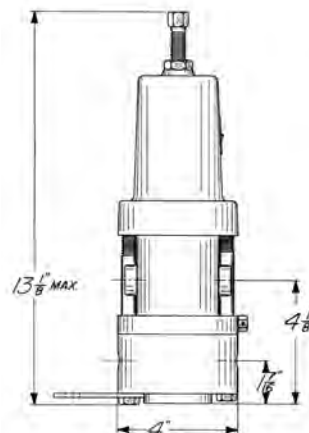
CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AFZ4	50 PG I.A. <sup>a</sup>	500	500	RBQ
AFZ5	50 PG D.A. <sup>b</sup>	500	500	RBQ
AFZ2	75 PG I.A. <sup>a</sup>	750	750	RBQ
AFZ2SS6	75 PG I.A. <sup>a</sup> SS6	750	750	RBQ-V
AFZ3	75 PG D.A. <sup>b</sup>	750	750	RBQ
AFZ	150 PG I.A. <sup>a</sup>	1500	1500	RBQ
AFZSS6	150 PG I.A. <sup>a</sup> SS6	1500	1500	RBQ-V
AFZ1	150 PG D.A. <sup>b</sup>	1500	1500	RBQ
AFZ1-SS6	150 PG D.A. <sup>b</sup> SS6	1500	1500	RBQ-V
AFZ6	250 PG D.A. <sup>b</sup>	2500	2500	RBQ
AFZ7	250 PG I.A. <sup>a</sup>	2500	2500	RBQ

<sup>a</sup> Indirect Action

<sup>b</sup> Direct Action

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

## PILOT DIMENSIONS



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#### APPLICATION:

Pilot may be installed remotely from the motor valve (see Motor Valves shown in Sections E1 and E2). This pilot is used in the regulation of inlet pressure to gas compressors, the control of supply pressure, or distribution system pressure. It may be used to produce a pneumatic output signal when the monitored pressure falls below the set pressure. The pneumatic signal source is isolated from the monitored pressure.

#### FEATURES:

- Single Adjustment
- Filtered gas supply
- Accurate control
- Intermittent bleed pilot construction
- Remote installation

#### SUPPLY PRESSURE:

Equal to or not less than 60% of maximum upstream pressure when used to operate low pressure motor valves (shown in Section E2).

20 to 30 psig when used to operate high pressure motor valves (shown in Section E1).

#### PRESSURE RANGE:

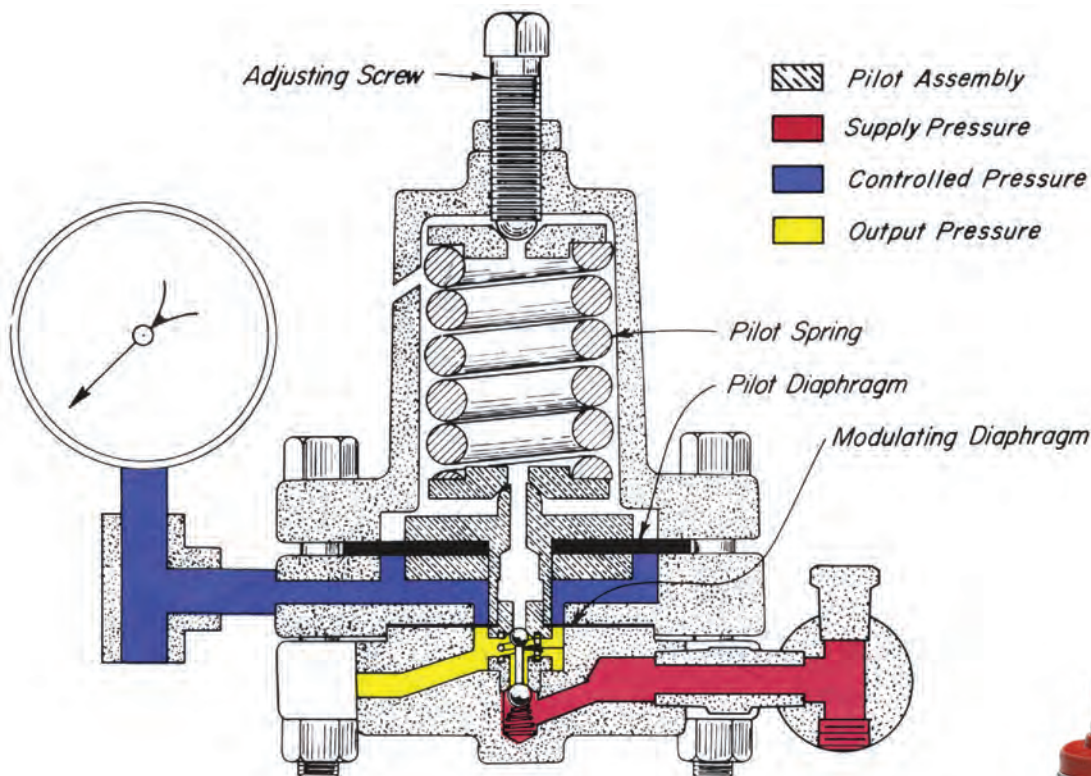
5 psig to 300 psig.

#### OPERATION:

The Pilot Assembly, which moves as a unit without friction within the housing, is supported by the PILOT DIAPHRAGM and the MODULATING DIAPHRAGM. The PILOT SPRING loads the upper side of the Pilot Assembly and is opposed on the underside by Controlled Pressure (Blue) acting on the net area of the PILOT and MODULATING DIAPHRAGMS (area of PILOT DIAPHRAGM minus area of MODULATING DIAPHRAGM).

The 12/30 PG Pilot can be considered as an inverse multiplier. Each 1 psig change in Controlled Pressure (Blue) results in a change in Output Pressure (Yellow) of 8 psig. A ratio of 8:1.

With a slight decrease in Controlled Pressure (Blue) the Pilot Assembly is forced downward by the PILOT SPRING. The upper seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Red to Yellow) is opened. This results in an increased Output Pressure (Yellow) under the MODULATING DIAPHRAGM which balances the lost upward force due to the slight decrease of Controlled Pressure (Blue). The Pilot Assembly returns to a position at which both the upper and lower seats are closed. A slight increase in Controlled Pressure (Blue) opens the upper seat and closes the lower seat to reduce the Output Pressure (Yellow).



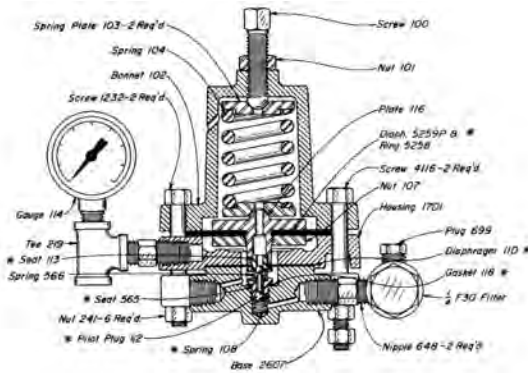
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# PILOTS AND ACCESSORIES

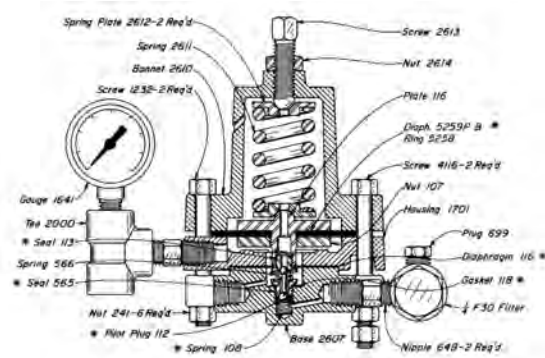


## PRESSURE PILOTS CAST IRON / DUCTILE IRON / STEEL

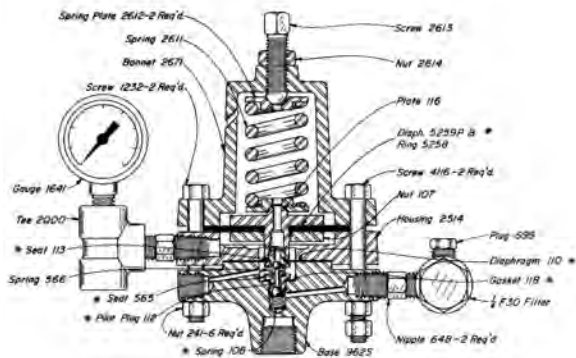
12 PG  
CAST IRON



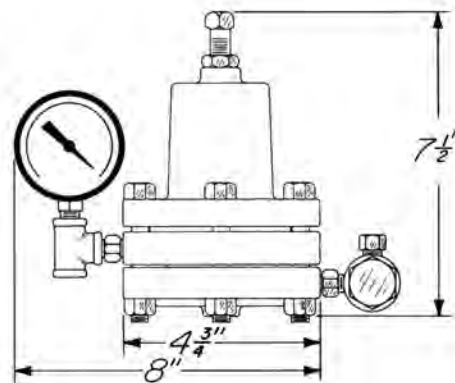
30 PG-D  
DUCTILE



30 PG-S  
STEEL



PILOT  
DIMENSIONS



### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AFN	12 PG PR	175	125	RBM
AFS	30 PG PR-D	300	300	RBM
AHU	30 PG PR-S	300	300	RBM

### NOTES:

All openings are tapped 1/4" NPT.

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

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATION:

The 30 HPG-D is used to produce a pneumatic output signal when the monitored pressure falls below the set pressure. The pneumatic source is isolated from the monitored pressure by a vent chamber which allows the monitored pressure to vent away if it reaches a high enough pressure to cause diaphragm failure.

The control pilot may be remotely installed to operate a motor valve and function as a pressure reducing regulator.

The best application of this pilot is for instrument protection where the monitored pressure may surge above the rated pressure of the pilot.

#### FEATURES:

- Single Adjustment
- Filtered gas supply
- Accurate control
- Intermittent bleed pilot construction
- Remote installation





#### SUPPLY PRESSURE:

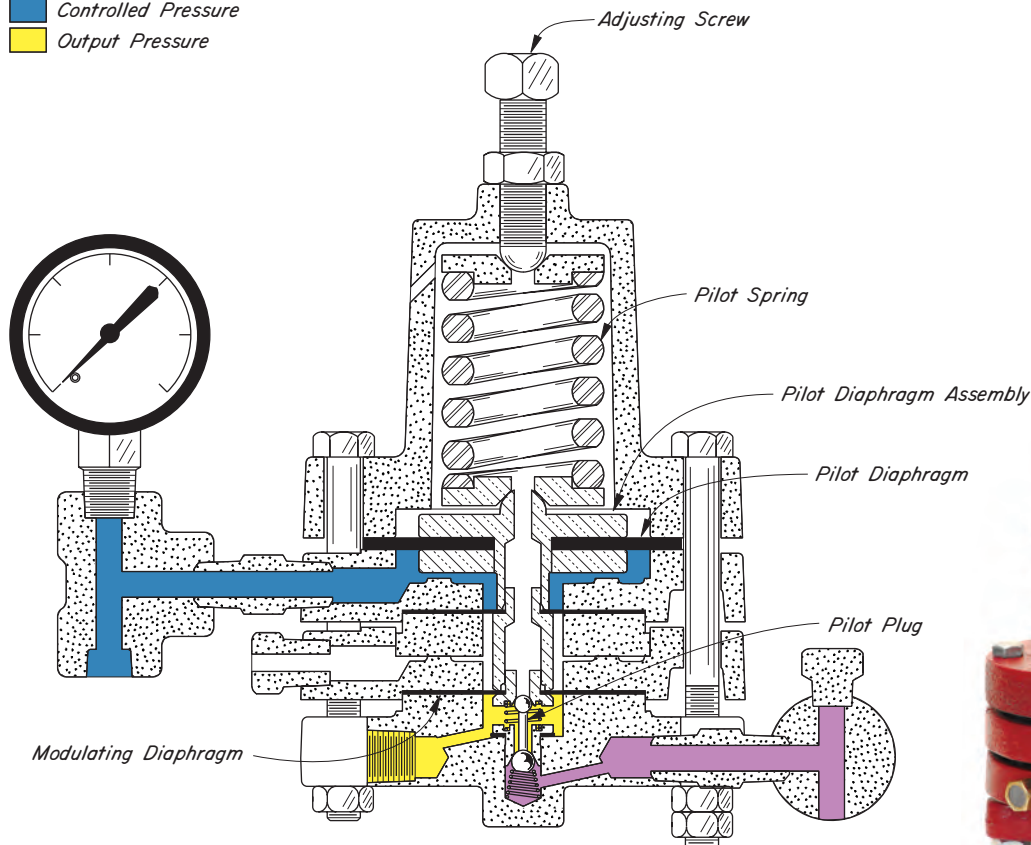
Equal to or not less than 60% of maximum upstream pressure when used to operate low pressure motor valves (shown in Section E2).

20 to 30 psig when used to operate high pressure motor valves (shown in Section E1).

#### PRESSURE RANGE:

5 psig to 300 psig

-  Pilot Diaphragm Assembly
-  Supply Pressure
-  Controlled Pressure
-  Output Pressure



#### OPERATION:

The 30 HPG-D consists of a PILOT DIAPHRAGM ASSEMBLY which moves without friction within a housing, to operate a 3 way PILOT PLUG. PILOT DIAPHRAGM ASSEMBLY is supported by the PILOT DIAPHRAGM and the MODULATING DIAPHRAGM. The PILOT SPRING loads the upper side of the PILOT DIAPHRAGM ASSEMBLY and is opposed on the underside by Controlled Pressure (Blue) acting on the net area of the PILOT and MODULATING DIAPHRAGMS (area of PILOT DIAPHRAGM minus area of MODULATING DIAPHRAGM).

The 30 HPG-D can be considered as an inverse multiplier. Each 1 psig change in Controlled Pressure (Blue) results in a change in Output Pressure (Yellow) of 8 psig. A ratio of 8:1.

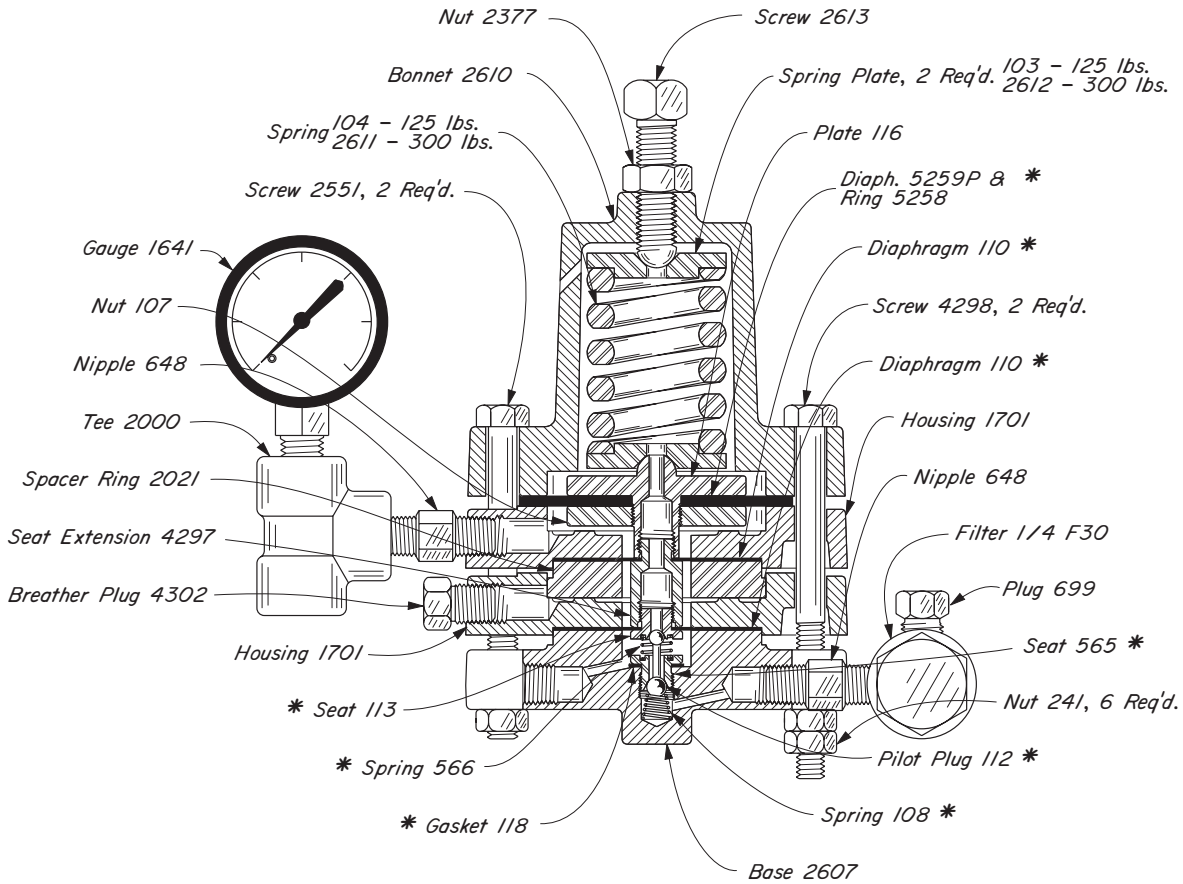
Assume that the Controlled Pressure (Blue) is at the set point. With a decrease in Controlled Pressure (Blue) the PILOT DIAPHRAGM ASSEMBLY is forced downward by the PILOT SPRING. The upper seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Violet to Yellow) is opened. This results in increased Output Pressure (Yellow) under the MODULATING DIAPHRAGM which balances the lost upward force due to the slight decrease of Controlled Pressure (Blue). The PILOT DIAPHRAGM ASSEMBLY returns to a position at which both the upper and lower seats are closed.

A slight increase in Controlled Pressure (Blue) opens the upper seat and closes the lower seat to reduce the Output Pressure (Yellow).

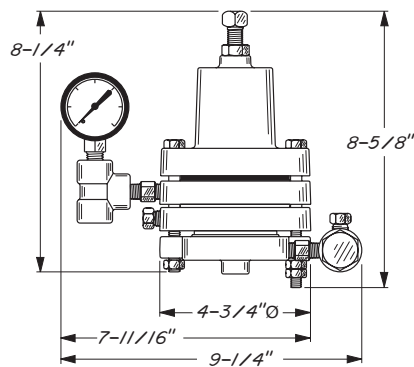
# PILOTS AND ACCESSORIES



## HIGH PRESSURE - PRESSURE PILOTS DUCTILE IRON



### PILOT DIMENSIONS



#### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AHJ	30 HPG-D	300	300	RSR
AHJSS6	30 HPG-D w/316SS & Vit	300	300	RSR-V
AHJ2	30 HPG-D w/125 lb Spring	300	125	RSR

#### NOTES:

All openings are tapped 1/4" NPT.

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

Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Pilot may be installed remotely from the motor valve (see Motor Valves shown in Sections E1 and E2). This pilot is used for maintaining a constant pressure drop across meter systems or to produce a pneumatic output signal when the differential pressure of a system falls below the set differential pressure. (see Motor Valves shown in Section B)

#### FEATURES:

- Single Adjustment
- Filtered gas supply
- Accurate control
- Intermittent bleed pilot construction
- Remote installation

#### SUPPLY PRESSURE:

0-300 psig, (60% or more of upstream pressure recommended for operating motor valves.)

#### PRESSURE RANGE:

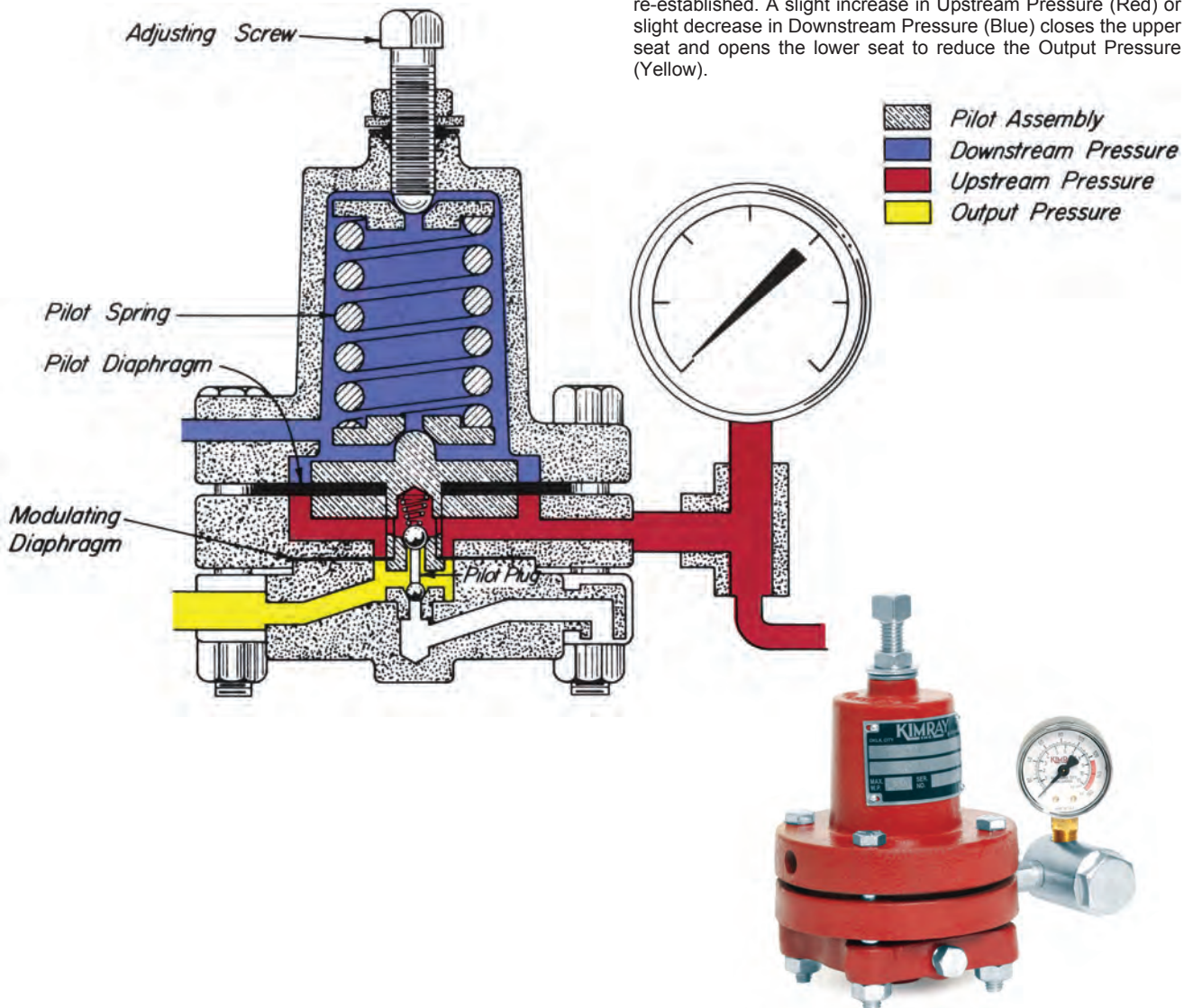
5 psig to 300 psig

#### OPERATION:

The Pilot Assembly, which moves as a unit without friction within the housing, is supported by the PILOT DIAPHRAGM and the MODULATING DIAPHRAGM. The PILOT SPRING and Downstream Pressure (Blue) loads the upper side of the Pilot Assembly and is opposed on the underside by the Upstream Pressure (Red) acting on the PILOT and MODULATING DIAPHRAGMS (Area of PILOT DIAPHRAGM minus area of MODULATING DIAPHRAGM).

The 12 PG PD Pilot can be considered as an inverse multiplier. Each 1 psig change in Differential pressure, Upstream Pressure (Red) minus Downstream Pressure (Blue), results in a change in Output Pressure (Yellow) of 12 psig. The 30 PG PD-D/S Pilot changes at a rate of 8:1.

With a slight decrease in Upstream Pressure (Red) or a slight increase in Downstream Pressure (Blue) the PILOT ASSEMBLY is forced downward by the PILOT SPRING. The lower seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the upper seat for the PILOT PLUG (Red to Yellow) is opened. This results in an increased Output Pressure (Yellow) under the MODULATING DIAPHRAGM which opposes the change. THE PILOT ASSEMBLY returns to a position at which both the upper and lower seats are closed when the Differential Pressure is re-established. A slight increase in Upstream Pressure (Red) or slight decrease in Downstream Pressure (Blue) closes the upper seat and opens the lower seat to reduce the Output Pressure (Yellow).



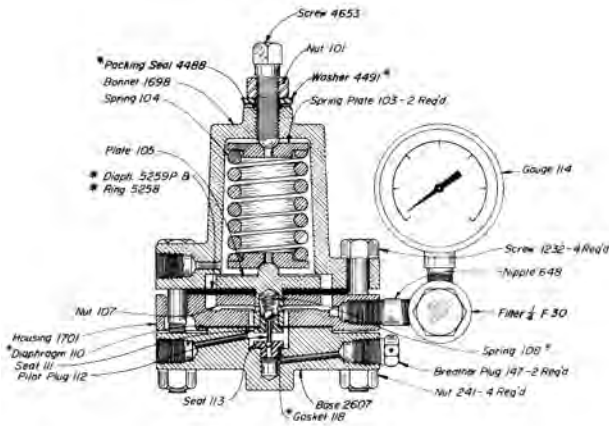
Kimray is an ISO 9001- certified manufacturer.

# PILOTS AND ACCESSORIES

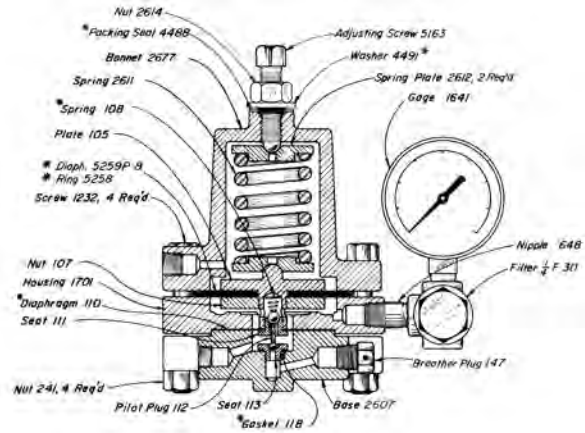


## PRESSURE DIFFERENTIAL PILOTS CAST IRON / DUCTILE / STEEL

12 PG PD  
CAST IRON

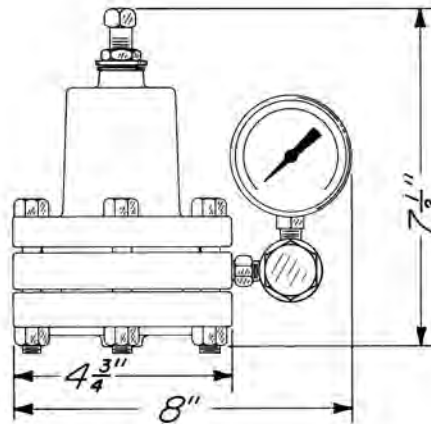
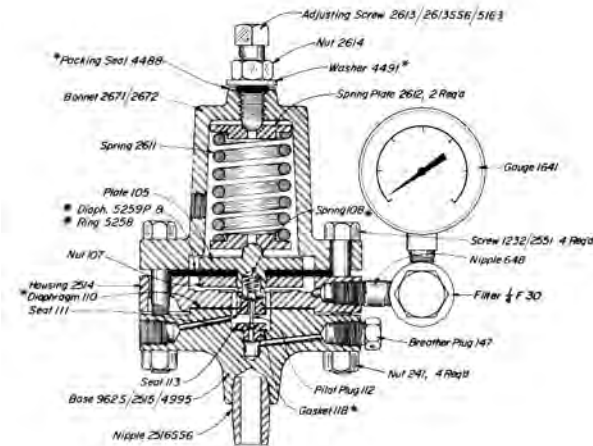


30 PG PD-D  
DUCTILE



30 PG PD-S  
STEEL

PILOT  
DIMENSIONS



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AFP	12 PG PD	175	125	RBL
AFT	30 PG PD-D	300	300	RBL
AHT	30 PG PD-S	300	300	RBL

**NOTES:**

All openings are tapped 1/4" NPT.

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

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#### APPLICATIONS:

The "PDC" Series Pressure Differential Controller connects across the orifice plate of a meter run to maintain a constant stable pressure differential across the meter run. This relates to a constant flow rate when the upstream pressure is constant. This pilot adjusts the flow rate to maintain the pressure differential by positioning a pressure opening motor valve that has characterized equal percentage valve trim for precise flow control.

Precise gas flow rate for gas lift.

Pressure differential control across orifice plates for better charts and measurement of gas flow.

Stabilizes gas flow for better well production.

Pressure differential limiting for reducing "off chart" conditions.

Any applications where a constant pressure differential and flow rate is desired.

#### FEATURES:

Intermittent bleed pilot

Throttle operation

1 to 260 inches of water differential pressure

Heavier springs available, if specified

May be used with any type of diaphragm motor valve

#### WORKING PRESSURE:

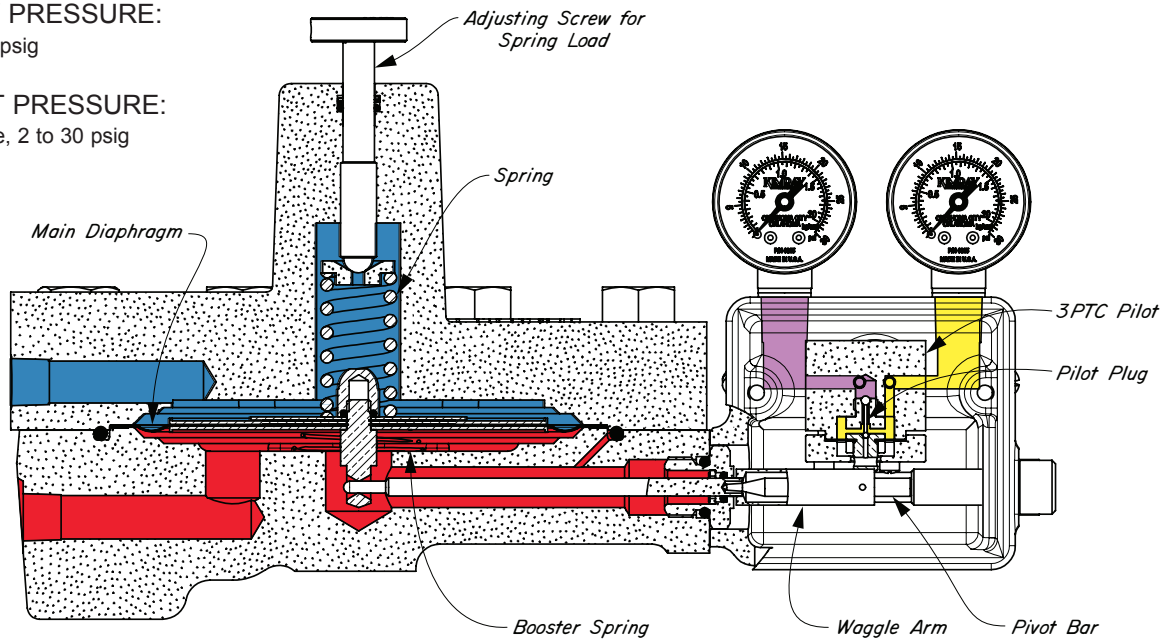
1000 or 2000 psig maximum







#### SUPPLY PRESSURE:

5 to 30 psig

#### OUTPUT PRESSURE:

Variable, 2 to 30 psig



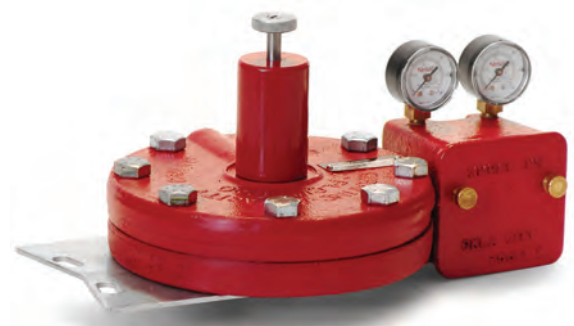
-  Main Diaphragm Assembly
-  3PTC Pilot Diaphragm Assembly
-  Upstream Pressure
-  Downstream Pressure
-  Supply Pressure
-  Motor Valve Diaphragm Pressure

#### OPERATION:

A typical system installation of the PDC Pilot consists of a PDC Pilot mounted so that the pressure differential across an orifice plate is applied across the diaphragm. The output signal from the PDC Pilot operates a diaphragm control valve to maintain the desired pressure differential across the orifice plate (Two stage, filtered, regulation of instrument gas with drip pot or equivalent is recommended).

Assume the control valve is open, and the pressure differential is rising. The Upstream Pressure is opposed by the Downstream Pressure plus an adjustable spring load. As the pressure differential increases to the set point, there is an upward movement of the diaphragm assembly which is transmitted by the WAGGLE ARM causing a downward movement in the 3 PTC PILOT. The 3 PTC is now in a relief mode which allows the pressure opening motor valve to begin to close. As the valve closes, the pressure differential will decrease and reposition the PDC diaphragm assembly to stop the relief of motor valve diaphragm pressure.

If the pressure differential decreases from the set point, the spring forces the diaphragm assembly downward. This causes an upward movement of the WAGGLE ARM on the 3 PTC PILOT, increasing the diaphragm pressure of the pressure opening motor valve. As the valve opens, the pressure differential will begin to increase until it reaches the set point.

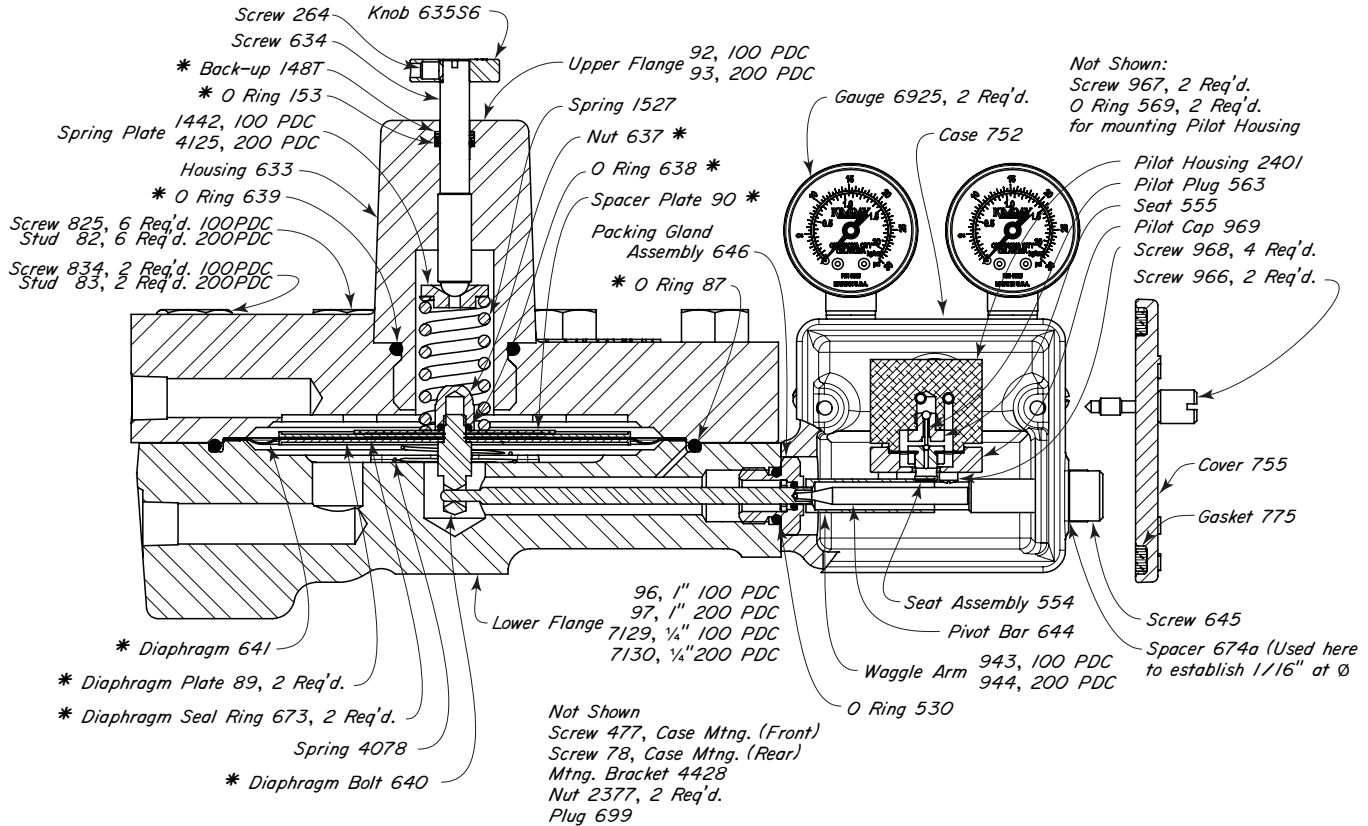


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# PILOTS AND ACCESSORIES



## 100 & 200 PDC STEEL



### PILOTS AVAILABLE:

CAT. NO.	CONN. SIZE*	PILOT	MAX W.P.	OPER. PRES.	KIT
FAA1	1/4"	100 PDC	1000	1000	RIJ
FAB1	1/4"	200 PDC	2000	2000	RIJ
FAA2	1"	100 PDC	1000	1000	RIJ
FAB2	1"	200 PDC	2000	2000	RIJ

### NOTES:

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

Bottom flange connection only

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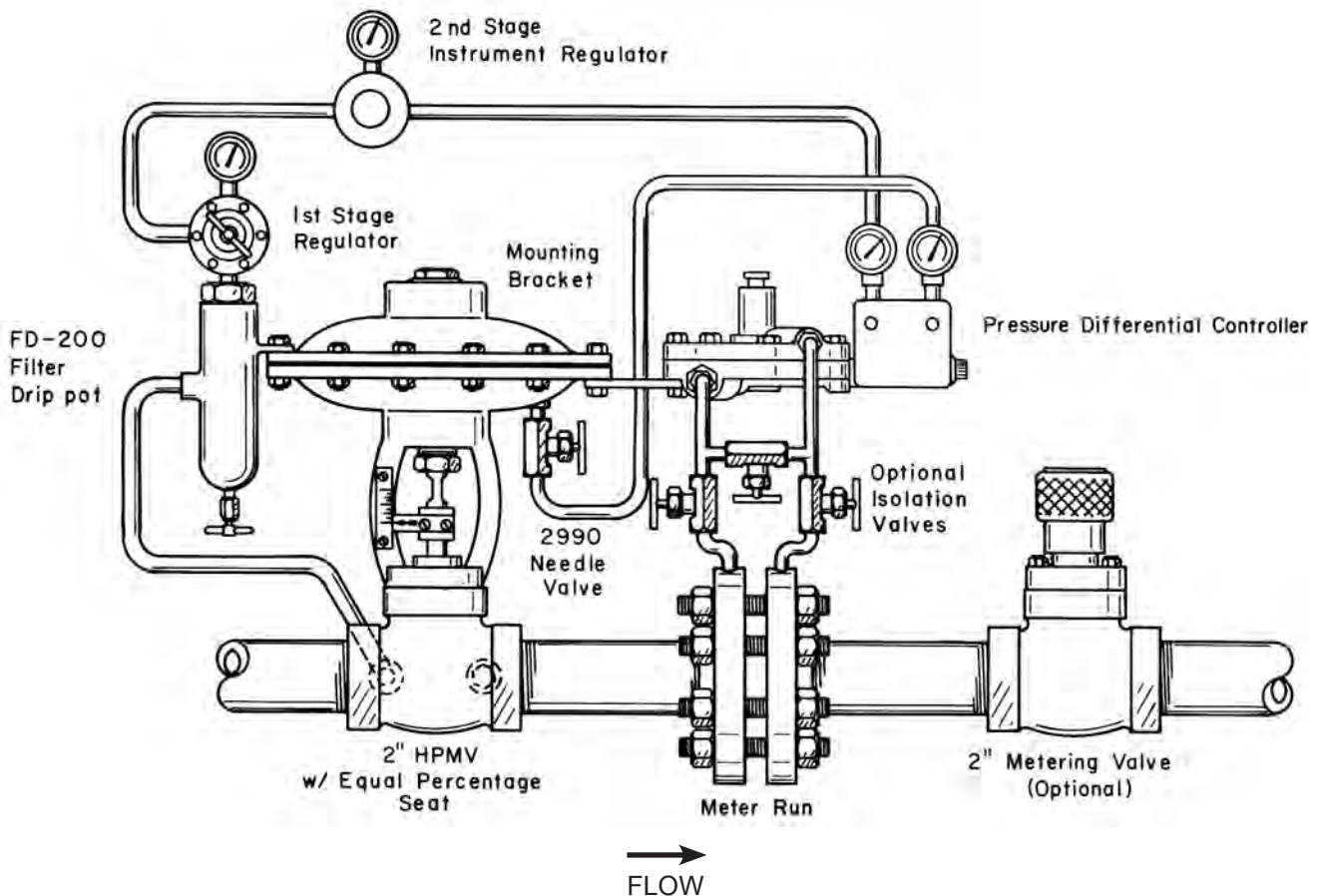
Y:175.2  
Issued 8/13

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Current Revision:  
Correct Connection Size

#### SIZING, INSTALLATION INSTRUCTIONS:

1. Locate the motor valve conveniently upstream or downstream of the meter run.
2. Size and install the proper orifice plate for flow conditions. Determine the pressure differential set point desired and install the proper spring for the maximum pressure differential to be controlled. (See Fig. 3)
3. The control valve should be sized according to recommended valve sizing procedures using equal percentage characteristic trim for precise flow control. Refer to gas rate charts for valve trim in the Kimray Catalog.
4. A metering valve or adjustable orifice can be installed to take part of the pressure drop to provide better control conditions for the valve.
5. Mount the controller so that it is accessible and level. Connect the 1" connector upstream of the orifice plate and the 1/4" NPT connector downstream. Install isolation valve manifold if desired.
6. Connect a dry instrument gas source (20-30 psig) to the pilot supply and connect the control tubing to the valve. A needle valve on this line is sometimes helpful in stabilizing the motor valve / controller system. (See Fig.1)



#### START-UP PROCEDURE:

1. Open the isolation valves and close the equalizing valve (if used) prior to applying pressure to the meter run to prevent an excessive pressure drop across the diaphragm. Excessive pressure drops across diaphragm will cause the diaphragm to rupture.
2. Turn the control knob fully counterclockwise.
3. Open the gas stream to the meter run.
4. Adjust the control knob until the motor valve begins to open.
5. Continue to adjust the control knob until the desired pressure differential is obtained. If the valve is fully open and the pressure differential is not obtained, recheck flow conditions, pressure, valve sizing and orifice sizing.
6. If the valve hunts (moves open and closed excessively), close the needle valve in the motor valve supply gas line until the positioning becomes stable or replace the motor valve trim with a smaller inner valve.
7. The Controller can now be set for the maximum limit or adjusted to control the desired pressure differential.

**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

### LIQUID DIFFERENTIAL PRESSURE PILOT

#### APPLICATION:

The 30 PG LDP-D sends a pneumatic signal when the differential pressure between two wet or dry pressures is less than the desired setting. The signal vents when the difference is higher than the setting.

Pilot may be installed remotely to operate a diaphragm operated motor valve as a liquid differential pressure regulator.

#### FEATURES:

- Single adjustment
- Filtered gas supply
- Accurate control
- Intermittent bleed pilot
- Remote installation

#### PRESSURE RANGE:

5 psig to 300 psig

#### SUPPLY PRESSURE:

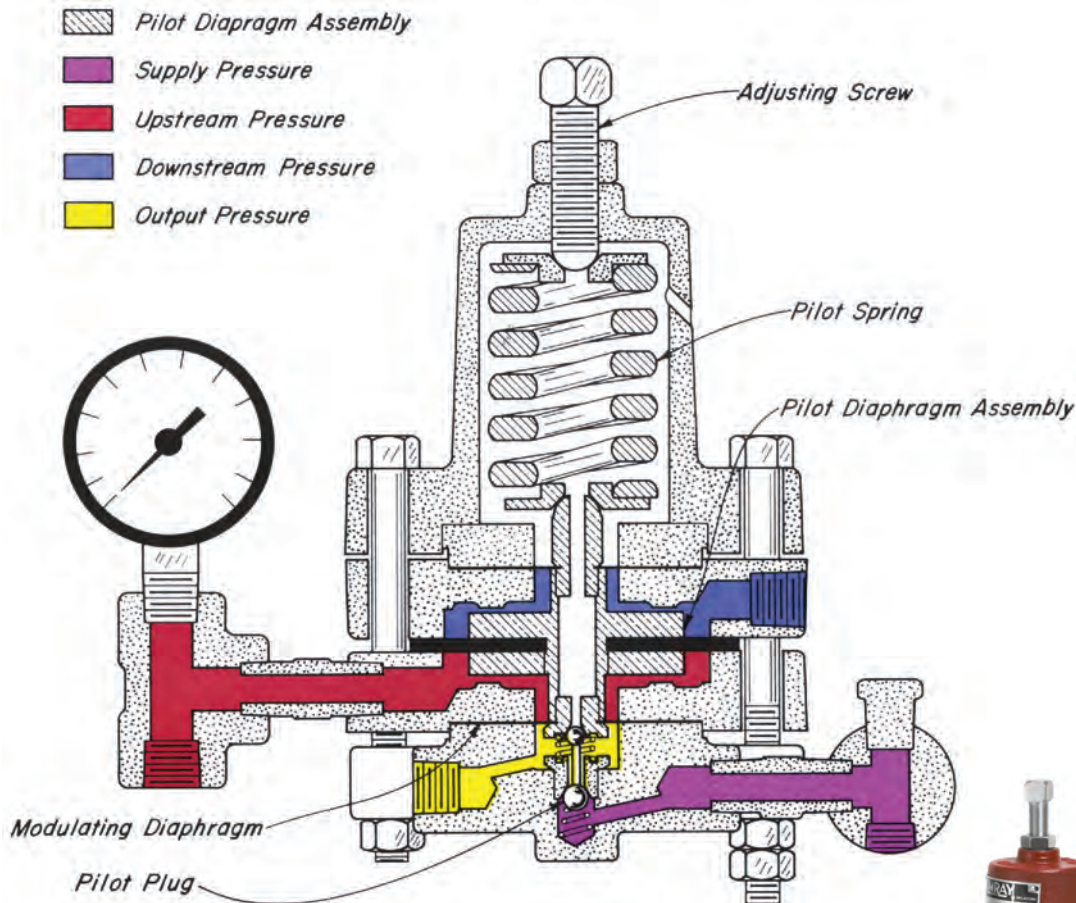
0-300 psig (60% or more of upstream pressure recommended for operating a motor valve)

#### OPERATION:

The LDP Pilot consists of a PILOT DIAPHRAGM ASSEMBLY which moves without friction to operate a 3 way PILOT PLUG. The Pilot Assembly is supported by the PILOT DIAPHRAGM ASSEMBLY and the MODULATING DIAPHRAGM. The PILOT SPRING and Downstream Pressure (Blue) load the upper side of the Pilot Assembly and is opposed on the underside by the Upstream Pressure (Red) acting on the PILOT DIAPHRAGM ASSEMBLY.

With a slight increase in Downstream Pressure (Blue) or a slight decrease in Upstream Pressure (Red), the PILOT DIAPHRAGM ASSEMBLY is forced downward by the PILOT SPRING. The upper seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Violet to Yellow) is opened. This results in an increased Output Pressure (Yellow) under the MODULATING DIAPHRAGM which opposes the change. The PILOT DIAPHRAGM ASSEMBLY returns to a position at which both the upper and lower seats are closed when the Differential Pressure is re-established.

A slight decrease in Downstream Pressure (Blue) or a slight increase in Upstream Pressure (Red) closes the lower seat and opens the upper seat to reduce the Output Pressure (Yellow).

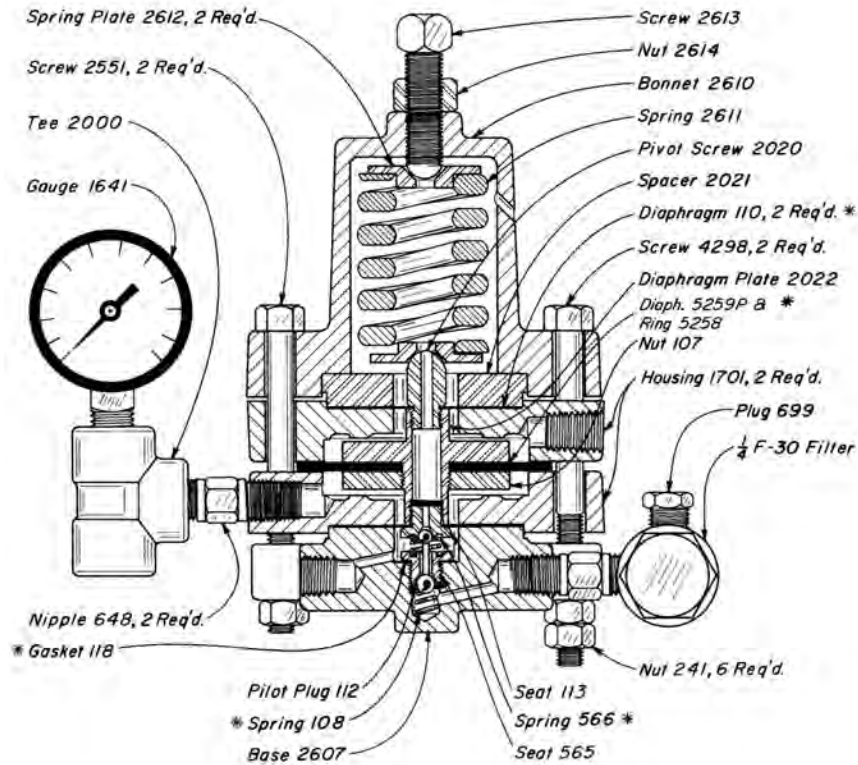


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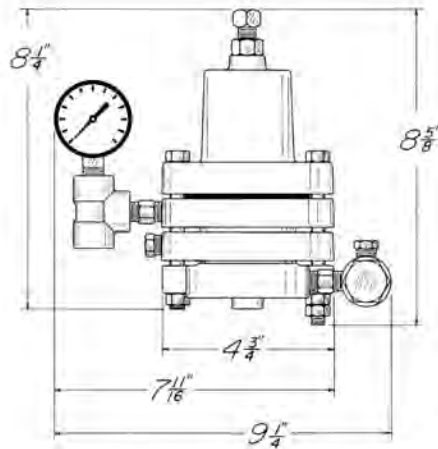
# PILOTS AND ACCESSORIES



## LIQUID DIFFERENTIAL PRESSURE PILOT DUCTILE



### PILOT DIMENSIONS



#### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AHP	30 PG LDP-D	300	300	RSR

#### NOTES:

All openings are tapped 1/4" N.P.T.

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

Kimray is an ISO 9001- certified manufacturer.

### 12 PL FLOATLESS LEVEL CONTROLLER

#### APPLICATIONS:

Oil and gas separator liquid level control.  
High level shut-off control.  
For use with Kimray MT series valves or Pressure Closing Motor Valves which use full separator pressure on the motor valve diaphragm.

#### FEATURES:

No float required  
Easily installed  
Intermittent bleed pilot saves gas  
Throttling or semi-snap control  
Only one adjustment for changing control  
Only one adjustment for changing liquid level

#### WORKING PRESSURE:

175 psig maximum

#### SUPPLY PRESSURE:

Separate external supply not required.  
Pilot uses separator gas equalizing and supply line for supply.

#### OUTPUT PRESSURE:

Varies from 0 psig to full separator pressure.

#### OPERATION:

The Pilot Assembly (Crosshatched) and the PILOT PLUG are the only moving parts in the Liquid Level Pilot.

The Pilot can be adjusted for throttling or semi-snap action using the CONTROL KNOB. With the CONTROL KNOB against its stop, the Pilot will throttle. Unscrew the CONTROL KNOB one-half to one full turn for semi-snap action.

The PILOT PLUG consists of two stainless balls rigidly connected together. The upper seat for the PILOT PLUG controls Separator Pressure to Modulated Pressure (Red to Yellow). The lower seat for the PILOT PLUG is the Modulated Pressure vent (Yellow to Atmosphere).

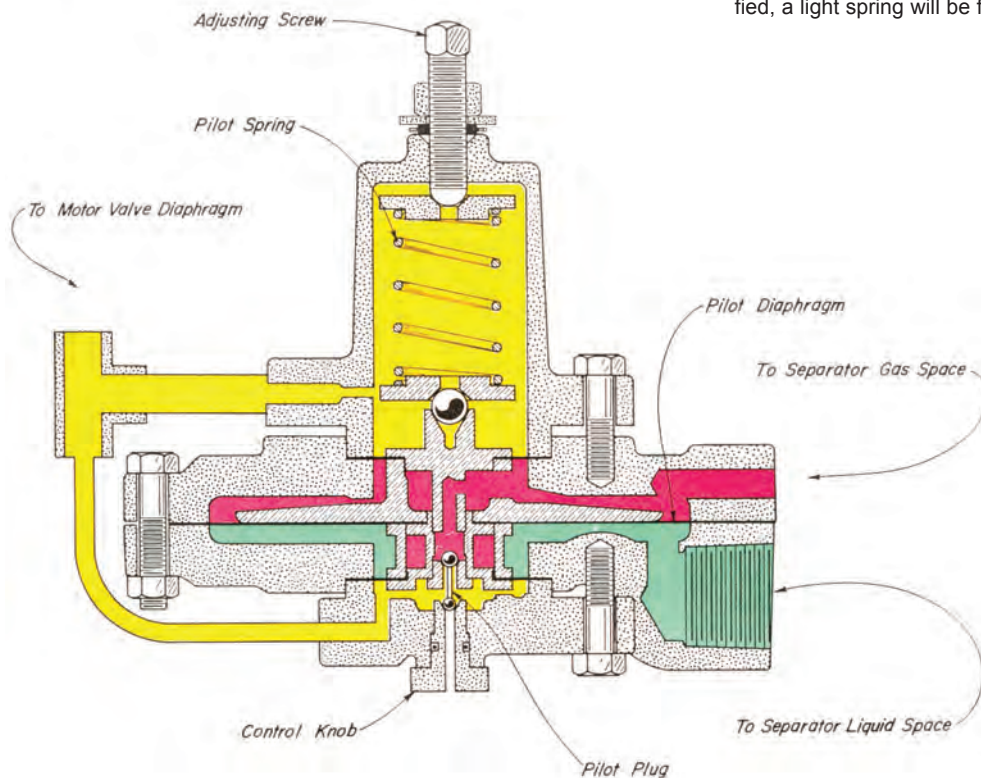
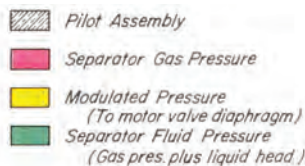
Separator Gas Pressure (Red) is equalized across the PILOT DIAPHRAGM. Separator Gas Pressure (Red) and the Modulated Pressure (Yellow) act in opposite directions on the two small diaphragms of equal area to balance the Pilot against changes in these pressures. The only upward force to move the Pilot Assembly is the liquid head in the separator, opposed by the PILOT SPRING. This spring load can be varied by the ADJUSTING SCREW to increase or decrease the liquid level.

As the liquid level rises in the separator, it overcomes the PILOT SPRING and forces the Pilot Assembly upward, closing the upper seat (Red to Yellow) and opening the lower seat (Yellow to Atmosphere). When the Modulated Pressure (Yellow) is vented, Separator Fluid Pressure then opens the valve.

As the liquid level decreases in the separator, the Pilot Assembly moves downward closing the lower seat (Yellow to Atmosphere) and opening the upper seat (Red to Yellow), which increases Modulated Pressure and closes the valve.

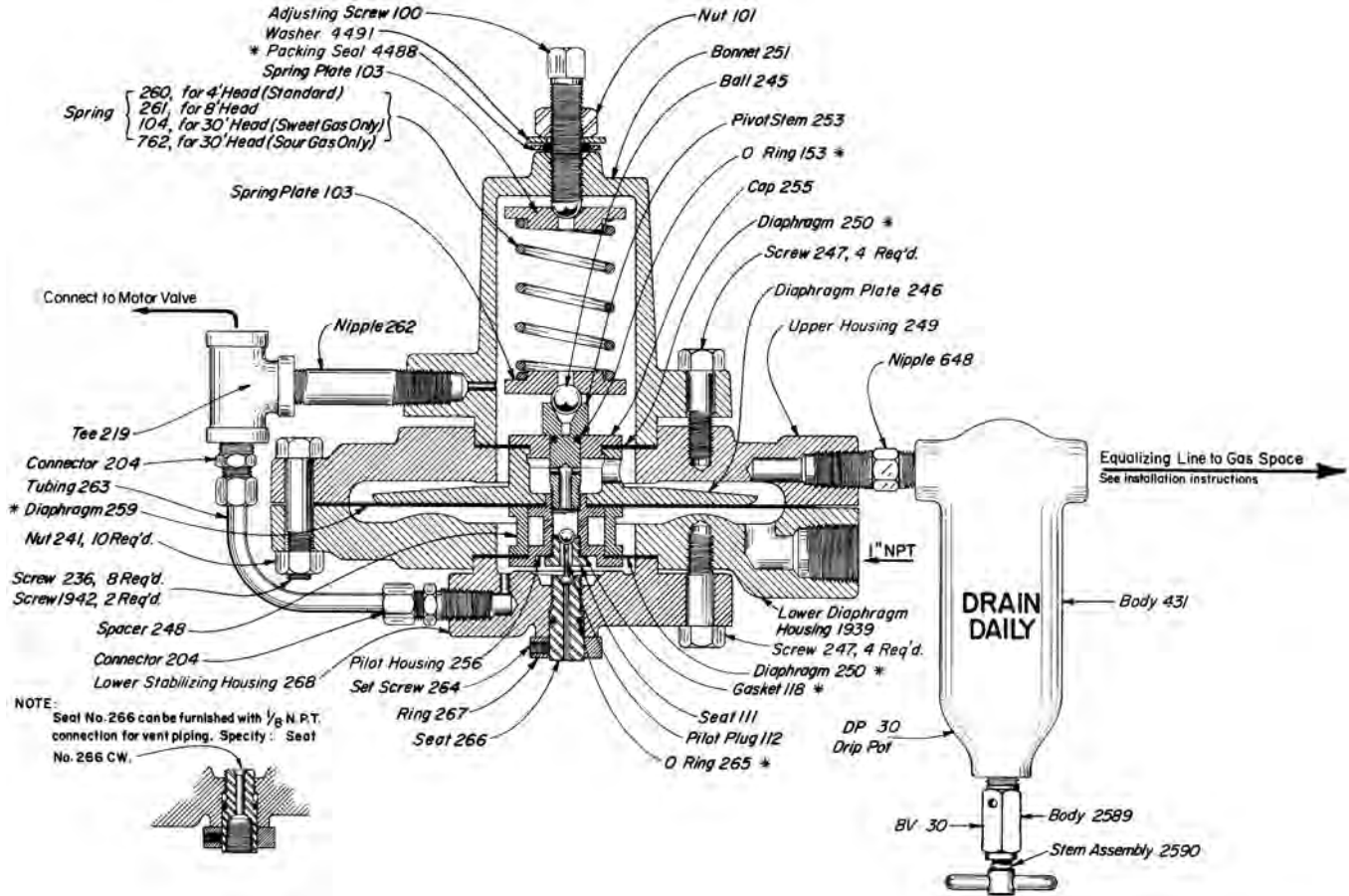
When the Pilot is adjusted for throttling, the intermittent bleed pilot three-way valve action of the PILOT PLUG against its seats adjusts the Modulated Pressure (Yellow) to reposition the Motor Valve Diaphragm to accommodate the required rated of flow. This rapid but stable repositioning produces a true throttling action.

For standard separator service a light spring is installed in the Pilot for a maximum liquid level height of approximately 4 feet. For other service, special springs can be installed for a maximum liquid level height of either 8 or 30 feet. Unless otherwise specified, a light spring will be furnished.



Kimray is an ISO 9001- certified manufacturer.

12 PL FLOATLESS LEVEL CONTROLLER  
DUCTILE IRON



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	OPER. PRES.	MAX W.P.	REPAIR KIT
BAT	12 PL	175	175	RCL

**NOTES:**

For standard separator service a light spring is installed in the pilot for a maximum level height of approximately 4 feet. For special service, springs can be installed for a maximum liquid level height of either 8 or 30 feet. Unless otherwise specified, a light spring will be furnished.

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



### 12 PL FLOATLESS LEVEL CONTROLLER INSTALLATION & DIMENSIONS

#### INSTALLATION:

1. Install the Motor Valve in the separator oil outlet line.
2. Install Drip Pot on 12 PL, separator gas line.
3. Mount the 12 PL Pilot on the separator shell in the liquid section. For best operation, the pilot should be located at least 4 inches below the minimum desired liquid level.
4. Connect Gas Equalizing and Pilot Supply Line between the Drip Pot and the gas section of the separator with 5/16 inch tubing and fittings. CARE should be taken so that the equalizing gas is as dry as possible. The equalizing gas must be the SAME pressure as the that in the liquid section. DO NOT connect to the gas outlet line or downstream from mist extractors.
5. Connect pilot output pressure to Motor Valve with 1/4 inch tubing and fittings as shown.

#### NOTES:

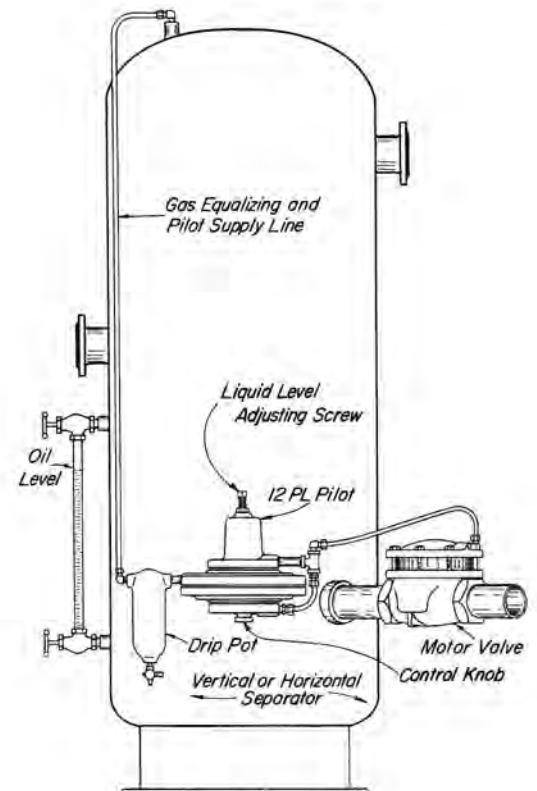
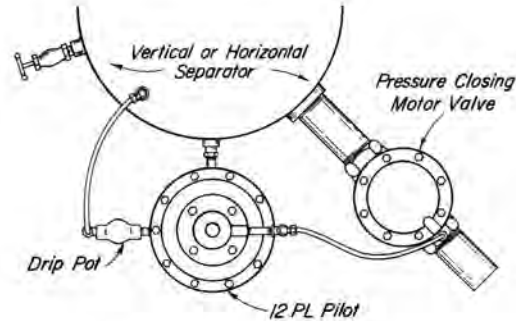
The lower gauge glass connection may be used for mounting the pilot if no other connection to the liquid section of the separator is available.

A connection is provided on the upstream side of the motor valve body for mounting the pilot. However, when the Motor Valve is set remotely from the separator, pressure drop through long piping will make the controller operation erratic.

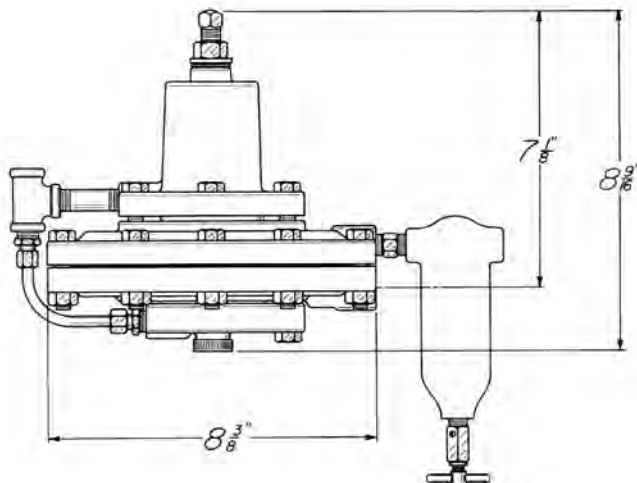
After assembly, the pilot is tested and set for throttling control. It is adjusted to control a liquid level of approximately 7 inches above the pilot.

On throttle control, the liquid level will vary approximately 1 inch. When set on semi-snap control, the liquid level will vary between 4 inches and 8 inches.

#### TYPICAL INSTALLATION



#### PILOT DIMENSIONS



**NOTES:**



Kimray is an ISO 9001- certified manufacturer.

#### APPLICATIONS:

Pilot may be installed remotely from the motor valve. The Pilot is used in the control of low pressure where the desired controlled pressure ranges from a few ounces to 20 psig on:

- Vessels
- Vent lines
- Distribution systems
- Inlet and recirculation on compressors, pressure

It may be used to produce a pneumatic output signal when the monitored pressure falls below the set pressure. The pneumatic signal source is isolated from the monitored pressure.

#### FEATURES:

- Single adjustment
- Filtered gas supply
- High accuracy
- Intermittent bleed pilot construction
- Remote installation





#### SUPPLY PRESSURE:

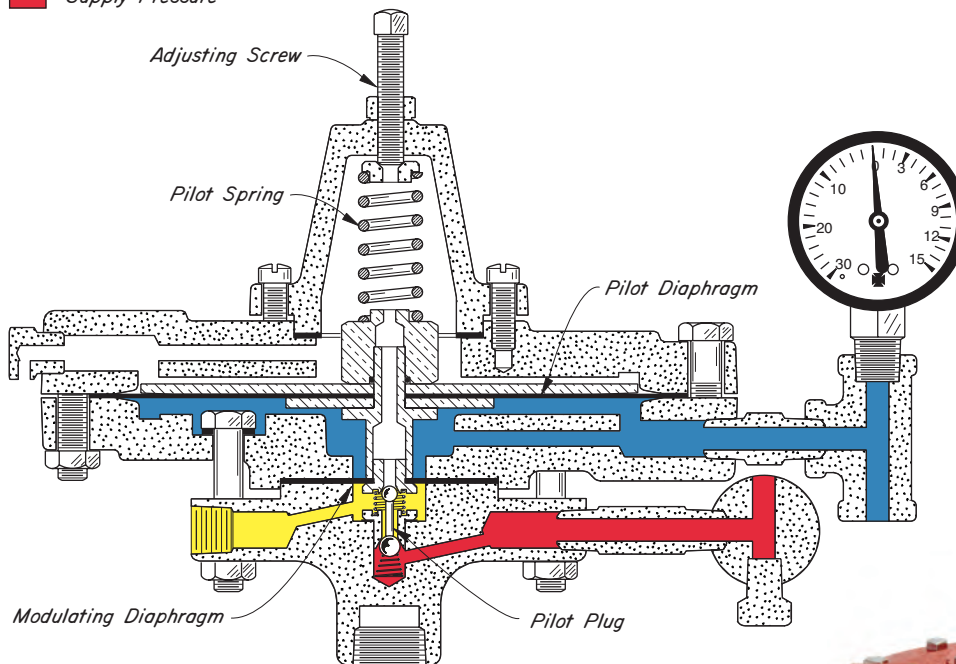
Equal to or not less than 60% of maximum upstream pressure when used to operate low pressure motor valves (shown in Catalog Section E2)

20 to 30 psig when used to operate high pressure motor valves (shown in Catalog Section E1).

#### PRESSURE RANGE:

Ounces to 20 psig

-  Pilot Assembly
-  Output Pressure
-  Controlled Pressure
-  Supply Pressure



#### OPERATION:

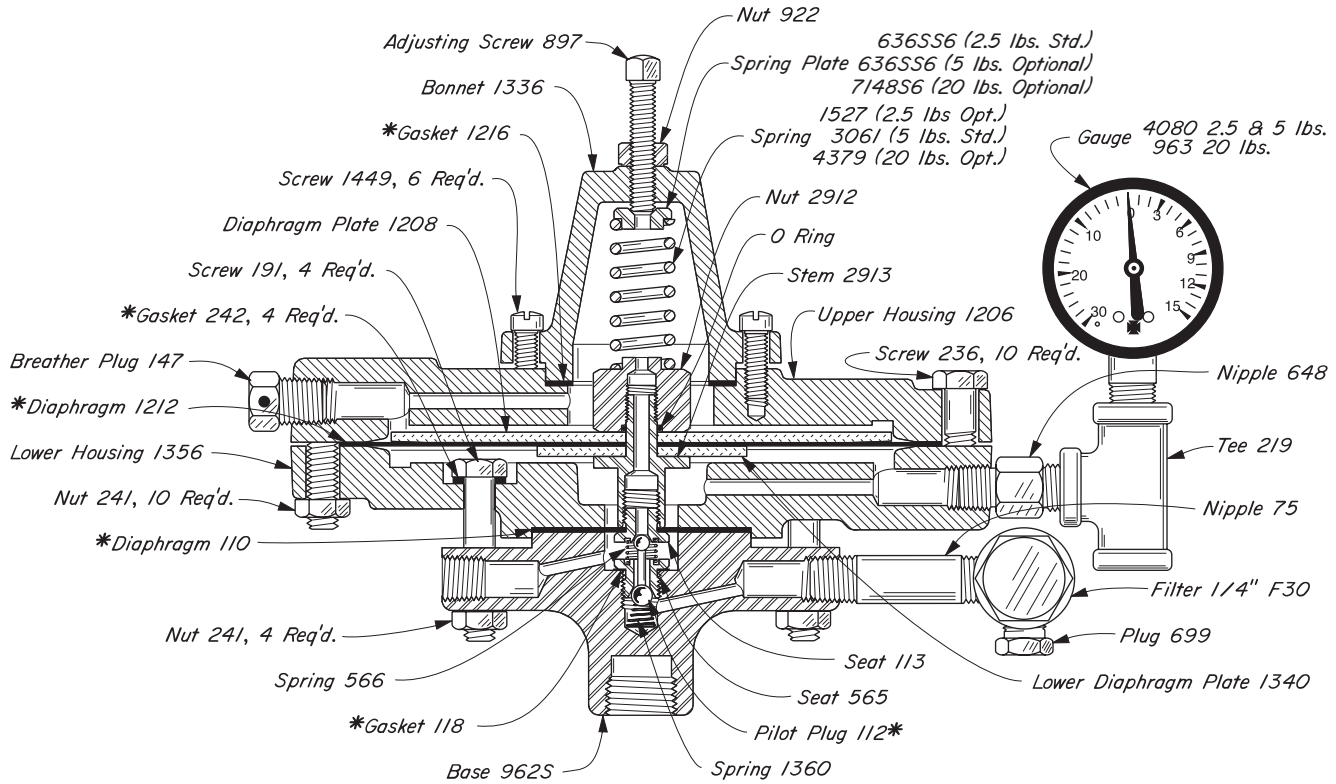
The Pilot Assembly, which moves as a unit without friction within the housing, is supported by the PILOT DIAPHRAGM and the MODULATING DIAPHRAGM. The PILOT SPRING loads the upper side of the Pilot Assembly and is opposed on the underside by Controlled Pressure (Blue) acting on the net area of the PILOT and MODULATING DIAPHRAGMS (area of PILOT DIAPHRAGM minus area of MODULATING DIAPHRAGM).

With a slight decrease in Controlled Pressure (Blue) the Pilot Assembly is forced downward by the PILOT SPRING. The upper seat for the PILOT PLUG (Yellow to Atmosphere) is closed and the lower seat for the PILOT PLUG (Red to Yellow) is opened. This results in an increased Output Pressure (Yellow) under the MODULATING DIAPHRAGM which balances the lost upward force due to the slight decrease of Controlled Pressure (Blue). The Pilot Assembly returns to a position at which both the upper and lower seats are closed. A light increase in Controlled Pressure (Blue) opens the upper seat and closes the lower seat to reduce the Output Pressure (Yellow).

# PILOTS AND ACCESSORIES



## OUNCES TO ATMOSPHERE PILOT CAST IRON

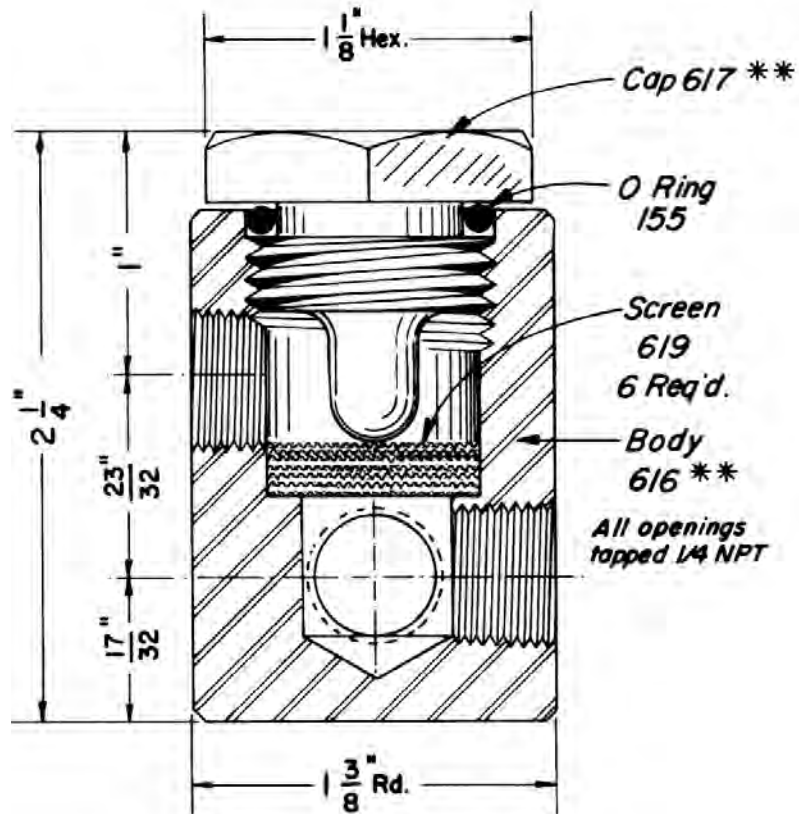


### PILOTS AVAILABLE:

CAT. NO.	PILOT	MAX W.P.	OPER. PRES.	KIT
AHK-2.5	0.2 PG OA	175	2.5	RWO
AHK-5	0.5 PG OA	175	5	RWO
AHK-20	2 PG OA	175	20	RWO

### NOTES:

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



**FILTERS AVAILABLE:**

CAT. NO.	FILTER	MAX. W.P.	OPER. PRESS.
YAS	1/4 F 30	300	300
YASSS6	1/4 F 100 SS6	1000	1000

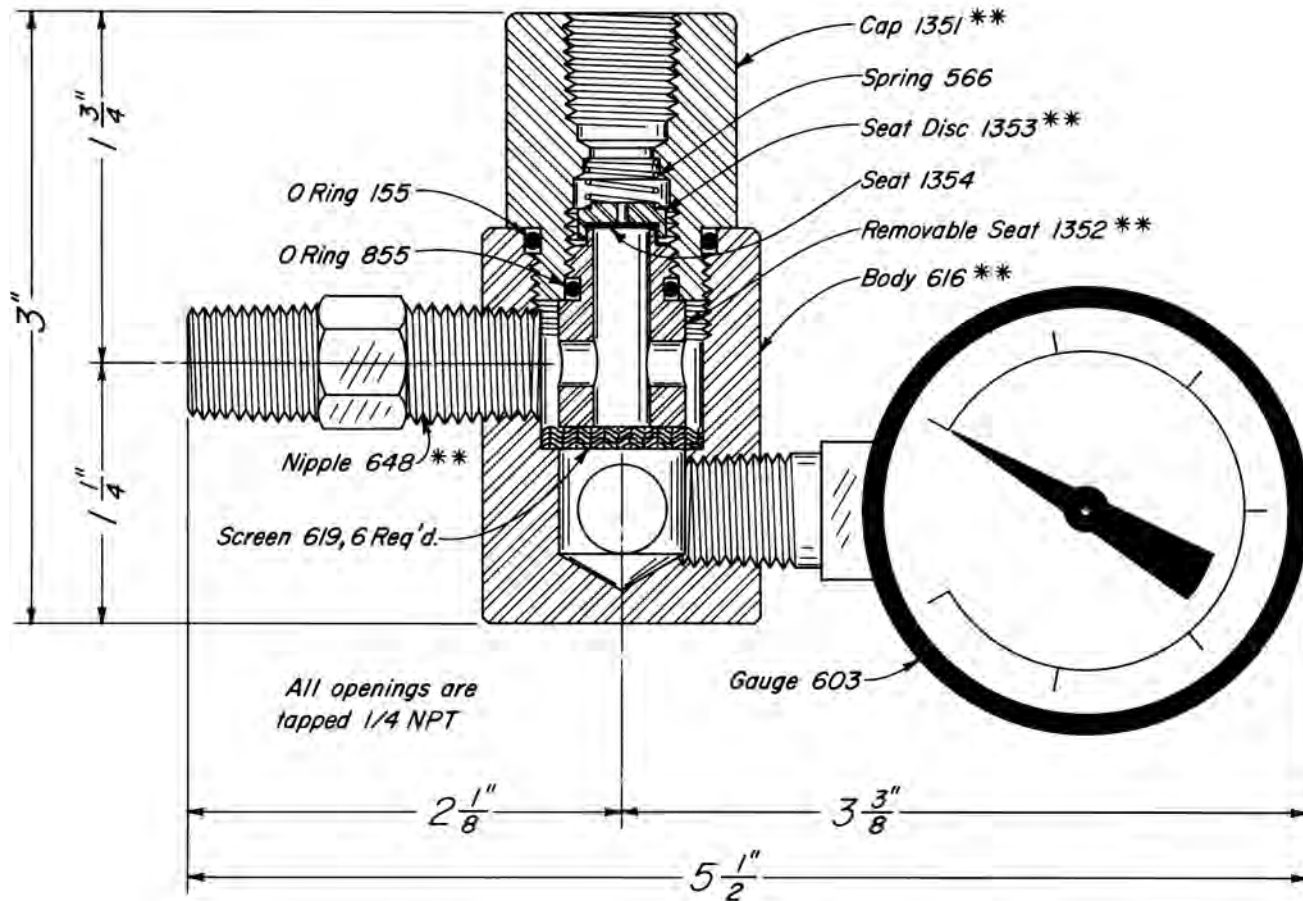
\*\*These steel parts are available in 316 stainless steel.

Kimray is an ISO 9001- certified manufacturer.

**FILTER POP VALVES**

**APPLICATIONS:**

Provides a small pressure relief at 30 psig.  
For use with the TC-12 Temperature Controller.  
(See catalog section "H" for Temperature Controllers).



**FILTER POP AVAILABLE:**

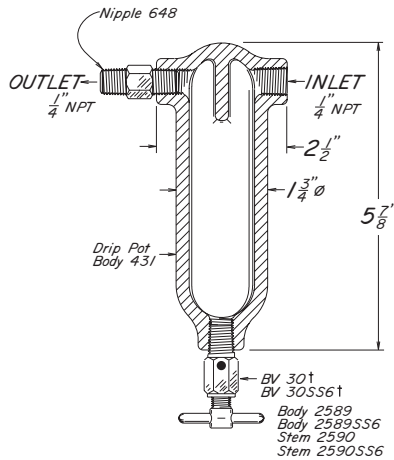
CAT. NO.	PILOT	MAX. W.P.	OPER. PRESS.
YBG	1/4 FPV 3	30	30
YBGSS6	1/4 FPV 3 SS6	30	30

\*\*These steel parts are available in 316 stainless steel.

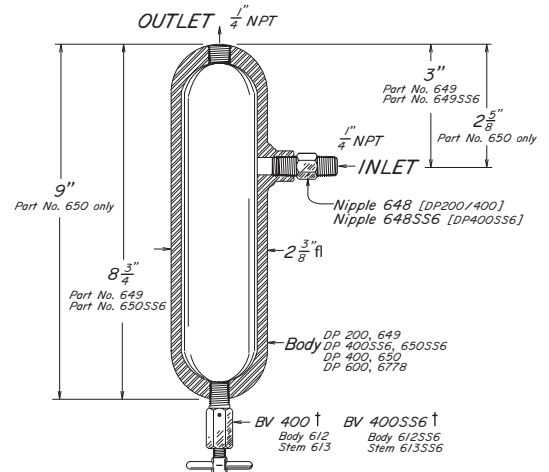


Kimray is an ISO 9001- certified manufacturer.

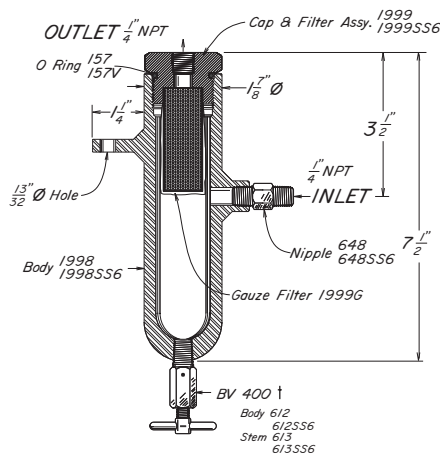
**DP-30  
LOW PRESSURE  
DRIP POT  
DUCTILE**



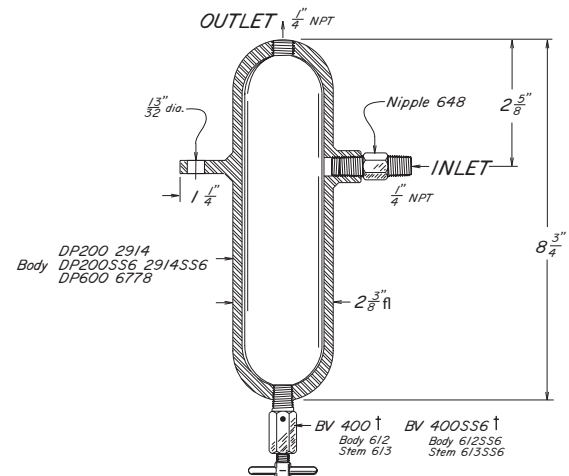
**DP-200/400/400SS6/600  
HIGH PRESSURE  
DRIP POT  
STEEL & 316 SS**



**FD 200/200SS6  
FILTER DRIP POT  
STEEL & 316SS**



**DP 200/600 SPECIAL  
DRIP POT  
STEEL**



**DRIP POTS AVAILABLE:**

CAT. NO.	DRIP POT	MAX. W.P.	OPER. PRESS.
YAM	DP 30	300	300
YAN	DP 200	2000	2000
YAO	DP 200*S	2000	2000
YAR	FD 200	2000	2000
YARSS6	FD 200SS6	2000	2000
YAP	DP 400	4000	4000
YAPSS6	DP 400SS6	4000	4000
YCE	DP 600	6000	6000
YCD	DP 600 *	6000	6000

\*Special

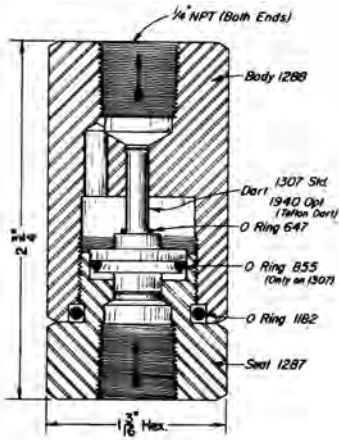
**†BLEED VALVES AVAILABLE SEPARATELY:**

CAT. NO.	BLEED VALVE	MAXIMUM PRESSURE
YBF	BV 400	4000
YBFSS6	BV 400SS6	4000
YBF1	BV 30	300
YBF1-SS6	BV 30SS6	300

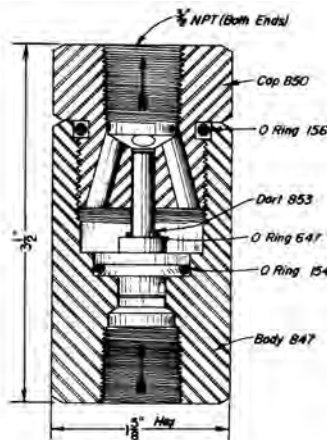
All openings tapped 1/4" NPT.

CHECK VALVES

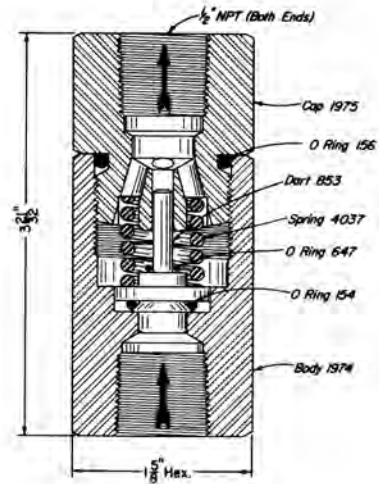
1/4 CV 15A  
STEEL



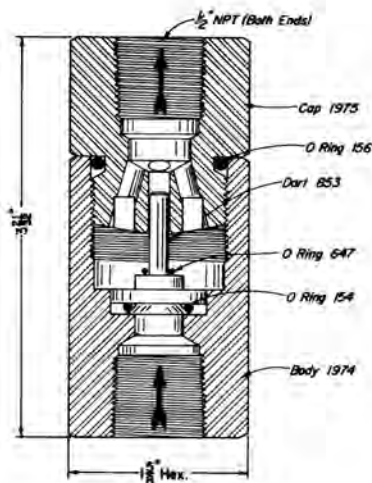
3/8 CV 15  
STEEL



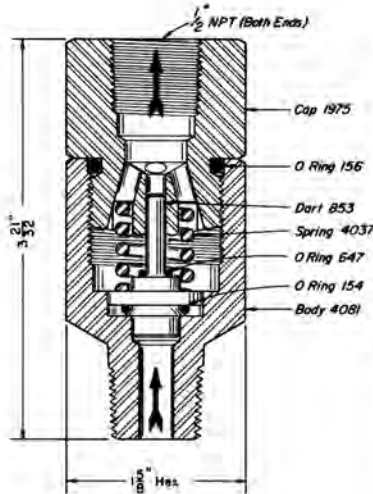
1/2 CV 15 w/S  
STEEL



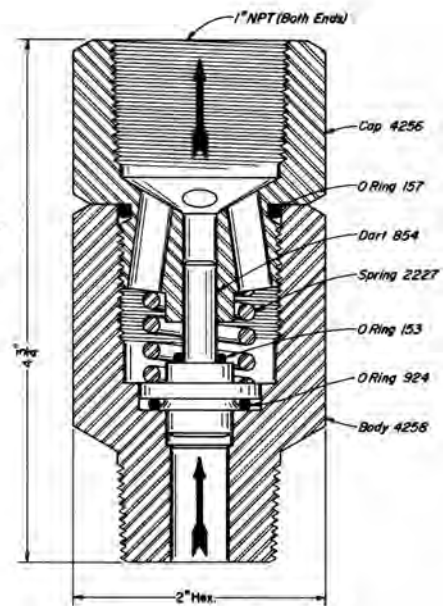
1/2 CV 15  
STEEL



1/2 CV 15 w/S-M  
STEEL



1 CV 15 w/S-M  
STEEL



CHECK VALVES AVAILABLE:

CAT. NO.	LINE SIZE	CHECK VALVE	MAX. W.P.	OPER. PRESS.
YAU	1/4"	1/4 CV 15A	1500	1500
YAU1	1/4"	1/4 CV 15A w/TD*	1500	1500
YAW	3/8"	3/8 CV 15	1500	1500
YBC	1/2"	1/2 CV 15 w/S-M*	1500	1500
YBD	1/2"	1/2 CV 15 w/S*	1500	1500
YBE	1/2"	1/2 CV 15	1500	1500
YBB	1"	1 CV 15 w/S-M*	1500	1500

NOTES:

- \*With Teflon Dart
- \*With Spring and 1/2" NPT Male Connection
- \*With Spring
- \*With Spring and 1" NPT Male Connection



#### APPLICATION:

For pressure reducing service where a supply of constant reduced pressure is required for pneumatic instruments and pilot operated controllers.

#### FEATURES:

- Easily adjusted
- Internally relieving
- Available in Aluminum and 316 Stainless Steel

#### CONNECTIONS:

Inlet and Outlet - 1/4" NPT

#### OPERATING TEMPERATURE:

0°F to 200°F (-18°C to 93°C)

#### OPERATION:

The diaphragm-operated design delivers constant downstream pressure by quickly responding to changes in volume requirements. The DIAPHRAGM-SEAT ASSEMBLY moves freely up and down in response to slight changes in volume demand at the outlet port. As the DIAPHRAGM-SEAT ASSEMBLY moves the gap between the NOZZLE and NYLON SEAT changes, compensating for the change in volume demand.

#### INLET PRESSURE:




4000 max. psig

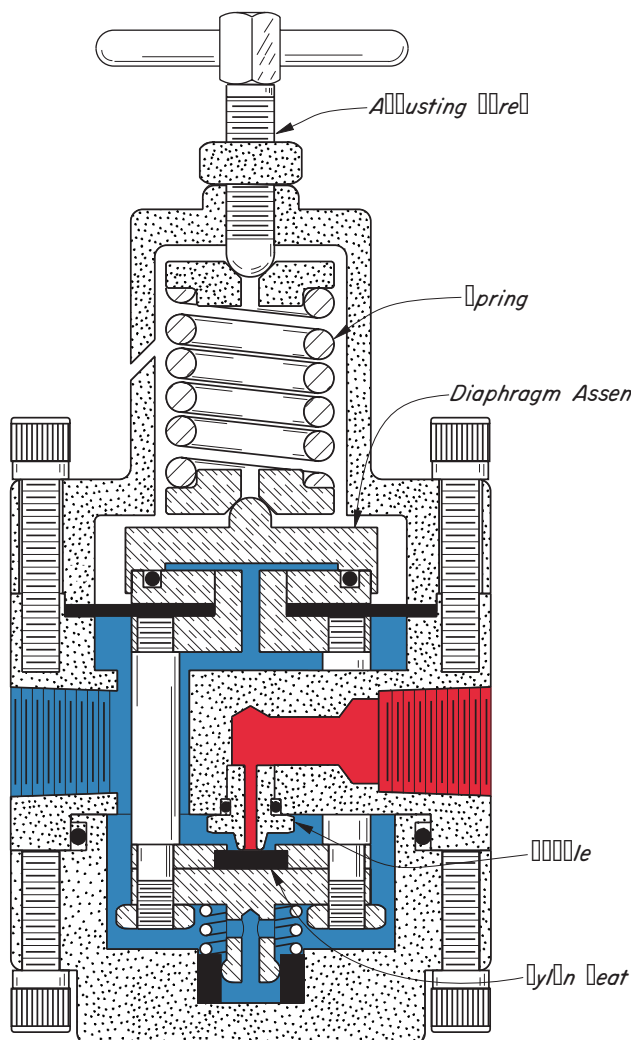
#### DESIGN PRESSURE:

5500 max. psig

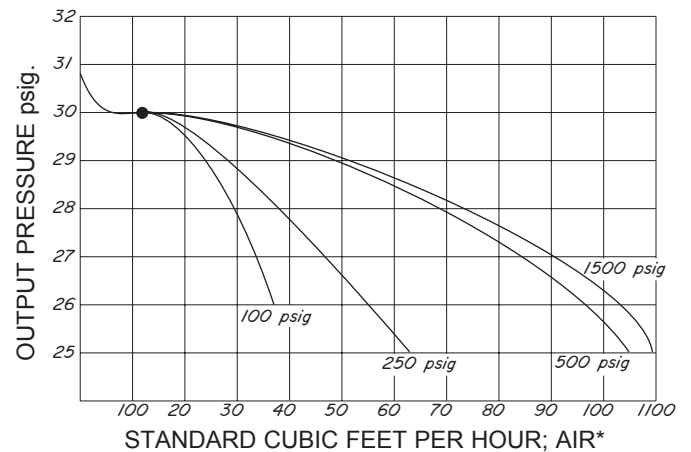
#### OUTPUT PRESSURE:

10 to 250 psig

-  Diaphragm Assembly
-  Input Pressure
-  Output Pressure



#### CAPACITY CHART

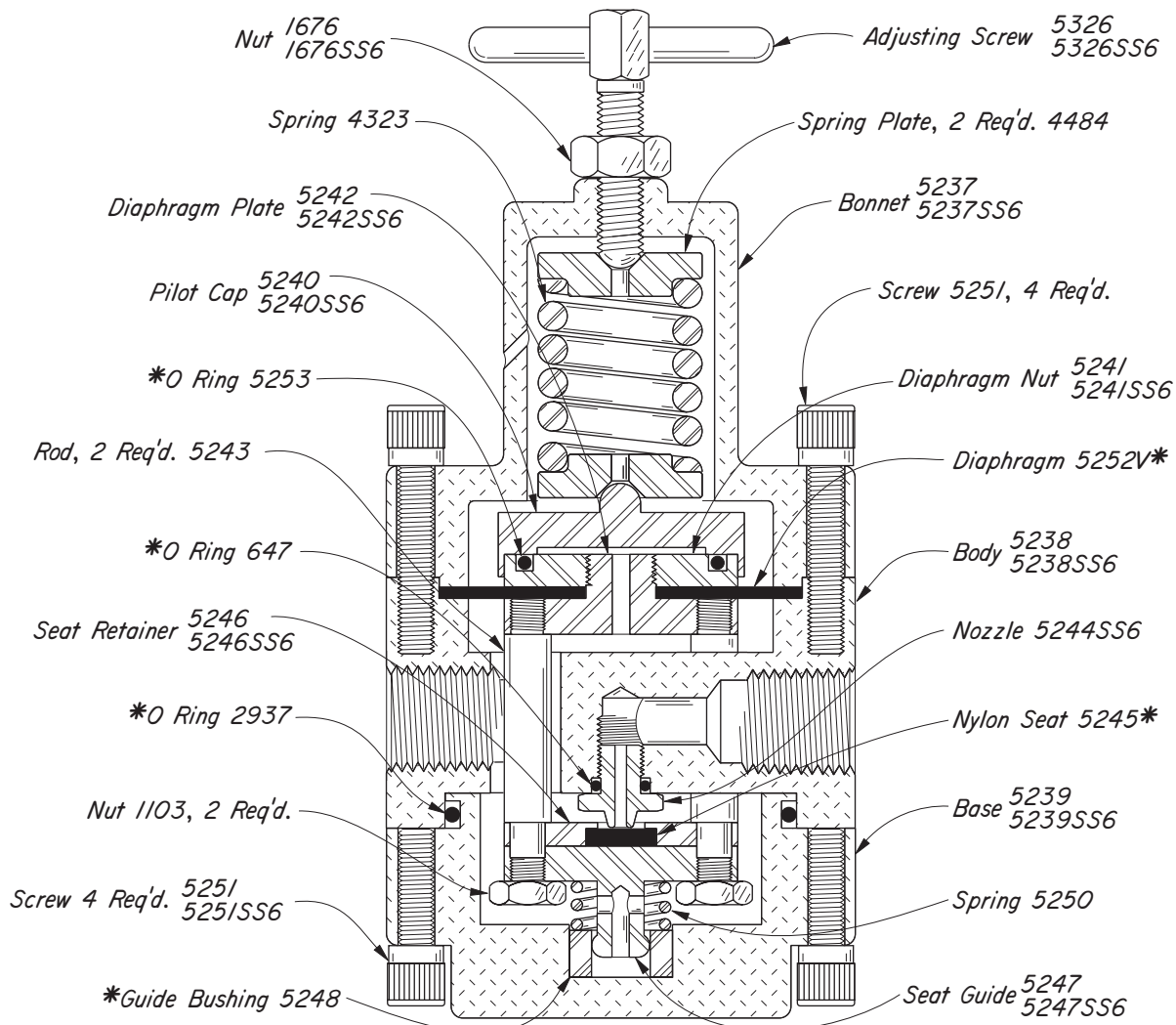


\*FOR CAPACITIES IN S.C.F.H. OF GAS AT .65 SPECIFIC GRAVITY MULTIPLY FLOW RATE BY 1.24

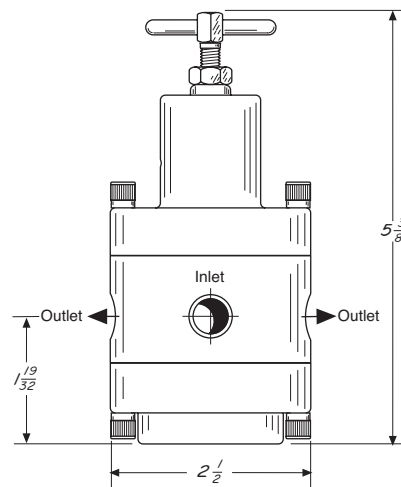


Kimray is an ISO 9001- certified manufacturer.

SUPPLY GAS REGULATOR  
ALUMINUM



REGULATOR DIMENSIONS



Kimray is an ISO 9001- certified manufacturer.

**REGULATORS AVAILABLE:**

CAT. NO.	REG.	MATERIAL	INLET PRESS.	OUTLET PRESS.	KIT
YAV	12 SGR	ALUM.	4000 max.	10-250	RSP
YAVSS6	12 SGR-SS6	316 SS	4000 max.	10-250	RSP

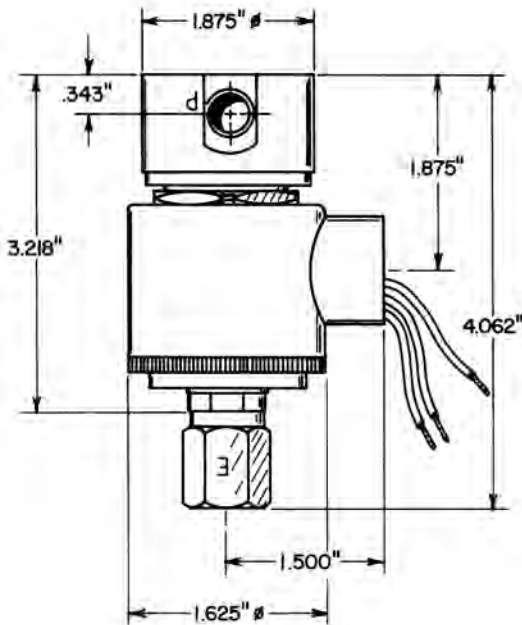
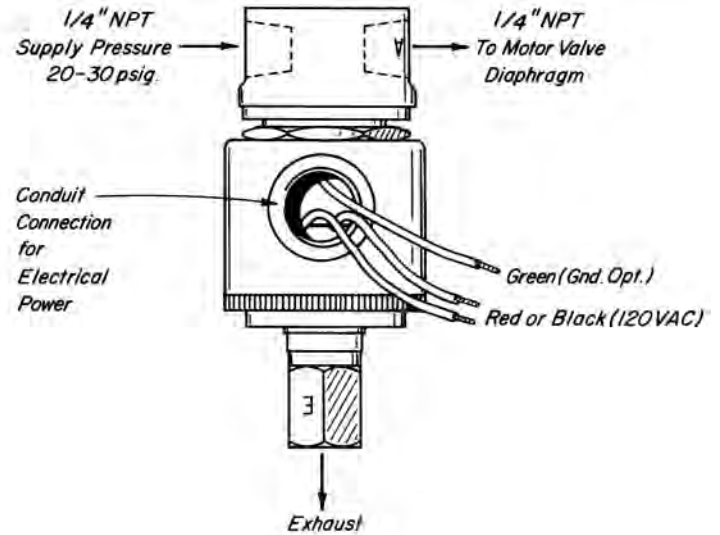
\*These parts are recommended spare parts and are stocked as repair kits.

#### APPLICATIONS:

For electrical control of a pneumatic pressure used to open and close a motor valve.

#### SPECIFICATIONS:

Voltage 110/120 VAC 50/60 HZ  
 Current (inrush) .3 amp  
 Current (continuous) .15 amp  
 Watts 10  
 Maximum supply pressure 100 psig  
 Normally closed, with output vented  
 1/2" conduit connections  
 1/4" NPT pressure connections  
 Explosion proof  
 1/16" orifice diameter  
 Weight 1.4 lbs.  
 Body 316 SS  
 Electrical housing cadmium plated steel



#### PILOTS AVAILABLE:

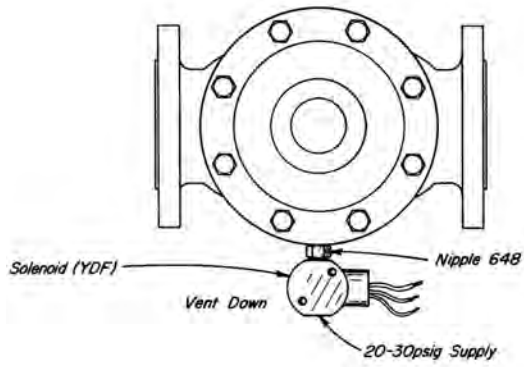
CAT. NO.	SOLENOID	MATERIAL	INLET PRESS.	OUTLET PRESS.
YDF	120 VAC E.P. <sup>a</sup>	316 SS	0 - 100	0 - 100

<sup>a</sup>Explosion Proof

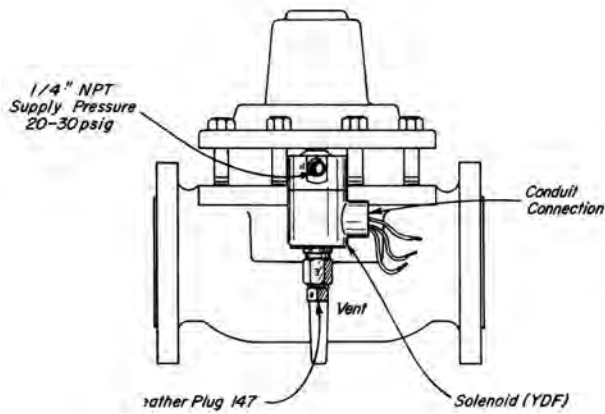
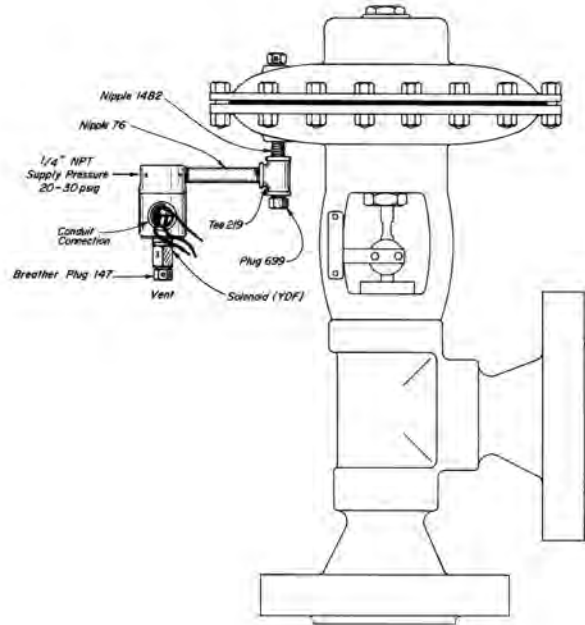
#### NOTES:

TYPICAL INSTALLATIONS

LOW PRESSURE MOTOR VALVE



HIGH PRESSURE MOTOR VALVE



#### APPLICATIONS:

For installations where it is necessary to operate a valve by using an electrical current pulse of 0.02 milliseconds duration.

Can be used in applications where a radio frequency or mechanical timer is require to control the solenoid.

Due to the Magnelatch Solenoid's compactness it can be used in conjunction with sensors, such as thermistors and thermocouples.

#### SPECIFICATIONS:

Maximum operating pressure 100 psig

3-Way explosion proof

1/4" NPT pressure connections

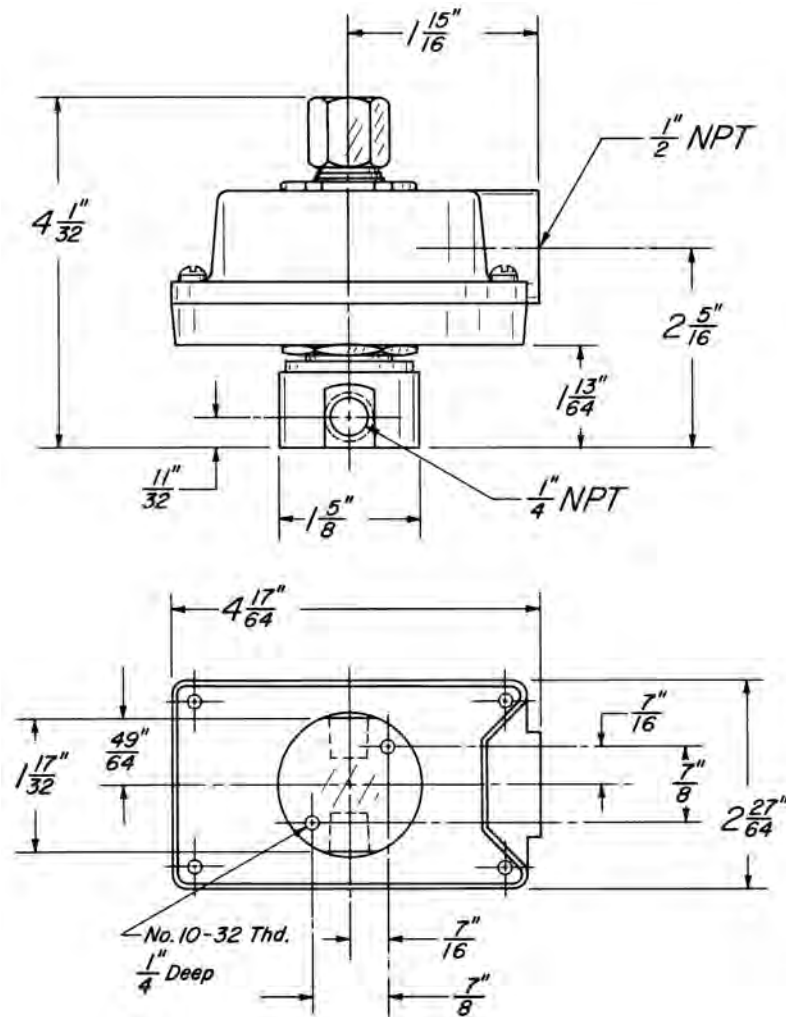
1/2" NPT conduit connection

Voltage 12 VDC

Momentary Latching;

10 Milliseconds to latch @ 1.40 amps

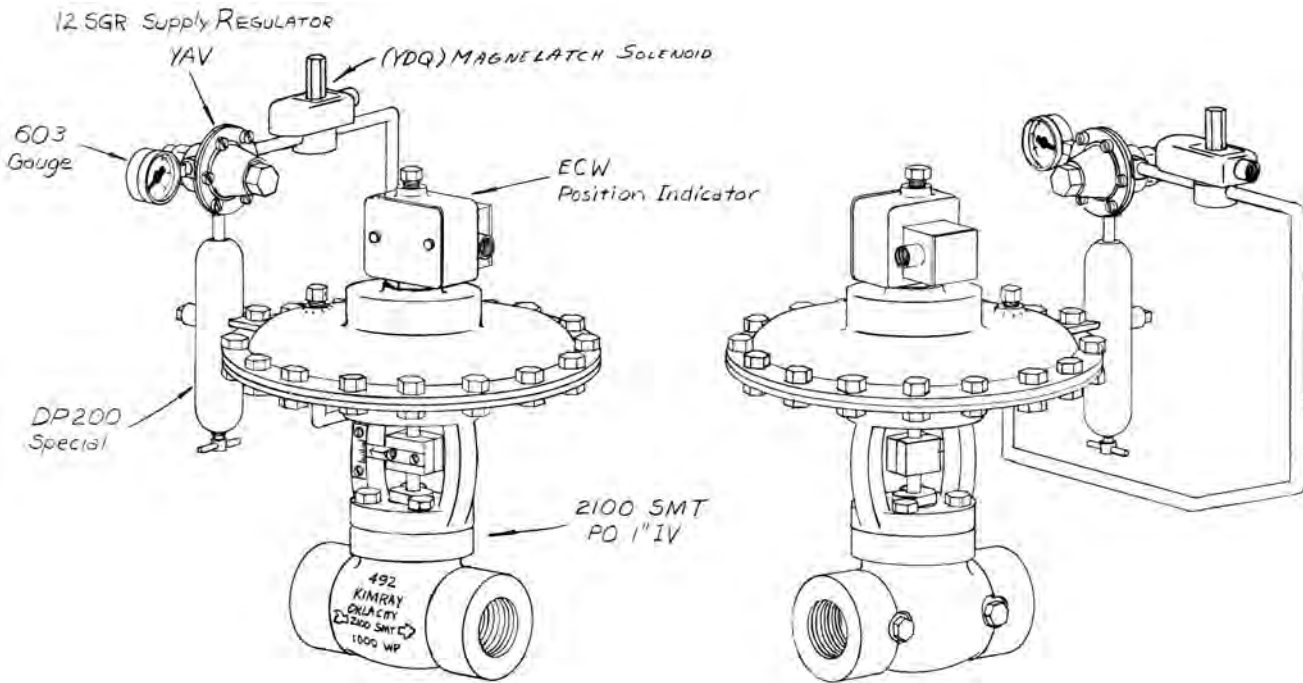
25 Milliseconds to unlatch @ .75 amps



Company or product names mentioned may be trademarks of their respective companies

**MAGNELATCH SOLENOID**

2100 SMT PO (1" I.V.)  
w/POSITION INDICATOR & MAGNELATCH SOLENOID  
STEEL



TYPICAL INSTALLATIONS

**SOLENOID AVAILABLE:**

CAT. NO.	SOLENOID	MAX. W.P.	OPER. PRESS.
YDF3	MAGNELATCH	100	100

**NOTES:**

Company or product names mentioned may be trademarks of their respective companies

#### APPLICATIONS:

The Kimray Air Motor is used to operate shutters on air cooled heat exchangers and similar equipment. This unit can be used wherever a linear movement produced by a changing pneumatic signal is required.

#### FEATURES:

- Aluminum housing
- 5 1/2" inch stroke
- Operates in any position
- Stainless steel stem and pins

#### WORKING PRESSURE:

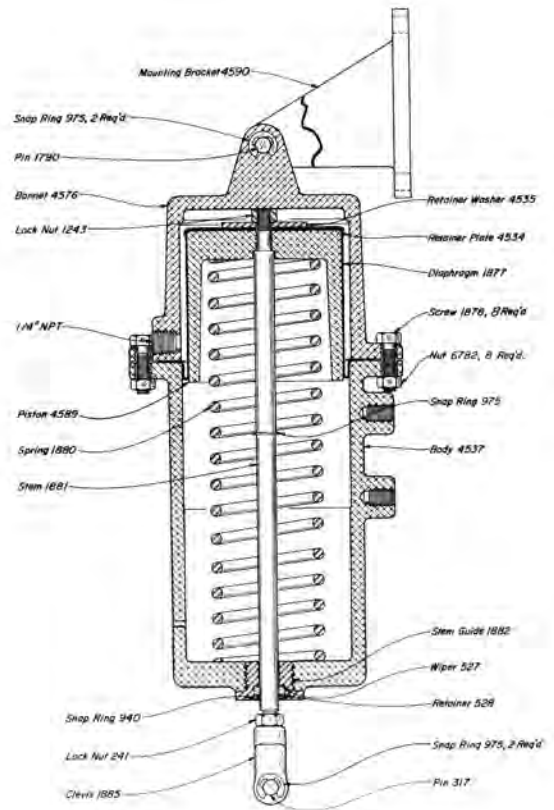
125 psig

#### DIAPHRAGM PRESSURE:

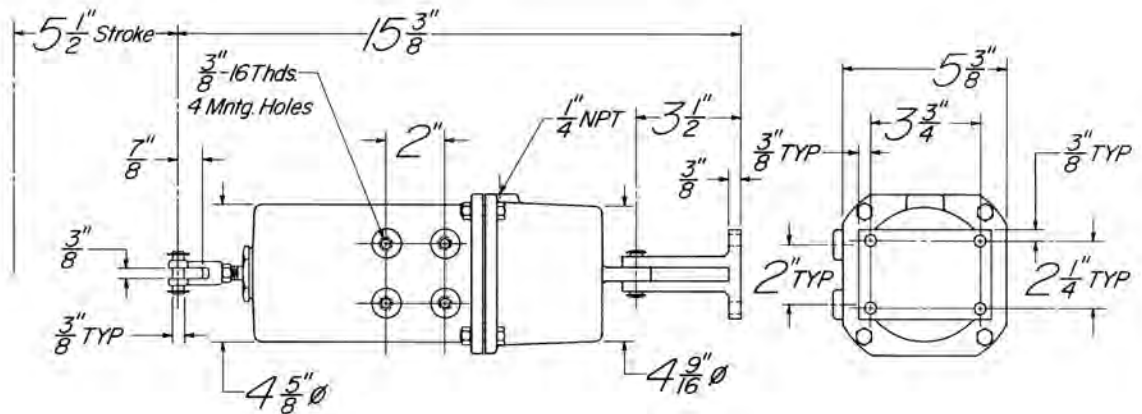
(Against Spring Load)

- 1 1/2" psig to start movement
- 18 psig to fully stroke

(Additional pressure required to overcome external load)



#### 455AL DIMENSIONS



#### AIR MOTOR AVAILABLE:

CAT. NO.	AIR MOTOR	MAT'L.	MAX W.P.	OPER. PRES
YAX1	455AL AIR MOTOR	ALUM	125	125



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**NOTES:**

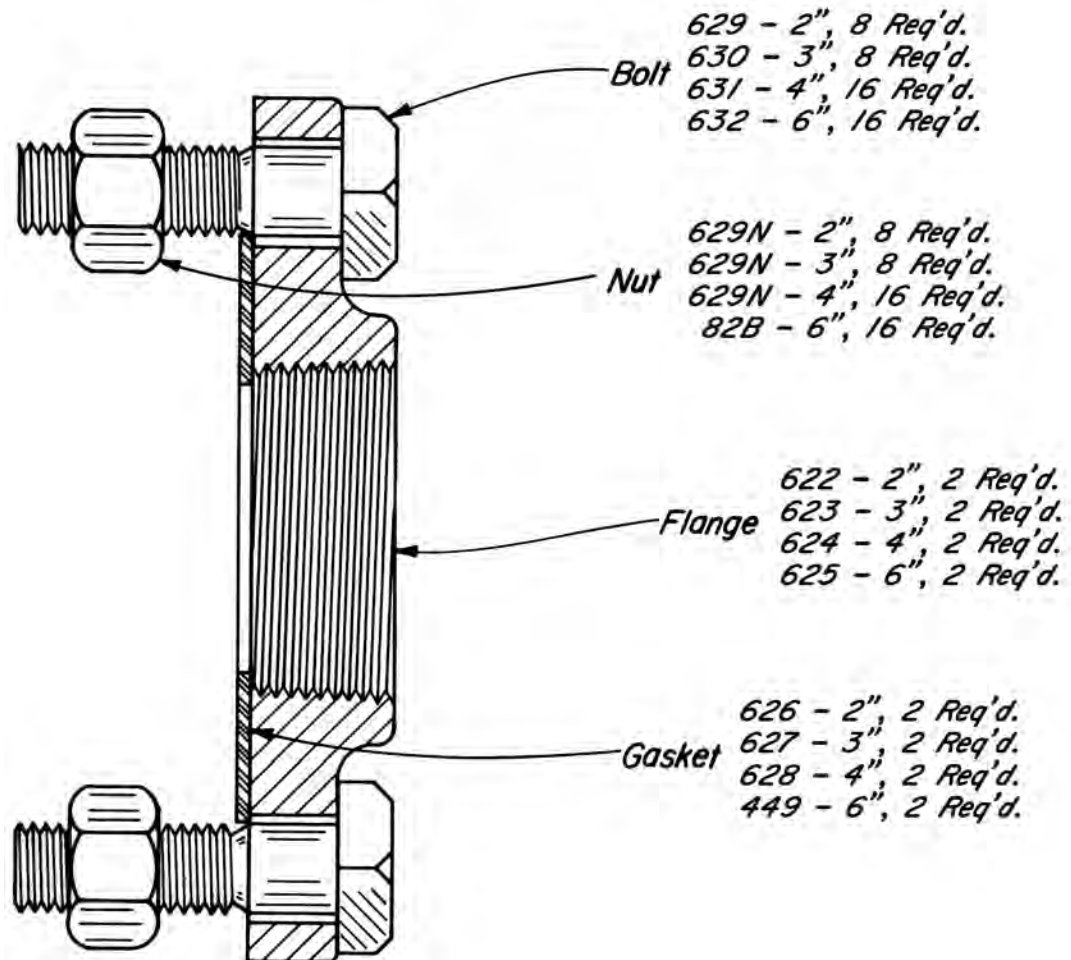


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**APPLICATION:**

Provides for installation of flanged valves in a screwed piping system.



**COMPANION FLANGE SETS AVAILABLE:**

CAT. NO.	LINE SIZE	MAX. W.P.	OPER. PRESS.
YFA	2"	125	125
YFB	3"	125	125
YFC	4"	125	125
YFD	6"	125	125

The Companion Flange Sets listed in the above chart are for use on the FGT, FMT & FMA bodies. Hardware and gaskets are provided with each set ordered. To order Companion Flange Set specify: (Line size & catalog number) Companion Flange Set. Example: "2" YFA Companion Flange Set."



Kimray is an ISO 9001- certified manufacturer.

**NOTES:**



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#### APPLICATIONS:

As an adjustable, self-resetting, pressure limiting device to protect instrumentation from over pressurization and subsequent damage.

Designed to protect pilots on high pressure regulators. Blocks the sense line or supply pressure to a device when it exceeds the adjustable limit of 300 psig. Reopens when inlet pressure drops below the limit.

#### NOTE:

This device is not to be installed as a:  
Instrument gas regulator,  
Pressure reducing regulator.

#### CONNECTIONS:

Inlet and Outlet - 1/4" NPT

#### DESIGN PRESSURE:

1000 psig. Max.

#### OUTPUT PRESSURE:

0 to 300 psig

#### FEATURES:

- Single Adjustment
- Intermittent bleed pilot
- Remote Installation
- Compact Design

#### OPERATION:

The Pilot Spring loads the upper side of the Pilot Diaphragm Assembly and is opposed on the under side by Output Pressure (Blue) acting on the area of the Pilot Diaphragm.

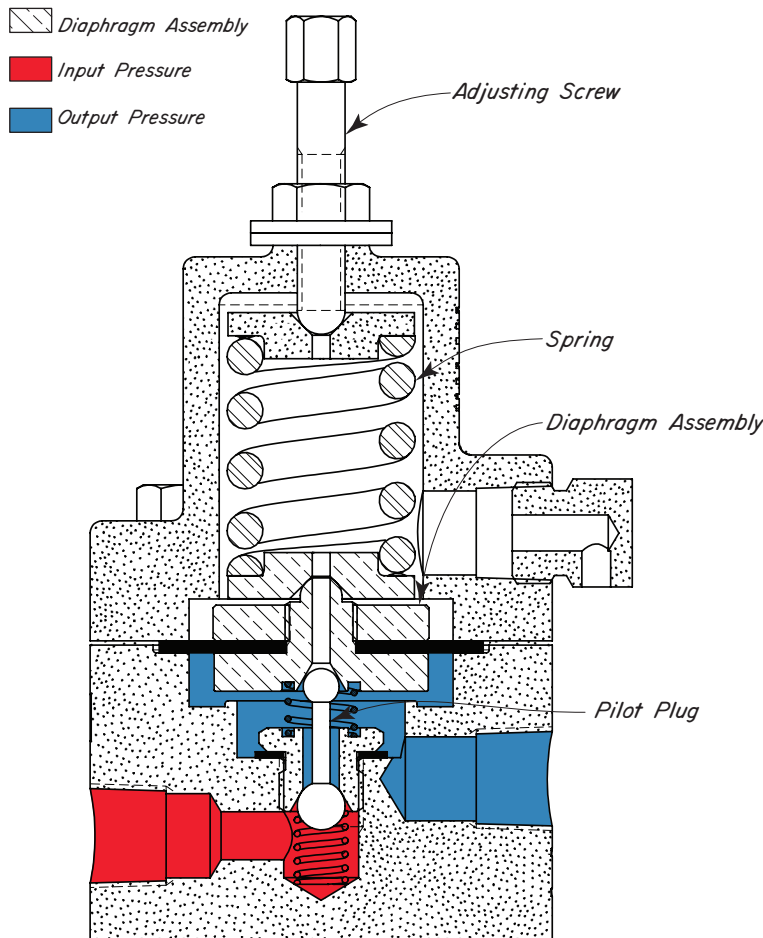
As long as the Input Pressure (Red) is below the setting for the desired maximum Output Pressure (Blue) the Pilot Diaphragm Assembly is held down by the Pilot Spring, and the lower seat of the Pilot Assembly (Red to Blue) is held open, allowing direct communication of input Pressure (Red) to Output Pressure (Blue).

Changes in the Input Pressure (Red) will directly result in changes in the Output Pressure (Blue) unless the pressure reaches the upper limit established by the setting of the Pilot Spring. At this point the Pilot Diaphragm Assembly is forced upward to the point the lower seat for the Pilot Plug (Red to Blue) is closed, preventing any further increases in Output Pressure (Blue).

If for any reason conditions would cause the Output Pressure (Blue) to start to increase above the desired set point, the Pilot Diaphragm Assembly will move upward, opening the upper Pilot Plug Seat (Blue to Atmosphere) and relieving enough pressure to restore Output Pressure (Blue) to the set point.

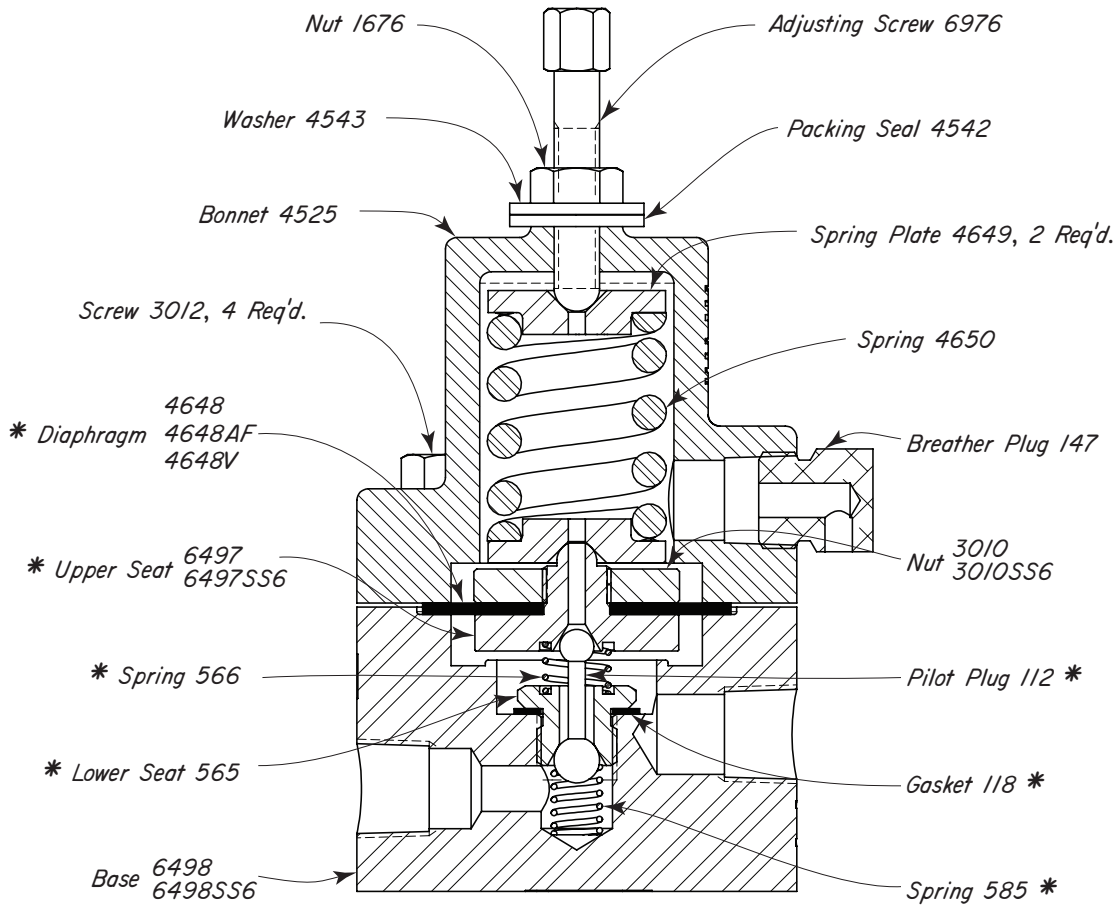
When the Input Pressure (Red) returns to a level below the set point limit, the Pilot Plug will drop slightly allowing Input Pressure (Red) to again communicate with Output Pressure (Blue).

The upper limit for the Output Pressure (Blue) is set with the adjusting screw. Turning the Adjusting Screw clockwise will increase the Output Pressure (Blue) limit, turning the Adjusting Screw counter clockwise will lower the Output Pressure (Blue) limit. The maximum output pressure is 300 psig.

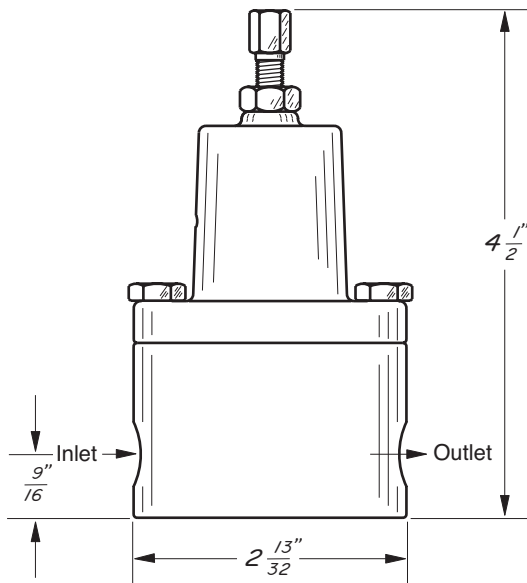


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SENSE LINE PROTECTOR  
STEEL



PILOT  
DIMENSIONS



**PILOTS AVAILABLE:**

CAT. NO.	PILOT	MATERIAL	OPER. PRESS.	OUTLET PRESS.	KIT
YDM	30 PR	STEEL	1000	300	RMV
YDMSS6	30 PR-SS6	316SS	1000	300	RMVSS6

**NOTES:**

All openings are tapped  $\frac{1}{4}$ " N.P.T.

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

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