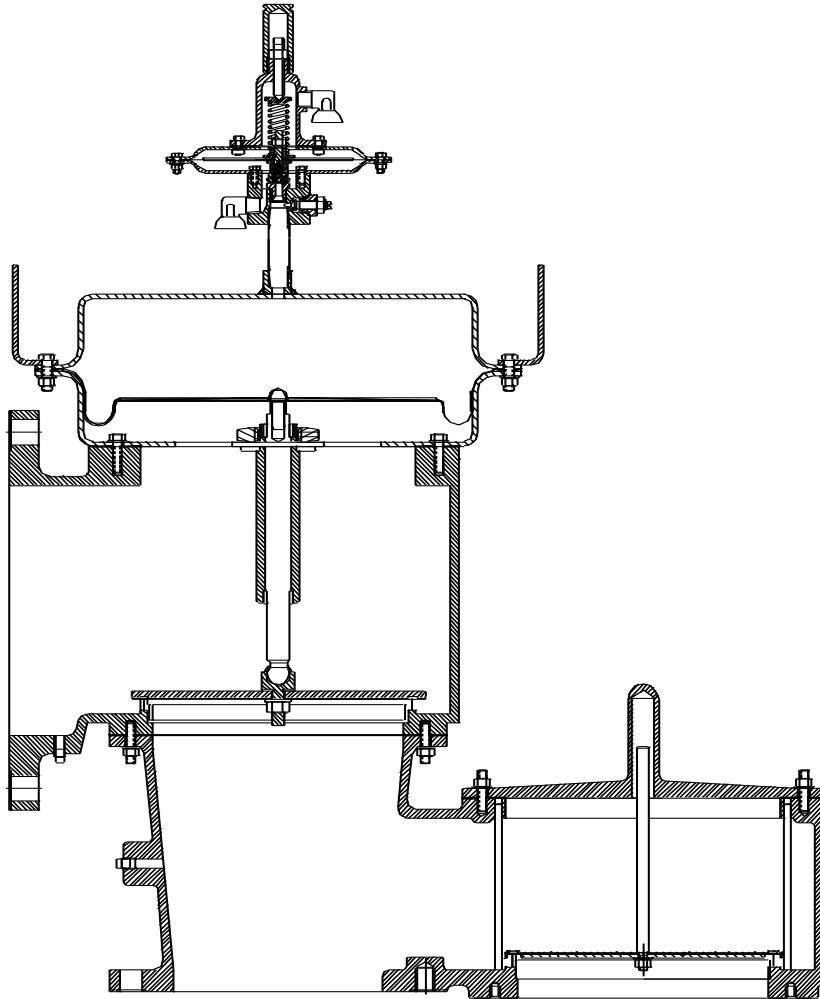


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# Installation, Operation and Maintenance

## MODELS 1400, 1420, 1430, 1460



IOM1400.0  
January 2, 2014  
REV B 12887  
REF. ID 98136



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**NOTE:**

For a list of abbreviations used in this manual, refer to Table 8.

## INTRODUCTION

Pressure and/or vacuum relief valves are used on liquid storage tanks and other process vessels or systems to prevent structural damage due to excess internal pressure or vacuum.

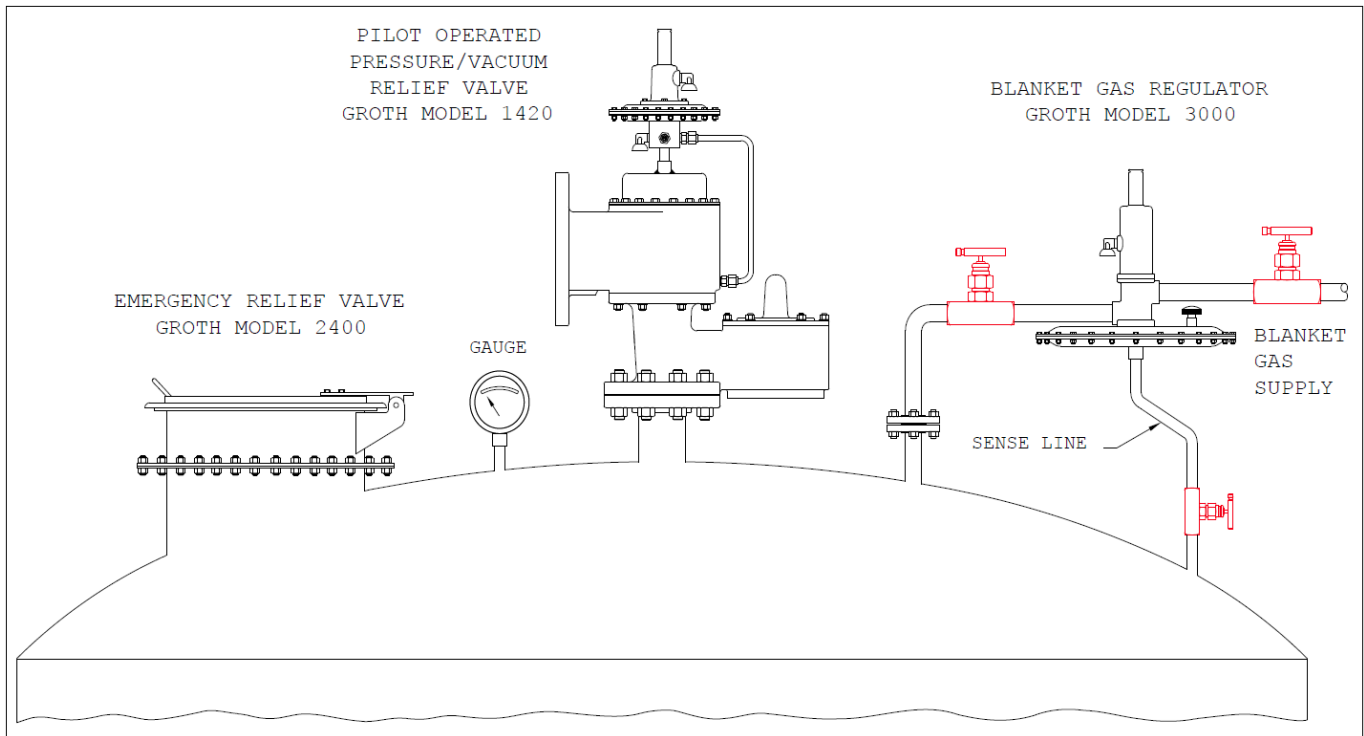
Storage tanks are pressurized when liquid is pumped in, compressing the existing vapor or when increasing temperature causes increased evaporation or expansion of existing vapor. Conversely, a vacuum may be created when pumping out or due to decreasing temperature. To prevent damage, vapor must be allowed to escape or enter the tank at a specified pressure or vacuum condition. The volume rate of venting depends upon the tank size, volatility of the contents, the pumping rate and the temperature. See API Standard 2000 for the procedures to determine venting requirements.

The pilot operated relief valve has two principal advantages over other types of relief valves:

- 1) Better sealing capabilities.
- 2) It achieves the full open position at 10% above set pressure.

These characteristics permit operating pressures nearer to the maximum allowable working pressure of the tank. High operating pressures reduce evaporation and total venting volume, thereby reducing product loss and the cost of processing emissions. A tank may also have provisions for emergency pressure relief due to fire exposure and/or inert gas blanketing of the vapor space. A typical tank installation is shown in Figure 1 which includes a 1420 Pilot Operated Pressure/Vacuum Relief Valve, a Gas Blanketing Regulator (Model 3011) and a 2400 Emergency Pressure Relief Valve which provides protection under fire or other abnormal conditions. Groth Corporation manufactures all of these devices.

A Pilot Operated Valve (POV) must be carefully maintained by a qualified valve technician. It should only be assembled under clean conditions, preferably in a service shop environment. Carefully read and understand this manual before attempting to repair a 1400 series POV. Groth Corporation provides repair services for all products manufactured by the Groth Products Group.



**FIGURE 1: TANK INSTALLATION - SAFETY EQUIPMENT**

\*Pressure relief is pilot operated, vacuum relief is weight loaded.

The 1400 Series Pilot Operated Valves are designed to provide pressure and/or vacuum relief for API 620 and 650 tanks. Several configurations are available; these are summarized in Table 1 below. Each type is available with either a standard FEP film or with an O-Ring pallet. A variety of material options are available depending on the type of service.

The nameplate below shows the basic information that is listed on each relief valve:

**FIGURE 2: GROTH NAMEPLATE**

GROTH CORPORATION HOUSTON TEXAS USA		MD: 1420-03-55-V-S-□□R□□	
		S/N: 98765432	
		TAG: 123456-3	
		FLANGE: 3" FF ANSI 150#	
SETTING	TYPE	% OP	FLOW [SCFH]
1.0 PSI	PRESS.	10	42,200
1.0 □SI	VAC.	100	14,500

TABLE 1: 1400 SERIES MODELS (Pilot Operated Pressure Valves)			
Model	P	V	Vacuum Operation
1400	✓	✓	Weight Loaded
1420	✓	✓	Weight Loaded
1430	✓		Not Available
1460	✓		Not Available

**For more information about these valves, please contact:**

*Groth Corporation  
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 Stafford, Texas 77477  
 281-295-6800 (phone)  
 281-295-6995 (fax)*

## PILOT VALVE DESIGN AND FUNCTION

Each application must be reviewed to ensure material compatibility of all metal and soft good components with the service conditions. The pallet assembly and wetted components are available in Aluminum or 316 SS; they may be upgraded to Hastelloy C or other alloys for severe corrosive service. Diaphragms are all FEP film; other soft goods can be specified as Buna-N, FKM, or FFKM. The standard sense tubing is 316 SS; it is available in Kynar for severe corrosive chemicals.

The pilot valve is set at the factory to comply with the specification on the purchase order. The range of adjustment will depend on the spring installed and will be stamped on the nameplate. The pressure setting may be

changed within the design range either while on line or in a service shop. Observe the proper setting and testing procedure in the appropriate pilot valve manual.

This manual is intended to provide recommended procedures and practices for installation, operation, and maintenance of the Groth Series 1400 Pilot Operated Valve (POV) Series. Any standard procedures and practices developed for a specific plant or process may supersede this manual. Although this manual cannot cover all possible contingencies, following these guidelines should provide safe, reliable pilot valve performance.

Note: This manual covers the operation and maintenance of only the main valve; refer to the appropriate manual for the pilot valve instructions.

### SAFETY WARNINGS

*This section is an overview of safety guidelines that should be followed during the installation, operation, and maintenance of your valve. To understand the context of these instructions and warnings, read and understand this complete manual.*

*The purpose of a POV is to prevent excessive pressure in a tank or process system. The valve must be designed for the proper MAWP and flow requirements of the system. Consult API Standard 2000 for tank protection sizing procedures. An improperly specified or functioning relief valve may result in structural damage to the tank or system.*

*In the event of an actuator diaphragm failure, the valve will vent pressure to the atmosphere, causing the pressure relief valve to fail in the OPEN position. The valve will function like a weight loaded valve under this condition with a lower setting point, and will normally provide rated flow capacity. Consult factory for any questions related to this over-pressure condition.*

*POV relief pressure and blowdown are set at the factory per purchase order specifications.*

*The set pressure is stamped on the pilot valve nameplate. DO NOT attempt to readjust the set pressure beyond the limit specified on the*

*pilot nameplate.*

*The pilot sense line is either 3/8" OD SS tubing, or 1/2" NPT Kynar pipe. It must be kept open and unobstructed to ensure that the pilot "senses" actual tank pressure. For applications where tank vapors may condense or "polymerize" in the sense tube or pilot valve, a nitrogen purge may be required to prevent internal obstruction of the tube. Consult the factory for recommendations.*

*DO NOT attempt to remove the pilot valve from the main valve without removing or isolating the relief valve from the system. ALTERNATIVE MEANS OF PRESSURE RELIEF MUST BE PROVIDED WHEN THE VALVE IS OUT OF SERVICE. After isolating the relief valve, bleed all pressure from both main and pilot valve before removing the valve. Consult the pilot valve manual before attempting to repair it. Both the pilot valve and POV are exposed to process vapors. Observe all plant procedures and Material Safety Data Sheet recommendations for the products in the system when inspecting, adjusting or servicing the valves. Vents on the body and spring bonnet of the pilot valve must be clean and unobstructed for proper and safe operation of the valve. These vents should be inspected periodically, and cleaned or replaced, if necessary.*

## SHIPPING, INSPECTION AND STORAGE

The POV should be protected during handling and storage. Always keep all ports plugged to prevent intrusion of foreign materials. Inspect the valve for any sign of damage that may have occurred in shipment and report this to the carrier. If there are indications of physical damage or internal contamination, the valve must be disassembled, cleaned and inspected before installation. The spring adjustment cap and blowdown screw locknut will be "car sealed" to ensure that the factory pressure setting has not been altered.

Inspect the valve for any sign of damage that may have occurred in shipment and report this to the carrier and Groth Corporation. Removal of car seal may invalidate the warranty.

Lifting eyes are provided on the upper actuator for handling the valve. To avoid damage to the lower flange surface, set the valve on a soft clean gasket material until it is ready to be installed. It should be stored in a clean environment until it is to be mounted on the tank.

The pilot pickup fitting is in the body and must be kept completely free of all foreign materials. DO NOT store the valve directly on the ground.

## INSTALLATION

The 1400 Series valves are precision devices that must be handled carefully to ensure seat tightness.

- At installation, the valve should be smoothly lifted into position using the lifting eyes on the actuator. Use the actuator housing to align the valve directly over the tank nozzle. Do NOT use the pilot valve or pickup line to pull the valve into position.
- Aluminum valve bodies should be connected with flat faced 150# ANSI flanges. A full faced gasket is recommended. Mating flanges should be flat within .020" and clean, free of scratches, corrosion and tool marks.
- Inspect the gasket; make sure that the material is suitable for the service. Gasket dimensions are listed below, Table 2. Full gaskets must be used with flat face flanges.

Either full or ring gaskets may be used with raised face flanges.

Table 2 Body Flange Gasket Dimensions					
150# ANSI Flange*	O.D. (IN)	I.D. (IN)	B.C. (IN)	Hole (IN)	Qty
2" RF	4.12	2.38	---	---	---
3" RF	5.38	3.50	---	---	---
4" RF	6.88	4.50	---	---	---
6" RF	8.75	6.62	---	---	---
8" RF	11.00	8.62	---	---	---
10" RF	13.38	10.80	---	---	---
12" RF	16.12	12.80	---	---	---
2" FF	6.00	2.00	4.75	0.75	4
3" FF	7.50	3.00	6.00	0.75	4
4" FF	9.00	4.00	7.50	0.75	8
6" FF	11.00	6.00	9.50	0.88	8
8" FF	13.50	8.00	11.75	0.88	8
10" FF	16.00	10.0	14.25	1.00	12
12" FF	19.00	12.0	17.00	1.00	12

\* RF = Raised Face, FF = Flat Face

- Lubricate all studs and nuts with an appropriate thread lubricant. If stainless steel fasteners are used, use an anti-seize lubricant such as moly-disulfide (Table 6).
- Center the gasket within the bolt circle of the tank nozzle flange.
- Set the valve carefully on the nozzle.
- Install nuts and lock-washers and torque all fasteners to half the recommended value in a staggered, alternating pattern. *Consult with Plant and/or Maintenance Personnel for appropriate practices and standards.*

Table 3 Recommended Minimum Torque Values*				
Size	Qty Holes	Bolt (UNC)	Torque (lb-ft)	
			Raised Face	Flat Face
2"	4	5/ 8" - 11	31	81
3"	4	5/ 8" - 11	43	106
4"	8	5/ 8" - 11	29	68
6"	8	3/ 4" - 10	51	101
8"	8	3/ 4" - 10	78	142
10"	12	7/ 8" - 9	75	138
12"	12	7/ 8" - 9	93	179

\*Note: Torque values are based on a gasket factor  $m = 3.5$ , gasket factor  $y = 4000$  psi, operating pressure = 30 psi

- Make sure that the flanges are not distorted and that the gasket is evenly compressed.
- Make up the final torque and check that no further nut rotation occurs.
- Normally, the pilot sense is integral to the valve assembly. However, if the optional

remote sense connection is specified, an external sense line must be installed. See the appropriate Pilot valve manual for recommendations. If the valve utilizes a 1402 Pilot Valve, there will be two connections to the tank. The connections can only be combined (with a tee) at the tank connection.

## MAINTENANCE

### **Safety Warning**

*If the valve must be removed from the tank for any reason, make sure that all pressure has been released before the flange fasteners are loosened. Refer to your company procedures before venting the tank pressure and when handling toxic or otherwise hazardous materials. Observe all standard safety precautions as specified on Material Safety Data Sheets for the product(s) in the system while removing the valve and when repairing it.*

The 1400 Series POV does not require routine lubrication or adjustments. It should be checked periodically, at least twice a year, to confirm that the valve is functioning properly and that the set point is correct. Test connections can be provided to facilitate testing the valve in the field.

The pilot valve is designed to function in a fail-safe manner. The failure of a seal or diaphragm will cause pressure to be vented to the atmosphere; the resulting loss in pressure will cause the main valve to open under rising pressure.

Periodic inspection for seat tightness should be done to ensure compliance with local air pollution control requirements. The valve will need to be periodically removed from the tank for inspection of diaphragms, gaskets and seals. When this is done, the valve must be handled carefully using the lifting eyes on the actuator housing.

Refer to handling instructions listed in the Installation section of this manual.

If a leak is detected, it will likely be from one of the following sources:

1. Pilot valve
2. Main valve actuator
3. Main valve diaphragm
4. Body - nozzle flange joint gasket

Refer to the troubleshooting section of this manual or the pilot valve manual for probable causes for these type of problems.

The main and pilot valve actuator housings, valve bodies, pallet assemblies and other components are exposed to the process vapor.

## DISASSEMBLY

The 1400 series valves can be simplified into three modules. These modules can be seen in the figures below:

Weatherhood (with Pilot)  
Outlet (with Pilot)  
Vacuum (integral with body)

Before any disassembly or assembly, make sure that there is NO PRESSURE (positive or negative) in the system.

### **Outlet/ Weatherhood Disassembly**

1. Disconnect the tubing connections (pilot to main valve).
2. Remove the pilot valve. Refer to appropriate pilot valve manual for disassembly instructions.
3. Remove all fasteners holding the actuator housings together.
4. Carefully lift the upper Diaphragm case to avoid damaging the actuator diaphragm.
5. Remove the housing gaskets.
6. Remove the actuator diaphragm and the screw holding the support plate.
7. Remove the actuator support plate.
8. Remove the fasteners holding the lower housing to the outlet (Models 1420 & 1460), or weatherhood posts (Models 1400 & 1430).
9. Lift lower housing and stem guide assembly. This assembly will slide over the stem.
10. Lift the stem and pallet assembly out of the valve, invert it, and hold the stem in a soft chuck vise (to avoid damage to the stem).
11. Remove the nut, to disassemble the pallet assembly.

### Vacuum Disassembly

1. Remove the nuts from the cover.
2. Lift the cover and remove the gasket.
3. Lift the stem-pallet assembly. (Make note of the weights. The valve must be reassembled with the same quantity of weights in the same location to achieve the specified settings.)
4. Invert the pallet assembly and remove the nut holding the assembly together.

### **ASSEMBLY**

Inspect all guides for corrosions, damage or product build up. Also inspect the vacuum cover guide bore. Check the metal seating surfaces for pitting, corrosion or product build up. **It is recommended to replace ALL soft goods including diaphragms, O-Rings and cover gaskets.** Note, the stem guide has internal PTFE bushings.

If the seats are damaged they must be lapped using a flat ground metal disc with fine grit emery cloth attached and lapping compound. Wipe the seating surface clean before assembly.

### Outlet/ Weather hood Assembly

1. Clean all the assembly component using cleaning agent.
2. Carefully place the Pressure pallet assembly on the seat, without damaging the diaphragm.
3. Place and secure the outlet on to the main valve body (Model 1420 & 1460), or the weather hood post and the weather hood (Model 1400 & 1420) using appropriate fasteners. Stem guide will slide over the pallet stem during this assembly process.
4. Next place the actuator housing and secure it with hex Jam nut and washer.
5. Fasten the actuator support plate in its position using a screw
6. Place the gasket and actuator diaphragm aligning the holes with lower actuator housing
7. Place the upper actuator housing and use the hex bolt, nut and washer to assemble the actuator housing together.

8. Put the pilot valve assembly on top of the upper actuator housing using a nipple.
9. Attached the tubing in place using the correct pipe connectors from the pilot to the main body.

### Vacuum Assembly

1. Inspect the seating surface for the vacuum pallet for any damage. If required, lapping should be performed using a flat ground metal disc with a fine grit compound or emery cloth attached to the disc.
2. Install the vacuum pallet assembly into the valve body, by holding the pallet sideways and lowering it into the vacuum chamber of the body through the notches in the body chamber.
3. Verify that the pallet assembly can freely slide up and down between the vacuum guide rods.
4. Stack the same amount of weight which was removed during disassembly procedure to achieve the required set pressure on the vacuum side.
5. Thread the vacuum cover studs into the body. Torque the studs into the body using the double nut technique. Do not use vise grips or similar wrench on the threads.
6. Place the cover and tighten the assembly with right size washer and hex nut.

### **FIGURES AND TABLES**

The following figures are to assist in identifying components during disassembly and assembly of the Groth 1400 Series valves. The actual configurations might vary because of special applications and customers' request, but the operation and function is similar.

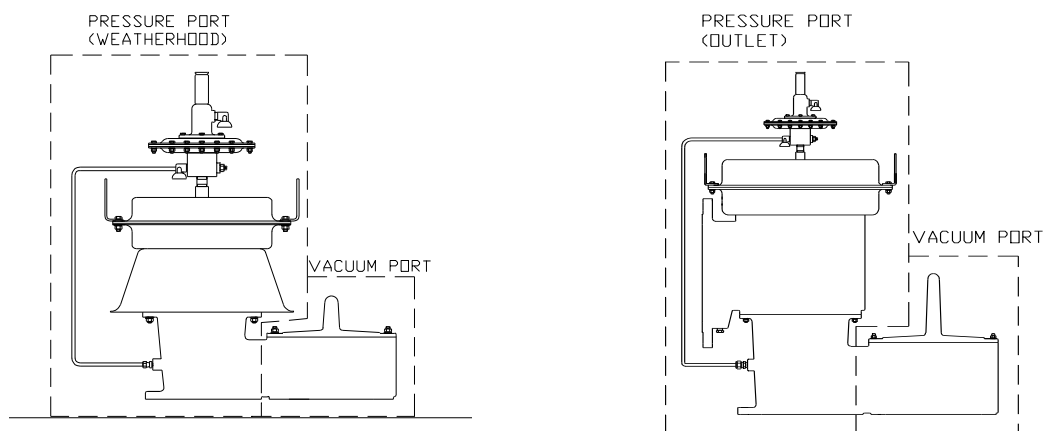
*Figure 5 through Figure 8 include a NOTE column. For an explanation of the NOTES, see Table 4 below.*

- For Lubricants suggested, see Table 6.
- For Troubleshooting Guide, see Table 7.
- For Abbreviations, see Table 8.

**TABLE 4: NOTES FOR FIGURE 5 THROUGH FIGURE 8**

NOTE	DESCRIPTION
1	Pallet Diaphragms & O-Rings. These soft goods should be replaced each time the valve is disassembled. Standard material options include FEP, Buna, FKM & FFKM.
2	Gaskets: Non-Asbestos Fiber. These should be replaced each time the valve is disassembled.
3	Bushing Guides: PTFE. At assembly, inspect stem travel through guides. The stem should slide smoothly with minimal drag. Replace as required.
4	Actuator Diaphragms & Gaskets. Replace each time valve is disassembled they are available only in FEP.

**FIGURE 3: VALVE PORT IDENTIFICATION**



**FIGURE 4: AVAILABLE SEAT CONFIGURATIONS**

ITEM	DESCRIPTION
1	Pallet*
2	Seat**
3	Diaphragm (Fig 4.1) O-ring (Fig 4.2)

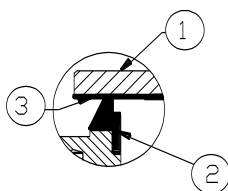


Fig. 4.1

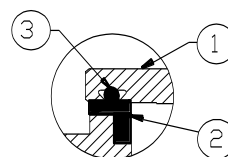


Fig 4.2

**FIGURE 4: AVAILABLE SEAT CONFIGURATIONS**

\* Actual pallet may not resemble drawing. Pallet design varies with operation.

\*\* Seat can be integral (machined into body), or a ring insert. (Depends on the body material).

**TABLE 5: PART NUMBERS FOR VACUUM PALLET ASSEMBLIES**

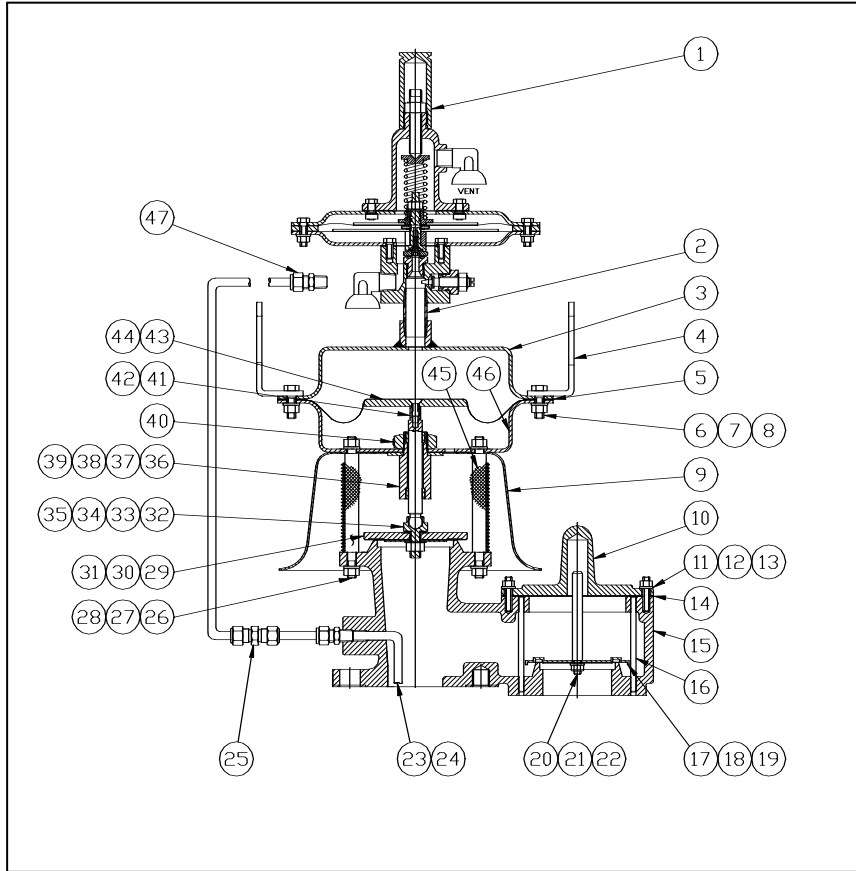
Component	Valve Size						
	2"	3"	4"	6"	8"	10"	12"
FEP Diaphragm, 10 mil	DPH1200027310	DPH1200037310	DPH1200047310	DPH1200067310	DPH1200087310	DPH1200107310	DPH1200127310
FEP Diaphragm, 20 mil	DPH1200027320	DPH1200037320	DPH1200047320	DPH1200067320	DPH1200087320	DPH1200107320	DPH1200127320
Gasket, Outlet (bottom)	GKT1220028002	GKT1220038002	GKT1220048002	GKT1220068002	GKT1220088002	GKT1220108002	GKT1220128002
Gasket, Cover (top)	GKT1200028001	GKT1200038001	GKT1200048001	GKT1200068001	GKT1200088001	GKT1200108001	GKT1200128001
O-Ring (plate pallet) - FKM	0267010U2 (#010 70 durometer)			0267012U2 (#012 70 durometer)			



Setting	< 4 OSI		4 - 8 OSI		8 - 12 OSI		12 - 16 OSI	
Diaphragm	10 mil	20 mil	10 mil	20 mil	10 mil	20 mil	10 mil	20 mil
Quantity	1	---	---	1	1	1	---	2

\* Please provide the valve serial number and pressure/vacuum settings when ordering replacement parts.

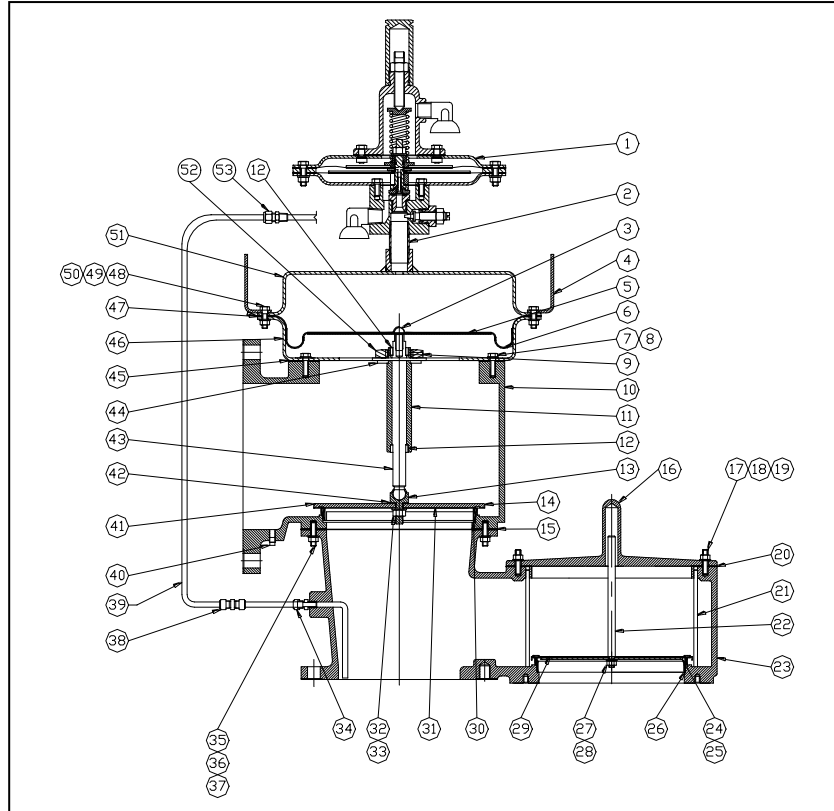
**FIGURE 5: MODEL 1400**



ITEM	DESCRIPTION	NOTE
1	Pilot Valve Assembly	
2	Pipe Nipple	
3	Upper Diaphragm Case	
4	Lifting Eye	
5	Gasket – Actuator	4
6	Hex Bolt	
7	Hex Nut	
8	Lock Washer	
9	Weather hood	
10	Cover – Vacuum	
11	Lock Washer	
12	Hex Nut	
13	Stud	
14	Gasket – Cover	2
15	Body	
16	Guide Rod – Vacuum	
17	Pallet – Vacuum	
18	Retainer Plate – Vacuum	
19	Diaphragm – Vacuum	1
20	Stem – Vacuum	
21	Hex Nut	
22	Lock Washer	
23	Tubing	
24	Male Connector	

ITEM	DESCRIPTION	NOTE
25	Connector	
26	Weather hood Post	
27	Lock Washer	
28	Hex Nut	
29	Pallet – Pressure	
30	Diaphragm, Pressure Pallet	1
31	Retainer Plate – Pressure	
32	Swivel Fitting	
33	Belleville Washer	
34	Hex Nut	
35	Seal - Guides	1
36	Stem Guide	
37	Washer – Stem Guide	
38	Hex Jam Nut	
39	Bushing	3
40	Set Screw	
41	Stem – Pressure	
42	Screw	
43	Support Plate	
44	Diaphragm	4
45	Screen	
46	Lower Diaphragm Case	
47	Male Connector	

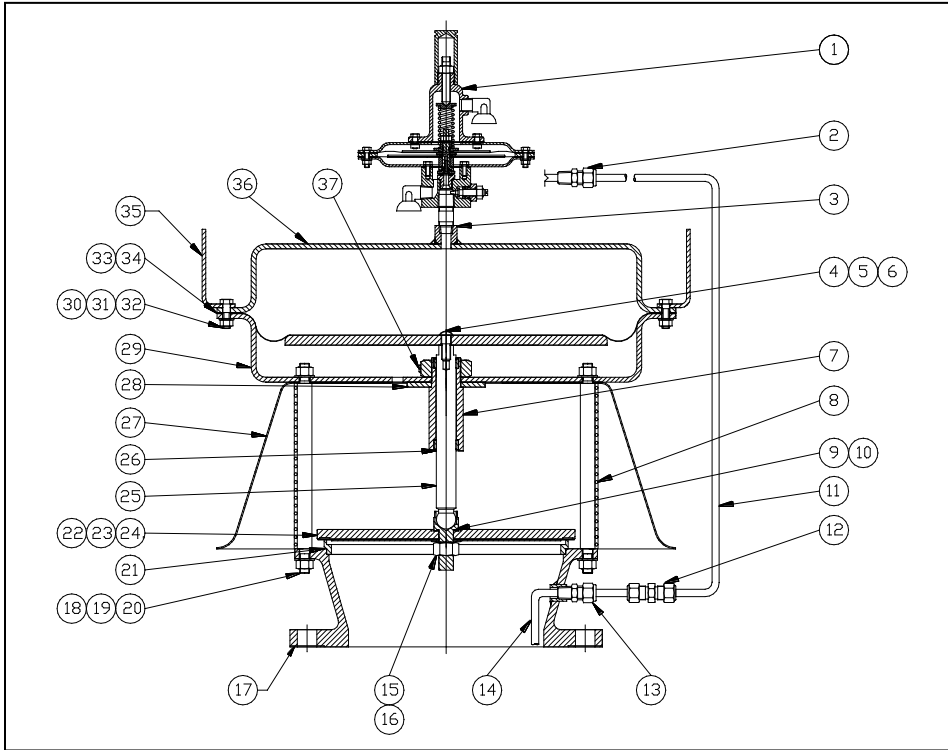
**FIGURE 6: MODEL 1420**



ITEM	DESCRIPTION	NOTE
1	Pilot Valve Assembly	
2	Pipe Nipple	
3	Button Head Cap Screw	
4	Lifting Eye	
5	Support Plate	
6	Diaphragm, Actuator	4
7	Hex Bolt	
8	Lock Washer	
9	Set Screw	
10	Outlet	
11	Stem Guide	
12	Bushing	3
13	Swivel Fitting	
14	Pallet	
15	Gasket	2
16	Vent – Cover	
17	Stud	
18	Lock Washer	
19	Hex Nut	
20	Gasket	2
21	Guide Rod	
22	Stem	
23	Body	
24	Diaphragm – Vacuum Pallet	1
25	Retainer Plate	
26	Seat Ring	
27	Lock Washer	

ITEM	DESCRIPTION	NOTE
28	Hex Nut	
29	Pallet	
30	Seat Ring	
31	Retainer Plate	
32	Hex Nut	
33	Belleville Washer	
34	Male Connector	
35	Stud	
36	Hex Nut	
37	Lock Washer	
38	Union Connector	
39	Tubing	
40	Drain Plug	
41	Diaphragm, Pressure Pallet	1
42	Seal	1
43	Stem	
44	Washer	
45	Gasket	2
46	Lower Diaphragm Case	
47	Gasket, Actuator	4
48	Hex Bolt	
49	Hex Nut	
50	Lock Washer	
51	Upper Diaphragm Case	
52	Hex Jam Nut	
53	Male Connector	

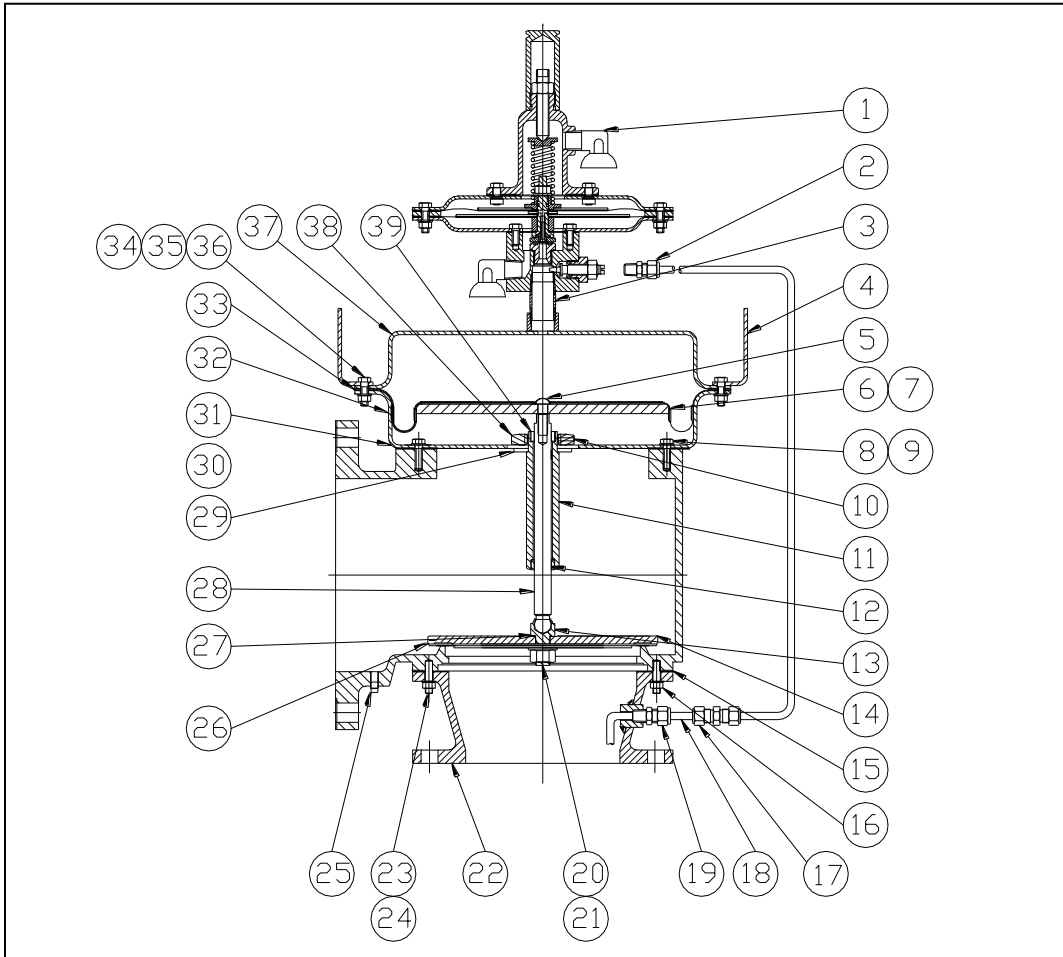
**FIGURE 7: MODEL 1430**



ITEM	DESCRIPTION	NOTE
1	Pilot Valve Assembly	
2	Male Connector	
3	Pipe Nipple	
4	Cap Screw	
5	Support Plate	
6	Hex Jam Nut	
7	Stem Guide	
8	Screen	
9	Seal – Swivel Guide	1
10	Swivel Fitting	
11	Tubing	
12	Union Connector	
13	Male Connector	
14	Pick – up Fitting	
15	Belleville Washer	
16	Hex Nut – Swivel	
17	Inlet	
18	Weather hood Post	
19	Lock Washer	

ITEM	DESCRIPTION	NOTE
20	Hex Nut	
21	Seat Ring	
22	Pallet	
23	Diaphragm, Pressure Pallet	1
24	Retainer Plate	
25	Stem	
26	Bushing – Stem Guide	3
27	Weather hood	
28	Washer – Stem Guide	
29	Lower Actuator Housing	
30	Hex Bolt	
31	Lock Washer	
32	Hex Nut	
33	Diaphragm – Actuator	4
34	Gasket – Actuator	4
35	Lifting Lug	
36	Upper Actuator Housing	
37	Set Screw	

**FIGURE 8: MODEL 1460**



ITEM	DESCRIPTION	NOTE
1	Pilot Valve Assembly	
2	Male Connector	
3	Pipe Nipple	
4	Lifting Eye	
5	Cap Screw	
6	Support Plate	
7	Diaphragm, Actuator	4
8	Hex Bolt	
9	Lock Washer	
10	Set Screw	
11	Stem Guide	
12	Bushing – Guides	3
13	Swivel Fitting	
14	Pallet - Pressure	
15	Gasket	2
16	Lock Washer	
17	Union Connector	
18	Tubing	
19	Male Connector	
20	Hex Nut	

ITEM	DESCRIPTION	NOTE
21	Belleville Washer	
22	Inlet	
23	Stud	
24	Hex Nut	
25	Drain Plug	
26	Diaphragm, Pressure Pallet	1
27	Seal	1
28	Stem	
29	Washer	
30	Outlet	
31	Gasket	2
32	Lower Diaphragm Case	
33	Gasket	2
34	Hex Bolt	
35	Hex Nut	
36	Lock Washer	
37	Upper Diaphragm Case	
38	Hex Jam Nut	
39	Bushing – Guides	3

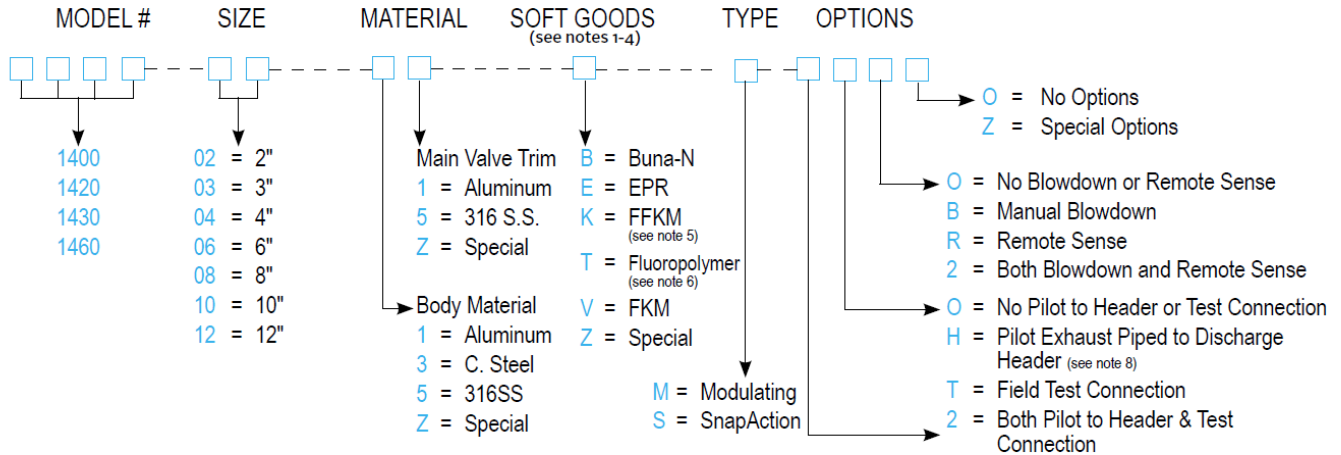
<b>TABLE 6: LUBRICANTS – RECOMMENDATIONS</b>		
<b>FASTENER LOCATION</b>	<b>LUBRICANT – SEALANT</b>	<b>MANUF. &amp; PART NO.</b>
Actuator Fastener	Dry Moly Film	Crown #6080 or equal
Stem Guide	MS2 Lubricant	Fel-Pro [Loctite] #51048 or equivalent
Stem/Swivel Fitting	Silicone Lubricant	Dow Corning #33 or equivalent

**Note:** Lubricant selection must consider process environment.

<b>TABLE 7: TROUBLESHOOTING GUIDE</b>		
<b>PROBLEM</b>	<b>INSPECTION</b>	<b>SUGGESTED CORRECTIVE ACTION</b>
Pilot Valve Leak	Visual or audible	Consult 1401 or 1402 IOM troubleshooting guide.
Main Valve Actuator Leak	Visual or audible	Leakage at the actuator flange may be corrected by tightening the fasteners adjacent to the leak path. If this is not successful, it will be necessary to install a new gasket. Refer to instructions on page 6.
Vapor leakage from the valve body outlet.	Visual or audible	Leakage can occur at the valve body seat - FEP film interface; other leak paths are the swivel seal or a torn actuator diaphragm. After removing the upper actuator housing, lift the pallet assembly off the seat and inspect for damage to the film or foreign debris buildup on the seat or film. Clean or replace the pallet diaphragm as required. Refer to page 6.
Vapor leakage between the valve body and tank nozzle	Visual or audible	Leakage between the flanges may be corrected by tightening the fasteners. Follow mounting instructions listed on page 4. The gasket may have deteriorated due to the chemical environment; replace if required. The tank nozzle may be warped, corroded or scratched. This will require resurfacing of the flange face; note that a flat faced flange is recommended to avoid potential damage to an aluminum valve body.

<b>TABLE 8: ABBREVIATIONS</b>			
ANSI	American National Standards Institute	NPT	National Pipe Thread
API	American Petroleum Institute	POV	Pilot Operated Valve
BOM	Bill of Materials	PSIG	Pounds/Sq. Inch – Gauge
DPHGM	Diaphragm	PTFE	Teflon
FEP	Fluorocarbon Film	SS	Stainless Steel
MAWP	Maximum Allowable Working Pressure	WC	Water Column
MS2	Moly – Disulfide		

The nameplate on the Groth Series 1400 Pilot Operated Valve contains the model number, serial number, set pressure and flow capacity. The model number contains additional information about materials of construction and options. The following chart will assist in relating the model number to the specifications of your pilot operated valve:



- NOTES**
1. See 1660 Brochure for details on 1401E or 1402 Pilot Valves.
  2. Carbon and Stainless Steel Valves include 316 SS Trim.
  3. Diaphragm material for main actuator and pilot valve are only available in Fluoropolymer FEP.
  4. 316 SS Pilot is standard.
  5. FFKM O-Rings; Fluoropolymer FEP Diaphragms and Gaskets.
  6. Fluoropolymer FEP Diaphragms and Gaskets with FKM O-rings.
  7. 1402 Pilot Valve available for modulating service only.
  8. Pilot Exhaust Piped to Discharge Header is not available w/1402 Pilot Valve. Pilot will only exhaust vapors in the dome.

**EXAMPLE**

**1 4 3 0 - 0 6 - 3 5 - V - S - OORO**

**Indicates a 6" Model 1430 with carbon steel body and 316SS trim using FKM soft goods, snap action with remote pilot pickup and no other options.**

**PRODUCT LIMITED WARRANTY**

- A. Seller warrants that products which are manufactured by Seller, are manufactured in accordance with published specifications and free from defects in material and/or workmanship for a period of (12) twelve months. Seller, at its option, will repair or replace any product returned intact to the factory, transportation charges prepaid, which Seller, upon inspection shall determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Seller's warranty.
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- C. The original Manufacturer shall be solely responsible for the design, development, supply, production, and performance of its products hereunder, and the protection of its trade name or names, if any. It assumes no responsibility, for product modified or changed in any way by its agent or customer. Any such modifications or changes to products sold by Seller hereunder shall make the product limited warranty null and void.
- D. The Manufacturer shall be under no obligation to manufacture, sell, or supply, or to continue to manufacture, sell or supply any of the Products.