GL-00073-03
July 15, 1986
Rev. W 01—17—24

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

AUTOMATIC AIR RELEASE VALVES

MODELS			
GRP33—07	GRP33—07A	GRP33—07B	GRP33—07C
GRP33—07D	GRP33—07E	GRP33—07F	GRP33—07G
GRP33—07H	GRP33—07J	GRP33—07K	GRP33—07L
GRP33—07M	GRP33—07N	GRP33—07P	GRP33—07R
GRP33—07S	GRP33—07T		

GORMAN-RUPP PUMPS

www.grpumps.com

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Register your new
Gorman-Rupp pump online at
www.grpumps.com/register.

Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: _____

Serial Number: _____

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INTRODUCTION

Thank You for purchasing a Gorman-Rupp Automatic Air Release Valve. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed **only** after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment **must** be installed and operated according to all national, local and industry standards.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or The Gorman-Rupp Company:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901—1217
Phone: (419) 755—1011
or:
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631—2870

HAZARD AND INSTRUCTION DEFINITIONS

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

DANGER!

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

WARNING!

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.

CAUTION

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

SAFETY — SECTION A

This information applies to Gorman-Rupp Automatic Air Release Valves. Refer to the manual accompanying the pump and power source before attempting to begin operation.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.



Before installing the Automatic Air Release Valve, check the chemical compatibility of the valve components with the liquid being pumped. For applications involving volatile, flammable or corrosive liquids, use a stainless steel valve fitted with an optional fluorocarbon (DuPont Viton® or equivalent) diaphragm (see the Parts Lists in Section E). Misapplication of materials could result in damage to the valve and/or danger to personnel as a result of valve failure.



Before attempting to service the Air Release Valve:

1. **Familiarize yourself with this manual.**
2. **Disconnect or lock out the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump and liquid to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**



If the application involves volatile, corrosive or hazardous liquids, wear protective safety equipment, such as goggles, rubber gloves and apron when servicing the pump or Automatic Air Release Valve.



If the application involves petroleum products such as fuel oil or gasoline, provide adequate ventilation, prohibit smoking, and wear static-resistant clothing and shoes before servicing the Automatic Air Release Valve. Clean up all fuel spills immediately after occurence.



Some leakage (1 to 5 gallons[3,8 to 19 liters] per minute) will occur when the valve is fully closed. Be sure the bleeder line is directed back to the wet well or tank to prevent hazardous spills.



Do not use fingers to move the plunger rod or to check spring compression while the pump is operating. Sudden release of spring tension could pinch fingers or seriously injure personnel.

INSTALLATION — SECTION B

Review all SAFETY information in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect and install the Automatic Air Release Valve. Refer to the literature accompanying the pump or contact the factory for specific pump installation instructions. Refer to **MAINTENANCE AND REPAIR**, Section E in this manual for disassembly and reassembly of the Automatic Air Release Valve.

PREINSTALLATION INSPECTION

The Automatic Air Release Valve was fully assembled and inspected before shipment from the factory. Before installation, inspect the valve for damage which may have occurred during shipment. Check as follows:

a. Inspect the valve for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose attaching hardware at mating surfaces.

c. Check the plunger rod for free movement by compressing the spring with an appropriate tool. Note the color code on the spring for future reference.

d. If the valve has been in stock for over 1 year, re-lubricate the shaft as indicated in **LUBRICATION**, Section E.

AIR RELEASE VALVE INSTALLATION

The Automatic Air Release Valve must be independently mounted in a horizontal position and connected to the discharge line of the self-priming centrifugal pump (see Figure B—1).

NOTE

*If the Air Release Valve is to be installed on a **staged** pump application, contact the factory for specific installation instructions.*

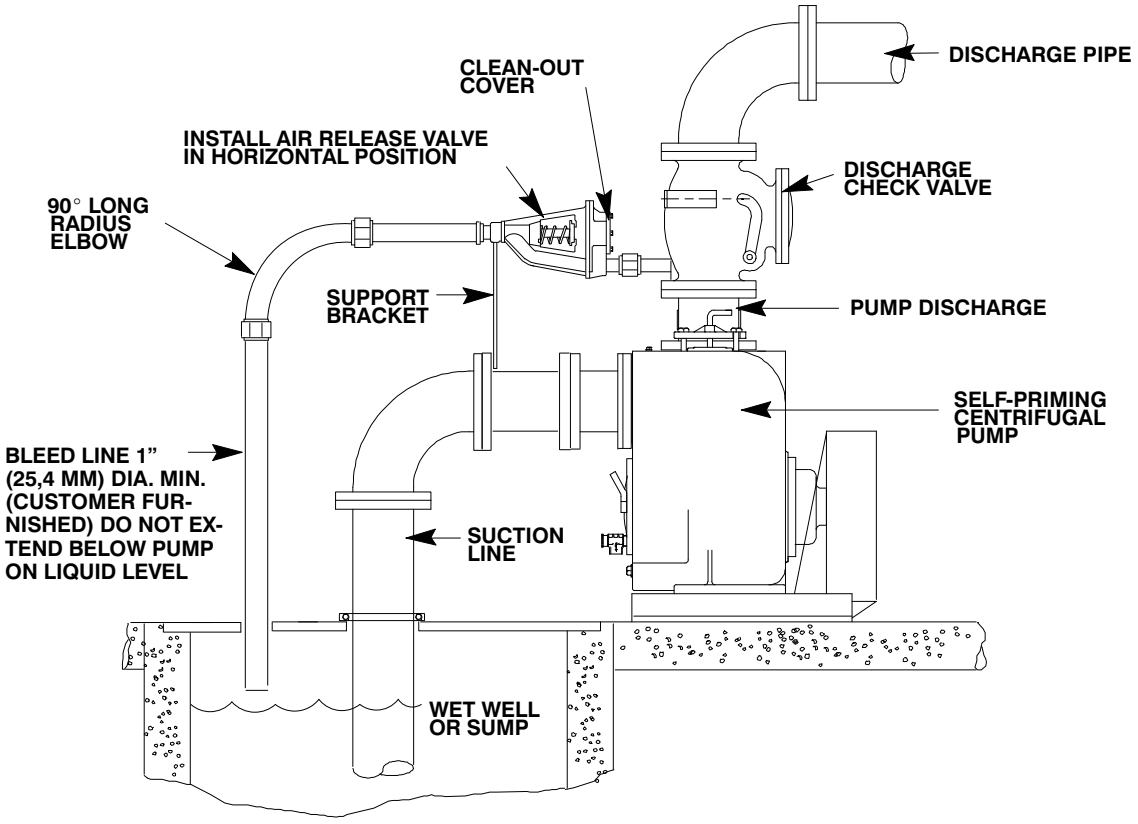


Figure B—1. Typical Automatic Air Release Valve Installation

The valve inlet line must be installed between the pump discharge port and the non-pressurized side of the discharge check valve. The valve inlet is at the large end of the valve body, and is provided with standard 1-inch NPT pipe threads.

The valve outlet is located at the opposite end of the valve, and is also equipped with standard 1-inch NPT pipe threads. The outlet should be connected to a bleed line which slopes back to the wet well or sump. The bleed line must be the same size as the inlet piping, or larger. If **piping** is used for the bleed line, avoid the use of elbows whenever possible.

NOTE

*It is recommended that each Air Release Valve be fitted with an independent bleeder line directed back to the wet well. If multiple Air Release Valves are installed in a system, they **must** be fitted with independent bleeder lines; **never** use a common manifold pipe. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for information about installation of an Automatic Air Release Valve for your specific application.*

If the liquid to be pumped contains large entrained solids, grease or other substances likely to cause clogging, use smooth-bore hose at least one size larger than the outlet. Air and liquid vented during the priming process will agitate the hose, loosening any build-up, greatly reducing the chance of clogging.

CAUTION

A bypass line returned to a wet well could be drawn into the pump suction inlet, which could result in damage to the system. Secure the bypass line to prevent this from occurring.

It is recommended that pipe unions be installed at the valve inlet, and at each 90° elbow to ease disassembly and maintenance. A shut-off valve may be installed before the valve inlet to allow the Air Release Valve to be removed for service while the pump remains in operation.

CAUTION

If the Air Release Valve is installed on a pump with a **flooded suction** (such as a below ground lift station), a pipe union and shut-off valve **must** be installed in the bleed line to eliminate the possibility of flooding the station while servicing the Air Release Valve.

If a manual shut-off valve is installed **anywhere** in the air release piping, **it must be a full-opening, ball-type valve** to prevent plugging by solids.

DANGER!

Any shut-off valve installed in a bypass line must not be left closed during operation. A closed manual shut-off valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

Allow an over-heated pump to completely cool before servicing. Do not remove plates, covers, gauges, or fittings from an over-heated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

OPERATION — SECTION C

THEORY OF OPERATION

Review all SAFETY information in Section A.

A self-priming centrifugal pump **will not prime** if there is sufficient static liquid head to hold the discharge check valve closed. Self-priming pumps are not air compressors. During the priming cycle, air from the suction line must be vented to atmosphere on the discharge side. It is therefore necessary to open the discharge side of the pump to atmospheric pressure and allow the air to bleed off during ther priming cycle. If the bleed line is not closed after the pump is primed, liquid would be forced back to the wet well under the full working pressure of the pump. This wasteful recirculation of liquid is controlled by the Automatic Air Release Valve.

When properly installed and correctly adjusted to the specific hydraulic operating conditions, the Automatic Air Release Valve will permit air to escape, and will close automatically when the pump is fully primed and pumping at full capacity.

Figures C—1 and C—2 show a cross-sectional view of the valve, and a corresponding description of operation.

Air from the pump casing passes through the valve to the wet well during the priming cycle (Figure C—1).

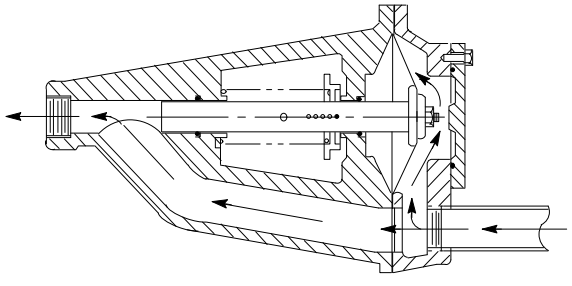


Figure C—1. Valve in Open Position

When the pump is fully primed, pressure resulting from flow against the valve diaphragm compresses the spring and closes the valve (Figure C—2). The valve will remain closed, reducing the bypass of liquid (some leakage will still occur) until the pump loses its prime or stops.

WARNING!

Some leakage will occur when the valve is fully closed. Be sure the bypass line is directed back to the wet well or tank to prevent hazardous spills.

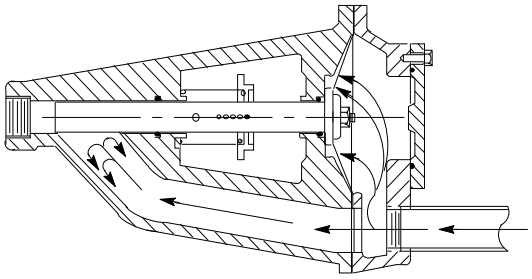


Figure C—2. Valve in Closed Position

When the pump shuts down, the spring returns the diaphragm to its original position. Any solids that may have accumulated in the diaphragm chamber settle to the bottom and are flushed out during the next priming cycle.

NOTE

The valve will remain open until the total dynamic discharge head exceeds the static discharge head. The range of the valve closing pressure is established by the tension rate of the spring as ordered from the factory. Valve closing pressure can be further adjusted to satisfy system requirements by moving the spring retaining pin up or down the plunger rod to increase or decrease tension on the spring. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for additional information.

AIR RELEASE VALVE CONSTRUCTION AND APPLICATION DATA

Refer to the table on page E—1 for Air Release Valve Construction and Application Data

ADJUSTMENT

The valve closing pressure within the ranges indicated in Table E—1 can be adjusted by increasing or decreasing the spring tension on the plunger shaft while the Air Release Valve is in the Open position. This can be accomplished by moving the pin in the spring centering washer either up or down the plunger rod. Five holes are provided for adjusting the spring tension. An optional spring compression tool, G-R part number 48781—003, will ease spring adjustment.

WARNING!

Do not use fingers to move the plunger rod or to check spring compression while the pump is operating. Sudden release of spring tension could pinch fingers or seriously injure personnel.

With the pin located in the hole nearest the diaphragm, the valve will close at the minimum discharge head (pressure) for that particular spring. With the pin located in the hole farthest from the diaphragm, the valve will close at the maximum discharge head (pressure) for that spring. **Adjustment is correct when the valve closes as the discharge check valve opens during pumping.** The valve will stay closed during the pumping cycle unless the pump loses its prime.

Depending on the frequency of operation and the initial spring tension, the valve plunger may eventually stick or operate erratically. If this occurs, remove the inspection plate on the valve cover and check for debris that may be clogging the diaphragm. Refer to **Lubrication** in **MAINTENCNCE AND REPAIR**.

LEAKAGE

All Automatic Air Release Valves have a slight index channel machined into the end of the plunger rod. This index acts as a pressure relief to prevent the valve from becoming hydraulically locked when the pump is shut down. This happens most often in a closed system where the Air Release Valve is isolated in the piping system by suction and discharge flap valves.

The pressure relief index releases the plunger rod by allowing liquid to drain out of the valve and back to the wet well during shutdown. As a result, some leakage will occur during both priming and pump operation. If greater leakage occurs, the valve may not be completely closing (see **ADJUSTMENT** in this section).

TROUBLESHOOTING — SECTION D

Review all SAFETY information in Section A.



Before attempting to service the Air Release Valve:

1. **Familiarize yourself with this manual.**
2. **Lock out or disconnect the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
VALVE FAILS TO CLOSE	Plunger rod needs lubrication.	Lubricate rod as indicated in **LUBRICATION**, Section E.
	Inlet line to valve clogged.	Clean inlet line.
	Spring tension incorrect.	Select spring and/or adjust tension based on discharge head conditions (see Table E—1).
	Pump not producing designed flow capacity or discharge head.	Operate pump at designed speed. Refer to literature accompanying pump.
	Plunger rod movement restricted by debris.	Disassemble and clean valve.
VALVE BODY LEAKS	Rubber diaphragm loose or damaged.	Tighten hardware at body flange or replace diaphragm.
	Worn lip seal or leaking O-ring.	Replace worn parts.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
VALVE FAILS TO OPEN	Plunger rod needs lubrication.	Lubricate rod as indicated in **LUBRICATION**, Section E.
	Bleed line or diaphragm cavity clogged.	Clean bleed line (particularly at 90° elbows). Remove inspection cover and clean diaphragm cavity.
	Valve hydraulically locked.	Introduce air behind suction check valve. Clean index channel at end of plunger rod.
	Spring tension incorrect.	Select spring and adjust tension based on discharge head conditions (See Table E—1).
	Plunger rod movement restricted by debris.	Disassemble and clean valve.

PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

Preventive Maintenance Schedule

Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication — See Mfgr's Literature					

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

MAINTENANCE AND REPAIR — SECTION E

MAINTENANCE AND REPAIR OF THE AUTOMATIC AIR RELEASE VALVE WILL MAINTAIN PEAK OPERATING PERFORMANCE.

VALVE PART NUMBER	C. I. CONSTRUCTION			SST CONSTRUCTION		
	RED SPRING 10# COMP 4-17 FT. DISCH. HEAD	NO PAINT 25# COMP 18-49 FT. DISCH. HEAD	BLACK SPRING 80# COMP 50 FT. + DISCH. HEAD	RED SPRING 10# COMP 4-17 FT. DISCH. HEAD	NO PAINT 25# COMP 18-49 FT. DISCH. HEAD	BLACK SPRING 80# COMP 50 FT. + DISCH. HEAD
GRP33—07		X				
GRP33—07A	X					
GRP33—07B			X			
GRP33—07C					X	
GRP33—07D				X		
GRP33—07E						X
GRP33—07F						X
GRP33—07G						X
GRP33—07H					X	
GRP33—07J			X			
GRP33—07K		X				
GRP33—07L						X
GRP33—07M	X					
GRP33—07N					X	
GRP33—07P		X				
GRP33—07R				X		
GRP33—07S					X	
GRP33—07T				X		

Table E—1. Air Release Valve Construction and Application Data

WARNING!

Before installing the Automatic Air Release Valve, check the chemical compatibility of the valve components with the liquid being pumped. For applications involving volatile, flammable or corrosive liquids, use a stainless steel valve fitted with an optional fluorocarbon (DuPont Viton® or equivalent) diaphragm (see the Parts Lists in Section E). Misapplication of materials could result in damage to the valve and/or danger to personnel as a result of valve failure.

ILLUSTRATION

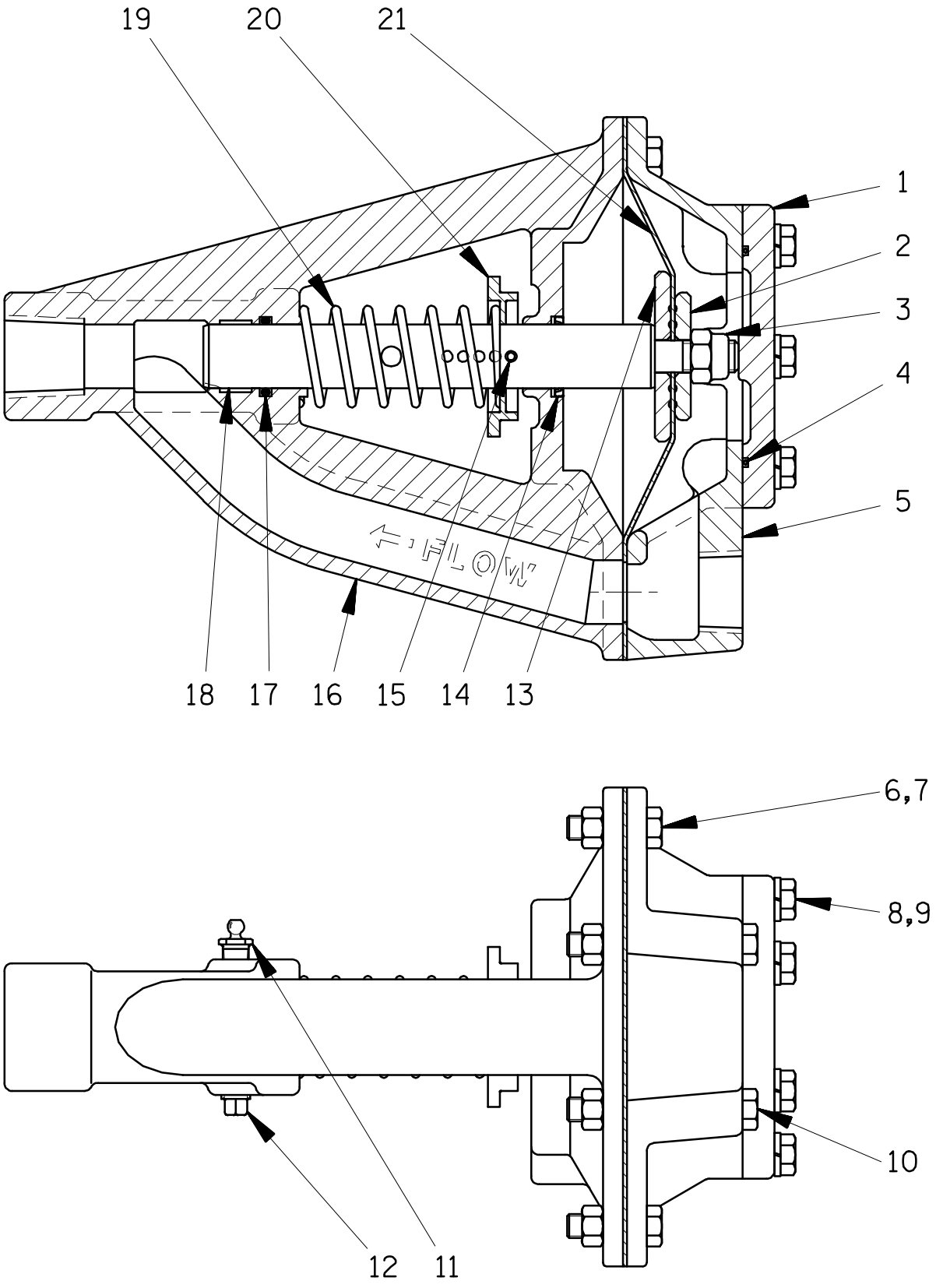


Figure 1. GRP33—07, GRP33—07A, GRP33—07B GRP33—07J, GRP33—07K, GRP33—07M And GRP33—07P Air Release Valves

PARTS LIST

GRP33—07, GRP33—07A And GRP33—07B Air Release Valves

This Parts List Represents Bill of Material Issue 3 For These Valves

GRP33—07J, GRP33—07K, GRP33—07M And GRP33—07P Air Release Valves

This Parts List Represents Bill of Material Issue 1 For These Valves

ITEM NO.		PART NAME	PART NUMBER	QTY
1		INSPECTION COVER	38346—610 10010	1
2		OUTER DIAPHRAGM WASHER	31711—029 17270	1
3	✳	NYLON LOCK NUT	BC08 17000	1
4	✳	GRP33—07, 07A, 07B, 07J, 07M, 07P INSPECTION COVER O-RING	25152—152	1
	✳	GRP33—07K INSPECTION COVER O-RING	25150—412	1
5		VALVE COVER	38346—609 10010	1
6		HEX HD CAPSCREW	B0605 15991	6
7		HEX NUT	DO6 15991	8
8		HEX HD CAPSCREW	B0604 15991	6
9		LOCKWASHER	J06 15991	6
10		HEX HD CAPSCREW	B0611 15991	2
11		GREASE FITTING	S186	1
12		PIPE PLUG	P02 15079	1
13		INNER DIAPHRAGM WASHER	31711—030 15180	1
14	✳	OIL SEAL	25225—025	1
15	✳	SPRING ADJUSTING PIN	21154—709	1
16		VALVE BODY	38344—004 10010	1
17	✳	GRP33-07, GRP33-07A, GRP33-07B O-RING	S816	1
	✳	GRP33-07J, GRP33-07M, GRP33-07P O-RING	25154—214	1
	✳	GRP33—07K O-RING	25150—413	1
18		PLUNGER ROD	31612—001 17038	1
19		GRP33—07A, 07M SPRING (10# COMPRESS)	38571—715 17110	1
		GRP33—07, 07K, 07P SPRING (25# COMP)	38571—610 17110	1
		GRP33—07B, 07J SPRING (80# COMPRES)	38571—717 17110	1
20		SPRING RETAINING WASHER	31514—007 17030	1
21	✳	GRP33—07, 07A, 07B DIAPHRAGM	38676—404 19260	1
	✳	GRP33—07J, 07M, 07P DIAPHRAGM	38676—404 19510	1
	✳	GRP33—07K DIAPHRAGM	38676—404 19570	1
OPTIONAL:				
		SPRING COMPRESSION TOOL	48781—003	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

ILLUSTRATION

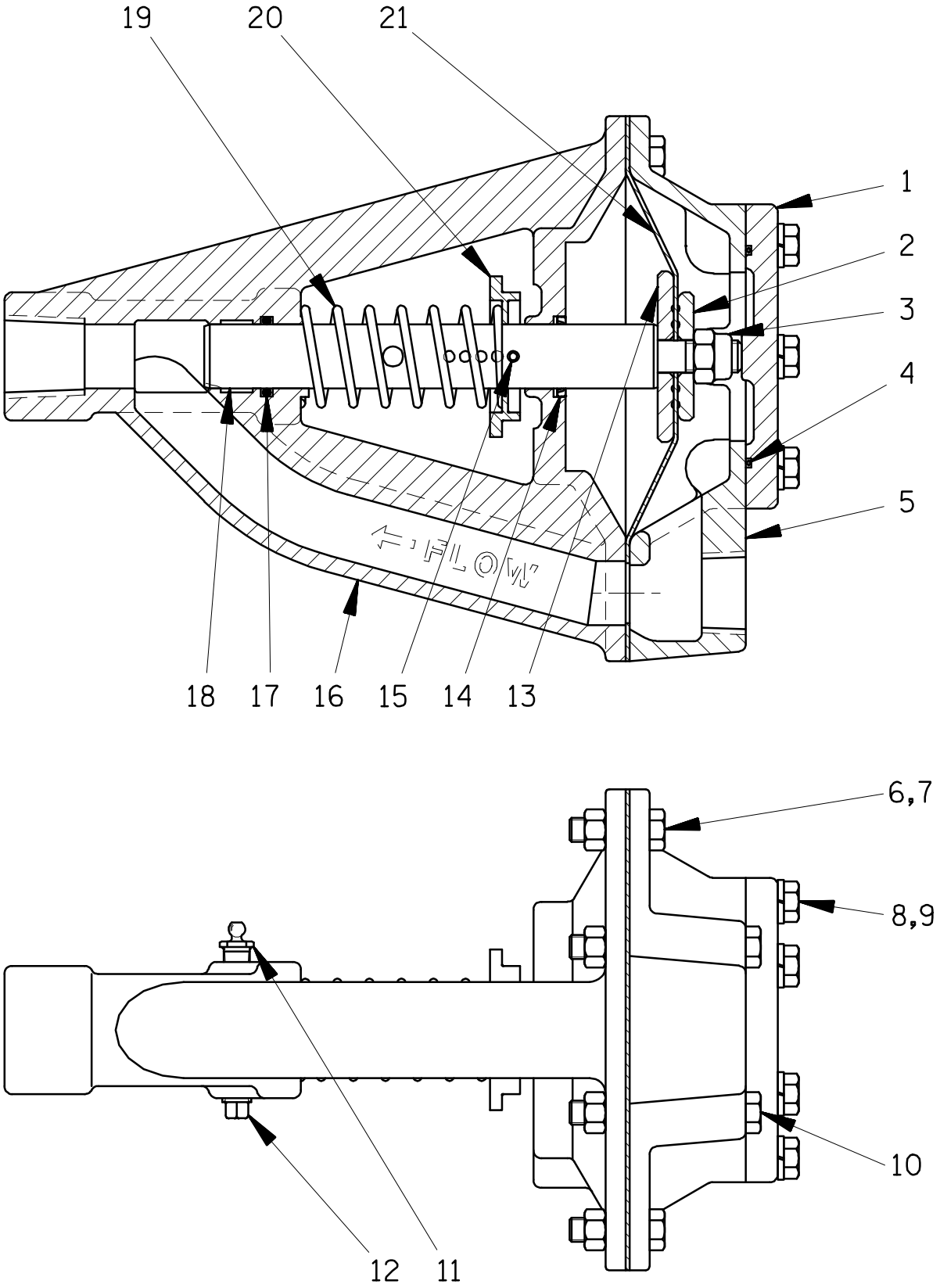


Figure 2. GRP33—07C, GRP33—07D, GRP33—07E And GRP33—07F Air Release Valves

PARTS LIST

GRP33—07C, GRP33—07D, GRP33—07E And GRP33—07F Air Release Valves

This Parts List Represents Bill of Material Issue 2 For These Valves

ITEM NO.		PART NAME	PART NUMBER	QTY
1		INSPECTION COVER	38346—610 17070	1
2		OUTER DIAPHRAGM WASHER	31711—029	1
3	✳	NYLON LOCK NUT	BC08 17040	1
4	✳	INSPECTION COVER O-RING	25152—152	1
5		VALVE COVER	38346—609 17070	1
6		HEX HD CAPSCREW	B0605 17090	6
7		HEX NUT	D06 17090	8
8		HEX HD CAPSCREW	B0604 17090	6
9		LOCKWASHER	J06 17090	6
10		HEX HD CAPSCREW	B0611 17090	2
11		GREASE FITTING	26711—003	1
12		PIPE PLUG	P02 17090	1
13		INNER DIAPHRAGM WASHER	31711—030	1
14	✳	OIL SEAL	25225—025	1
15	✳	SPRING ADJUSTING PIN	21154—709	1
16		VALVE BODY	38344—004 17070	1
17	✳	O-RING	S816	1
18		PLUNGER ROD	31612—001 17048	1
19		GRP33—07D SPRING (10# COMPRESSION)	38571—715 17110	1
		GRP33—07C SPRING (25# COMPRESSION)	38571—610 17110	1
		GRP33—07E, 07F SPRING (80# COMPRES)	38571—717 17110	1
20		SPRING RETAINING WASHER	31514—007 17030	1
21	✳	GRP33—07C, 07D, 07E, 07F DIAPHRAGM	38676—404 19260	1
OPTIONAL:				
		SPRING COMPRESSION TOOL	48781—003	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

ILLUSTRATION

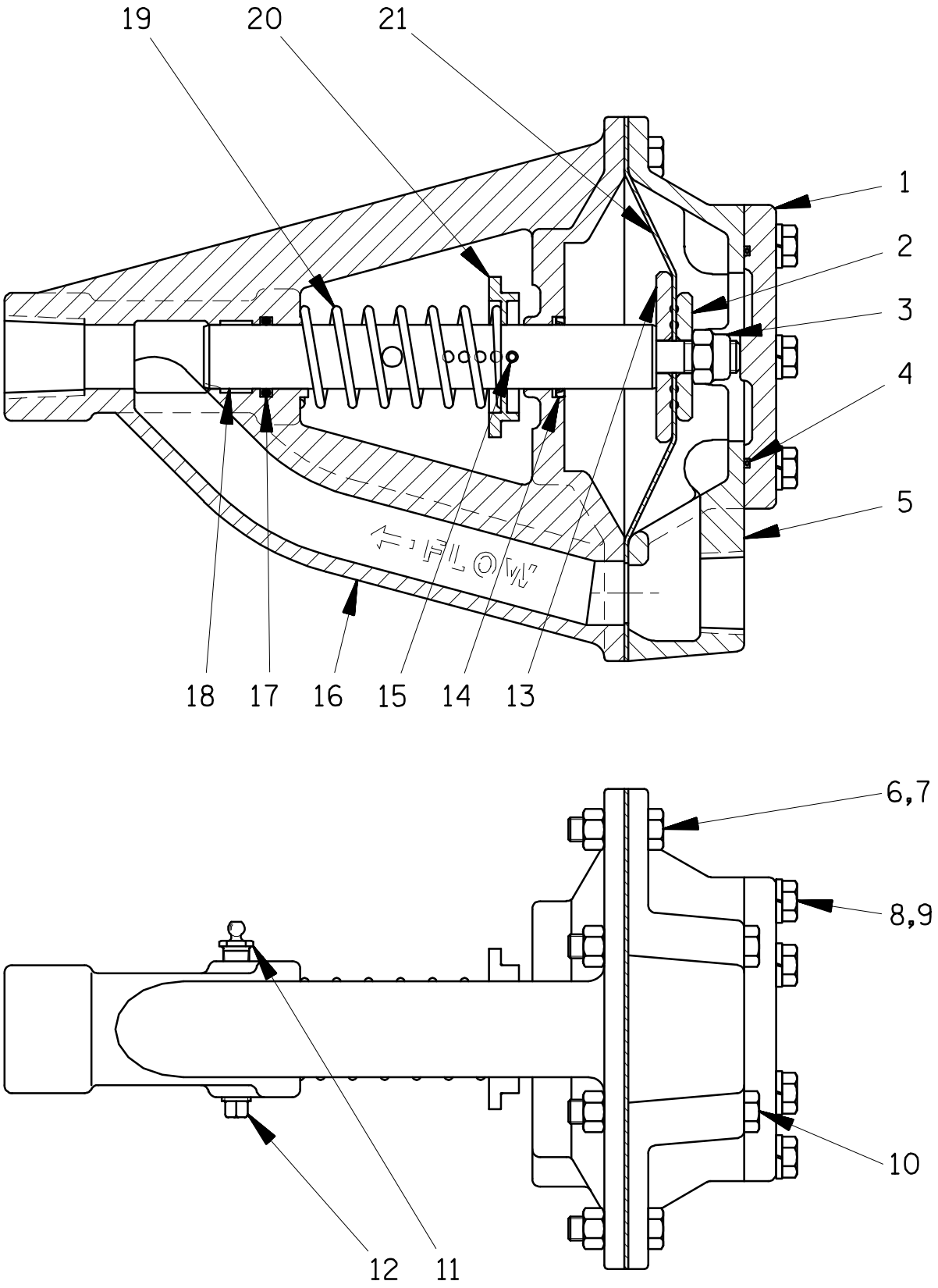


Figure 3. GRP33—07G, GRP33—07H, GRP33—07L, GRP33—07N, GRP33—07R, GRP33—07S AND GRP33—07T Air Release Valves

PARTS LIST
GRP33—07G, GRP33—07H, GRP33—07L, GRP33—07N, GRP33—07R, GRP33—07S And GRP33—07T
Air Release Valves

This Parts List Represents Bill of Material Issue 1 For These Valves

ITEM NO.		PART NAME	PART NUMBER	QTY
1		INSPECTION COVER	38346—610 17070	1
2		OUTER DIAPHRAGM WASHER	31711—029	1
3	✳	NYLON LOCK NUT	BC08 17040	1
4	✳	GRP33—07G, 07H, 07R INSPECT CVR O-RING	25158—658	1
	✳	GRP33—07L, 07N, 07T INSPECT CVR O-RING	25154—152	1
	✳	GRP33—07S INSPECTION COVER O-RING	25150—412	1
5		VALVE COVER	38346—609 17070	1
6		HEX HD CAPSCREW	B0605 17090	6
7		HEX NUT	D06 17090	8
8		HEX HD CAPSCREW	B0604 17090	6
9		LOCKWASHER	J06 17090	6
10		HEX HD CAPSCREW	B0611 17090	2
11		GREASE FITTING	26711—003	1
12		PIPE PLUG	P02 17090	1
13		INNER DIAPHRAGM WASHER	31711—030	1
14	✳	OIL SEAL	25225—025	1
15	✳	SPRING ADJUSTING PIN	21154—709	1
16		VALVE BODY	38344—004 17070	1
17	✳	GRP33—07G, 07H, 07R O-RING	25150—918	1
	✳	GRP33—07L, 07N, 07T O-RING	25154—214	1
	✳	GRP33—07S O-RING	25150—413	1
18		PLUNGER ROD	31612—001 17048	1
19		GRP33—07H, 07N, 07S SPRING (25# COMP)	38571—610 17110	1
		GRP33—07G, 07L SPRING (80# COMP)	38571—717 17110	1
		GRP33—07R, 07T SPRING (10# COMP)	38571—715 17110	1
20		SPRING RETAINING WASHER	31514—007 17030	1
21	✳	GRP33—07G, 07H, 07R DIAPHRAGM	38676—404 19400	1
	✳	GRP33—07L, 07N, 07T DIAPHRAGM	38676—404 19510	1
	✳	GRP33—07S DIAPHRAGM	38676—404 19570	1
NOT SHOWN:				
		CAP PLUG	25141—151	1
OPTIONAL:				
		SPRING COMPRESSION TOOL	48781—003	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

AIR RELEASE VALVE DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Gorman-Rupp Automatic Air Release Valves require little service due to their rugged, minimum-maintenance design. However, if it becomes necessary to replace parts, follow these instructions which are keyed to the sectional views (Figures 1, 2 or 3) and the accompanying parts lists.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor the integrity of the Air Release Valve are compromised by such practices.

Before attempting to service the Air Release Valve, disconnect or lock out the power supply to the pump and take precautions to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

WARNING!

Before attempting to service the Air Release Valve:

1. **Familiarize yourself with this manual.**
2. **Disconnect or lock out the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

DANGER!

If a manual shut-off valve is installed in the bypass line to facilitate service of the Air Release Valve, be sure to open the shut-off valve after servicing the Air Release Valve. A closed manual shut-off valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

Allow an over-heated pump to completely cool before servicing. Do not remove plates, covers, gauges, or fittings from an over-heated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

WARNING!

If the application involves volatile, corrosive or hazardous liquids, wear protective safety equipment, such as goggles, rubber gloves and apron when

servicing the pump or Automatic Air Release Valve.

CAUTION

Use **Only Genuine Gorman—Rupp** replacement parts. Failure to do so may create a hazard and damage the pump or diminish optimal pump performance. Any such hazard, damage or diminished performance is not covered by the warranty.

NOTE

When appropriate recycling facilities are available, the user should recycle components and fluids when doing any routine maintenance / repairs and also at the end of the pump's useful life. All other components and fluids shall be disposed of according to all applicable codes and regulations.

Air Release Valve Disassembly

After all piping system valves have been closed, disengage the hardware (8 and 9) to remove the inspection cover (1) and O-ring (4). If further disassembly is required, disconnect the unions in the inlet and bleed lines, and remove the Air Release Valve from its support bracket.

Move the valve to a clean work area. See Figure 4 and carefully compress the spring (19) using a suitable tool. Use a hammer and drift pin to tap the spring adjusting pin (15) from the plunger rod (18).

WARNING!

Tension applied to the compression spring is great enough to cause serious injury to personnel if the spring should slip and be ejected. Wear safety glasses, use a suitable spring compression tool, ensure that personnel are clear of the work area and use extreme caution when installing or removing springs.

NOTE

An optional spring compression tool (Figure E—4) is available from the factory. To use the tool, turn the capscrews until the ends are just flush with the compressor plate. Lightly compress the spring far enough to allow the compressor plate to be positioned over the spring retaining washer so the ends of both capscrews seat against the valve body. Use the capscrews to jack against the valve body until the spring is compressed enough to remove the spring adjusting pin.

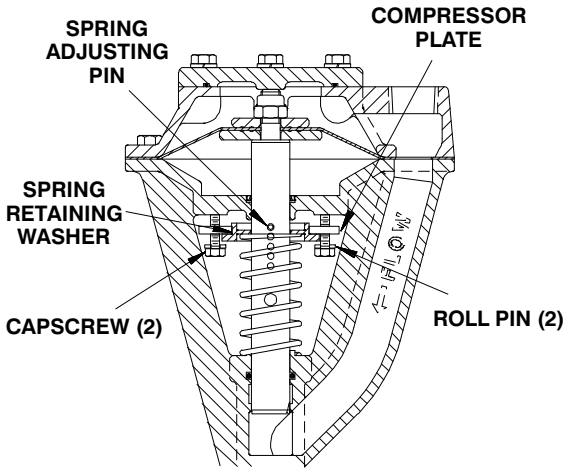


Figure E—4. Spring Compression Tool And Installation

Remove the hardware (6, 7 and 10) and separate the valve cover (5) from the valve body (16). Pull the diaphragm and plunger rod from the valve body as an assembly.

With the plunger rod removed, carefully press laterally against the compression spring until the spring and compression tool can be removed from the valve body.

Inspect the diaphragm (21) for wear or damage. If replacement is required, slide a 5/16—inch diameter rod through the large hole in the shaft to immobilize it, and remove the nylon lock nut (3) and outer diaphragm washer (2). Slide the diaphragm and inner washer (13) off the shaft.

Use a screwdriver or other suitable tool to remove the oil seal (14) from the valve body. Remove the O-ring (17) from the valve body.

Air Release Valve Reassembly

Clean the valve body, plunger rod and all component parts (except the diaphragm, lip seal and O-rings) with a soft cloth soaked in cleaning solvent.

Inspect the parts for wear or damage and replace as necessary.

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Inspect the plunger rod for nicks, scratches or thread damage. Dress small nicks and burrs with a fine file or emery cloth. Replace the plunger rod if required.

Lubricate the O-ring (17) and lip of the oil seal (14) with water-resistant grease (“Lubriplate”, “Parker-O-Lube” or equivalent) and install them in the valve body (16).

Apply a thin coating of silicone sealant (“Loctite No. 30560” or equivalent compound) to the diaphragm seating area on the plunger rod and subassemble the inner diaphragm washer (13) diaphragm(s) (21) and outer diaphragm washer (2) onto the plunger rod. Be sure the diaphragm washers are positioned with the concentric grooves against the diaphragm. Secure the parts with the nylon lock nut (3).

After the diaphragm is installed, lubricate the plunger rod with a small amount of water-resistant grease to ease installation in the valve body.

Install the spring retaining washer (20) on the spring. Position the valve body on a flat surface with the diaphragm opening facing up. Position the free end of the spring over the lower shoulder on the valve body. Compress the spring slightly and press the spring and retaining washer into the valve body opening until the retaining washer seats over the upper shoulder on the valve body and is centered over the plunger rod hole. Use caution not to allow the spring to come off the washer or valve body shoulders.

WARNING!

Tension applied to the compression spring is great enough to cause serious injury to personnel if the spring should slip and be ejected. Wear safety glasses, use a suitable spring compression tool, ensure that personnel are clear of the work area and use extreme caution when installing or removing springs.

Slide the assembled plunger rod and diaphragm down into the valve body, through the oil seal, spring and O-ring. **Be careful** not to roll the lip of the oil seal, or damage the seal or O-ring. **Be sure** the index in the end of the plunger rod faces toward the flow channel opening in the valve body.

NOTE

Some versions of the Air Release Valve were made with an angle at the end of the plunger rod. When installing this type of rod, the point of the angle must be positioned away from the flow channel opening in the valve body.

Use the tool to compress the spring to achieve the desired pressure setting, and install the roll pin (15) Remove the spring compression tool.

Align the ports in the valve body, diaphragm and valve cover (5) and secure with the hardware (6, 7 and 10). Be careful not to pinch or tear the diaphragm.

Install the O-ring (4) and secure the inspection cover (1) with the hardware (8 and 9).

Clean the inlet and bleed line before installing the valve in the piping system. Be sure to position the valve horizontally, and support it with a bracket as shown in **INSTALLATION**, Section B. If the pump was drained, be sure to fill the pump casing with liquid before starting.

Open any valves in the suction and discharge piping. **Be sure** to open the Air Release Valve isolation valve.

DANGER!

If a manual shut-off valve is installed in the bypass line to facilitate service of the Air Release Valve, be sure to open the shut-off valve after servicing the Air Release Valve. A closed manual shut-off valve may cause a pump which has

lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

Lubrication

The plunger rod is sealed with a lip seal (14) under the diaphragm and an O-ring (17) in the valve body. When lubricating the Air Release Valve, apply a generous amount of water-resistant grease ("Lubriplate", "Parker-O-Lube" or equivalent) to the lip seal, O-ring and plunger rod before reassembly.

Under normal conditions, add water-resistant grease through the grease fitting (11) weekly as indicated in the seal lubrication schedule shown in the Preventive Maintenance Schedule, page D—3.

If the valve sticks or operates erratically during normal operation, use a small brush to apply a liberal amount of water-resistant grease to the plunger rod. Apply the lubricant through the spring to the visible part of the shaft while the valve is in both the open and closed positions. This will allow the lubricant to be "dragged" through both seals during operation.

NOTE

A multi-purpose grease may be substituted if water-resistant grease is not available. More frequent lubrication may be required if water-resistant grease is not used.

For Warranty Information, Please Visit
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