Anderson Greenwood™ Type 4142HVV Vacuum Relief Valve

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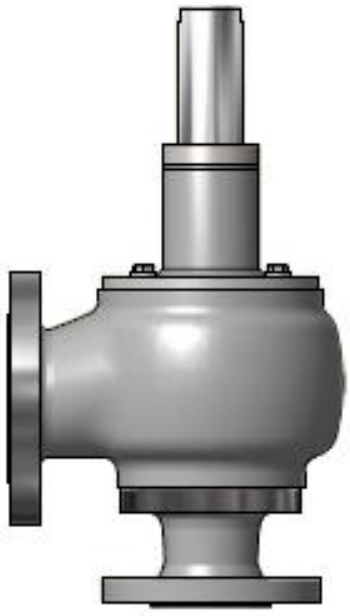

Figure 1. *Type 4142HVV Vacuum Relief Valve*

WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Anderson Greenwood Vacuum Relief Valve must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Pressure Management.

The relief valve must be isolated from tank pressure before servicing. All gas/vapour must be blocked and pressure safety vented. Wear appropriate protective clothing and breathing apparatus if hazardous gas/vapours are present. Use appropriate lifting equipment where required.

Introduction

Scope of the Manual

This manual provides instructions for installation, operation, maintenance and parts ordering of the Type 4142HVV Vacuum Relief Valve (VRV).

Outside North America Only

Specifications

This section lists the specifications for the Type 4142HVV Vacuum Relief Valve. Factory specification is stamped on the nameplate fastened on the Type 4142HVV Vacuum Relief Valve at the factory.

Valve Sizes

2, 3, 4, 6, 8, 10 and 12 in. / DN 50, 80, 100, 150, 200, 250 and 300

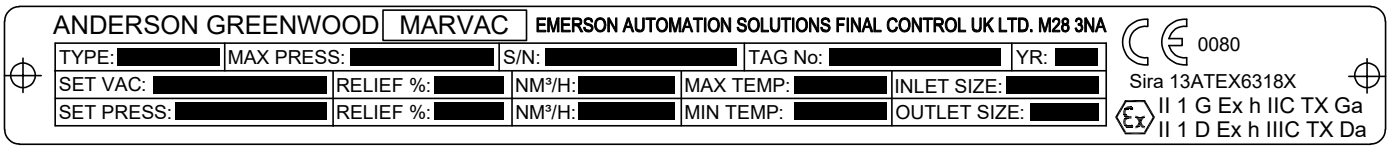

Figure 2. *Type 4040H ATEX Nameplate*

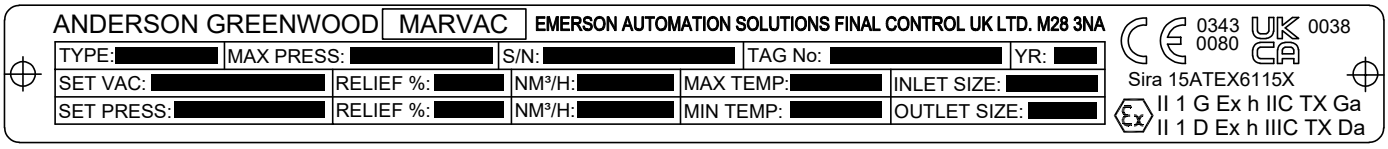

Figure 3. *Type 4040H PED/PED(S)R and ATEX Nameplate*

Product Description

The Anderson Greenwood™ Type 4142HVV VRV is employed in gas/vapour service applications for low pressure storage tanks, vessels or applications requiring vacuum protection with high capacity flow requirements. This product helps to prevent damage to the tank and also prevents the tank's contents from escaping, ensuring the safety of personnel and the surrounding environment.

Vacuum relief valves are designed to limit the maximum vacuum that can exist in a tank due to outflow of the tank contents or due to changes in temperature as a result of environmental conditions.

The Anderson Greenwood Type 4142HVV VRV consists of a flanged tank connection and a vacuum seat. The vacuum inlet is also supplied with a flanged connection to enable an alternative pressure source to be used to fill the tank for applications where the contents of the tank cannot come into contact with normal air.

- For ease of maintenance the vacuum seat is removable.
- PTFE coated internals are supplied as an all-weather option.

Principle of Operation

The Anderson Greenwood Type 4142HVV VRV is a direct acting vent valve with a spring-loaded pallet to keep the valve closed. When tank vacuum acting on the seat sealing area equals the opposing force acting on the pallet, the valve is on the threshold of opening. Any further increase in vacuum will cause the vacuum pallet to lift allowing either atmospheric air or a connected gas supply to be drawn into the tank (inbreathing).

In order for the valve to open and achieve its design lift, an increase in vacuum will be required. The Type 4142HVV VRV has been designed to achieve this design lift and rated capacity within 10% increase in vacuum over the set vacuum. Vacuum settings are adjusted by altering the compression on the vacuum setting spring.

Outside North America Only

Vacuum Setting

CAUTION

Care must be taken to identify correctly the flange connection for mounting the valve on the tank. If the valve is mounted incorrectly, it will not provide any vacuum protection.

If the vacuum setting is to be verified prior to installation, it is recommended that a test rig with a suitable accumulator be used having the following general features:

- Observed vacuum shall be measured in the accumulator tank.
- The flange on which the valve is mounted shall be level.
- The valve should be tested using clean air or nitrogen.

Remove valve from shipping container and remove all packaging. Check that the vacuum setting, the rated capacity and other details on the nameplate are correct.

Vacuum Setting Verification

For verification of the vacuum setting, the flow rate out of the accumulator should be limited such that when the vacuum setting is reached, the point at which atmospheric pressure is admitted to the accumulator can be observed.

1. Ensure that the test rig is clean and fasten the valve securely to the test flange.
2. Check nameplate for required vacuum setting.
3. Establish a steady flow out of the test vessel to increase the inlet vacuum slowly. The adjusted vacuum setting is the vacuum at which no further rise is observed. Repeat a further two times to ensure repeatability.

Vacuum Setting Adjustment (see Figure 6)

The valve has been factory set to the required setting, however if it is necessary to make vacuum setting adjustment this can be done as follows:

1. Remove cap (key V21) and release locknut (key V19).
2. The vacuum setting can be increased or reduced using adjusting screw (key V17). Turning clockwise will increase vacuum setting and anticlockwise will decrease vacuum setting. After adjustment, secure adjusting screw using locknut (key V19), ensure cap gasket (key V20) is in place and refit cap (key V21).
3. Repeat vacuum setting verification and repeat adjustment if required.

Installation

WARNING

Personal injury, property damage, equipment damage or leakage due to escaping steam or bursting of pressure containing parts may result if this equipment is over pressured or is installed where service conditions could exceed the limits given in the specifications or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting device.

The mating connection to the tank should be flat machined vertical flange (the Type 4142HVV is designed for side mounting on tank outer wall) and should be thoroughly cleaned to remove all foreign matter which could lead to valve leakage if trapped between the valve seat and the pallet. The bore diameter of the tank connection nozzle should be at least equal to the bore of the valve connection. For correct valve operation there shall be no external loads applied to the valve body.

A gasket should be fitted to the mating flange ensuring it does not obstruct the flow path and install the valve. Ensure that the main axis of the valve is perpendicular. Flange bolting should be tightened uniformly to ensure a good seal.

For valves of aluminium construction, appropriate flat face flanges should be used and a full face gasket fitted.

Note

Storage tank piping configurations should conform to recognised standards. Different configurations should be taken into consideration when sizing the valve for the application.

Any pipework connected to the vacuum inlet should be adequately supported to prevent any loads being applied to the valve body and should have proper drainage to prevent accumulation of liquids.

It is recommended that the external surfaces of carbon steel valves are painted immediately after installation.

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Valve Refurbishment

With valve in component parts thoroughly clean all surfaces with a suitable solvent and check for wear, corrosion or other forms of damage. Particular attention should be given to the sealing face of the valve seat.

Slight damage can be removed by lapping the seat face (removing guide or vacuum posts); however, care should be taken not to increase the width of the seat face beyond those given in Table 1. If successive refurbishments or severe damage requires the seat to be re-machined, consult the factory for approved dimensions.Discard and replace any damaged parts plus all soft goods including:

- O-rings
- Diaphragm
- Gaskets
- Skid Ring (if fitted)

Also discard and replace the pallet disc. See Table 2 for replacement parts.

Testing Set Vacuum

The vacuum setting should be checked and if necessary adjusted as described.

Maintenance

⚠ WARNING

The relief valve must be isolated from tank pressure before servicing or removing. All gas/vapor must be blocked and pressure safely vented. Wear appropriate protective clothing and breathing apparatus if hazardous gas/vapors are present.

Regular inspection should be carried out to ensure that the vacuum port is free from debris and that nothing preventing the correct operation of the valve is present. Maintenance should be performed at regular intervals and should be carried out by suitably qualified personnel in an appropriately equipped workshop. Alternatively, the valve should be returned to the manufacturer or suitably authorised agent for service/repair. During transport to the workshop the valve should be kept vertical to prevent damage to the internals.

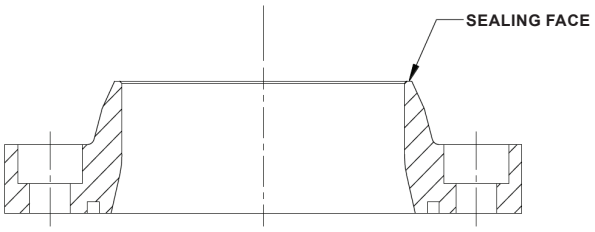

Figure 4. *Sealing Face of Valve Seat*

Table 1. *Seat Lap Band Widths*

VALVE SIZE, in. / DN	NOMINAL WIDTH, in. / mm	MAXIMUM WIDTH, in. / mm
2 / 50	0.039 / 1	0.059 / 1.5
3 / 80	0.039 / 1	0.059 / 1.5
4 / 100	0.047 / 1.2	0.071 / 1.8
6 / 150	0.059 / 1.5	0.071 / 1.8
8 / 200	0.059 / 1.5	0.087 / 2.2
10 / 250	0.079 / 2	0.12 / 3
12 / 300	0.079 / 2	0.12 / 3

Valve Disassembly (see Figure 6)

Before the valve is disassembled it should be thoroughly cleaned to remove potential hazards from process contamination.

1. Remove cap (key V21), cap gasket (key V20) and release locknut (key V19). Remove all load from spring by removing adjusting screw (key V17) complete with locknut. Remove hex set screws (key V10), washers (key V9), casing (key V2) and O-ring (key V8).
2. Remove upper spring end plate (key V16). For valves 6 in. / DN 150 and larger, recover skid ring (key V18) which is fitted between the adjusting screw and upper spring plate. Remove spring (key V15) and stem (key V14) complete with lower spring plate (key V13). Remove shroud (key V5), ball (key V12) then lift out pallet assembly (key V11).
3. Remove seat (key V3) complete with guide posts (key V4) by removing cap screws (key V6). This will separate the upper body (key V1) from the inlet (key V22), (ensure upper body is adequately supported when the two bodies are separated). Remove body gasket (key V23) and O-ring (key V7).

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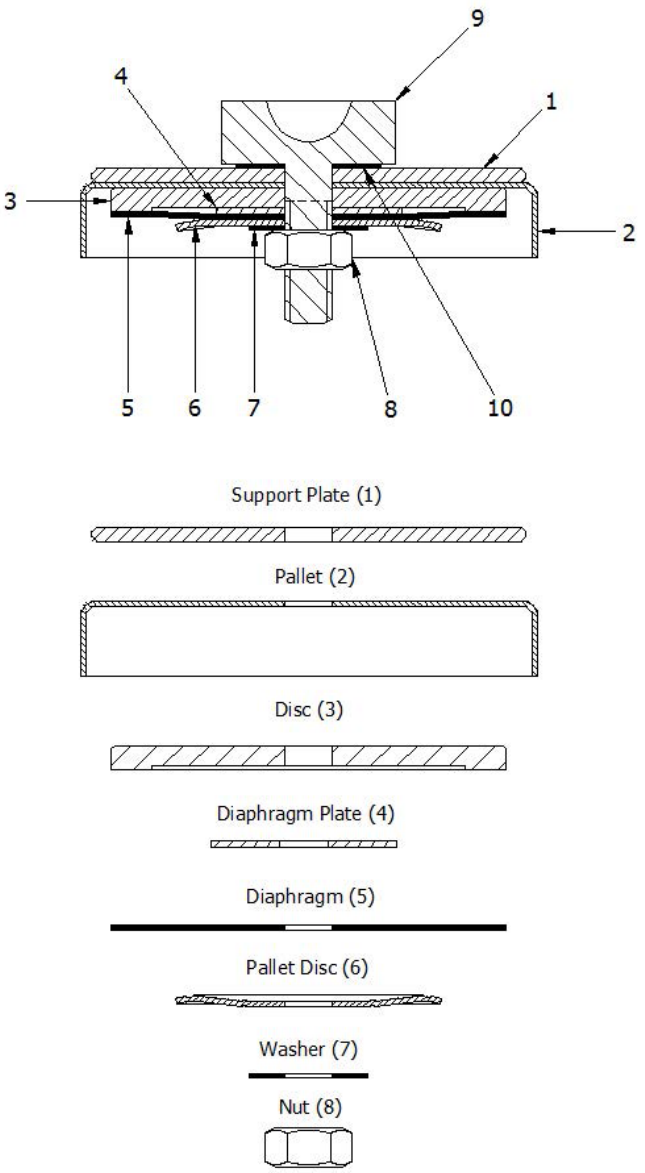

NOTE: WASHER ITEM (KEY 7) NOT FITTED TO 2 AND 3 IN. / DN 50 AND 80 SIZES

***Figure 5**. Pallet Assembly*

Pallet Disassembly (see Figure 5)

1. Remove nut (key 8) and washer(key 7), where used to release pivot point (key 9) from assembly.
2. Separate pallet disc (key 6), diaphragm (key 5), diaphragm plate (key 4), disc (key 3), pallet (key 2) and support plate (key 1). Remove pivot point gasket (key 10)

Pallet Re-assembly (see Figure 5)

Assemble pivot point gasket (key 10), support plate (key 1), pallet (key 2), disc (key 3), diaphragm plate (key 4), diaphragm (key 5), and pallet disc (key 6), to pivot point (key 9) and secure using washer if fitted (key 7) and nut (key 8).

If required, PTFE tape can be applied to stem threads and locking compound used to secure the nut.

Valve Re-assembly (see Figure 6)

1. Reassemble guide posts (key V4) (if removed), and O-ring (key V7) to seat (key V3). Fit gasket (key V23) between upper body (key V1) and inlet (key V22); secure seat and upper body to inlet using cap screws (key V6) ensuring that O-ring is not dislodged during assembly.
2. Reinstall pallet ensuring it slides easily between the guide posts (key V4). Place ball (key V12) in socket of pivot point (key 9).
3. Assemble shroud (key V5) over guide posts (key V4) then assemble stem (key V14) complete with bottom spring plate (key V13), to locate on ball (key V12). Assemble spring (key V15), and top spring plate (key V16). For valves 6 in. DN 150 and larger, fit skid ring (key V18) in recess of top spring plate.
4. Assemble casing O-ring (key V8) to casing (key V2) and assemble over stem (key V14) securing with washers (key V9) and hex set screws (key V10). Assemble adjusting screw (key V17) over stem and screw into casing. Apply nominal load to spring and secure using locknut (key V19). Assemble cap gasket (key V20) and cap (key V21).

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Table 2. *Replacement Parts*

DESCRIPTION	USAGE	MATERIAL	NOMINAL SIZE, in. / DN						
			2 / 50	3 / 80	4 / 100	6 / 150	8 / 200	10 / 250	12 / 300
Pallet Disc	Pallet Assembly	Stainless Steel	11182941	11182943	11182945	11182946	11183009	11183092	11183133
Diaphragm	< 200 mbar	PTFE	11281485	11280622	11281490	11281493	11281496	11281498	11281500
	> 200 mbar	PTFE	11281489	11280624	11281492	11281495	11281497	11280837	11281502
Gasket	Body	General Service Gasket	11182947	11182948	11182949	11182247	11183010	11183093	11183134
	Pivot Point		11272778			11405355	11272733		
	Cap		11411641			11411646		11411649	
O-ring	Seat	Viton®	11183351	11183354	11183320	11180110	11183326	11182024	11180089
		Nitrile	11183350	11183353	11183319	11180109	11183325	11182023	11180088
		PTFE	11183349	11183352	11183318	11180108	11183324	11182022	11180087
	Cover	Viton®	11183314	11183317	11183323	11183326	11183334	11183337	11183340
		Nitrile	11183313	11183316	11183322	11183325	11183333	11183336	11183339
		PTFE	11183312	11183315	11183321	11183324	11183332	11183335	11183338
Skid Ring	- - - -	PTFE	- - - -			11405352	11272734	11275612	

Parts Ordering

When corresponding with your local Sales Office about this vacuum relief valve, include the type number, serial number and other information stamped on the nameplate.

When ordering replacement parts, reference the key number of each needed part and specify the eleven character part number as found in the following parts list.

Parts List

Key	Description
V1	Body
V2	Casing
V3	Seat
V4	Guide Post
V5	Shroud
V6	Cap Screw
V7	Seat O-ring
V8	Casing O-ring
V9	Casing Washer
V10	Casing Hex Set Screw
V11	Pallet Assembly
V12	Ball
V13	Lower Spring Plate
V14	Stem
V15	Compression Spring
V16	Upper Spring Plate
V17	Adjusting Screw
V18	Skid Ring (6 in. / DN 150 and larger)
V19	Locknut
V20	Cap Gasket
V21	Cap
V22	Inlet
V23	Body Gasket

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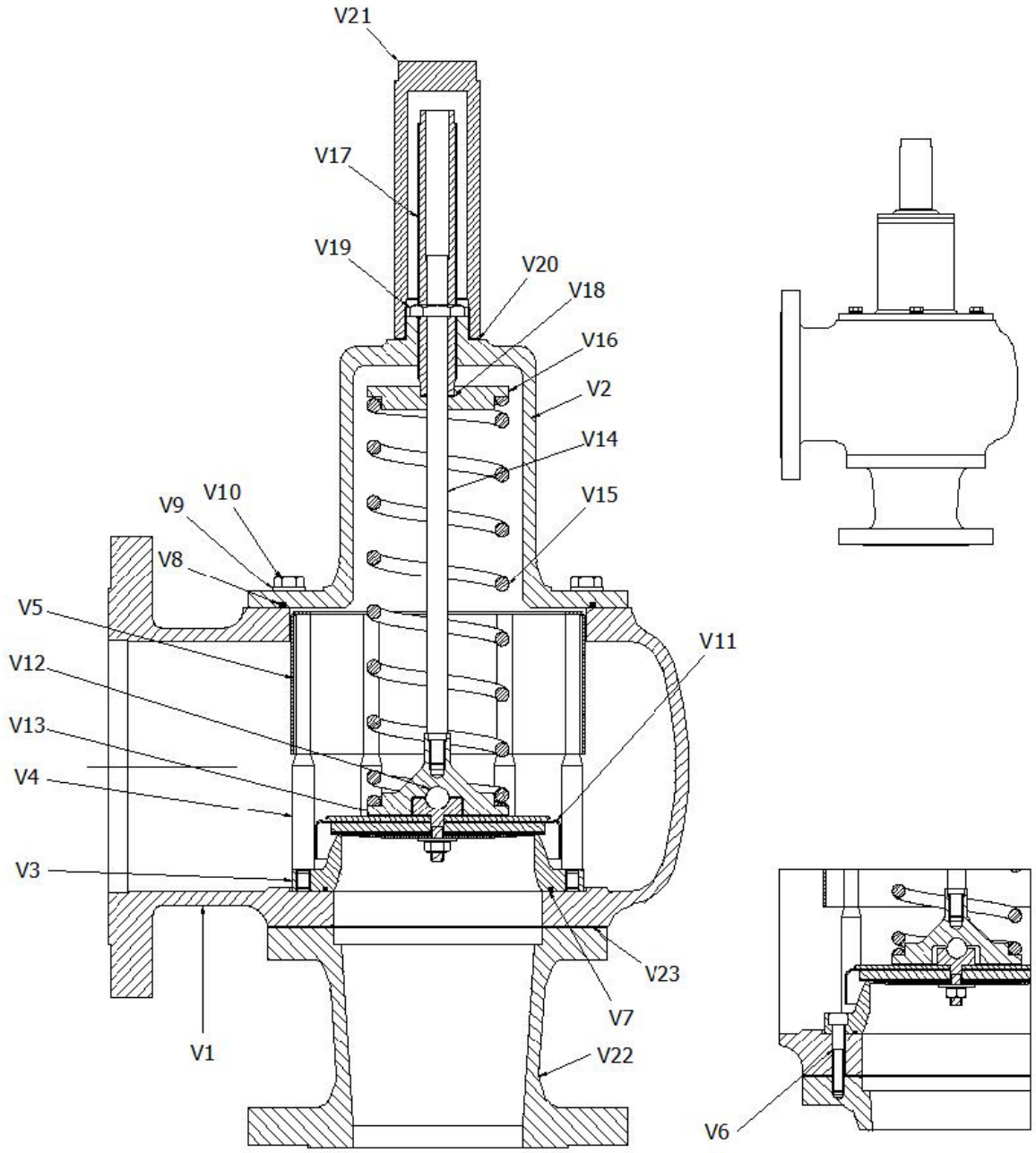

Figure 6. *Type 4142HVV Valve Assembly*

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Type 4142HVV

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