

Troubleshooting and Repair:

English	13-15
Français	N/A
Deutsch	N/A
Italiano	N/A
Español	N/A
Nederlands	N/A

Português	N/A
Suomalainen	N/A
Norsk	N/A
Svensk	N/A
中文	N/A
日本語	N/A

To Protect Your Warranty, Use Only Enerpac Hydraulic Oil.

Enerpac recommends that all kit components be installed to insure optimum performance of the repaired product.

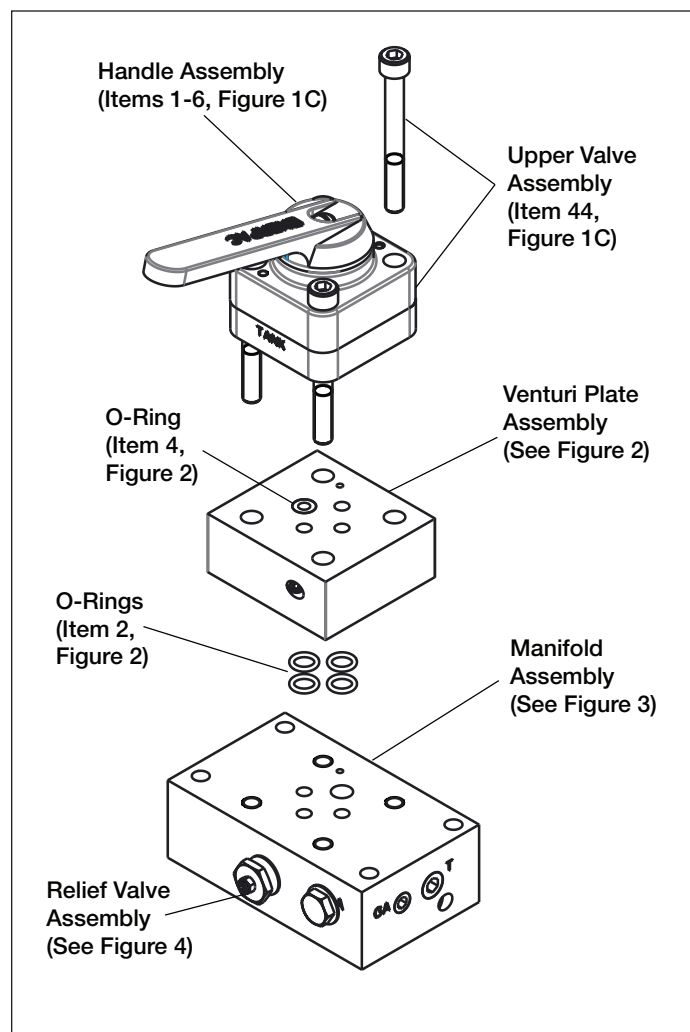


Figure 1A, Manual Valve Components, VM33VAC

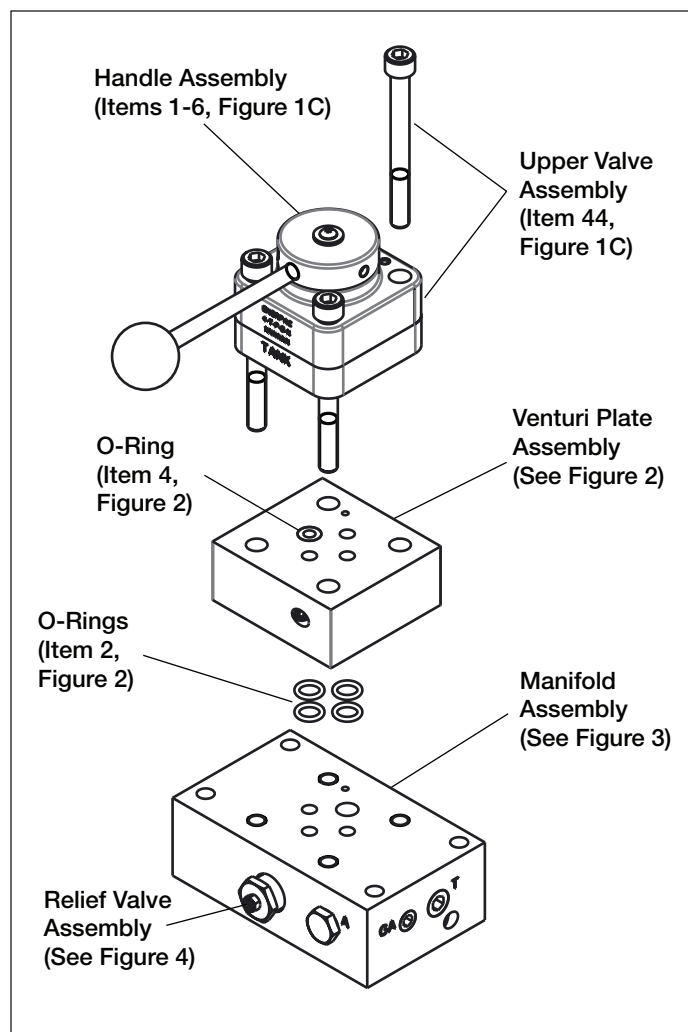


Figure 1B, Manual Valve Components, VM33MVAC

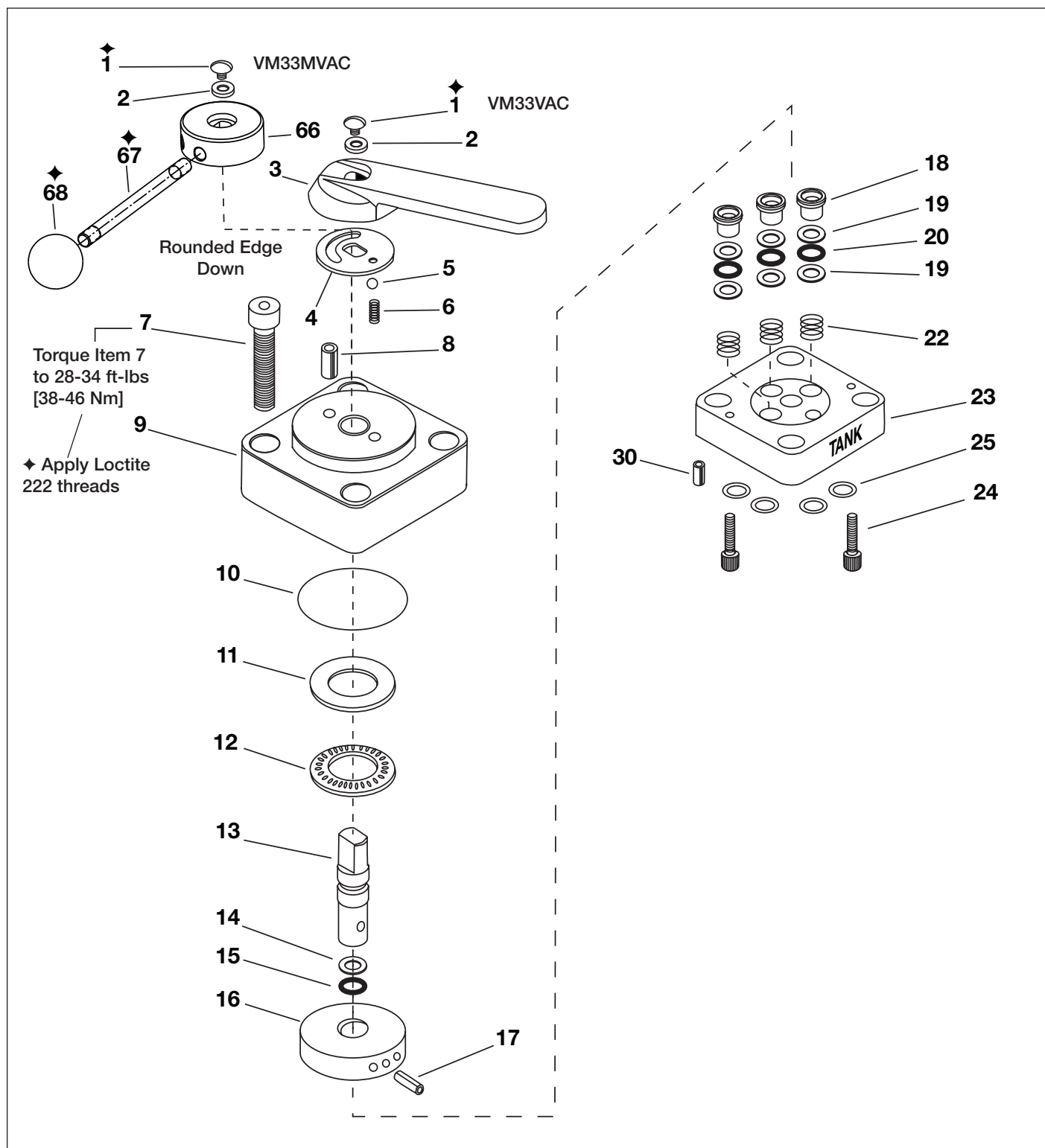


Figure 1C, Upper Manual Valve Assembly, VM33VAC and VM33MVAC

Repair Parts List for Figure 1C			
Item	Part Number	Qty.	Description
1	★ A8076048	1	Screw
2	★ B1086108	1	Washer
3	Y325070	1	Handle
4	A8005071	1	Disc
5	▲★ B1006016	1	7/32" Dia. Ball
6	▲★ A8039110	1	Spring
7	CBE1037028-1A	4	SHCS (VM33VAC, VM33MVAC)
8	★ B1126057	1	Roll Pin
9	CB3244001	1	Valve Cap
10	★◆● B1269503	1	O-Ring
11	CB327101	1	Bearing Plate
12	CB328281	1	Bearing
13	CH536104	1	Shaft
14	★ B1012564	1	Backup Ring
15	★ B1007503	1	O-Ring
16	CH538950SR	1	Disc Assembly (Valve code begins with 3O)
	CH541950SR	1	Disc Assembly (Valve code begins with 3C)
17	★ B1109057	1	Roll Pin
18	◆ DA9560041	3	Metal Seal
19	★◆ B1011564	6	Backup Washer
20	★◆ B1006503	3	O-Ring
22	★◆● CB28110	3	Spring
23	CH539190	1	Body
24	B1326028	2	SHCS
25	★ B1111803	4	O-Ring
27	DC6171950SR	1	Manifold Assembly, VM33VAC & VM33MVAC (see Figure 3)
30	B1051057	1	Pin, Locating
44	I CB317900SR	1	Upper Valve Assembly (VM33VAC & VM33MVAC)
66	▲ DC7246489	1	Handle Cap
67	▲ DC7304157	1	Lever
68	▲ DC7288147	1	Knob
★ Items included in Repair Kit VM4K3. Items not sold separately. ◆ Items included in Repair Kit DA9560041SR. Items not sold separately. ● Items included in Repair Kit DC7250041SR. Items not sold separately. ▲ Items included in Repair Kit VMMK. Items not sold separately. I Includes items 9-20 and 22-25.			

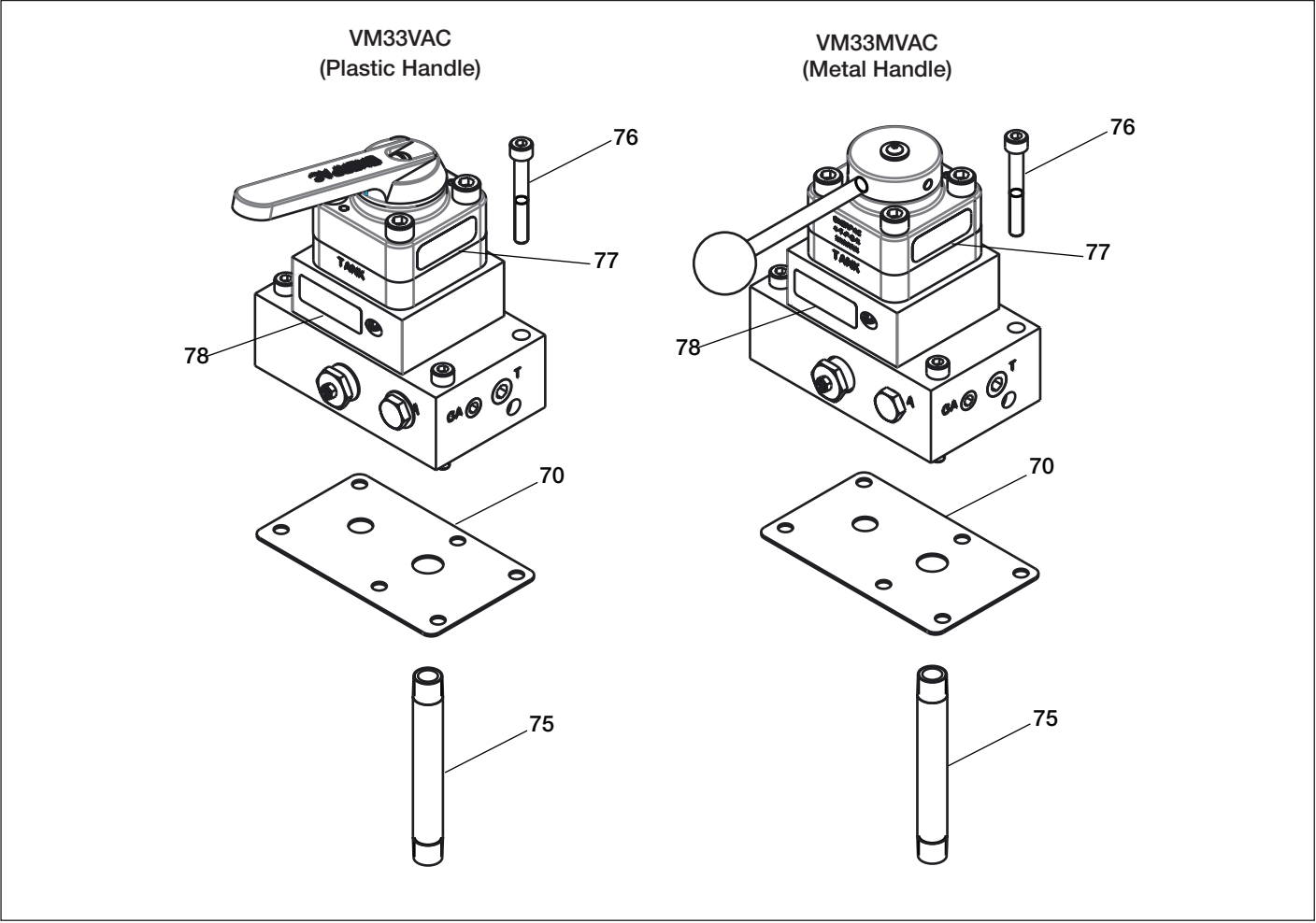
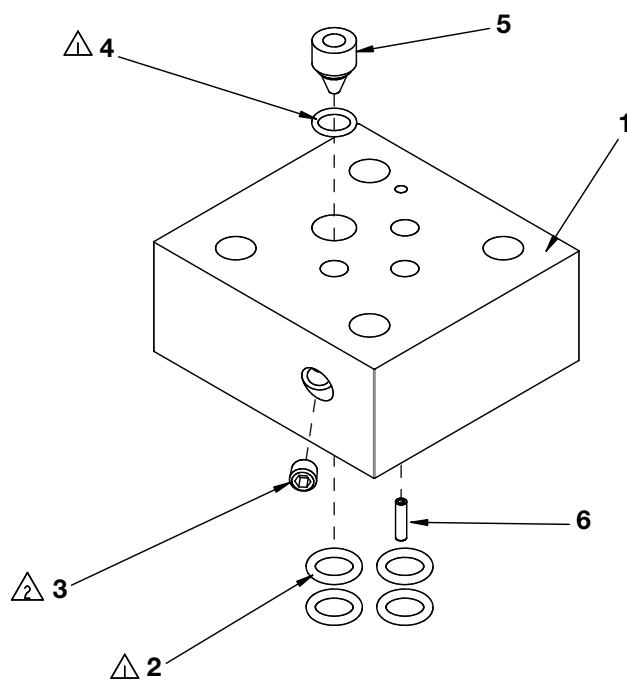


Figure 1D, Manual Valve Mounting Arrangement, VM33VAC and VM33MVAC

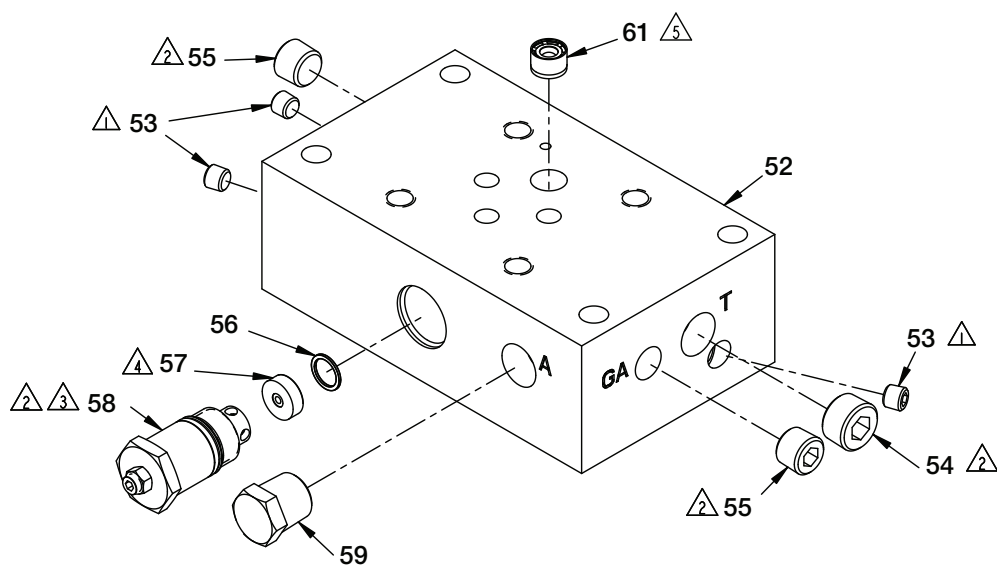
Repair Parts List for Figure 1D			
Item	Part Number	Qty.	Description
70	DC9356037	1	Gasket
75	DC2749768	1	Return Pipe
76	CBE837028-1A	4	SHCS
77	DC7868026	1	Decal, Valve (VM33VAC, VM33MVAC)
78	DD6801026	1	Decal, Warning



-  Lubricate all seals and mating surfaces with grease prior to assembly.
 Torque to 10-12 ft-lbs [14-16 Nm].

Figure 2, Venturi Plate Assembly, VM33VAC and VM33MVAC

Repair Parts List for Figure 2			
Item	Part Number	Qty.	Description
1	★ DC7850190	1	Venturi Plate
2	★ B1111803	4	O-Ring
3	★ DC6792249	1	Plug
4	★ B1007503	1	O-Ring
5	★ DD6612828	1	Nozzle
6	★ B1051057	1	Spring Pin
★ Items included in Repair Kit VUV6MSR.			



- Torque to 10-12 ft-lbs [14-16 Nm].
- Torque to 32-39 ft-lbs [43-53 Nm].
- Lubricate all seals and mating surfaces with grease prior to assembly.
- Coin ball seat at 80-100 psi [5.5-6.8 bar], using a 10-ton press. Use ball #B1003.016 to coin, then discard.
- Press seat of check valve (Item 61) into manifold (Item 52) to 1000 psi $\pm$ 100 psi [$\pm$ 6.8 bar] using a 10-ton press. Install ball #B1007.016 and coin ball seat to 190-200 psi [13-13.7 bar]. Install retaining ring #DC5134.549. Make sure ring is installed in groove of seat.

Figure 3, Port Manifold Assembly, DC6171950SR, VM33VAC and VM33MVAC

Repair Parts List for Figure 3			
Item	Part Number	Qty.	Description
52	★ DC6323038	1	Manifold
53	★ DC6792245	3	Flush Plug 1/16"
54	★ DC6795245	1	Flush Plug 3/8"
55	★ DC6794245	2	Flush Plug 1/4"
56	★ P20037	1	Gasket
57	★ DC5124290	1	Seat
58	★ DC5139900SR	1	Relief Valve Assembly (See Figure 4)
59	★ R515245-2	1	Plug
61	★ DC5140900	1	Check Valve (See Figure 5)
★ Items included in Repair Kit DC6171950SR.			

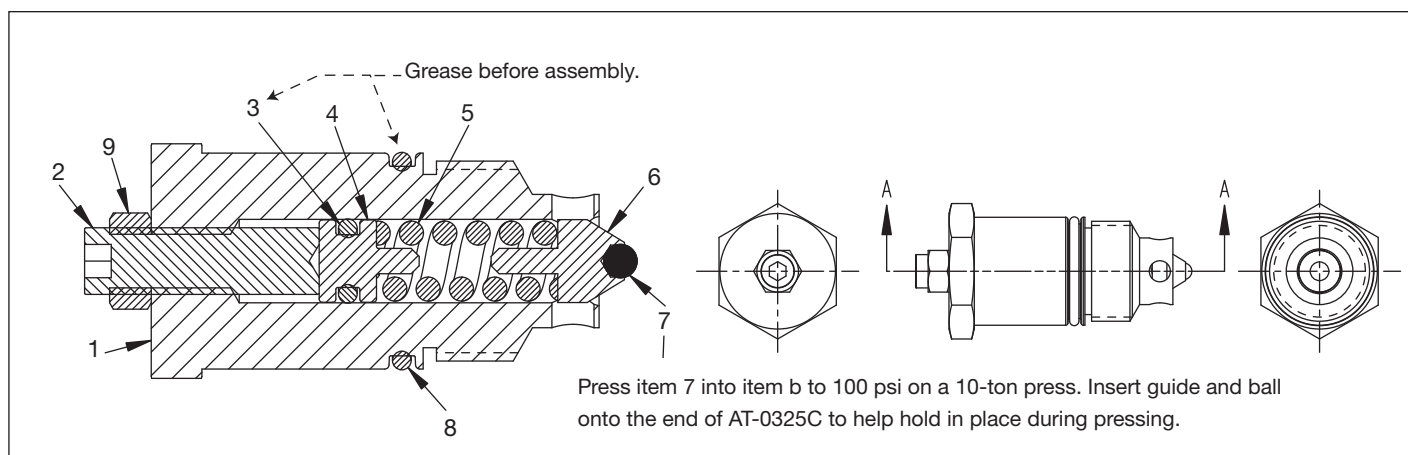


Figure 4, User-Adjustable Relief Valve Assembly, DC5139900SR

Repair Parts List for Figure 4			
Item	Part Number	Qty.	Description
1	★ DC5138190	1	Valve Body
2	★ BC2512027FX	1	Set Screw
3	★ B1003503	1	O-Ring
4	★ DC5127007	1	Plug
5	★ A8126110	1	Spring
6	★ DC5125013	1	Guide
7	★ B1003016	1	1/8" Dia. Ball
8	★ B1223503	1	O-Ring
9	★ B1001122	1	Lock Nut
10	★▲ DC5124290	1	Seat (not shown)
	★▲ P20037	1	Gasket (not shown)
★ Items included in Repair Kit DC5139900SR.			
▲ See Figure 3, Items 56 and 57.			

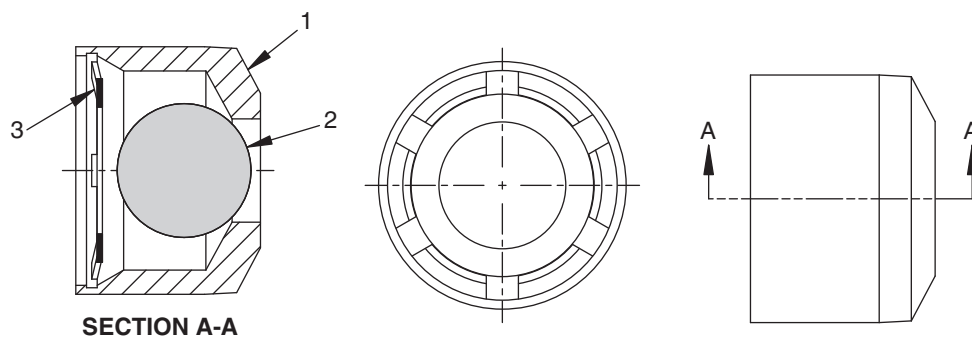


Figure 5, In-line Check Valve, DC5140900SR

Repair Parts List for Figure 5			
Item	Part Number	Qty.	Description
1	-----	1	Seat (available only in the manifold)
2	★ B1007016	1	1/4" Dia. Ball
3	★ DC5134549	1	Retaining Ring
★ Items included in and available only as part of Repair Kit DC51400900SR.			

TROUBLESHOOTING AND REPAIR PROCEDURES, VM33VAC AND VM33MVAC

In diagnosing malfunctioning valves, certain symptoms may be common not only to valves, but often to hydraulic equipment in general. Before repairing the valve, mount a different VM valve onto the pump and verify that the problem is not with the pump.

TROUBLESHOOTING



CAUTION: Standard safety procedures are to be followed during assembly to minimize any possibility of injury.

1. Inability to obtain any pressure may be the result of damaged connector seals on the pump, or failed relief valve components (items 6, 7, figure 4) a damaged ball and seat in the body (items 1, 2, figure 5), or damaged or worn metal seals and disc (item 16, 18, figure 1C). These problems are usually a symptom of contaminated hydraulic oil. The system should be drained and refilled with fresh Enerpac hydraulic oil.
2. Pressure leaks that are consistent and increase proportionately with increasing pressure ranges are usually the result of leaking gaskets or threaded surfaces such as NTPF fittings or plugs.
3. Ball seat leakage is often erratic and intermittent and is caused by contaminants trapped on the sealing edge. Over time, as wear occurs, these seats will need to be replaced.
4. Leakage observed on the external surfaces around the shaft (item 13, figure 1C) is an indication that the O-ring (item 15) and backup ring (item 14) need to be replaced.
5. Leakage observed on the external surfaces around the relief valve body (item 1, figure 4) is an indication that the O-ring (item 8) needs to be replaced.
6. Slow retract speed of a single acting cylinder may be the result of the return pipe (item 75, figure 1D) is not installed. Make sure that item 75 is installed to the tank return port under the valve manifold (item 52, figure 3). Using a hose with a larger inside diameter or using a shorter length hose (between the valve and the cylinder) will improve cylinder retract speed.

DISASSEMBLY

1. Remove the 4 socket head cap screws (item 76, figure 1D) and remove the valve from the pump.
2. Remove the return pipe (item 75) and gasket (item 70).
3. Remove the screw (item 1, figure 1C) and washer (item 2) from the shaft (item 13).
4. **VM33VAC Models:** Remove the handle (item 3), disc (item 4) ball (item 5) and spring (item 6).
VM33MVAC Models: Remove handle cap (item 66) lever (item 67) and knob (item 68) as an assembly. Remove ball (item 5) and spring (item 6).
5. Remove the 4 socket head cap screws (item 7) and remove the upper valve assembly (item 44) from the manifold (item 27).
6. Remove the 2 socket head cap screws (item 24) and separate the body (item 23) from the valve cap (item 9).

7. Remove the shaft assembly and inspect the O-ring (item 15) and backup ring (item 14) for damage. Replace if needed.
 8. Remove the O-ring (item 10) and inspect for damage such as nicks or cuts. Replace if needed.
 9. Remove the bearing (item 12) and bearing plate (item 11) and inspect for damage. Replace if needed.
 10. Remove the metal seal assemblies (items 18-20) from the bores in the body.
 11. Remove O-rings (item 20) and backup washers (item 19) and inspect for damage. Replace if needed.
 12. Remove springs (item 22) and inspect for damage such as breakage or permanent set. Replace if needed.
 13. Disassemble Venturi Plate:
 - a. Remove 4 O-rings (item 2, figure 2). Inspect, if damage such as nicks or wear and replace if necessary.
 - b. Remove venturi nozzle (item 5) and O-ring (item 4). Inspect O-ring for damage such as nicks or wear and replace if necessary.
- NOTE:** It is not necessary to remove or replace plug (item 3) unless there is leakage of hydraulic oil.
14. Disassemble Manifold:
 - a. Loosen lock nut (item 9, figure 4) and unscrew the set screw (item 2).
 - b. Using a 7/8" socket, loosen and remove the relief valve assembly (item 58, figure 3) from the body.
 - c. Remove the seat (item 57) from the body.
 15. Inspect the seat for damage such as nicks or dents on the sharp edge of the internal diameter. Replace if necessary.
 16. Inspect the O-ring (item 8, figure 4) for damage and replace if necessary.
 17. Inspect the ball (item 7) and guide (item 6). Replace if necessary.
 18. Remove the pipe plugs (item 53, 54, 55, figure 3) and clean the body. Inspect body for damage and repair as needed.

REASSEMBLY

Procedure for Manifold Assembly:

1. Apply Teflon tape to threads. Install new pipe plug (item 53, figure 3) and torque to 10-12 ft-lbs [14-16 Nm]. Install pipe plug (item 54, 55) and torque to 32-39 ft-lbs [43-52 Nm].
2. Install copper gasket (item 56) onto seat (item 57), with round edges facing away from the seat.
3. Place seat onto the bottom counter bore in the valve body, with the gasket side down. **NOTE:** Make sure that the seat is firmly seated and not crooked.
4. Grease O-ring on relief valve assembly and insert into cavity in the valve body.
5. Torque relief valve assembly (Item 58) to 32-39 ft-lbs [43-53 Nm].
6. Install return pipe (item 75, figure 1D) to the tank return port on the bottom of the manifold (item 52, figure 3). Torque return pipe hand tight.

Procedure for Venturi Plate Assembly:

1. Insert O-ring (item 4, figure 2) into cavity of venturi plate. Apply a light coating of oil to the O-ring prior to installation.
2. Insert nozzle (item 5) into cavity of venturi plate as shown. Apply a light coating of oil to the exterior surfaces of the nozzle. Press down firmly and momentarily hold in position. The top of the venturi plate should be flush to the valve body.
3. Install 4 O-rings (item 2) into O-ring grooves in valve body.

Procedure for Upper Manual Valve Assembly:

1. Position plate (item 11, figure 1C) and bearing (item 12) into cap.
2. Place O-ring (item 10) into cap groove.
3. Place O-ring (item 15) and backup ring (item 14) onto shaft (item 13). The O-ring is placed closest to the threaded end of the shaft.
4. Place roll pin (item 17) into thru hole in disc (item 16). Insert shaft (item 13) into disc from the solid side of the disc. Align the thru hole in the shaft with the thru hole in the disc and press or hammer roll pin until flush with disc outside diameter.
5. Lubricate the O-ring and backup ring on the shaft with grease. Insert the shaft and disc assembly into the valve cap (item 9).
6. Place springs (item 22) in each of 3 holes except for hole on tank side of the body (item 23).
7. Assemble each metal seal (item 18) with 2 backup washers (item 19) and 1 O-ring (item 20). The O-ring is placed between the backup washers.
8. Lubricate the O-ring and backup washers. Insert the metal seal assemblies into body (item 23) by hand.
9. Install body onto cap with 2 socket head cap screws (item 24) with 5/32" hex wrench. Torque to 28-38 in-lbs [3-4 Nm].
10. Place 4 O-rings (item 25) onto body.
11. Mount upper valve assembly (item 44) onto manifold (item 27) using 4 socket head cap screws (item 7). Torque to 28-34 ft-lbs [38-46 Nm].
12. Insert spring (item 6) into hole in valve cap (item 9). Install ball (item 5) onto the spring.
13. **VM33VAC Models:** Place disc (item 4) with sharp edged side facing upwards onto the shaft and resting on ball. Place handle (item 3) onto shaft.

VM33MVAC Models: Place handle cap (item 66), lever (item 67) and knob (item 68) onto shaft as an assembly.

14. Insert washer (item 2) onto shaft. Apply Loctite 222 to threads on screw (item 1) and hand tighten.

Relief Valve Adjustment:

The valve assembly is equipped with a user-adjustable relief valve. Adjust pressure as follows:

1. Install a 0-15,000 psi [0-1,035 bar] gauge in the "A" port (see figure 6).
2. Loosen the relief valve locknut to permit adjustment of set screw.
3. Rotate the control valve handle to the neutral ("3") position. See figure 7 for VM33VAC valve positions. See figure 8 for VM33MVAC valve positions.
4. Start the pump and allow the oil to warm.
5. Rotate the control valve handle to the advance ("1") position. Allow pressure to build.
6. To increase pressure: SLOWLY turn the relief valve set screw clockwise until pressure increases to the desired setting.
NOTE: An internal check valve in the manifold will prevent the pressure from dropping when the set screw is turned counter-clockwise. To lower the pressure setting, follow the procedure in steps 7a through 7e.
7. To decrease pressure:
 - a. Be sure the pump is running.
 - b. Rotate the control valve handle to the neutral ("3") position to relieve pressure on the "A" port.
 - c. Turn the relief valve set screw counter-clockwise one turn.
 - d. Rotate the control valve handle to the advance ("1") position.
 - e. SLOWLY turn the relief valve set screw clockwise until pressure increases to the desired setting.
8. When the desired pressure setting is reached, lock the set screw with the locknut. DO NOT overtighten.
9. Before turning off pump, rotate the control valve handle momentarily to the retract ("2") position to relieve pressure at the "A" port. Then, rotate the handle to the neutral ("3") position. Check that gauge indicates zero (0) psi/bar.
10. Stop the pump.

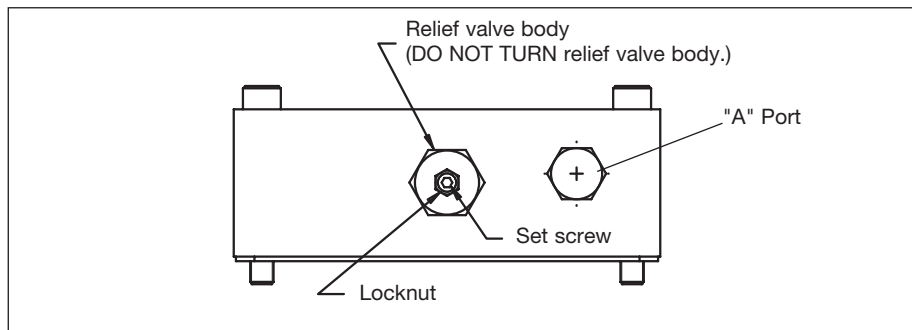


Figure 6, Relief Valve Adjustment

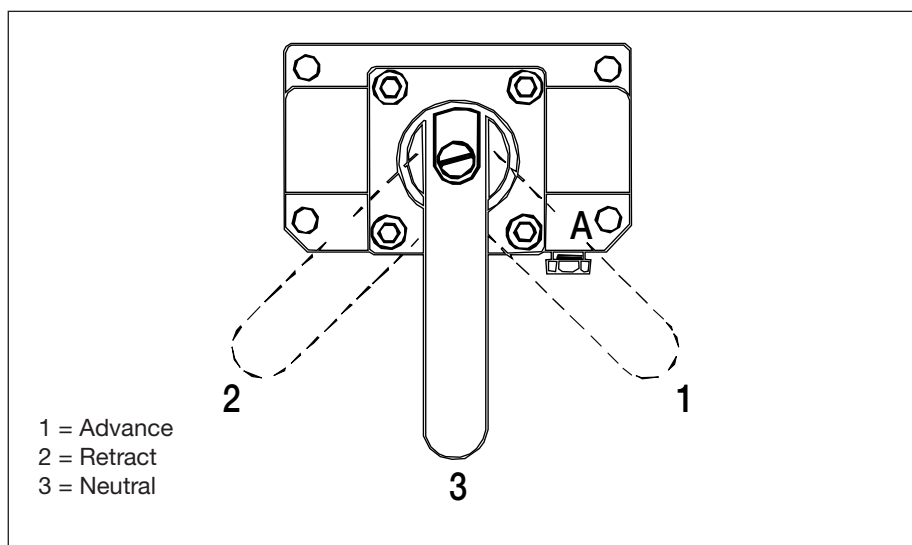


Figure 7, Valve Handle Positions, VM33VAC

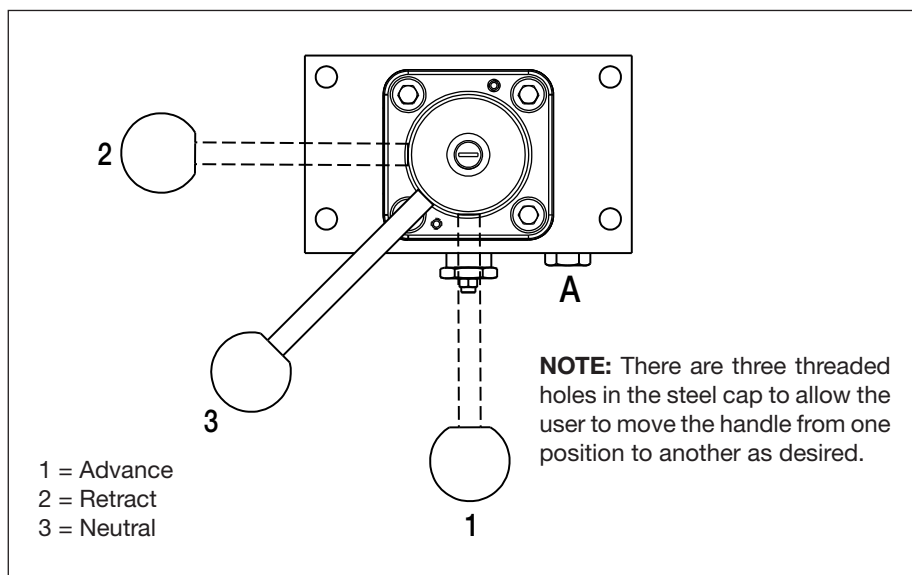


Figure 8, Valve Handle Positions, VM33MVAC

