



Models 94 and 94W Mity Mite Regulator OPERATING AND MAINTENANCE INSTRUCTIONS

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NOTE: The following drawings form a part of this Instruction:

Instruction Drawing:	W-94-B01
Assembly Drawing:	As Applicable
Parts List:	As Applicable
Accessories:	As Applicable

SCOPE

The instructions to the right give procedures for installing, adjusting, and servicing the following modes of RedQ Mity-Mite air dome regulators:

Each basic model is available with two valve orifice sizes, various end and dome connection types and sizes, and various materials, to suit service requirements. Standard design variations are identified by the basic figure number followed by code letters and numbers.

MODEL	BODY & DOME MATERIAL	INLET PRESSURE	OUTLET ADJUSTABLE TO
94 (Internal loading)	Aluminum, round	3500 psig	1500 psig
	Aluminum, round	5000 psig	3000 psig
	Aluminum, round	6000 psig	5000 psig
	18/8 CreS	5000 psig	3000 psig
	Aluminum, rect.	5000 psig	3000 psig
94W (External loading)	Aluminum, round	3500 psig	1500 psig
	Aluminum, round	5000 psig	3000 psig
	Aluminum, round	6000 psig	5000 psig
	18/8 CreS	5000 psig	3000 psig
	Aluminum, rect.	5000 psig	3000 psig

General Description

Refer to Instruction Drawing W-94-B01 and the applicable assembly drawing.

The RedQ Mity-Mite Pressure Reducing Regulator is designed to maintain a constant reduced or delivered fluid pressure in a line or closed vessel where inlet pressure or flow volume may vary. It is a balanced pressure type of regulator which is actuated by static gas pressure in a sealed dome. There is a flexible diaphragm between the sealed dome and the outlet line fluid. When outlet line pressure drops below dome pressure, the diaphragm moves out slightly, and pushes the main valve open. This allows inlet line fluid to flow through the valve until outlet line pressure builds up enough to balance the dome pressure. Then the diaphragm moves back to throttle or close the main valve so that dome and outlet pressures always remain in balance.

Any change in dome pressure causes a corresponding change in outlet line pressure. When the dome is completely vented, the main valve shuts off bubble tight.

The 94 and 94W models are alike except for the method of loading the air dome. 94 models are loaded internally from the inlet line and can be used only in gas systems. The 94W models are loaded externally and can be used in either gas or liquid systems, but the dome must be loaded with air or other gas.

Either model will show a slight variation in outlet line pressure if the inlet pressure varies over a wide range after the dome is set. With the 3/16" orifice, a 100 psi drop in inlet pressure will cause about 2.6 psi rise in the outlet line. With the 3/32" orifice, a 100 psi drop in inlet pressure will cause about 0.41 psi rise in the outlet line.

Since the dome is sealed after loading, a change in temperature will cause a change in dome pressure and a corresponding change in the outlet line of about 1% for each 5 Fahrenheit degrees. This effect is eliminated if the Model 94W is used with a RedQ Hand Loader to maintain the dome pressure constant.

Installation

(See Figures 1 and 2 for suggested installation set-up).

1. The Mity-Mite Air Dome Regulator may be installed in any position
2. Choose a location in the line where there is clearance for easy removal of both dome and body plug for inspection and maintenance of internal parts.
3. Install a pressure gage on the downstream side, ahead of the downstream stop valve, readable from the regulator location.
4. To help eliminate operating problems, install a pressure gage in the upstream line.
5. To reduce problems due to clogging, as may occur when lines or fluid contain excessive dirt, install a strainer or filter in the upstream line above the inlet pressure gage.
6. Before installing regulator, be sure upstream line is thoroughly clear of particles or other contaminants which might impair free movement and sealing of valve parts in the flow stream.

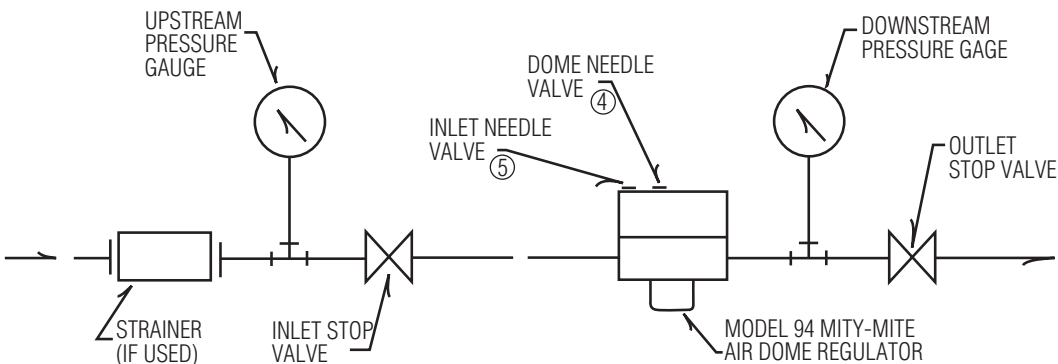


Figure 1 - Suggested Installation, Model 94

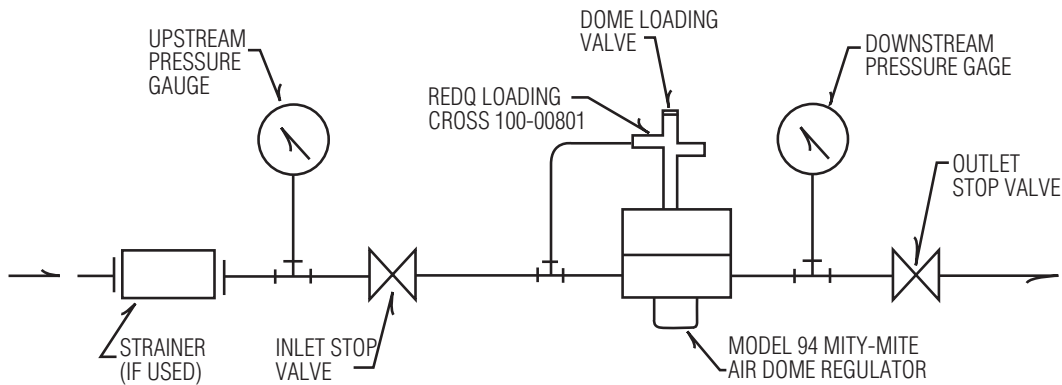


Figure 2 - Suggested Installation, Model 94W

Adjustment

To put the RedQ Mity-Mite Regulator into operation after it has been installed, load the dome with a gas pressure which will result in the desired outlet pressure.

NOTE: Actual pressure inside the air dome will be slightly higher than the controlled outlet pressure.

A. ADJUSTMENT, MODEL 94 (Dome internally loaded)

NOTE: There are two needle valves for internal loading: Center valve opens into dome, and rim valve opens into supply line. A loading duct connects these valves.

1. Using loading wrench per Table O, close SUPPLY needle valve. Vent dome by opening DOME needle valve.
2. Close DOME needle valve.
3. Open inlet line stop valve, admitting pressure to inlet side of regulator. If feasible, adjust outlet line stop valve to allow a small flow.
4. Open SUPPLY needle valve about one hand-turn. This opens loading duct to inlet line. (Needle valves are not sealed, so there will be some blow-by during dome loading operation.)
5. Insert loading wrench in DOME needle valve and open slowly, watching outlet pressure gage as it indicates pressure building up in the outlet line.
6. When desired outlet pressure is reached in the line, as shown on outlet pressure gage, close DOME needle valve.

7. Close SUPPLY needle valve.
8. Check to see that DOME and SUPPLY needle valves are securely closed, but do not exceed 30 inch-lb torque. Excessive torque on needle valves may cause deformation or galling and leaks.
9. Slowly open outlet stop valve to wide open position. Internally loaded Mity-Mite is now in operation.
10. If outlet system is not sealed, outlet pressure may be reduced by opening DOME needle valve, to vent dome. When outlet falls to desired level, close DOME valve.

B. ADJUSTMENT, MODEL 94W (Dome externally loaded)

NOTE: Adjustment of Model 94W depends on the particular loading device used, such as RedQ Hand Loader, RedQ Loading Cross, or other device or system preferred by the user.

1. Adjustment procedure using RedQ Hand Loader
 - a. Turn Loader handwheel counterclockwise to its limit. This vents Powreactor dome
 - b. Admit line pressure to inlet port of Powreactor. If feasible, adjust outlet stop valve to allow a small flow.
 - c. Slowly turn loader handwheel clockwise until outlet pressure gage shows desired pressure in outlet line.

- d. Slowly open outlet stop valve to wide open position.

No other adjustment is necessary and any temperature variation will be automatically compensated. Model 94W Mity-Mite is now in operation.

2. Adjustment using RedQ Loading Cross

(Refer to Drawing W-94-B01, detail A)

- a. Using loading wrench 18 (5/32 hex key wrench), close loading needle valve and vent dome by opening vent needle valve.
- b. Close vent needle valve
- c. Open inlet stop valve and adjust outlet stop valve to allow a small bleed.
- d. Slowly open loading valve and watch downstream pressure gage as it shows pressure being established in the outlet line.
- e. When outlet pressure reaches desired level, close dome loading valve.
- f. Gradually open outlet stop valve to wide open position.

Model 94W Mity-Mite is now in operation

3. Adjustment procedure using loading manifold or other device preferred by the user:

- a. Close dome loading line, and vent dome
- b. Admit line pressure to inlet port of Powreactor. If feasible, adjust outlet stop valve to allow small flow to outlet line.
- c. Admit gas pressure to dome loading line.
- d. Slowly open dome loading line, watching outlet pressure gage as it indicates pressure building up in outlet line.
- e. When desired outlet pressure is reached as shown on outlet pressure gage, close dome loading line.
- f. Slowly open outlet stop valve to wide open position.

Model 94W Mity-Mite is now in operation.

Maintenance

Refer to Instruction Drawing W-94-B01 and/or assembly drawing to identify parts. Refer to Table I for tools and assembly torques.

If outlet pressure deviates from original setting, check as follows:

A. RISE IN OUTLET PRESSURE

1. Check to see whether inlet pressure has fallen below the level it was when dome was set. Outlet will return to original setting when inlet rises to original level. If inlet is expected to remain at the lower level, re-set dome pressure per Adjustment.
2. Check temperature. A rise in temperature will cause a rise in outlet pressure (unless RedQ Hand Loader is used to load dome externally). Outlet will return to original setting when temperature returns to original level. (See General Description).
3. Check for dirt in valve and regulating mechanism:
 - a. Slowly open outlet line so as to increase flow through regulator.
 - b. Slowly return normal flow.
 - c. Outlet gage should show return to original setting.
4. If regulator is externally loaded, check loading mechanism for malfunction.
5. If outlet continues to rise, close inlet stop valve and inspect Mity-Mite main valve parts for damage. Follow directions for disassembly, Section V-C and V-D-4

B. DROP IN OUTLET PRESSURE

1. Check to see whether inlet has risen above the level it was when dome was set. Outlet will return to original setting when inlet falls to original level. If inlet is expected to remain at the higher level, re-set dome pressure per Adjustment.
2. Check temperature. A drop in temperature will cause a drop in outlet pressure (unless RedQ Hand Loader is used to load dome externally.) Outlet will return to original setting when temperature returns to original level. (See General Description).
3. Check for external leaks in dome or dome venting system:

- a. On internally loaded models, use bubble fluid around DOME needle valve.
 - b. On externally loaded models, use bubble fluid on vent valve and connections of loading device.
4. If leaks appear around DOME needle valve or loading devices, vent dome, inspect needle valve or loading system, and replace defective parts as required. Re-set dome pressure per Adjustment.
 5. If outlet continues to fall off, diaphragm is leaking and parts must be replaced. Follow directions for disassembly, Maintenance-C and Maintenance-D-3 below.

**B. REPLACEMENT OF PARTS,
GENERAL INSTRUCTIONS**

1. Order spares and replacement parts by part number and name, as shown on the applicable Assembly Drawing and Parts List; or give serial number of the regulator involved and names of parts required.
2. Inlet and outlet stop valves must be closed securely and pressure released from dome and line. To replace damaged parts, Mity-Mite Regulator must be removed from line. Reassembly of both 3/16" and 3/32" valve requires inverting Mity-Mite body.
3. Disassembly procedure is similar for all Mity-Mite regulators, but wrench sizes, special tools, and assembly torques may vary. Refer to Table I to find the information that applies. Refer to Instruction Drawing W-94-B01 and/or applicable Assembly Drawing for identification of parts.

CAUTION

If non-metal parts are to be re-used, handle with extreme care. Cuts, scratches, or over-stretching will cause leaks

4. Clean all parts before inspection.
 - a. Clean metal parts with suitable solvent. Wipe, flush, or vapor degrease as necessary to get desired level of cleanliness.
 - b. Clean non-metal parts by dry wipe with soft paper or cloth, or use ethyl or isopropyl alcohol, or wash in mild alkaline solution followed by thorough rinse in clean water. Any other solvents may cause damage to parts.
5. Inspect all seating and sliding metal surfaces and

all soft sealing parts for damage that might cause leaks or faulty operation. Replace any defective items.

6. Lubricate as required before re-assembly, using hydrocarbons for best performance, other types as required for compatibility with service conditions. Acceptable lubricants are as follows:

ITEM	HYDROCARBON	FLUOROCARBON
Metal Surfaces	Aero Lubriplate Molykote Type G	Kel-F 90 grease Fluorolube LG-160-grease Fluorolube FS-5 oil
Non-Metal Parts	Texaco Mrfak #3	Same as above

C. DISSASSEMBLY PROCEDURE

NOTE: Procedures for 3/16" and 3/32" valve orifice parts differ slightly.

1. Close inlet stop valve. This traps pressure on inlet side of regulator
2. Release trapped inlet pressure
 - a. If regulator is internally loaded, open SUPPLY needle valve in regulator body, using loading wrench per Table I.
 - b. Open outlet line to atmosphere, if feasible.
3. Vent dome as follows:
 - a. If internally loaded, open DOME needle valve, using loading wrench per Table I.
 - b. If externally loaded using RedQ Hand Loader, turn handwheel counterclockwise to its limit and remove dome connection line.
 - c. If externally loaded using other loading devices, release gas pressure from device, open dome VENT valve, and then remove loading device from dome port.
4. On units with 3/16" orifice, remove and replace main valve parts as follows:
 - a. With dome vented, remove body plug (11), using wrench per Table I. The following parts are now free:

Valve Spring (14)	Strainer (20)
Valve (13)	O-ring (6) on body plug
Pushrod (23)	

- b. Remove valve seat unit (19) and gasket (25) from body cavity. If valve seat does not come out freely, use a wood or brass rod, or a brass wire hook, to work it loose.
- c. Valve seat unit (19) consists of valve seat, plastic seal insert retainer washer, and seat seal retainer. Only the insert is likely to need replacement. Parts may be pried apart if necessary with any thin blade, using care not to damage plastic insert.
- d. Clean all seating surfaces. Inspect metal surfaces and plastic seal insert for damage which might impair sealing, especially at inner and outer edges. Replace defective parts. No adjustment or fitting should be necessary to install RedQ replacement parts.
- e. Lubricate threads per Maintenance-C-6.
- f. Reassemble valve seat unit (19), using a small amount of lubricant on gasket (25) before mounting it on valve seat.
- g. Turn body so small end is up.
- h. Insert pushrod (23) in body cavity.
- i. Seat the remaining parts in the following order as shown in drawing W-94-B01 Detail B:
Screen (20) (if used) flared and toward body plug
Gasket (25) with valve seat unit (19)
Valve (13)
Valve Spring (14)
- j. Replace O-Ring (6) on body plug (11). Use lubricant freely to prevent cutting O-Ring on threads.
- k. Insert body plug (11) into body and hand tighten. Be sure all parts are securely seated, particularly valve (13) on top of pushrod (23).
- l. Tighten body plug (11) using wrench and torque per Table I.

CAUTION

Do not over-tighten body plug (11) as this will cause distortion of valve seat unit (19) and valve will not seat properly.

- 5. On units with 3/32" valve orifices, remove and replace main valve parts as following:
 - a. Vent all pressure and remove Mity-Mite Regulator from line.
 - b. Remove body plug (11) using wrench per Table I. The following parts are now free:

Valve Spring (14)	Strainer (20) (if used)
Valve (13)	Diaphragm Spring (8)
Valve Seat (19)	Pushrod (23)
Gasket (25)	O-Ring (6) on body plug.
 - c. Clean all seating surfaces. Inspect metal surfaces and nylon valve for damage which might impair sealing. Replace defective parts. No adjustment or fitting should be necessary to install RedQ replacement parts.
 - d. Lubricate threads per Maintenance-C-6
 - e. Replace gasket (25) on shoulder of valve seat (19) and O-Ring (6) on body plug (11). Use lubricant freely to prevent cutting O-Ring on threads.
 - f. Turn body so small end is up.
 - g. Insert pushrod (23) and diaphragm spring (8) in body cavity
 - h. Seat the remaining parts in the following order. (See assembly drawing for orientation of parts.)
Screen (20) (if used) flared end toward body plug.
Gasket (25) with valve seat (19)
Valve (13)
Valve Spring (14)
 - i. Insert body plug (11) into body and hand tighten. Be sure all parts are securely seated, particularly diaphragm spring (8) over pushrod and inside valve seat recess.
 - j. Tighten Body plug (11) using wrench and torque per Table I.
 - k. Replace Mity-Mite Regulator in line.
- 6. Remove and Replace diaphragm parts as follows:
 - a. Vent dome as in D-3. On Model 94W, disconnect dome loading accessories. Remove eight capscrews (17).

- b. Carefully lift dome (1) off body (9), using care not to damage dowel pin (10) or diaphragm (15). Dowel should remain in body (9).
- c. Diaphragm assembly parts are now free. Lift off diaphragm (15) and diaphragm plate (12).
- d. On units with 3/16" orifice, remove diaphragm spring (8). Pushrod (23) may also be lifted out. If 3/16" regulator is mounted in a non-horizontal position, be careful pushrod does not fall out accidentally.
- e. Grommet (21) in dome loading duct does not ordinarily need replacement, but can be replaced if necessary.
- f. Clean diaphragm and all clamping surfaces. Inspect metal surfaces and diaphragm for any damage which might impair sealing. Replace defective parts.
- g. Lubricate threads of capscrews, using lubricant per Maintenance-C-6.
- h. If pushrod was removed, be sure in replacing it that it seats properly in top of valve (13) otherwise diaphragm plate will not seat properly over it.
- i. On units with 3/16" orifice, seat diaphragm spring (8) in groove in diaphragm plate (12). (This is a snap fit.)
- j. Position diaphragm plate, and spring if used, over pushrod (23) in body recess, and place diaphragm (15) over plate. If pushrod was properly seated, diaphragm will fit into body recess, flush with top of body.

- k. Replace dome unit (1), aligning dowel hole in dome with pin (10) in body.
- l. Tighten capscrews (17) using wrench and torque per Table I.
- m. Needle valves (4) and (5) may also be removed, cleaned, inspected for damage which might impair sealing, lubricate as in g. above, and replaced.

CAUTION

Needle valves (4) and (5) are not identical. Dome needle valve (4) is throttling type; inlet needle valve (5) is pointed type. Do not interchange these parts. Do not exceed 40 inch-lb torque when tightening, or damage to sealing surfaces may result. A torque of 15 to 30 inch-lb should be sufficient to seal.

This completes maintenance procedures for Model 94 and 94W Mity-Mite Air Dome Regulators.

NOTE: When ordering spares or replacement parts, order by part number and name. Always give the serial number of the regulator involved.

Appendix

- Instruction Drawing: W-94-B01
- Assembly Drawing: As Applicable
- Parts List: As Applicable
- Accessories and Special Tools: As Applicable

TABLE 1 - Model 94 and 94W Assembly Tools and Torques

P/L ITEM	PART NAME	PART NO.	THREAD SIZE	WRENCH OR TOOL	ASSEMBLY TORQUE
4	Needle, dome	20517	5/16-24 NF	33301 (1)	30 lb-inch (2)
5	Needle, supply	20519	5/16-24 NF	33301 (1)	30 lb-inch (2)
11	Body Plug	51438	1-14 NF	1-1/4 hex	50 lb-ft
17	Capscrew	12796	_ -20 NC	Screwdriver	44 lb-inch
ALUMINUM, ROUND, 5000# IN/3000# OUT					
4	Needle, dome	20517	5/16-24 NF	33301	30 lb-inch (2)
5	Needle, supply	20519	5/16-24 NF	33301	30 lb-inch (2)
11	Body Plug (3)	51438	1-14 NF	1-14 NF	50 lb-ft
17	Capscrew	N22-54143	_ -20 NC	33303 (1)	88 lb-inch
ALUMINUM, ROUND, 6000# IN /5000# OUT					
4	Needle, dome	20517	5/16-24 NF	33301	30 lb-inch (2)
5	Needle, supply	20519	5/16-24 NF	33301	20 lb-inch (2)
11	Body Plug	143-20002	1-14 NF	1-1/4 hex	50 lb-ft
17	Capscrew	N22-55163	5/16-18 NC	33305 (1)	15 lb-FT
STAINLESS STEEL, ROUND, 5000# IN /3000# OUT					
4	Needle, dome	20517-1	5/16-24 NF	ALUMINUM	30 lb-inch (2)
5	Needle, supply	20519-1	5/16-24 NF	ROUND, 3500#	30 lb-inch (2)
11	Body Plug (3)	51438-1	1-14 NF	IN /1500# OUT	50 lb-ft
17	Capscrew	N32-54143	_ -20 NC		88 lb-inch
ALUMINUM, RECTANGULAR, 5000# IN /3000# OUT					
4	Needle, dome	20517	5/16-24 NF	33301	30 lb-inch (2)
5	Needle, supply	20519	5/16-24 NF	33301	30 lb-inch (2)
11	Body Plug	51438	1-14 NF	1-1/4 hex	50 lb-ft
17	Capscrew	N45-54203	_ -20 NC	33303	88 lb-inch

- Notes:**
- (1) Wrench 33301 is 5/32 hex key
Wrench 33303 is 3/16 hex key
Wrench 33305 is 7/32 hex key
 - (2) Do not exceed 40 lb-inch, or valves may be damaged.
 - (3) Body plug part number shown is for 3/16" dia. Valve orifice.
Same tools and torques apply to 3/32" orifice.

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