



Models 15L, 15LX Small Volume High Pressure Regulator (Loader) MAINTENANCE INSTRUCTIONS

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

Assembly Drawing:	As Applicable
Parts List:	As Applicable
Special Tools:	041-00004, 041-00006

Refer to Section VII Appendix for the applicable assembly drawing and parts list. Item numbers used in the text are the same as those on the assembly drawing.

Description of Components

The 15L/15LX Regulator body contains the inlet and outlet port fittings, and the inlet valve assembly. The regulation diaphragm assembly is mounted over the body cavity at the base of the valve stem unit, and is held in place by the clamp ring and spring barrel. The relief valve is mounted in the head of the diaphragm bolt.

The spring barrel houses the operating spring, stem unit, and thrust bearing, and is vented to permit flow from relief valve to atmosphere. The handwheel, mounted on the stem unit, controls the compression of the operating spring, and the relief valve adjustment is controlled by a screw in the top of the stem unit.

A filter unit is provided inside the inlet port fitting, and a panel mounting plate assembly is included with the unit.

Disassembly Procedure

1. Remove Model 15L/15LX Regulator from mounting as follows:
 - a. Remove pressure supply from inlet port.
 - b. Turn handwheel (33) counterclockwise to limit.
 - c. Disconnect line fittings.
 - d. Remove regulator from mounting. If panel mounted, remove cap nut 17, nameplate (22),

handwheel (33) and thrust washers (25) if any. Mounting plate can now be removed.

2. Clamp body of regulator in vise, clamping across port fitting faces. Use soft jaws or protect port fittings with cloth or cardboard
3. Working through side slot in spring barrel, remove guide button (6) from the stem adjusting unit.
4. Remove spring barrel (1) from body (4) using special tool wrench 041-00006.
5. Lift out stem unit subassembly and operating spring (3).
6. Remove thrust bearing (32). This may have remained seated either in the spring barrel, or on stem unit.
7. If desired, stem nut (59) may be removed from stem unit (14) by removing snap ring (60) and stop collar (19).
8. Stem unit (14) is not to be further disassembled.
9. Lift out diaphragm assembly from body (4) and disassemble as follows:
 - a. Lift off locking ring (61) and clamp ring (28).
 - b. Grip hex head of diaphragm bolt (23), head down, in vise with soft jaws. Use card not to damage diaphragms.
 - c. Remove diaphragm nut (24), using special Driver 041-00004 or similar tool to engage slot in nut.

- d. Lift off diaphragm plate (5), diaphragms (49), and inner gaskets (52), if any.
 - e. Turn diaphragm bolt over and re-clamp in vise.
 - f. Remove relief seat retainer (12).
 - g. Lift out valve pin (26) from diaphragm bolt cavity.
 - h. Remove valve seat (21) on Model 15L, or [20] on Model 15LX, from relief seat retainer (23). If necessary, use pliers covered with soft cloth.
 - i. Valve (8) and spring (0) will now drop out from seat retainer.
10. Remove outer diaphragm gaskets (53), if any, from body
 11. Disassemble inlet valve from body as follows:
 - a. Remove inlet seat retainer (13).
 - b. Remove valve seat (21) and valve pin (27) from retainer. If necessary, use 1/16" drift pin and very lightly tap top end of valve pin to force seat out. Inlet valve seat shims on Model 15LX are now free.
 - c. Lift out valve (8) on Model 15L, or [7] on Model 15LX, and spring (9).
 12. Remove body (4) from vise and re-clamp carefully across top and bottom of surfaces. Remove port fittings (65).
 13. Remove filter (48) from inlet port fitting.

This completes disassembly of Model 15L/15LX Regulator.

Cleaning and Inspection

1. All parts should be clean before inspection. Metal parts may be cleaned with a petroleum solvent. Non-metallic parts should be cleaned in a mild alkaline solution with a water rinse.
2. Examine all threads and sealing surfaces of valves, valve seats, and port fittings for damage which might impair fluid-tight seals.
3. Examine thrust bearing and stem threads for galling or other damage which might impair smooth operation.
4. Examine clamping surfaces of body clamp ring, and diaphragm plate for roughness which might affect diaphragm seal.
5. Examine diaphragms and gaskets for damage

which might impair sealing, especially at inner and outer edges.

6. Examine filter. If feasible, it may be cleaned and re-used. If not, discard and replace with a new one.

Discard any parts found to be defective and replace. Use only RedQ spare parts. The 15L/15LX Regulator is manufactured to extremely close tolerances which must be maintained if the regulator is to function properly.

On all spares or replacement parts orders, give part number, name and the serial number of the regulator involved.

Lubrication

For best performance, use Molykote type G lubricant. If hydrocarbons cannot be tolerated in the system, it is permissible to use Kel-F 90 or Fluorolube LG-160 grease, or Fluorolube FS-5 oil. Apply sparingly to the following parts:

1. Threads only, inlet and outlet port fittings
2. Threads on spring barrel.
3. Threads on stem unit and relief adjusting screw.
4. Races on thrust bearing

Regulator parts are now ready for reassembly.

Reassembly Procedure

Provide equipment for bench testing with dry compressed air or nitrogen at rated inlet pressure, while unit is being assembled.

A. BODY UNIT SUBASSEMBLY

1. Install filter unit in one port fitting. This becomes the inlet port fitting.
2. Install port fittings (65) in body (4) as follows:
 - a. Clamp body top and bottom carefully and securely in vise with soft jaws.
 - b. Screw in inlet and outlet port fittings, using 140 ft-lb torque on stainless steel models, 75 ft-lb on aluminum, to ensure a tight metal-to-metal seal.
3. Assemble inlet valve parts and install in body unit (4) as follows:
 - a. Mount body in vise with soft jaws, clamping across port fitting faces.
 - b. Insert spring (9) and valve (8) on Model 15L, or [7] on Model 15LX, in body recess.

- c. On 15LX only, insert four shims (66) (Part No. 299179, .006" thick) into inlet seat retainer (13).
- d. Insert pin (27) and valve seat (21) in inlet seat retainer (13).

CAUTION:

Do not confuse inlet seat retainer with relief seat retainer. See assembly drawing for proper identification of retainers.

- e. Screw inlet seat retainer (13) over valve in body recess. Be sure valve is seated properly, then tighten retainer, using 15 to 17 ft-lb torque.
4. On 15LX only, before proceeding further, measure projection of valve pin above inlet seat retainer, using depth micrometer
- If pin projects more than .010 or less than .008 inches, disassemble and adjust shims as required to bring this projection within tolerance. (Shim No. 299179 is .006" thick; Shim No. 299245 is .002" thick. Use as required)
5. Test inlet valve assembly:
- a. Mount regulator in bench test set-up.
 - b. Apply rated inlet gas pressure to inlet port and check for leaks at inlet valve and inlet port fitting, using approved bubble fluid.
 - c. If inlet leak is detected, re-torque inlet seat retainer. If leak persists, disassemble and re-inspect valve seating surfaces and retainer threads for damage. Reassemble with care, being sure all parts are seated properly.
 - d. If port fitting leak is detected, re-torque. If leak persists, inspect seating surfaces and threads for damage.
6. After leaks are eliminated, wipe off bubble fluid and continue reassembly.

B. DIAPHRAGM BOLT SUBASSEMBLY

1. Install relief valve parts in diaphragm bolt as follows:
- a. Mount hex head of diaphragm bolt (23) in vise, head up.
 - b. Insert pin (26) in bolt recess.
 - c. Into relief seat retainer (12), insert spring (9), valve (8) and valve seat (21), on Model 15L, or [20] on 15LX.
 - d. Screw seat retainer into diaphragm bolt and tighten, using 15 to 17 ft-lb. torque.

- 2. Turn diaphragm bolt over and re-clamp hex end in vise.
- 3. Assemble diaphragms (49) and inner gaskets (52) if any.

NOTE: This assembly varies according to the outlet pressure range of the regulator. See the applicable assembly drawing and parts list to determine location and quantities of diaphragms and gaskets required.

- 4. Place diaphragm plate (5) over end of diaphragm bolt
- 5. Install diaphragm nut (24) using _" socket wrench with special Drive 041-00004 (or similar tool to engage slot in nut), using 13 ft-lb torque.

CAUTION:

Over tightening will cause the diaphragm to buckle.

- 6. Insert outer gaskets (53), if any, in recess in body. Be sure to use same quantity of outer gaskets in body as inner gaskets in diaphragm bolt.
- 7. Place diaphragm bolt assembly over gaskets in body recess.
- 8. Place clamp ring (28) and locking ring (61) over diaphragm. Two tabs on locking ring fit into slots in body.

C. OPERATING PARTS AND FINAL ASSEMBLY

1. Assemble stem unit subassembly as follows:
- a. If stem nut (59) was removed, replace. Run stem nut to top of threads (left hand thread). Replace stop collar (10) and snap ring (60).
 - b. Mount thrust bearing (32) on top shoulder
- 2. Clamp body subassembly tightly in vise with soft jaws, holding across port fitting faces.
 - 3. Place operating spring (3) over diaphragm plate (5).
 - 4. Seat stem unit in spring barrel (1) so bearing seats in recess inside top of barrel.
 - 5. Hold stem up in top of spring barrel, and screw spring barrel down over body unit (4). Make sure lower end of stem unit seats in top of diaphragm nut. Tighten spring barrel with special wrench 041-00006, using 150 ft-lb torque.
 - 6. Rotate stem (14) with fingers until guide button (6) can be installed on stem nut (59) through slot in spring barrel.

7. Omit mounting attachments until after the Performance Tests, section.
8. Install thrust washers (25), if any, handwheel (33), nameplate (22), and cap nut (17).

Model 15L/15LX Regulator is now ready for Performance Tests.

Performance Tests

1. Turn handwheel counterclockwise to limit and mount regulator in bench test set-up with dry air or nitrogen pressure not exceeding rated inlet, but not less than rated outlet pressure of the regulator being tested.
2. To the outlet line attach a suitable pressure gage and a means of shutting off outlet flow, such as a needle valve.
3. Admit rated pressure to inlet port of regulator.
4. Set relief adjusting screw as follows:
 - a. Close outlet needle valve.
 - b. Turn handwheel clockwise to about 20% of maximum rated outlet pressure.
 - c. Remove cap nut and turn relief adjusting screw clockwise until venting occurs, then turn counterclockwise until venting just stops.
 - d. Replace cap nut.

5. TEST PROCEDURE

- a. Turn handwheel slowly clockwise to get maximum outlet pressure. Outlet pressure should follow smoothly without excessive lags or jumps.
- b. Watch outlet pressure gage. Outlet locked-up pressure should not creep up.
- c. Crack outlet needle valve momentarily and re-close. Outlet pressure should return quickly to set level and should not creep up.
- d. Check for leaks around port fittings, using soap solution or other bubble fluid compatible with system requirements.
- e. Check for leak through side slot in spring barrel:

It may be necessary to improvise a testing device such as a flexible rubber sleeve around the spring barrel with a pin-hole over the slot. Check for gas flow through the pin-hole, using bubble fluid. If necessary, handwheel may be removed while making this check. Replace handwheel before continuing tests.

- f. Turn relief screw clockwise until steady venting is obtained.
- g. Turn relief screw counterclockwise until venting just stops; then turn about one turn further to get a stable setting.
- h. Turn handwheel counterclockwise to limit, to give zero outlet pressure. Relief system should bleed outlet pressure as handwheel setting is reduced.
- i. Open outlet needle valve. There should be no flow to outlet line.

6. TEST RESULTS:

If the regulator fails to pass the foregoing tests, it must be disassembled and re-inspected as follows, and damaged parts replaced:

- a. Erratic response to handwheel may be caused by distorted diaphragm, or out-of-tolerance ends on operating spring.
- b. c., and i: Outlet creep and flow are caused by inlet valve leak. Inspect inlet seat retainer and inlet valve parts for damage to threads and/or sealing surfaces. Reassemble with care, using 15 to 17 ft-lb torque on inlet seat retainer.
- d. If port fittings leak, check torque (140 ft-lb). If leak persists, inspect fittings and body for damage to threads and/or sealing surfaces. Be sure proper lubricant is used on threads.
- e. If relief valve was set properly, leak through spring barrel slot may be caused by defective relief valve assembly or by damaged diaphragm. Inspect relief seat retainer and relief valve parts for damage to threads and/or sealing surfaces. Inspect diaphragm for damage especially at inner and outer edges. Reassemble with care, using 13 ft-lb torque on diaphragm nut, and 15 to 17 ft-lb on relief seat retainer.
- f. g., and h: If relief valve will not stop venting when adjusting screw is turned counterclockwise, or does not bleed outlet pressure as handwheel setting is reduced, inspect relief valve seating and sliding surfaces, and valve spring.

7. After regulator passes satisfactorily all test under step 5, remove handwheel and install mounting plate (29), screws (15), and nuts (16), for panel mounting. Replace handwheel, nameplate, and cap nut.

RedQ Model 15L/15LX Regulator is now ready for service.

Final adjustments to be made after regulator is installed in its operating location are given in W-15L-B01-1, INSTALLATION AND OPERATING INSTRUCTIONS.

Appendix

Assembly Drawing As Applicable

Installation Drawing W-15L-B01

Parts List As Applicable

Special tools: Wrench, 041-00006
Driver, Diaphragm Nut,
041-00004

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