

Models 16KX Small Volume High Pressure Regulator (Loader) MAINTENANCE INSTRUCTIONS

Contents

Description of Components	1	Lubrication	2
Disassembly Procedure	1	Reassembly Procedure	2
Cleaning & Inspection	2	Performance Tests	3
		Appendix	6

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

Assembly Drawing:	W-16KX-A01,	or as applicable
Parts List:	W-16KX-A01-1,	or as applicable
Special Tools:	041-00407	

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 Model 16KX Regulator body contains the inlet and outlet port fittings, and inlet valve assembly. The regulating 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.

The spring barrel houses the operating spring, stem unit and thrust bearing, and is vented to atmosphere. The handwheel gear assembly is mounted over the spring barrel. The compression of the operating spring is controlled by the handwheel.

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

Disassembly Procedure

1. Remove Model 16KX Regulator from mounting as follows:
 - a. Release pressure supply from inlet and outlet ports.
 - b. Turn handwheel (33) counterclockwise to limit.
 - c. Disconnect line fittings.
 - d. Remove handwheel screw (17), nameplate (22), and handwheel (33).
 - e. Remove mounting screws and plate, and remove regulator from panel.
2. Clamp regulator body tightly in vise, holding across outside diameter of body so that port fittings are accessible.
3. Remove capscrews (25).
4. Lift off cover (2), pinion (10), planet gears (11) ring gear (13), and drive plate (34).
5. Working through side slot in spring barrel, remove guide button (6) from stem adjusting nut.
6. Remove spring barrel (1) from body (4), using special spanner wrench 041-00007.
7. Remove closure (50) from top of spring barrel, using two spanner wrenches as above.
8. Lift out stem unit subassembly, operating spring (3) and spring ring (38).
9. Remove thrust bearing (32). This may have remained seated either in the spring barrel or on stem unit.
10. Disassemble stem unit subassembly as follows:
 - a. Remove upstop (14) from inside stem (30).
 - b. Nylok nut (19) may be removed from upstop for inspection of nylon insert.
 - c. If necessary, stem nut (46) may be removed from stem (30) by removing snap ring (31) and stop collar (16).

11. Remove diaphragm capscrews (39) and clamp ring (28).
12. Lift out diaphragm assembly, spring guide (42) and support spring (43).
13. Disassemble diaphragm assembly as follows:
 - a. Hold diaphragm bolt (23) across flats with 9/16" open end wrench.
 - b. Remove diaphragm nut (24), plate (5), gasket (41), and four-piece diaphragm unit (40). Use care in handling non-metallic parts.
14. Disassemble valve from body as follows:
 - a. Remove seat retainer (12).
 - b. Remove valve seat (20), valve pin (26), and shims (35) from retainer. If necessary, use 1/16" drift pin and very lightly tap top end of valve pin to force seat out.
 - c. Lift out valve (7) and spring (9).
15. Remove port fittings (44), and shims if any.
16. Remove filter (45) from inlet port fitting.

This completes disassembly of Model 16KX 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. Check gear teeth, drive plate pins, and thrust bearing for galled surfaces or other damage which might impair smooth operation. See that drive pins are secure in drive plate.
4. Examine clamping surfaces of body, clamp ring, and diaphragm plate for roughness which might affect diaphragm seal.
5. Examine two diaphragms and Teflon shield for damage which might impair sealing, especially at inner and outer edges.
6. Examine gasket on diaphragm bolt, and nylon thread insert in Nylok upstop nut.
7. Examine filter in inlet port fitting. If feasible it may be cleaned and re-used. If not, discard and replace with new one.

Discard any parts found to be defective and replace. Use only RedQ spare parts. The 16KX Regulator is manufactured to extremely close tolerances which must be maintained if the regulator is to function properly.

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

Lubrication

On units used in ordinary pressure systems, use Molykote Type G lubricant. For units in supercleaned service, use Kel-F 90 grease. Apply lubricant sparingly to the following parts:

1. Threads only, on inlet and outlet port fittings.
2. Threads on spring barrel.
3. Threads on stem.
4. Races on thrust bearing.
5. Drive plate planet gear pins.
6. Gear faces.
7. Shaft of pinion.

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. Assembly torques are given in Table I. below.

Table 1 - Model 16KX Assembly Torques

ITEM	PART NAME	ASSEMBLY TORQUE
1	Spring Barrel	75 Ft-lb
12	Retainer, valve seat	15 to 17 ft-lb
17	Handwheel screw	12 ft-lb
24	Nut, diaphragm	7 ft-lb
25	Capscrews, gear cover	20 inch-lb
39	Capscrews, clamp ring	5 ft-lb
44	Port Fittings: Corrosion resistant steel Aluminum	140 ft-lb 75 ft-lb
50	Spring barrel closure	75 ft-lb

A. BODY UNIT SUBASSEMBLY

1. Install supercleaned filter (45) in one port fitting (44). This becomes the inlet port fitting.
2. To install port fittings, clamp body securely in vise with soft jaws, holding across O.D. of body. Use great care not to damage raised surface on top of body.
3. Install inlet and outlet port fittings (44). On aluminum models, insert port fitting shims. Use torques per Table I to ensure a tight metal-to-metal seal.
4. Assemble valve parts and install in body unit (4):
 - a. Insert spring (9) and valve (7) in body recess.
 - b. Insert pin (26) and valve seat (20) in seat retainer.
 - c. Seat retainer over valve in body recess and tighten, using torque per Table I.
5. Before proceeding further, measure projection of valve pin (26) above inlet seat retainer using depth micrometer.

If pin projects less than .008 inch, adjust shims (35) until pin projects .008 to .010 inch. (Shim No. 299179 is .006 inch thick; Shim No.299245 is .002 inch thick. Use as required.

Torque seat retainer per Table I before measuring.

6. After correct projection of valve pin (26) has been established, valve assembly may be tested as follows:
 - a. Mount body in bench test set-up.
 - b. Apply rated inlet gas pressure to inlet port and check for leaks at valve and port fittings, using approved bubble fluid.
 - c. If inlet leak is detected, re-torque seat retainer. If leak persists, disassemble and re-inspect valve seating surfaces and retainer threads. Reassemble with care, being sure all parts are resealed properly.
 - d. If port fitting leak is detected, re-torque. If leak persists, inspect seating surfaces and threads.
7. After leaks are eliminated, wipe off bubble fluid and continue reassembly.

B. DIAPHRAGM BOLT SUBASSEMBLY

1. Mount diaphragm bolt (23) carefully in vise, gripping flats in vise jaws.
2. Over threaded end of diaphragm bolt, mount

four-piece diaphragm unit (40) and Kel-F gasket (41). Refer to Figure 1.

3. Install diaphragm plate (5) and nut (24) using torque per Table I to tighten nut.
4. In body (4) recess, place support spring (43) and spring guide (42) over inlet valve.
5. Remove diaphragm bolt assembly from vise and seat over spring guide in body (4).
6. Install clamp ring (28) with six capscrews (39). Torque capscrews per Table I.

C. OPERATING PARTS

1. Stem Subassembly:

- a. Install stem nut (46) on stem (30) and run up to top of threads (Left hand thread). Install stop collar (16) and retaining snap-ring (31).
- b. Seat thrust bearing (32) over top of stem.

2. Upstop subassembly:

- a. If Nylok nut (19) is a new one, it may be necessary to pre-shape the nylon insert by screwing it over a standard 5/16-24 screw. If any excess nylon appears on washer faces of nut, remove it at this time.
- b. Install Nylok nut over end of upstop (14) and run nearly to limit of threads.

D. UPSTOP ADJUSTMENT

1. Install closure (50) in top of spring barrel (1), using two special spanner wrenches No. 041-00007. Torque per Table I.
2. Slide upstop subassembly inside stem subassembly and insert both in spring barrel so thrust bearing seats in closure (50). Turn spring barrel so open end is up.
3. Adjust nut (19) until distance from open end of spring barrel to end of upstop is 1.762"/1.764" as measured with depth micrometer when nut (19) is seated against end of stem (30). Refer to Figure 2

CAUTION:

Keep this setting fixed during the following steps.

E. OPERATING PARTS, FINAL

1. After completing adjustment of upstop nut (19), replace body (4) in vise.

2. Place spring ring (38) over end of diaphragm bolt.
3. Hold upstop inside stem, hold stem inside operating spring (3), and seat spring over spring ring in body.
4. Screw spring barrel (1) to body (4), at same time guiding stem into position through hole in top closure.
5. Be sure spring barrel is properly seated on shoulder of body, and wrench spring barrel hand tight.
6. Re-check to be sure all parts are seated properly, then tighten spring barrel (1) using spanner wrench 041-00007. Torque per Table I.
7. Install guide button (6) in stem nut (46) through side slot in spring barrel.
8. Drop drive plate (34) over hex end of stem.
9. Assemble planet gears (11) on drive plate pins.
10. Slide ring gear (13) into place, meshing with planet gears, and rotate until three capscrew holes line up with top closure on spring barrel
11. Slide washer (47) down over pinion (10), and mesh pinion with planet gears.
12. Place cover (2) over pinion and ring gear, and install three capscrews (25), using torque per Table I.
13. Omit mounting attachments until after the Performance Tests section.
14. Place handwheel (33) over pinion, and install nameplate and handwheel screw (17), using torque per Table I while holding handwheel against rotation.

Model 16KX Regulator is now ready for Performance Tests.

Performance Test Procedures

1. Turn regulator handwheel counterclockwise to limit and mount 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. Shut off outlet flow.
5. TESTS:
 - 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 an approved bubble fluid.
- e. Check for leak through side slot in spring barrel.
- f. Crack outlet needle valve for steady flow, and turn handwheel counterclockwise to limit. Open outlet needle valve fully. 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 f.: Outlet creep and flow are caused by valve leak. Inspect seat retainer and valve parts for damage to threads and/or sealing surfaces. Reassemble with care, using torque per Table I on seat retainer.
- d. If port fittings leak, check torque per Table I. If leak persists, inspect fittings and body for damage to threads and/or sealing surfaces.

7. After regulator passes satisfactorily all tests under Step 5., remove handwheel and install mounting brackets and plate as follows:
 - a. Install mounting brackets (36) on spring barrel (1), using bracket screws (37).
 - b. Drop mounting plate (29) over spring barrel and start screws into bracket.
 - c. Replace handwheel (33) and nameplate (22) over pinion, and fasten in place with handwheel screw (17).

The RedQ Model 16KXRegulator is now ready for service.

For final adjustments to be made after regulator is installed in its operating location, refer to W-16KX-B00-1, INSTALLATION AND OPERATING INSTRUCTIONS.

Figure 1 - Diaphragm Bolt Subassembly

Showing orientation of four-piece diaphragm unit (40)

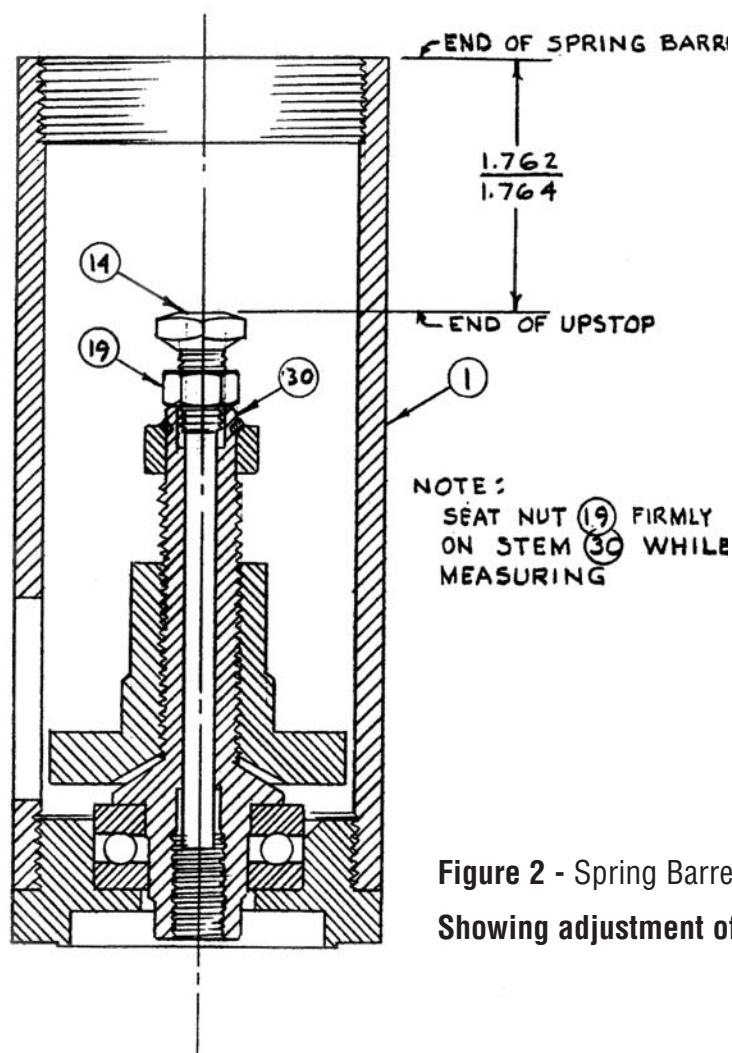
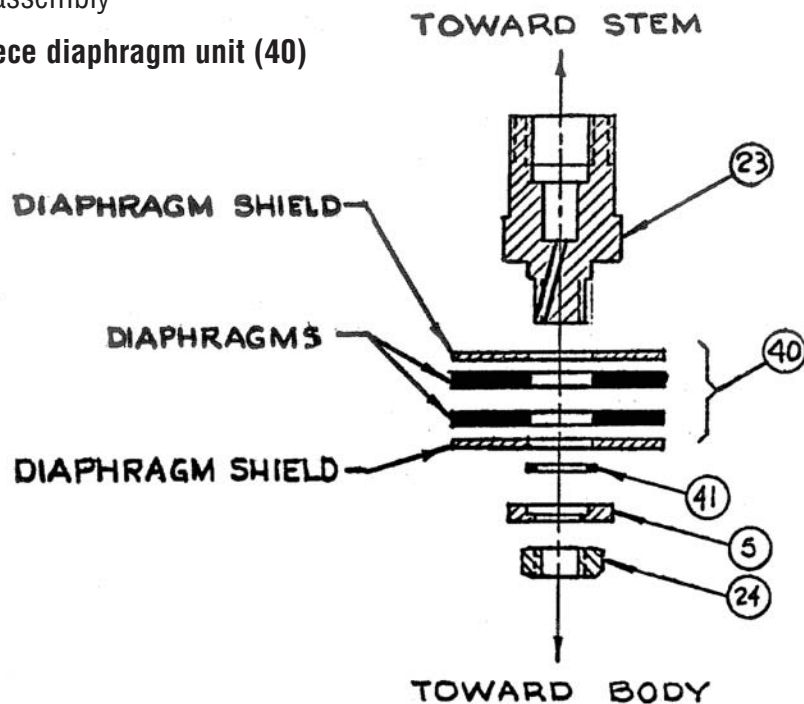


Figure 2 - Spring Barrel Subassembly
Showing adjustment of upstop nut (19)

Appendix

Assembly Drawing W-16KX-A01, or as applicable

Parts List..... W-16KX-A01-1, or as applicable

Special tools:041-00007, special spanner wrench, 2 required

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