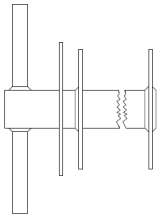
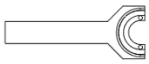
Title: **ES 3021 [Work Instructions for Replacing K17 Main Valve]**

Tools Required:

- 3/8” Allen Wrench or Socket
- 5/16” Allen wrench or Socket
- 5/64” or 2mm Allen wrench
- 1 ½” Socket
- Adjustable wrench
- Torque Wrench
- K17 Seat Removal Wrench (K1737) or K81 Seat Removal Wrench (K8147)



- K17 Drain Nut Wrench (K1738)



Instructions:

1. Shut off Water Supply.
   A. Shut off water supply to hydrant by closing the gate valve controlling flow of water to the hydrant. Remove a nozzle cap and open the hydrant a maximum of three turns.

2. Removal of Hydrant Upper.
   A. Remove the stem pin(K1709B) fully from the bushing(K1709) after first removing the set screw (K1709A)

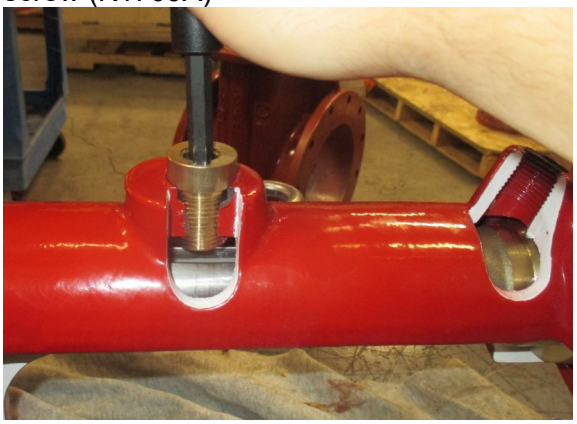


Fig 1. Remove Stem Pin and backing set screw

B. Remove the barrel coupling bolts(K1715) with a 3/8" Allen wrench or socket.

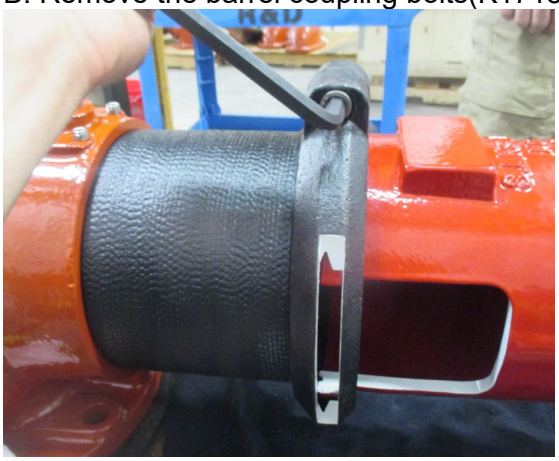


Fig 2. Remove barrel couplings and bolts

C. Remove the barrel couplings (K1717)

D. Turn the operating nut (K1702) in the direction to open and hold the barrel to keep it from rotating as the operating nut unscrews and lifts the cap. Turn until the operating nut walks off the stem (K1710).

Fig 3. Unscrew upper barrel from the lower

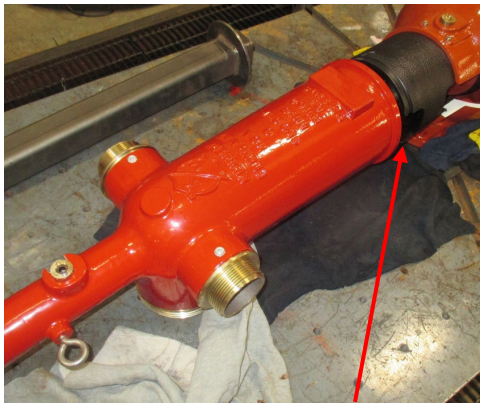


Fig 4. Note the upper lifting away from the lower

E. Lift the upper barrel (K1707) straight up and off. The main valve (K1722) and stem assembly should drop to the bottom of the elbow after removal.

3. Removal of Stem and Main Valve Assembly

A. Slide the seat removing wrench over the upper stem (K1710) and down into the upper barrel. Slide the wrench over the lugs of the breaker coupling(K1713)

Fig 5. Slide seat removal wrench over breaker coupling

B. Turn the seat removal wrench in the counter clockwise direction until the main valve(K1722) can pass through the elbow. This will take approximately 6 turns. After approximately 3 to 5 turns, the force required to turn the wrench will decrease considerably, this does not guarantee the main valve is able to be removed. Continue to turn the wrench, in effect “stretching” the main valve to a smaller diameter.

C. Lift upwards to remove the main valve. If considerable resistance is still felt, loosen the main valve an additional turn, and lift upward again.

D. Remove the seat removal wrench and lift the entire main valve/stem assembly out through the lower pipe.

Fig 6. Lift stem assembly out of hydrant

E. To fully remove the main valve, first loosen the set screw(K1721A) in the drain nut (K1721).

Fig 7. Secure lower stem in vice if possible

Fig 8. Loosen drain nut set screw with 5/64” or 2mm Allen key

F. Loosen the drain nut with the drain nut wrench(K1738). If the main valve was “stretched” during removal, rotate it relative to the lower stem(K1718) in the clockwise direction until resistance is no longer felt. Secure the lower stem in a vise if possible when performing this step.

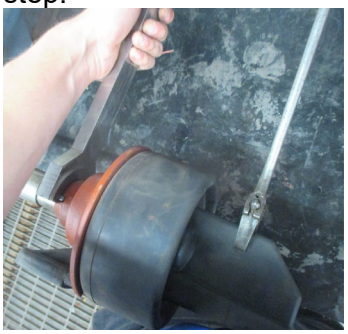


Fig 9. Loosen drain nut

G. Once the drain nut is removed, rotate the main valve in a counterclockwise direction to un-screw it from the lower stem.

Fig 10. Remove main valve

4. Inspect and Replace, if Necessary, Hydrant Components.

5. Reassemble Hydrant.

A. Inspect and clean the threads of the drain valve nut and lower stem with a wire brush.

B. Install the new main valve on the lower stem. Installation is the reverse of disassembly. Tighten the drain nut approximately ½ turn. Make sure to screw on the new main valve in a hand-tight arrangement. Ensure the baffle (K1733) is installed. Tighten the drain nut set screw (K1721A)

Fig 11. Install new main valve

Fig 12. Reinstall drain nut set screw

C. Lower the full stem assembly into the lower barrel. Make sure the “fin” of the main valve is facing opposite the inlet pipe. Allow the main valve to drop into the bottom of the elbow.

Fig 13. Lower main valve into hydrant, ensure main valve reaches bottom of elbow

D. Slide the seat removal wrench over the stem and lugs of the breaker coupling.

Fig 14. Slide seat removal wrench over breaker coupling

E. Turn the wrench approximately 4 ¾ turns to “expand” the main valve. This will correlate to approximately 170 ft*lbs.

Fig 15. Slide seat removal wrench over breaker coupling

F. Remove the wrench and check the position of the slot in the upper stem. This slot must face opposite the intended direction of the steamer face. If slot is in the wrong position, further tighten or loosen the main valve until it is. Use the seat removal wrench to adjust the stem position.

G. Double check the O-rings in the bottom of the neck of the upper barrel(K1712). Replace if damaged. Double check the O-ring at the bottom face of the upper barrel (K1716). Wipe any debris with a clean rag, replace if damaged.

H. Install the upper barrel by guiding the upper stem through the stem bushing(K1711). The slot in the upper stem will be within the neck portion of the barrel by the time the upper stem contacts the op nut.

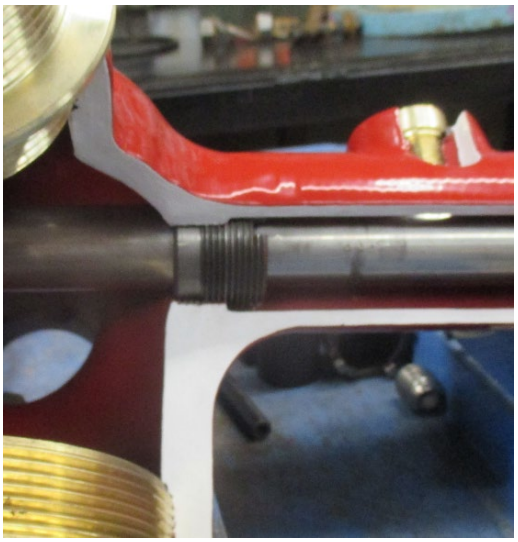


Fig 16. Check the O-rings at this bushing and at the bottom of the upper barrel

I. Turn the op nut and allow the threads to catch. Draw the upper barrel down until the bottom face contacts the upper face of the lower barrel.

J. Rotate the upper barrel until the bushing (K1709) is aligned with the slot in the stem. Look through the hole in the bushing to locate this position. Screw in the stem pin(K1709B) until a sudden stop is reached. Back off the screw ½ turn. The stem pin must sit deep within the bushing and engage the slot in the stem. Verify engagement by rotating the upper barrel, it should not be able to turn more than 1/16 rotation without feeling resistance.

Fig 17. Screw in the stem pin, it must enter the keyway in the stem.

K. Re-install the backing set screw(K1709A). Tighten firmly.

L. Remove the op nut set screw(K1701A), back off the op stop(K1701B) as far is it can from the top side of the pentagon (it cannot come out this way). A 3/8” Allen wrench or socket can be used to accomplish both.

Fig 18. Remove top set screw

Fig 19. Back off the stop

M. Draw up the main valve into the closed position by turning the operating nut, tighten until some resistance is felt. Check the O-ring (K1716) on the bottom face of the upper barrel, ensure that it is completely covered by the mating face of the lower barrel.

Fig 20. Ensure O-ring is covered at upper/lower barrel joint

N. Install barrel couplings(K1717) and tighten bolts (K1715) to approximately 50 ft*lbs.

Fig 21. Note orientation of barrel coupling

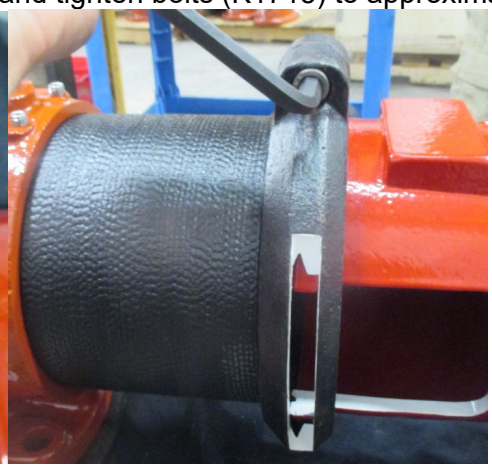


Fig 22. Tighten screws evenly

O. Further close the hydrant until the pentagon is aligned enough to allow the locking wrench(K1731) to slip over the op nut and eyebolt in the neck of the upper barrel.

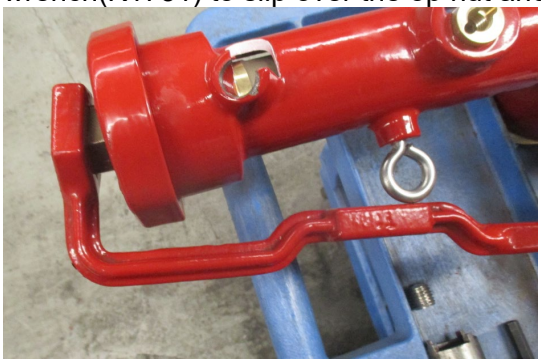


Fig 23. Adjust op nut until wrench can slide over

P. Tighten the Op nut stop (K1701B) with a 3/8" Allen key or socket until a sudden stop is felt. Do not torque against this stop, once a sharp increase in resistance is felt, immediately stop tightening. Then tighten the backing set screw (K1701A) to approximately 125 ft *lbs.

Fig 24. Tighten the op stop until a dead stop is felt

Fig 25. Install backing set screw

Q. Ensure a nozzle or steamer cap is removed (K1728) and open the gate valve upstream. Check for any leaks through the main valve. If this is the case, close the gate valve, back off the stop (K1701B) and further close the main valve, making sure to maintain alignment with the locking wrench.

R. Cycle hydrant to check for free operation.

S. Close hydrant wait for hydrant to drain, then reinstall nozzle cap and tighten