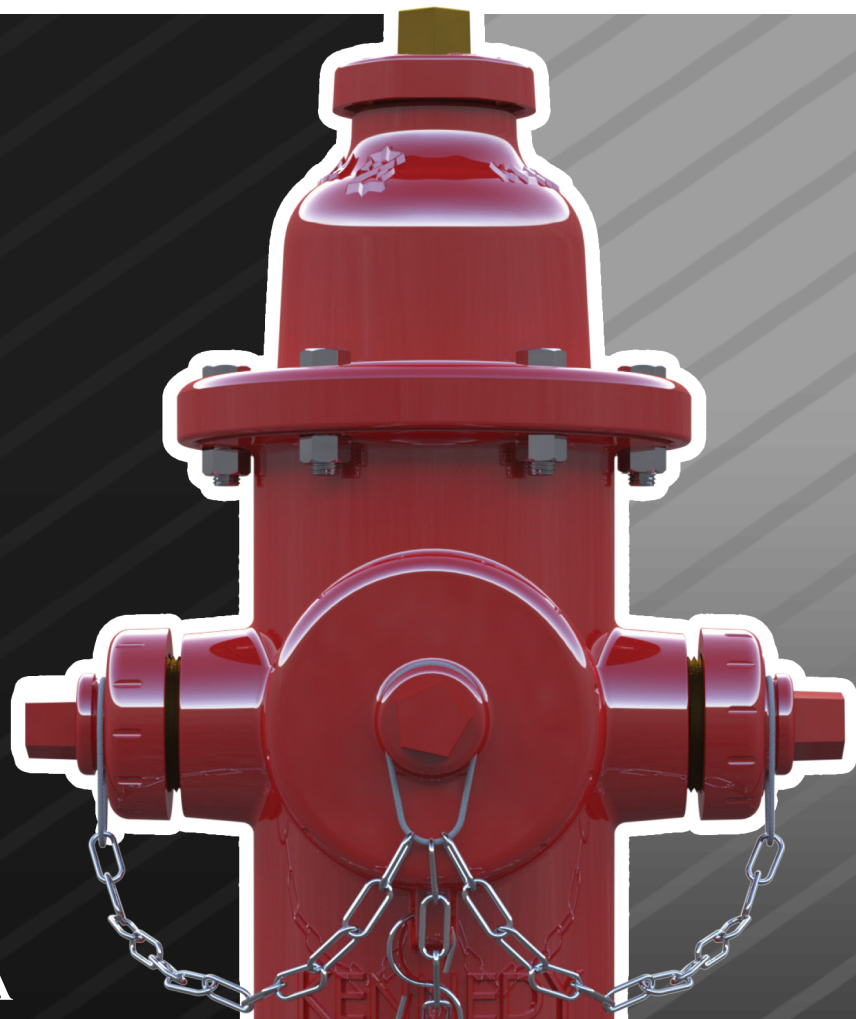




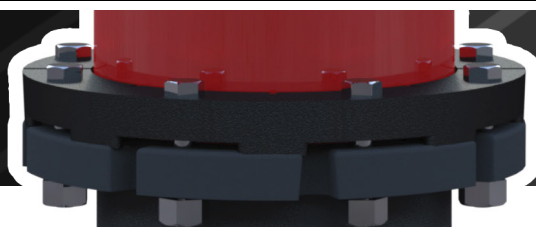
KENNEDY VALVE
GUARDIAN



AWWA

UL/FM

K81-D
Maintenance Manual



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WARRANTY

Kennedy Valve products are guaranteed against defects in manufacture. Any products proved defective within ten years following the date of shipment will be replaced if used in the services for which we recommend them. No charges will be allowed for labor, damages or other expenses occasioned by defective material.

This company makes no other warranties expressed or implied except as provided in this limited warranty.



WARNING

Kennedy Valve recommends following AWWA Manual “M17 Fire Hydrants: Installation, Field Testing, and Maintenance.” **WARNING: Special care should be taken in the installation, inspection, testing, maintenance, and repair of pressure containing devices such as valves and hydrants. To prevent bodily injury, property damage, or damage to the fire hydrant and its supporting structures, use only a diffuser or a flexible hose (properly restrained at the point of discharge) for flushing or flow testing. FAILURE TO FOLLOW PROPER PRACTICES AND GUIDELINES CAN RESULT IN SERIOUS BODILY INJURY OR DEATH.**

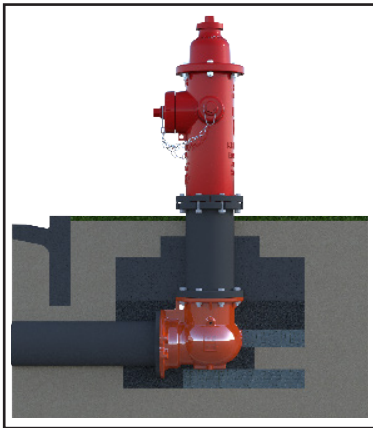
Note

In accordance with Federal OSHA requirements, replaced hydrant parts should be disposed of in a manner which is consistent with their materials of construction. We recommend that you contact the Institute of Scrap Iron & Steel, Inc. at (202) 466-4050 or Kennedy Valve at (607) 734-2211 (Engineering) for recommendations.



Installation

1. When hydrants are received from manufacturer they should be handled carefully to avoid breakage and damage to flanges. Keep hydrants closed until they are installed. Protect stored hydrants from the elements, if possible.
2. Before installation of hydrants clean piping and elbow of any foreign matter.
3. Install hydrants away from the curb line a sufficient distance to avoid damage from or to overhanging vehicles. A set-back of 2 ft. from the curb line to the point on the hydrant nearest the curb is recommended. The pumper outlet nozzle should face the street. Make sure that the outlet nozzles are high enough above the ground line for hose attachment and that there are no obstructions to prevent operation.



In setting up a hydrant, the elbow should be placed on a flat stone or other solid foundation. It is good practice to brace the side of the base opposite the inlet to oppose the stress due to pressure tending to force the hydrant off the end of the lateral. Hydrants must be firmly supported underground all around the standpipe, especially where there is no concrete sidewalk to help support them. This is particularly important since the proper working of the Safety Breakable Section in severe impact depends upon unyielding support of the underground standpipe.

4. The bottom and lower part of the hydrant should be surrounded with broken stone or coarse gravel so that water released from the standpipe by the drain valves may escape quickly. The stone-filled area should contain a volume of water at least twice that held by the hydrant barrel.
5. Both drainage stone and earth fill above the stone should be tamped to give firm support to the hydrant barrel.
6. It is recommended practice to install an auxiliary or secondary gate valve in the lateral between the hydrant and the main. This permits inspection and repair of hydrant without shutting down mains. Check the hydrant and auxiliary valve for perpendicular setting.
7. After the hydrant is installed and the line as well as the hydrant have been hydrostatically tested, the hydrant should be flushed and then checked for proper drainage.
 - A. A nozzle cap should be removed, then the hydrant opened fully. This will flush out any dirt or sediment which may have accumulated during installation.

After the hydrant is flushed, close it, replace the nozzle cap, then open the hydrant again and inspect all joints for leaks: Close the hydrant again, remove a hose cap and/or steamer cap to test your hose thread for proper fit.
 - B. Before replacing the hose cap and/or steamer cap, check the inside of the hydrant for drainage. This can be

accomplished by placing the palm of the hand firmly over the nozzle outlet. Drainage rate should be sufficiently rapid to create a suction.

Note:

In certain areas ground water stands at levels above that of hydrant drains. In such cases it is recommended that hydrant drains be plugged at the time of installation. If drains are plugged, hydrants in service in cold climate areas should be pumped out after usage. Mark such hydrants to indicate the need for pumping out after usage.

Operation

The Guardian hydrant requires a minimum of torque to be operated. It is possible to damage the hydrant by forcing it beyond the limits of the operating nut travel with excessive torque; therefore, the following steps are recommended:

1. CHECK DIRECTION OF OPENING as marked on the dirt shield.
2. TO OPEN, DO NOT FORCE THE HYDRANT IN THE OPENING DIRECTION BEYOND FULL OPEN as indicated by sudden resistance to turning. If water does not flow when the hydrant is open, it is probably due to a closed valve upstream from the hydrant.
3. WHEN USING HYDRANT, hydrant should be opened full. Partially opened hydrant may allow substantial leakage through the drain valves. This may prevent the hydrant from draining properly when it is shut down. Operation of hydrant in this manner over a period of time could also undermine the hydrant and/or the water main.
4. TO CLOSE, turn the operating nut until the valve closes off the flow. Always shut off hydrant slowly. In old water mains where corrosion has taken its toll, or even on new mains where high pressure is maintained, closing the hydrant too rapidly could cause a water hammer resulting in damage to the main.

IT IS NOT NECESSARY to OPEN or CLOSE the hydrant with great force. When closing the hydrant, the closed position will be evident by a reduction in the effort required to close it. When that position has been reached, back off the operating nut in the opening direction one-quarter turn to take the strain off the operating parts of the hydrant and to make it easier to open the hydrant when needed again.

Maintenance

It is recommended the hydrant be inspected twice yearly, in the spring and fall. In extremely cold weather it is advisable to inspect hydrant after each use.

Maintenance and adjustments are easy and economical with the Guardian hydrant. All parts which are susceptible to damage or rough treatment can be reached without excavation or expensive equipment. The main valve, seat ring, drain valve, drain valve seat and the stem may all be easily withdrawn and replaced by one man.

Inspection or renewal are practical without disturbing the standpipe, pavement or mains. Inspection should cover the following points:

1. Physical examination noting condition of operating nut, nozzle caps and drains, and general appearance.
2. Use an Aquaphone and listen for leakage through main valve.
3. To check for leakage at seals loosen one hose cap one-



half turn. Check ease of operation while fully opening hydrant. When all the air has escaped through the hose cap and the hydrant is full, re-tighten the hose cap and check for leakage at joints, packing or seals, and outlet caps.

4. Close hydrant and remove one nozzle cap. Observe drainage.
5. Open hydrant completely, flush hydrant and observe flow. Care should be taken that the water coming from hydrant will not cause any damage to surrounding area.
6. Close hydrant slowly to insure tight closure.
7. Clean and lubricate all nozzle threads. Replace caps, tighten with spanner wrench, then back off slightly so that the caps will not be excessively tight, but have sufficient frictional resistance to prevent removal by hand.
8. Lubricate stem threads through the Alemite fitting centered in the operating nut (one or two pumps with a grease gun).
9. Clean the exterior of the hydrant and repaint, if necessary.
10. Be sure any auxiliary valves are in the wide open position.
11. Keep complete records on inspection and location of all hydrants in the system.

Problems & Solutions

Various problems which occur in the field are described below with hints on how to solve them.

Stem Binding: Rap the hydrant dome with hammer or spanner wrench. This often will unbind the stem. If stem still binding, loosen dome bolts. Stem should then operate easily. Retighten bolts evenly.

Poor Drainage: It is possible dirt or pebbles may have plugged the drain holes. Presence of water or ice standing in barrel can be checked using a plumb bob.

To correct:

1. Screw nozzle caps on tightly to prevent leakage.
2. Open hydrant slowly until you hear water entering barrel of hydrant. This will allow water to enter the hydrant with drain valve in an open position. When enough pressure builds up in the barrel any dirt or foreign objects causing the blockage should be forced out.
3. After a few minutes, resume turning the operating nut until the hydrant is fully opened.
4. Slowly shut off hydrant.
5. Remove one of the nozzle caps.
6. Observe through nozzle port to make sure water in barrel is receding. Drainage should be sufficiently rapid to create a suction if palm of hand is placed over a nozzle outlet during drainage.
7. Check again for seat leakage with the Aquaphone.

Poor Shutoff: DO NOT exert extra torque forcing hydrant to close. Trouble may be a stone lodged between the seat and the main valve. Forcing closure may damage the hydrant. Stones or other foreign objects are the usual causes of this problem. To correct this problem, remove one or both nozzle caps and open hydrant fully to flush out any foreign material.

Care should be taken that water coming from hydrant will not cause any damage to surrounding area. Attach a canvas apron if necessary, to direct the flow into the street.

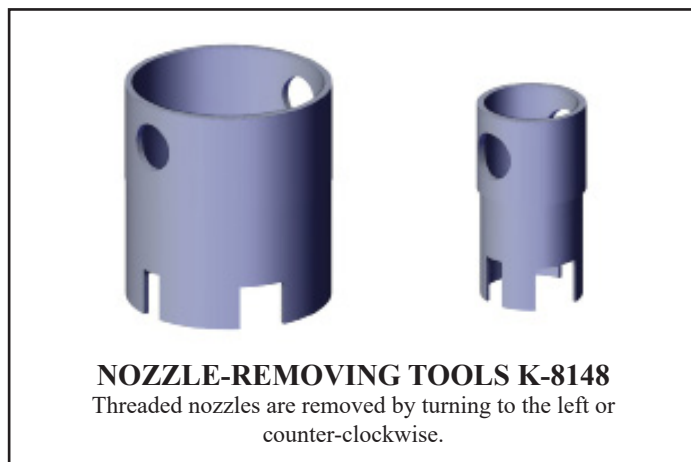
Shut off hydrant slowly until fully closed. Put your ear to nozzle opening to hear if water has stopped coming through main valve.

Removing Nozzles

In 1982 most Guardian hydrants were changed from threaded (12 T.P.I.) nozzle to 1/4-turn nozzle, designed to provide easy replacement in case of damage. Both hose and steamer nozzles are 1/4-turn, left-hand thread segments, and are secured by a stainless steel retaining screw. 1/4-turn nozzles can be removed without difficulty by following these steps:

Instructions to remove 1/4-turn nozzles:

1. Remove nozzle cap (K-8144).
2. Remove nozzle retaining screw (K-8141) using a 1/4" Hex Allen Wrench and turning counter-clockwise.
3. Insert nozzle removing wrench (K-8148) into nozzle (K-8140) and engage nozzle lugs with slots in wrench.
4. Use a 1" diameter bar to turn the nozzle wrench in a clockwise* direction (right) 1/4-turn and remove the nozzle. Note: Nozzles are held in the upper by segments of a left-hand thread.
5. Remove the old nozzle "O"-Ring (K-8145).
6. Inspect the nozzle seating surface in the upper barrel (K-8115) and remove any dirt or sediment.
7. Lubricate the new "O"-Ring and place into upper barrel.
8. Insert new nozzle and use nozzle wrench (K-8148) and 1" diameter bar to turn nozzle approximately 1/4-turn counter-clockwise (left). Turn nozzle so the nozzle retaining screw will clear the shoulder on the upper casting when it is inserted.
9. Check that the nozzle "O"-Ring is compressed evenly.
10. Lubricate the nozzle retaining screw with a Moly-Type grease and thread it into nozzle until it is flush with the nozzle I.D.
11. Inspect nozzle cap gasket (K-8143) and replace if necessary.
12. Install nozzle cap and tighten.



Extension of K81 Guardian for Raise in Street Grade

Height extension of the Guardian hydrant to compensate for a raise in street grade is easily accomplished through the use of the Guardian extension kit (K-8150) without any excavation or interruption of water service and without discarding any parts of the existing hydrant. Extensions are available in 6" increments from 6"- to 36"-in length.



The parts supplied with a kit consist of a barrel extension piece and an extension stem of suitable length with all necessary hardware to insert between the upper and lower hydrant sections. The upper barrel and stem sections are connected to the new parts by means of the original standpipe breaking ring and stem coupling.

The entire change can be handled by one man in less than 30 minutes. The new assembly is as rigid and operates as easily as a single piece hydrant.

If the extension increases the overall bury of the hydrant to more than 8 feet, it is strongly recommended that a “deep bury” lower stem be used to minimize chatter.



GRADE EXTENSION KIT K-8150

Extension Instructions

For hydrants not equipped with Stop Nut on Upper Stem. Stop Nut is furnished on all 4”- and 4-1/2”- Mathews-Guardian inserts and on Guardian Hydrants where specifications require. See diagram on this page.

1. Remove cap bolts and nuts (K-8108).
2. Remove cap assembly by placing hydrant wrench on the operating nut (K-8102) and turning in direction to open hydrant. Assembly will walk off stem (K-8114).
3. Remove standpipe breaking ring bolts and nuts (K-8118).
4. Remove standpipe breaking rings (K-8119).
5. Lift upper barrel (K-8115) over stem (K-8114).
6. Remove Coupling Pin (K-8122R) from stainless steel lower coupling pin (K-8122R) and remove pin from the coupling (K-8116).
7. Remove upper stem section with coupling (K-8114 & K-8116).
8. Remove extension stem and coupling from kit (K-8150) and fasten stem to coupling with allen socket head coupling pin provided (K-8150 kit).
9. Place extension stem with coupling (K-8150 kit) on lower stem section (K-8123). Line up pin holes and fasten with allen socket head coupling pin provided (K-8150 kit).
10. Place fiber gasket (K-8150 kit) on lower barrel flange.

11. Place extension spool over stem and fasten with bolts and nuts provided (K-8150 kit).
12. Place upper stem section with breaking coupling (K-8114 & K-8116) on extension stem, line up pin holes, insert stainless steel lower coupling pin and fasten with Clevis Pin.
13. Check “O”-Ring (K-8120) on lower flange of upper barrel. If damaged, replace with new “O”-Ring provided (K-8150 kit).
14. Place upper barrel section (K-8115) over stem and orient nozzles in proper position.
15. Replace standpipe breaking rings (K-8119).
16. Insert bolts and nuts (K-8118) and tighten evenly to 30-35 Ft.-Lbs.
17. Check gasket at hydrant cap flange. If damaged, replace with fiber gasket provided (K-8150 kit).
18. Place cap assembly (K-8107) over hydrant stem carefully so as not to damage “O”-Rings (K-8111) and turn in direction to close hydrant. Insert two cap bolts (K-8108) to align flanges and draw down until snug.
19. Replace cap bolts and nuts (K-8108) and tighten.
20. Cycle hydrant to test for leaks or binding.



Repairing Directions for Breakout Couplings on K81A, K81AD & K81AW Hydrants

For hydrants not equipped with Stop Nut on Upper Stem. Stop Nut is furnished on all 4”- and 4-1/2”-Mathews-Guardian Inserts and on Guardian Hydrants where specifications require. See diagram-page 5.

1. Remove broken stem breaking coupling and standpipe breaking rings.
 - A. Remove the broken stem breaking coupling (Item K-8116) from the lower stem and remove the lower coupling.
 - B. With a socket wrench, remove the bolts (Item K-8118)

holding the broken standpipe breaking rings (Item K-8119) pieces and remove the pieces. Lay the hydrant upper on the ground.

2. Remove stem from hydrant upper.
 - A. Unscrew the upper stem (Item K-8114) from the operating nut (Item K-8102) by holding the stem stationary and turning the operating nut in the direction to open.
 - B. Remove broken upper stem breaking coupling (Item K-8116) and the upper coupling pin.
3. Install new stem coupling.
 - A. Place the new stem breaking coupling (K-8149 kit) on the upper stem and secure with the upper coupling pins provided (K-8149 kit).
 - B. Slide the upper stem and coupling assembly over the lower stem. Push in the lower coupling clevis pin and fasten with the bridge pin.
4. Remove the cap from hydrant upper.
 - A. Place the hydrant upper barrel (Item K-8115) on cardboard or other clean surface.
 - B. With a socket wrench, remove the bolts (Item K-8108) holding the cap (Item K-8107) to the upper barrel and remove cap.
5. Reassemble hydrant.
 - A. Check the "O"-Ring (Item K-8120) on the bottom of the hydrant upper barrel. Replace if damaged (K-8149 kit).
 - B. Set the hydrant upper barrel over the stem and orient the nozzles in the direction required.
 - C. Place the breaking rings on the lower barrel (Item K-8124) flange and around the upper barrel. Replace the bolts in the breaking rings and finger tight.
 - D. Replace the hydrant cap gasket (Item K-8109) (K-8149 Kit) and lower the cap over the stem. (Be careful not to damage the "O"-Rings (Item K-8111) in the cap.) Start the upper stem into the operating nut by turning the operating nut in the direction to close. Turn until the cap is seated on the upper barrel.
 - E. Replace the cap bolts (Item K-8109) and tighten.
 - F. Tighten the breaking rings bolts (Item K-8118) evenly to 30-35 Ft./Lb.

NOTE: CHECK FOR FREE OPERATION BY CYCLING THE HYDRANT FROM FULLY OPEN TO FULLY CLOSED.



Collision Repair Kit

K81A, K81AD, K81AW

5-1/4"-ITEM #1-58008

4-1/2"-ITEM #1-58007

DESCRIPTION	QUANTITY
Stem breaking coupling	1
Breaking ring	2
Flange seal "O"-Ring	1
Gasket hydrant cap	1
Coupling Pin	2
Screw hex head plated 1/2" x 2-3/4"	8
Nut finished hex plated 1/2"	8
Instruction Sheet	1

PROPER TOOLS REQUIRED

Figure 111 spanner wrench with proper sized operating nut opening	1
Hammer	1
Pliers	1
3/8"- or 1/2"-drive ratchet with 3/4"-socket	1
AND	
3/4"-open or box end wrench	1
OR	
3/4"-open or box end wrenches	2

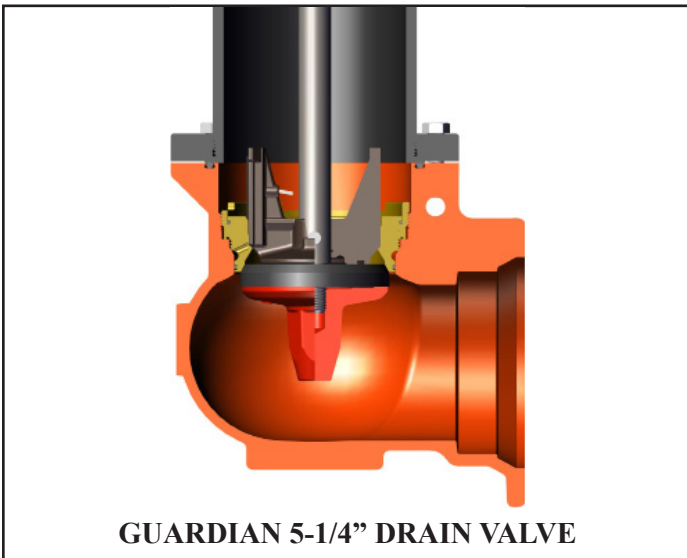
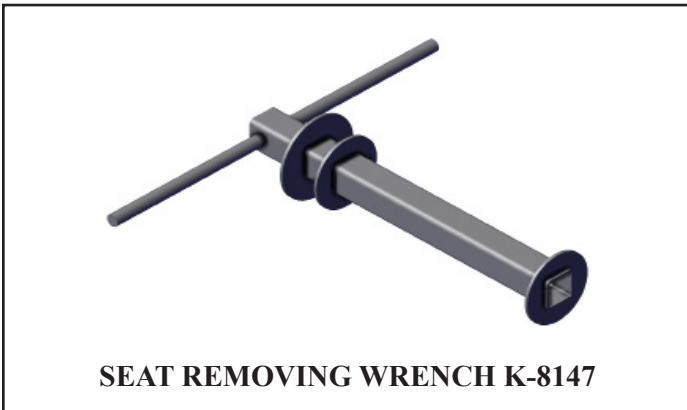
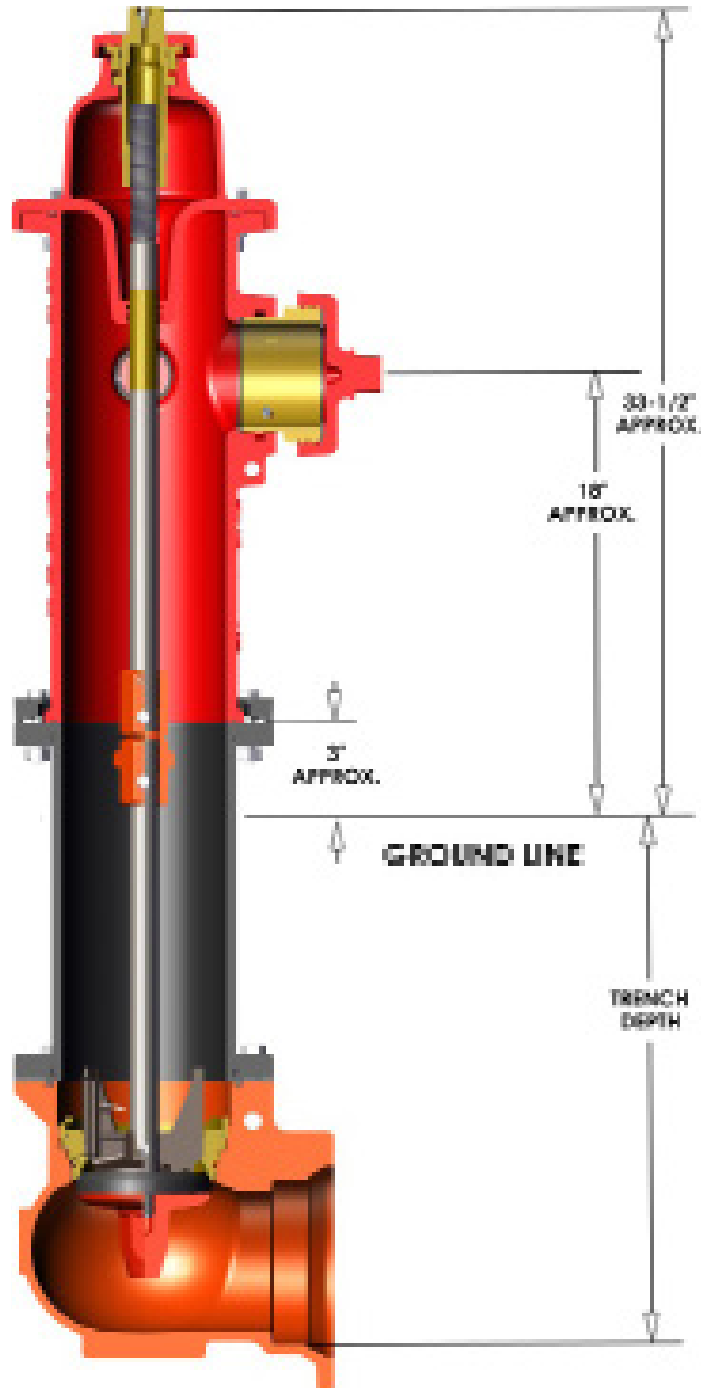
Hydrant Seat Instructions

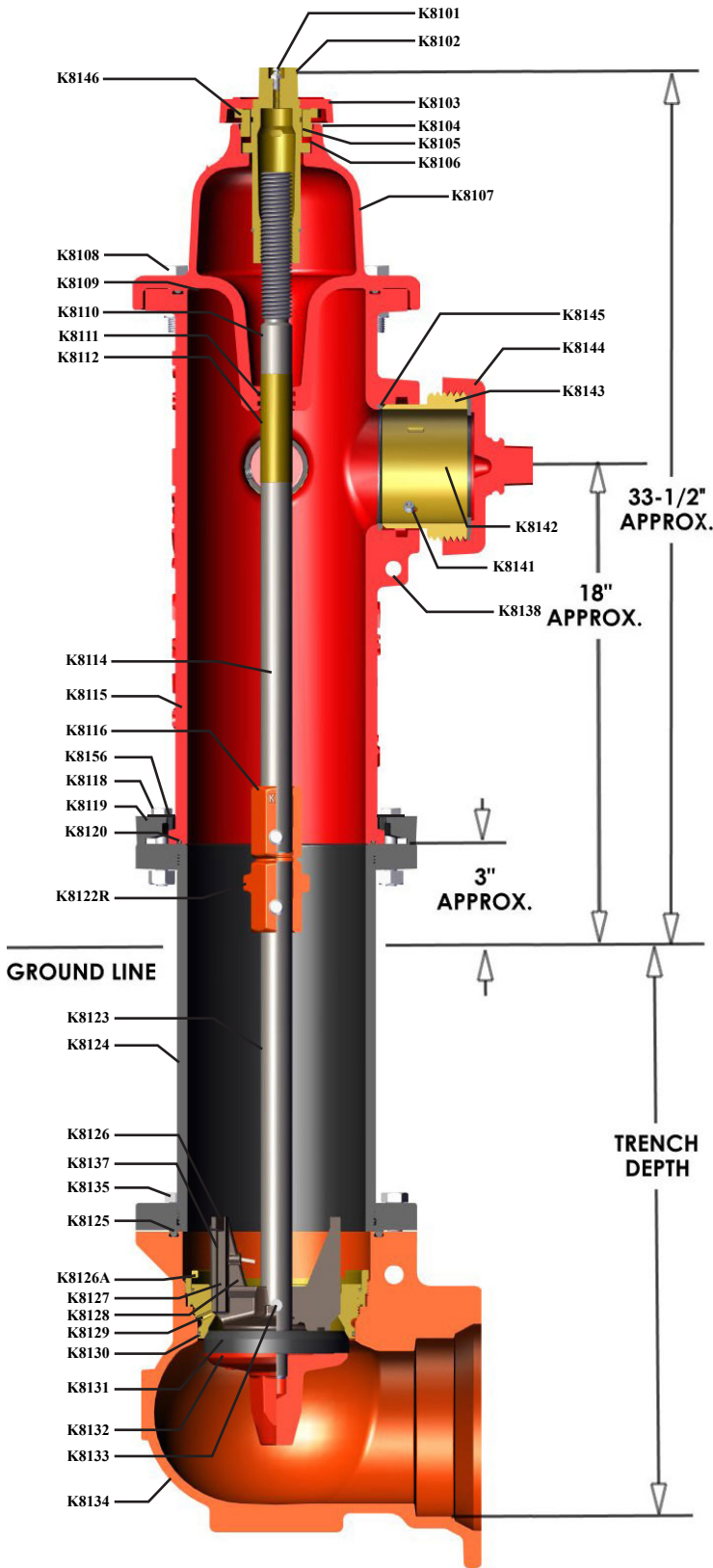
REMOVING WRENCH ON GUARDIAN HYDRANT

For hydrants not equipped with Stop Nut on Upper Stem. Stop Nut is furnished on all 4"- and 4-1/2"-Mathews-Guardian Inserts and on Guardian Hydrants where specifications require. See diagram-page 5.

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. Remember, for operator safety, remove the nozzle cap before opening the hydrant.
2. Removal of Hydrant Cap.
 - A. With a socket wrench, take out the bolts (K-8108) holding the cap (K-8107).
 - B. Turn the operating nut (K-8102) in the direction to open and hold the cap to keep it from rotating as the operating nut unscrews and lifts the cap. Turn until the operating nut walks off the stem (K-8114).
 - C. Lift the cap straight up and off. Take care not to damage the "O"-Rings (K-8111) in the lower part of the cap.
3. Removal of Stem and Drain Valve Assembly
 - A. Slide the seat removing wrench (K-8147) over the stem and down into the upper barrel (K-8115). Thread the seat removing stem nut (K-8147) on to the stem.
 - B. Turn the wrench while tightening the nut to align it with the stem breaking coupling (K-8116). This will allow the coupling to be drawn into the wrench.
 - C. Lift on the wrench, to pull the drain valve (K-8136) firmly into the seat ring (K-8128) and turn the wrench counter-clockwise to unscrew the seat ring.

- D. Lift the entire drain valve and stem assembly, with the seat ring and seat removing wrench, out of the standpipe. Do not allow the seat ring to rub against the lower.
- E. Inspect to be sure “O”-Rings (K-8126A and K-8130) are not in the standpipe.
- 4. Inspect and Replace, if Necessary, Hydrant Components.
- 5. Reassemble Hydrant.
 - A. Place the seat ring, stem, breaking coupling and hydrant drain valve as a unit into the wrench. Check to assure “O”-Rings (K-8126A and K-8130) are in place. Engage the wrench (K-8147) on the stem breaking coupling and tighten.
 - B. Insert this assembly into the barrel and lower carefully.
 - C. Turn the wrench one full turn counter-clockwise to line up the threads to prevent cross-threading. Then turn clockwise to tighten the seat ring. Tighten to 100 Ft.-Lbs. +/- 10 Ft.-Lbs.
 - D. Remove the wrench.
 - E. Lower the cap assembly onto the stem carefully so as not to damage “O”-Rings and turn the operating nut in the direction to close the hydrant, until the cap seats on the barrel, align the bolt holes in the cap and bolt to the barrel.
 - F. Close the hydrant and open the gate valve controlling flow of water to the hydrant.
 - G. Cycle hydrant to check for free operation.
 - H. Close hydrant, wait for hydrant to drain, then reinstall nozzle cap and tighten.





DETAIL & PART	MATERIAL	ASTM SPEC (or as stated)
K8101	ALEMITE FITTING	STAINLESS STEEL A276 (304)
† K8102	OPERATING STEM NUT	BRONZE B584 C87850
K8103	DIRT SHIELD	CAST IRON A126 CLASS B
K8104	STEM LOCK NUT	BRONZE B584 C87850
† K8105	O-RING	BUNA-N (SYN. RUBBER) D2000
† K8106	THRUST WASHER	NYLATRON GS MIL LP-410
K8107	HYDRANT CAP	CAST IRON A126 CLASS B
K8108	CAP BOLTS & NUTS	STAINLESS STEEL F593C/F594
† K8109	CAP O-RING	BUNA-N (SYN. RUBBER) D2000
* K8110	STEM FERRULE	BRASS B135 C26000
† K8111	O-RING	BUNA-N (SYN. RUBBER) D2000
* K8112	O-RING	BUNA-N (SYN. RUBBER) D2000
K8114	UPPER STEM	C.R. STEEL A108
K8115	UPPER BARREL	CAST IRON A126 CLASS B
K8116	STEM BREAKING COUPLING	CAST IRON A126 CLASS B
K8118	BOLTS & NUTS	STAINLESS STEEL F593C/F594
K8119	BREAKING RING	CAST IRON A126 CLASS B
K8120	O-RING	BUNA-N (SYN. RUBBER) D2000
K8122R	COUPLING PINS	STAINLESS STEEL 410
K8123	LOWER STEM	C.R. STEEL A108
K8124	LOWER BARREL	DUCTILE IRON ANSI 21.50, 21.51
† K8125	ELBOW O-RING	BUNA-N (SYN. RUBBER) D2000
† K8126A	O-RING	BUNA-N (SYN. RUBBER) D2000
* K8127	SEAT RING INSERT	BRONZE B584/C87850
† K8128	SEAT RING	BRONZE B584/C87850
K8129	DRAIN TUBE	BRASS B135 C23000
† K8130	O-RING	BUNA-N (SYN. RUBBER) D2000
† K8131	MAIN VALVE	EPDM
K8132	BOTTOM PLATE	CAST IRON A126 CLASS B
K8133	DRAIN VALVE PIN	STAINLESS STEEL 410/416
K8134	ELBOW	DUCTILE IRON A536 10 70 50 05
K8135	ELBOW BOLTS AND NUTS	STEEL-302/304 STAINLESS ASTM F593
K8136	DRAIN VALVE	BRONZE B806 C95400/C95500
† K8137	DRAIN VALVE FACING W/INSERT	BUNA-N W/STAINLESS STEEL D2000/A276 (304)
K8138	NOZZLE CHAIN 'S' HOOK	STEEL A108
K8139	NOZZLE CAP CHAIN	STEEL A108
K8140	NOZZLE CHAIN BAND	STEEL A108
† K8141	NOZZLE RETAINING SCREW	STAINLESS STEEL A276 (304)
# K8142	NOZZLE: HOSE / STEAMER	BRONZE B806C95400/B584C87850
†# K8143	NOZZLE CAP GASKET	RUBBER D2000 TYPE AA
# K8144	NOZZLE CAP	CAST IRON A126 CLASS B
†# K8145	O-RING	BUNA-N (SYN. RUBBER) D2000
K8146	ALLEN HEAD SET SCREW	STAINLESS STEEL A276 (410)
K8147	SEAT REMOVAL WRENCH	
K8148	NOZZLE REMOVAL TOOLS	
† K8149	COLLISION REPAIR KIT	
K8150	GRADE EXTENSION KIT	
K8156	BREAKING RING STRAPS	

* Denotes that part is available only as part of an assembly
 # Must specify type of Nozzle, Hose or Steamer.
 † Recommended spare parts.

NOTE: Also available in DI 350 PSI.



Kennedy Valve

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