KENNEDY VALVE

Division of McWane, Inc.

1021 East Water Street
P.O. Box 931
Elmira, New York 14902-0931
Telephone (607) 734-2211
Fax (607) 734-1003

KENNEDY VALVE RESILIENT SWING CHECK MAINTENANCE MANUAL

I. SELECTION

Check valves are for the prevention of backflow. Particular check valves perform additional services as follows:

1. Wafer check valves reduce the effect of water hammer (FM approved for such service).
2. Outside lever check valves may be fitted with a limit switch to detect flow.

General Service by Product

1. Figure 106/1106 Check Valve

   For service in other than fire protection lines and other than a connection to a potable water system where there is the possibility of a pollutant in the user's system back flowing into the potable water system. The 106/1106 check valves should not be used if water hammer is a known problem.

   a. Standard Figure 106/1106 brass to brass seating – General service, cold water, and non-shock up to 200 psi. Allows backflow (when new) up to 1 oz/hr/in nominal size at 200 psi back pressure (possibly more at low back pressure.
   b. Figure 106A/1106A - Resilient rubber to brass seating for General service, cold water, non-shock, at temperatures not exceeding 125°F. Provide drip tight sealing (when new). May allow some backflow at conditions of low backpressure (less than 5 ft H_2O backpressure) preferred for service when water hammer check cannot be used. Not for steam service.
   c. Outside lever (lever & spring/lever & weight) – occasionally used where water hammer might be a problem. Occasionally fitted with limit switches to detect flow. Rarely arranged to counter balance disc and reduce head loss at low flows. Levers may be a safety hazard for personnel if the valve opens suddenly.

2. Figure 126/1126 Check Valves

UL/FM approved for fire protection service. All other remarks for Figure 106/1106 valves apply. Differ from 106/1106 valves in body length and primary pressure rating.

3. Figure 706 Wafer Checks

   UL/FM approved for service where hammer is a problem. Fit between standard ASME/ANSI B16.1, Class 125 flanges. Drip tight sealing at backpressures greater than 5 fl. H_2O. Recommended for service where water hammer is a problem. Not for steam service.

4. Figure 426 Groove Check Valves

   UL/FM approved for service where an approved grove coupling is desired. This valve may be installed in either horizontal or vertical positions (flow up). All valves have a ½" NPT connection on the inlet size for installation of a ½" ball drip.

5. Figure 506 Resilient Hinged Check Valve

   This AWWA valve eliminates most problems associated with swing check valves. It is ideal for dirty water applications. Design is simple requiring no maintenance.

6. Figure 306/1306 Increasing Check Valve

   Utilizes same components as used in the 106/1106 swing check valve. Used where you need to increase the size of outlet side pipe.

7. Figure 206/1206 Cushion Check Valve

   Utilizes same internal components as the 106/1106 swing check valves but additionally has an air cylinder, which retards the closing of the check valve.

General Selection Information

1. For swing check valves to function properly and not be a source of chatter and water hammer, there must be at least ½ psi differential across the valve under normal flow conditions. When in doubt, undersize check valves.
2. For service in normal environments (clear water or dry air) at temperatures less than 100°F, resilient seated valves will allow less backflow and minimize water hammer vs. metallic seated valves.
3. For service other than clean water, consult the factory.
4. Levers may injure personnel and may be misused by persons to open the valve and allow backflow.

INSTALLATION

All Kennedy AWWA and UL/FM check valves bolt between ASME/ANSI B16.1, Class 125 flanges.

A. Swing Check Valves

1. Orientation

   a. Swing check valves are always installed with the hinge pin parallel to the place of the horizon and above the pipe centerline. Incorrect installation may result in binding, high head loss, and/or hanging open.
   b. Figure 106/1106 & 126/1126 check valves must be installed with the flow horizontal or the flow up.
   c. Outside lever swing check valves must be installed with the end of the lever that is fixed to the hinge pin higher than the opposite end. Failure to do this will certainly void the function of the check and may result in backflow.

2. Lifting

   Lift swing check valves with a sling around the body. Never lift valves by placing a bar or fork through the valve.

3. Clearances

   a. Allow two pipe diameters clearance minimum from the top of the cover for removal of the disc without removing the valve from line.
   b. Allow a minimum of one pipe diameter on one side of the valve and two and a-half (2-1/2) pipe diameters on the opposite side for removal of the hinge pin.
   c. If space is limited, consult factory for space limitations with outside lever valves. Levers may be a safety hazard for personnel and lever valves should be installed where personnel will not normally be in the area or guards should be installed.

4. Start-up

   The lines should be bled of air.

5. Gaskets

   See page 8.

B. Wafer Check Valves – C508

1. Orientation

   a. The hinge pin should be parallel to the plane of the horizon and above the centerline of the pipe.
   b. Wafer check may be installed horizontally or vertically with the flow up.

2. Gaskets

   The wafer check valves bolt between ASME/ANSI B16.1, Class 125 flanges and do not require gaskets (o-rings being provided).

3. Fasteners

   Threaded rods are usually used to fasten up the wafer check.

4. Lifting

   Some sizes may be provided with a threaded hole for inserting an eyebolt for lifting.

III SERVICE LIMITATIONS (Pressure Temperatures)

All valves, all services 32°F minimum working temperature non-shock.

A. UL/FM (Figure 126/1126) valves are for service at 175 psi maximum and 125°F maximum, water only.
B. Figure 106A/1106A (Resilient Seated Checks)

   1. Cold water service (125°F maximum)

      Sizes: 2” to 12” - 200 psi maximum
      Sizes: 14” to 24” - 150 psi maximum

C. Figure 106/1106 (Metallic Seated Checks)

   1. Cold water service (150°F maximum)

      Sizes: 2” to 12” - 200 psi maximum
      Sizes: 14” to 24” - 150 psi maximum

IV MAINTENANCE, CHECKING AND TESTING

A. Swing Checks

Excepting misuse and severe service, maintenance should be limited to the following:

1. Seating surfaces;
2. Bearing surfaces (hinge pins, hinges and side plugs);
3. Replacement of parts subject to corrosion; and
4. Lubrication and repacking of hinge pin stuffing boxes and o-ring stuffing boxes for outside lever valves.

Replacement of resilient disc rings (item #1) and lubrication and repacking of stuffing boxes for outside lever valves (item #4) are the only items subject to regular replacement maintenance or repair.

Replacement of parts subject to corrosion is unpredictable, as corrosion conditions are unknown and subject to many variables. Only the field service representative is qualified to judge when a part is corroded beyond use or safe limits and should be replaced; for replacement procedures see the section on replacing disc rings.

Kennedy Valve is not aware of a case where the bearing surfaces have been worn beyond use, but the possibility remains.

The field service representative must decide what item has worn and replace it.

1. Resilient Discs

    a. When to replace
        1. Replace resilient disc rings whenever leakage is judged excessive or at scheduled intervals.

    b. Replacement parts (order from factory for correct size)

        1. Disc ring
        2. Cover gasket or o-ring (advisable, but not always required, see Schedule Page 8 for sizes).
        3. Anaerobic sealants low strength “Loctite” or equal.
        4. O-ring(s) or gasket for disc bolt (advisable, but not always required).

    c. Special tools

        None

    d. Procedure (see 22 below for lever valves)

        1. Remove cover.

2. Remove side plugs. Use an appropriate size socket or box wrench not an adjustable or pipe wrench.
3. Drive hinge pin out with wooden dowel.
4. Lift hinge/disc assembly from valve ("V" notches in side of valve provide clearance for disc assembly).
5. Remove nut retaining disc plate. At this time, it might be advisable to remove the disc bolt and replace the o-ring(s) or gasket on the disc ball.
6. Lift the disc plate off. If the disc plate sticks, try tapping the back of the disc assembly with a soft faced mallet. Pry it off only as a last resort.
7. Remove the resilient disc ring.
8. Clean the "pocket" where the disc ring seats in the disc holder.
9. Replace the resilient disc ring (seat) with a new one, seating it flat and centered in the "pocket" in the disc holder. Do not use gasket sealant.
10. Clean the back of the disc plate.
11. Polish the seat ring in the valve body with crocus cloth or 600 grit wet/dry sandpaper (see Page 7).
12. If the disc bolt has been removed, lubricate the hole in the disc holder and the disc bolt with clean grease. Then carefully insert the disc bolt through the hinge and disc holder taking care not to twist or cut the o-ring(s).
13. Replace the disc holder by positioning it over the threaded portion of the disc bolt.
14. Replace the disc bolt nut and use a low strength anaerobic sealant. Do not over tighten the disc bolt nut. Tighten the nut only to the point that the disc plate makes a very slight impression into the resilient disc ring.
15. Carefully position the disc/hinge assembly through the cover flange and align with side plug holes and insert the hinge pin.
16. Replace the side plugs, starting by hand, and then tighten with 300 in-lb torque.
17. Inspect the cover sealing surfaces and clean if needed.
18. Inspect the cover gasket or o-ring and replace if needed (order from Kennedy Valve or see Schedule on Page 8).
19. Tighten the cover bolts in an alternating pattern, tightening two bolts at 180° snug, and then tighten two bolts 90° to the first two and 180° to each other, finally tightening all bolts tight. (See Schedule on Page 8 for specific torque.)
20. Pressurize and bleed the valve, checking for any leaks and tighten joints as necessary.
21. Procedure for outside lever valves; same as for valves without outside lever except:

a. Remove spring or weight before removing cover.
b. Loosen setscrew on lever and remove lever and key.
c. Remove side plug packing gland.
d. Remove side plug opposite hinge pin.
e. If setscrews are used on hinge, remove them.
f. Lubricate extended hinge pin.
g. Remove side plug stuffing box from valve.
h. Drive the hinge pin out with a hardwood dowel. (It may be necessary to heat the hinge, but this should be avoided if at all possible).
i. Replace resilient disc ring as above.
j. Lubricate hinge pin and start hinge pin and key into the hinge.
k. Replace the side plug (normally on left-hand side as seen facing valve inlet).
l. Drive hinge pin in with a soft tool (make certain that key and key seats remain lined up).
m. Replace set screws in hinge (if any).
n. Repack or replace rings in the side plug stuffing box.
o. Start packing gland into side plug stuffing box.
p. Replace lever, lever key, and setscrew on extended hinge pin.
q. Tighten side plug stuffing box. Tighten slowly and move lever frequently so as to not over tighten and cause valve to hang open.
r. Replace cover
s. Replace spring or weight.
t. Pressurize and bleed.

2. Seat Rings/Disc Rings

a. When to polish

Leakage is considered excessive.

b. Replacement parts

See Pages 7 & 8.

c. Supplies

Crocus cloth or very fine (600 grit maximum) wet/dry sand paper or valve lapping compound.

d. Procedure

1. See Page 5 – Steps d.1 through d.6.
2. Inspect seat ring and disc ring (on metal to metal valves). Polish away any scale and check for nicks and scratches.
3. For metal to metal valves – lay a piece of wet/dry paper on a very flat surface and polish the disc ring (with a wiping and rotating motion) until the entire brass disc ring is smooth, flat and free of scratches.
4. Wipe the entire surface of the seat ring. It must be smooth, flat and free from radial scratches.
5. For a better than usual seal, use some valve lapping compound on the seat ring. Rub the disc on the seat ring with a rotating and wiping motion. Clean the compound from the seat and disc and replace it several times.
6. See Page 5 & 6 – Steps d.13 through d.21.

V. RECOMMENDED SPARE PARTS FOR C.I. CHECK VALVES (Figure 106, 106A, 1106, 1106A, 126, 126A, 1126 and 1126A.

A. Necessary

1. Cap gasket (1100 series checks use o-rings)
1. Resilient disc (for rubber faced valves only)
2. Packing for lever & spring and lever & weight valves.

B. Useful

2. Hinge pin, hinge, and disc assembly
3. Bolts and nuts (1100 series valves do not require cover nuts)
4. Disc bolt o-ring(s) (106A, 1106A, 126, 1126, 126A and1126A valves)
5. Disc bolt gasket (106/1106 valves)

Valve Size	Bolt Size	Torque (ft-lbs)
2”, 2 ½”, 3”, 4”, 6”	5/8 UNC	100
6” & 8”	¾ UNC	150
10” & 12”	7/8 UNC	230

Gaskets (Cap):

2” to 12” valves use a cap gasket identical to the end flange gasket (N/A for 1100 series check valves)

VI SIZING OF SWING CHECK VALVES

To assure reliable, stable, chatter-free operation, it is recommended that swing check valves be sized to assure the disc will open full during normal flow conditions. The head loss during normal flow conditions should exceed (1) one psi for valves 4" and smaller and exceed (1/2) one-half psi for the remaining larger sizes. The data below provides an estimate of what should be the minimum design flow rates:

SIZE	DESIGN MIN. FLOW G.P.M.	REF CV*
2"	150	141
2 ½"	250	235
3"	350	347
4"	650	643
6"	1100	1532
8"	2100	2836
10"	3300	4573
12"	4800	6756

*CV values are based partially on extrapolated data and in any case only apply to flows greater than the minimum flows specified.