



KENNEDY VALVE

SWING CHECK VALVES

Sizes 14"-36"

INSTALLATION & OPERATION MANUAL

TABLE OF CONTENTS	PAGE
General	2
Installation	2
Service Limitations	4
Maintenance, Checking & Testing	4
Spare Parts	8
Sizing	9
Specifications	10
Drawings	11

I. General Service by Product

A. Style 59, 159, and 259 Check Valves

1. Bronze to bronze seating is not available in sizes 14" – 36".
2. Resilient, rubber to bronze seating for general service cold water, non-shock, at temperatures that shall not exceed 125 Degrees Fahrenheit. May allow some backflow at conditions of low backpressure (less than 5ft H2O). Not for steam service.
3. Lever & Spring/Lever & Weight are occasionally used in conditions where water hammer may occur. They may be fitted with limit switches to detect flow. Check valves with levers can possess clearance and swing hazard issues during the opening and closing of the clapper.

B. General Selection

1. To prevent chatter and water hammer there must be at least ½ PSI differential across the valve under normal flow conditions.
2. In typical clear water environments under 100 Degrees Fahrenheit, resilient-seated valves will allow less backflow and minimize water hammer versus bronze-to-bronze seated check valves.
3. Consult the factory for services other than clean water.
4. Allow clearance for external levers and understand that external levers allow possible unauthorized operation of the check valve.

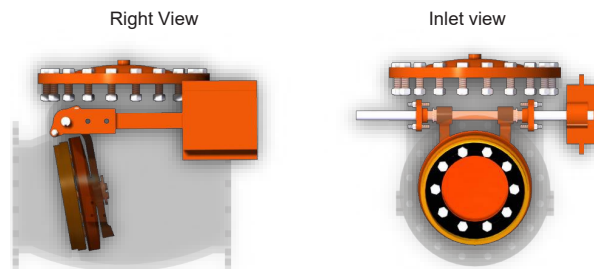
II. Installation

All M&H AWWA Check Valves bolt between ASME/ANSI CLASS 125 Flanges.

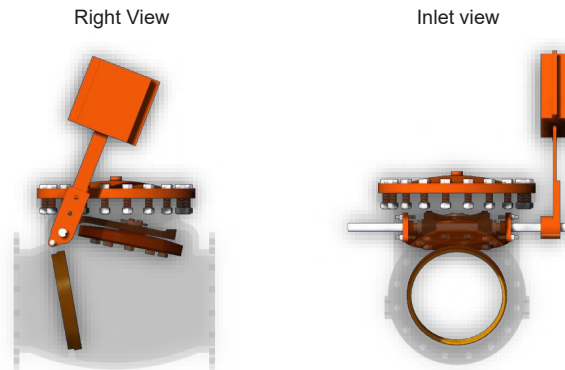
A. Orientation

- a. Swing check valves are always installed with the **HINGE PIN** placed horizontally, and above the pipe centerline (as shown in the pictures at the end of this section). Incorrect installation may result in binding, high head loss, and/or sticking in the open position.
- b. Style 59, 159, and 259 check valves must have flow horizontally or vertically, with the **CLAPPER** opening in the upwards vertical direction (as shown in the pictures at the end of this section).
- c. Outside lever swing check valves must be installed with the end of the **LEVER**, that is fixed to the **HINGE PIN**, at a higher position than the opposite end of the valve (as shown in the pictures at the end of this section). Failure to do this will cause the valve function to fail.

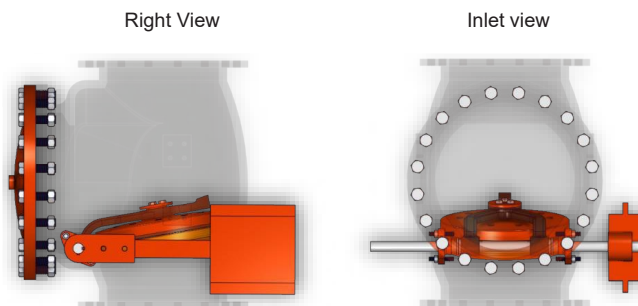
HORIZONTAL CHECK VALVE IN THE CLOSED POSITION



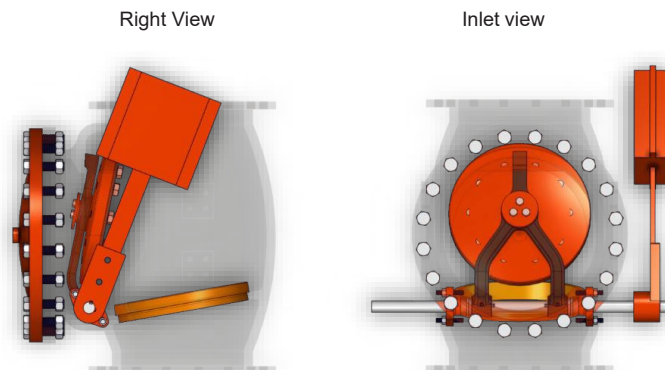
HORIZONTAL CHECK VALVE IN THE OPEN POSITION



VERTICAL CHECK VALVE IN THE CLOSED POSITION



VERTICAL CHECK VALVE IN THE OPEN POSITION



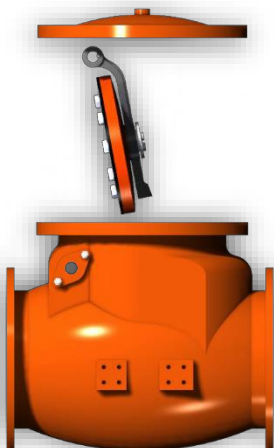
Notice that the hinge pins in the above pictures are all horizontal, and that the clapper always swings upwards, in both horizontal and vertical flow positions.

B. Lifting.

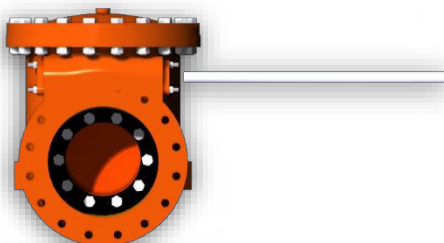
When lifting check valves, always make sure to put the sling around the **BODY**, and avoid putting anything through the inside of the valve.

C. Clearances

- a. Allow a minimum of two pipe diameters above the top of the cover for disc removal without having to remove the valve from the line (see picture below).



- b. Allow a minimum of one pipe diameter on one side of the valve and 2.5 diameters on the opposite side for the removal of the hinge pin (see picture below).



- c. Consult the factory for space limitations with outside lever valves. Note that levers can be clearance and safety hazards (see pictures in section II.A depicting clearance issues caused by the swing of the lever).

D. Start-up

Confirm that all lines have been bled of air.

III. Service Limitations (Pressure & Temperatures)

- A. All valves and all service types have a 32° F working temperature minimum, non-shock.
- B. Styles 59, 159, and 259 (Resilient Seated Check Valves)
1. Cold water services (125° F maximum, 32° F minimum)
 2. Sizes 14" – 36" - 150 PSI maximum

IV. Maintenance, Checking and Testing

A. Swing check valves

With the exception of issues caused by misuse and severe service of the valve, maintenance should be limited to the following:

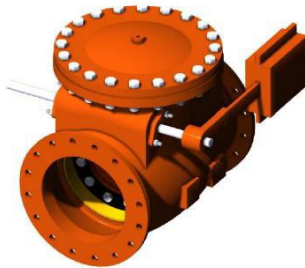
1. Seating surfaces
2. Bearing surfaces (hinge pins, hinges, and packing glands)
3. Replacement of parts that are subject to corrosion
4. Lubrication and repacking of hinge pin stuffing boxes for outside lever of valves

As stated above, replacement of resilient disc rings, lubrication, and re-packing

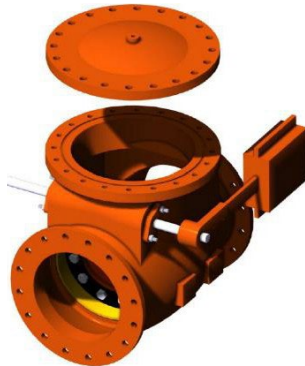
boxes for outside lever valves are the only items subject to regular replacement maintenance or repair.

Corrosion of parts is linked to many variables. M&H Sales Staff is qualified to judge a part for repair or replacement.

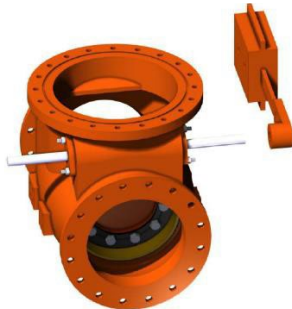
- 1. Resilient Discs
 - a. When to replace
 - 1. **RESILIENT DISCS** should be replaced any time there is excessive leakage, or at scheduled intervals.
 - 2. When replacing any **CLAPPER** component
 - a. Confirm year of valve with M&H
 - b. Based on year, components required will be determined
 - c. No special tools are required for replacement
 - b. Procedure



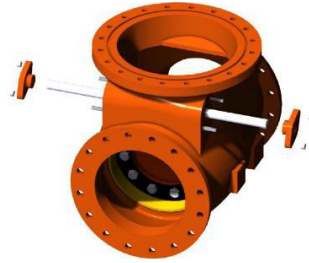
2. Remove **COVER**



3. Remove **LEVER & WEIGHT** or **LEVER & SPRING** (if applicable)



4. Loosen **PACKING GLANDS** (completely removed from valve in the below picture, for clarity).



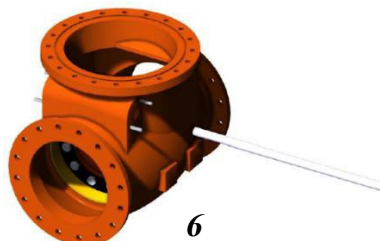
5. Put a load rated soft strap around the **HINGE** of the **CLAPPER ASSEMBLY**



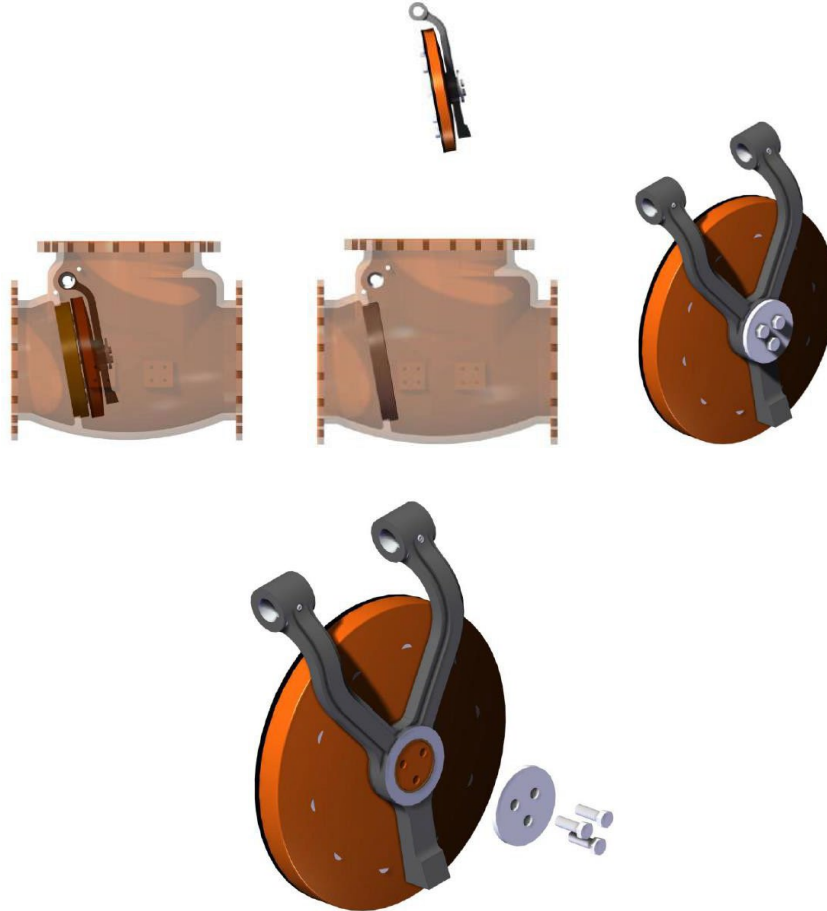
APPROXIMATE CLAPPER ASSEMBLY WEIGHTS

<u>14", 16"</u>	<u>200 LBS.</u>
<u>18", 20", & 24"</u>	<u>350 LBS.</u>
<u>30", & 36"</u>	<u>650 LBS.</u>

6. Drive the **HINGE PIN** out using a wooden dowel.



7. Using the soft strap, lift the **CLAPPER ASSEMBLY** from the valve (if applicable, “V” notches on the side of the valve are to provide clearance for the disc assembly).

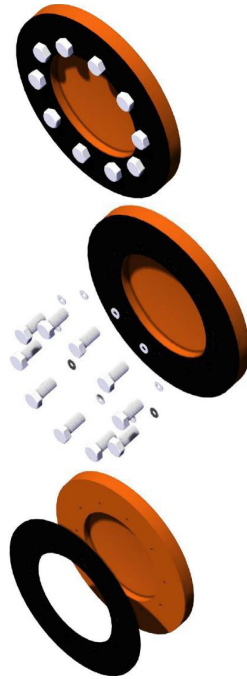


8. Remove **CLAMP PLATE BOLTS**, and **CLAMP PLATE** from the **CLAPPER ASSEMBLY**.

9. Remove the **HINGE** and **BRASS BUSHING** from the **CLAPPER DISC** (using a soft mallet, if necessary). M&H recommends replacing the **BRASS BUSHING**.



10. Remove the **BOLTS** and **WASHERS** holding the **ENCAPSULATED RESILIENT SEAT RING** on to the **CLAPPER DISC**, and then remove the **ENCAPSULATED RESILIENT SEAT RING**.



11. Clean any parts that need to be cleaned, particularly focusing on the flat, seating surfaces, and the **CLAPPER ASSEMBLY**.
12. Replace the **ENCAPSULATED RESILIENT SEAT RING** with a new one, and make sure to seat it flat in the on the **DISC**. Do **NOT** use gasket sealant.
13. Polish the **SEAT RING** in the valve body with 600 grit crocus cloth or wet/dry sandpaper, if necessary.
14. Replace the reassembled **CLAPPER** on the **HINGE**.
15. Reinsert the **CLAPPER ASSEMBLY** into the **CHECK VALVE**, and reinsert the **HINGE** in the same fashion as it was removed, while making sure to keep key-ways lined up.
16. Replace **SIDE PLUGS** or **PACKING GLANDS** (where applicable; **SIDE PLUGS** should be tightened to 300 in-lbs. of torque).
17. Inspect **COVER** sealing surfaces, and clean if needed. Inspect the cover
O-RING / GASKET, and replace if needed (order from M&H).
18. Tighten the **COVER PLATE BOLTS** in a star pattern.
19. Pressurize and bleed the valve, tightening any leaks. It may be necessary to loosen and re-tighten any bolts.

V. Spare Parts for Large Resilient Seated Check Valves

A. Basic

1. Cover plate gasket / O-ring.
2. Encapsulated resilient seat ring.
3. Packing for Lever & Spring / Weight valves

B. Useful

1. Hinge pin and clapper assembly (clamp plate and associated bolts, hinge, disc bushing, clapper / disc, encapsulated rubber clamp ring and associated bolts and washers).
2. Bolts and nuts (contact M&H for sizing)
3. O-rings and gaskets

VI. Sizing of Swing Check Valves

To assure reliable, 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 (1/2) one-half PSI. The data below provides an estimate of what should be the minimum design flow rates:

M&H Model 59, 159 & 259 Check Valve

Flow Coefficient (Cv) for Valves Fully Open

<u>Valve Size</u>	<u>Cv</u>
14	6,000
16	8,000
18	10,000
20	12,000
24	17,000
30	27,000

$$\Delta P = (Q/C)$$

ΔP = head loss in psi

Q = gallons per minute of flow

Cv = flow coefficient with valve full open

1. OIL CUSHIONED CHECK VALVES CAN ONLY BE INSTALLED IN A HORIZONTAL APPLICATION.
2. ISO AW 32, 46 OR 68 HYDRAULIC OILS ARE RECOMMENDED FOR USE IN THE OIL CUSHION CYLINDER.
3. FLOW CONTROL VALVE SETTING WILL VARY DEPENDING ON HYDRAULIC OIL VISCOSITY (WEIGHT). LIGHTER WEIGHTS WILL REQUIRE THE FLOW CONTROL VALVE TO BE MORE CLOSED; HEAVIER WEIGHTS WILL REQUIRE THE VALVE TO BE MORE OPEN. THE DESIRED CLOSING SPEED IS TO BE DETERMINED BY THE END USER.
4. FOR CHECK VALVES UTILIZING ONE CYLINDER CUSHION, FILL THE HYDRAULIC OIL RESERVOIR TO THE HALFWAY MARK, PER THE FILL GAUGE ON THE SIDE (APPROXIMATELY 1.5 GALLONS); FOR CHECK VALVES UTILIZING TWO CYLINDER CUSHIONS, FILL THE HYDRAULIC OIL RESERVOIR TO THE FULL MARK, PER THE FILL GAUGE ON THE SIDE (APPROXIMATELY 3.0 GALLONS).
5. AFTER FILLING THE HYDRAULIC OIL RESERVOIR TO THE APPROPRIATE LEVEL, CYCLE THE CHECK VALVE SEVERAL TIMES TO PURGE AIR FROM THE HYDRAULIC SYSTEM. RECHECK OIL LEVEL AND ADD ADDITIONAL, IF NEEDED.
6. SEE CHART BELOW FOR MAXIMUM RECOMMENDED BACK PRESSURES. BACKPRESSURES EXCEEDING THESE LIMITS MAY DAMAGE THE OIL CYLINDERS.

CV SIZE	BACK PRESSURE	CYLINDER QTY
14"	55 PSI	1
16"	35 PSI	1
18"	28 PSI	1
20"	22 PSI	1
24"	12 PSI	1
30"	14 PSI	2
36"	CONSULT FACTORY	CONSULT FACTORY

SWING CHECK VALVE

PARTS LIST *Sizes 14"-36"*

PARTS LIST		
PART No.	PART	MATERIAL & ASTM DESIGNATION
1	Body - F.E.	Ductile Iron A536 65-45-12 or 70-50-05
2	Cover Bolts	ASTM A-307 Gr. B or A EZ Plated
3	Cover	Ductile Iron A536 65-45-12 or 70-50-05
4	Cover O-ring	Buna-N Durometer 70 Approved
5	Clapper Arm Key	304 Stainless Steel
6	Set Screw	Alloy Steel (RC 45-63)
7	Hinge Pin	Stainless Steel ASTM A-276 Yupe 303
8	Clapper Arm	Ductile Iron A536 65-45-12 or 70-50-05
9	Clapper Cap Plate	304 Stainless Steel
10	Hex Bolt Cap Plate	18-8 Stainless Steel
11	Clapper Arm Bushing	Brass C26000
12	Clapper	Ductile Iron A536 65-45-12 or 70-50-05
13	Encapsulated Rubber Clamp Ring	Buna-N Durometer 70 Approved
14	Body Ring	Bronze Alloy C89836
15	Washer, Flat	18-8 Stainless Steel
16	Hex Bolt Clamp Ring	18-8 Stainless Steel
17	Stuffing Box Bushing	Bronze Alloy C89850
18	Packing	Multi-Lock Braid Style ML2254 PTFE
19	Stuffing Box Gland	Ductile Iron A536 65-45-12 or 70-50-05
20	Stud	Steel ASTM A307, EZ Plated
21	Hex Nut	18-8 Stainless Steel

Limit Switch:

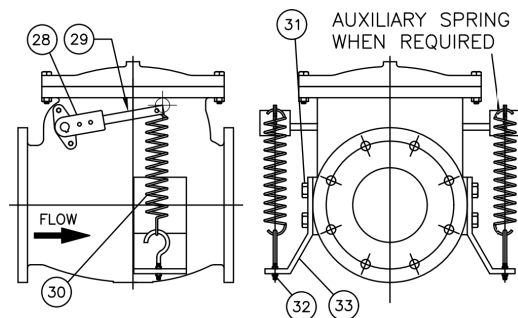
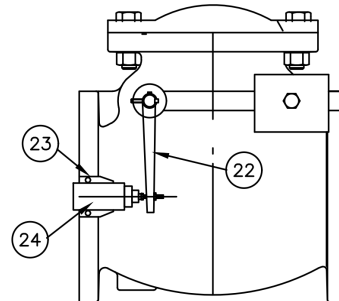
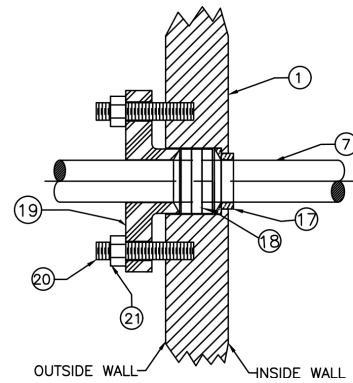
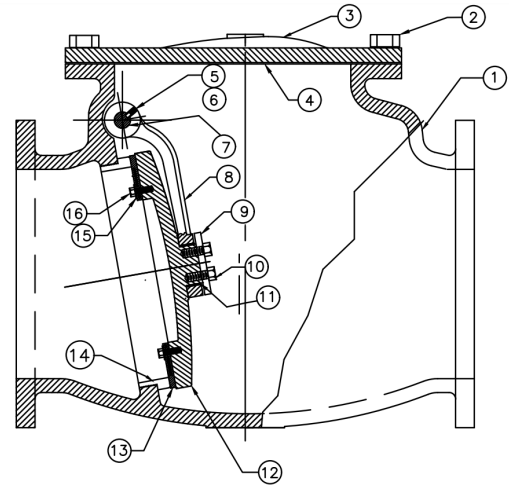
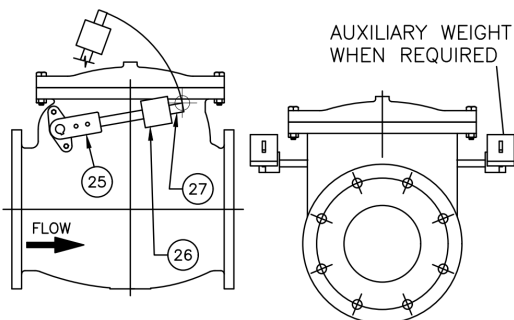
22	Tripper Arm	Steel
23	Mounting Bracket	Steel
24	Limit Switch	SD-D-Type-CR53E

Lever & Weight Check Valve:

25	Weight Lever Arm	Ductile Iron
26	Weight	Fab. Steel
27	Weight Arm Bar	CR Steel C-1018/1020

Lever & Spring Check Valve:

28	Spring Arm Lever	Ductile Iron
29	Spring Arm Bar	CR Steel C-1018/1020
30	Spring	Steel
31	Spring Bracket Cap Screw	Steel A-307 Grade B
32	Spring Eyebolt	Steel A-307 Grade B
33	Spring Bracket	Steel



SWING CHECK VALVE

DIMENSIONS *Sizes 14"-36"*

DIMENSIONS							
SIZE	14	16	18	20	24	30	36
F	31	36	40	40	48	49 1/2	63
G	1 3/8	1 7/16	1 9/16	1 11/16	1 7/8	2 1/8	2 3/8
H	21	23 1/2	25	27 1/2	32	38 3/4	46
J	18 3/4	21 1/4	22 3/4	25	29 1/2	36	42 3/4
K	12-1	16-1	16-1 1/8	20-1 1/8	20-1 1/4	28-1 1/4	32-1 1/2
L	22 3/8	25 3/4	27 1/2	32	34 7/8	41	47
R	18 3/4	19 1/16	25	24 1/2	24 11/16	28	34

Lever & Spring Check Valves - Style 259-02

T	18 1/2	19	20 3/4	22 1/2	26	28 1/4	35
WEIGHT	1150	1630	1835	2500	3415	4950	

Lever & Weight Check Valves - Style 159-02

S	19	19 1/2	20 3/4	22 1/2	27 3/8	29 3/8	35
U	32 1/2	34 1/2	40	42	54 1/2	57 1/2	
WEIGHT	1130	1530	1903	2383	3298	5550	

Plain / Swing Check Valves - 59-02

T	18 1/2	19	20 3/4	22 1/2	26	28 1/4	35
WEIGHT	1060	1460	1750	2230	3040	5200	

NOTES:

These dimensions will be phased in during 2013. Contact factory for exact laying lengths. Check laying lengths when replacing valves that were manufactured prior to 2013. Dim "V" consult M&H for max. cut-off of hinge pin to eliminate clearance problems.

