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- 1 The following combinations must be set with reference to 5.2.1 – 5.2.7 to ensure that the closing force is set to automatically close the door at 20°.**

Type:A1 + A + A(without Hold-Open Function)

Type:A1 + B + A (Hold-Open Function)

Type:A1 + HB +A (Hold-Open Function)

Type: A + HB (Hold-Open Function)

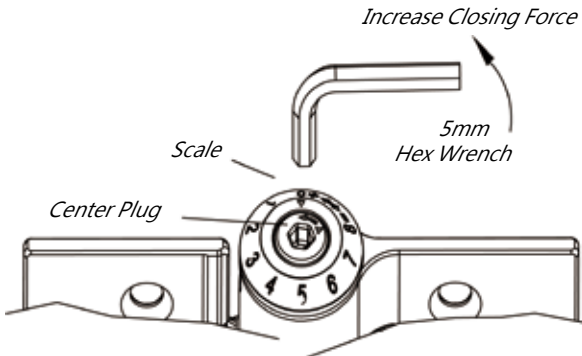
Type:A1 + HA (without Hold-Open Function)

Type: B + HA (Hold-Open Function)

### Definition of General Terms:

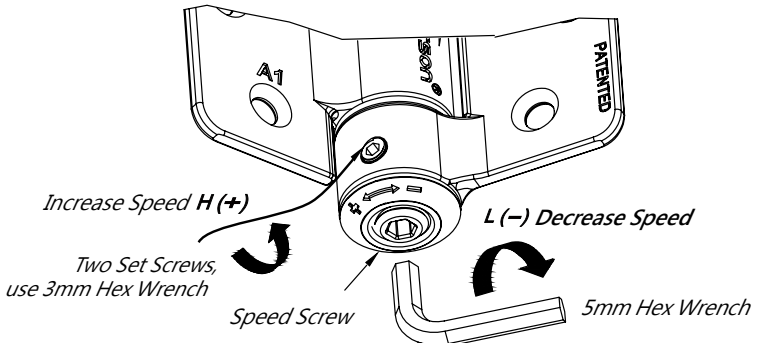
- 1.1 Type A1 : Control closing force, door latching and closing speed at 0°-20°**

- 1.1.1** Scale 0-8 (on the top of Waterson hinge)  
represents the closing force  
(The larger the number is the greater the closing force )



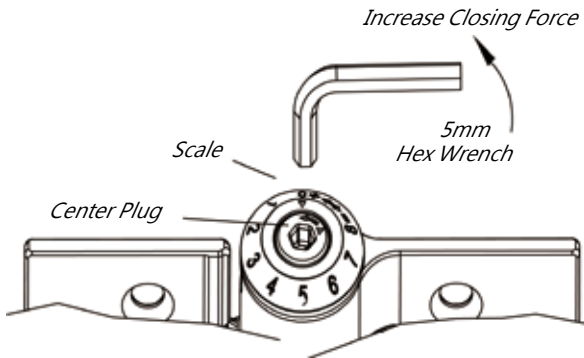
- 1.1.2** Symbol (+) (on the bottom of Waterson hinge):  
Increase the closing speed

- 1.1.3** Symbol (-) (on the bottom of Waterson hinge):  
Decrease the closing speed

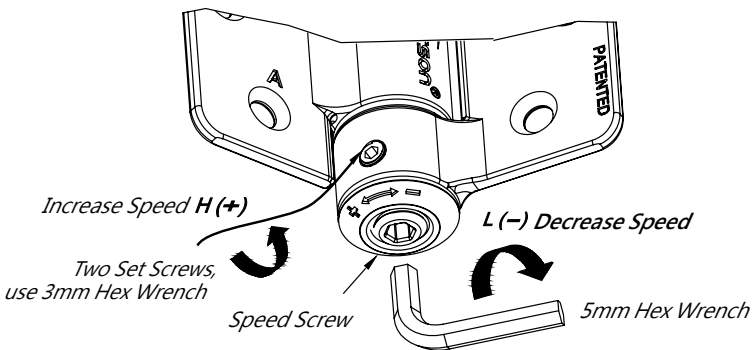


**1.2      Type A: Control closing force,  
door swing and closing speed at 20°-90°**

- 1.2.1    Scale 0-8 (on the top of Waterson hinge)  
represents the closing force  
(The larger the number, the greater the closing force )



- 1.2.2    Symbol (+) (on the bottom of Waterson hinge):  
Increase the closing speed
- 1.2.3    Symbol (-) (on the bottom of Waterson hinge):  
Decrease the closing speed

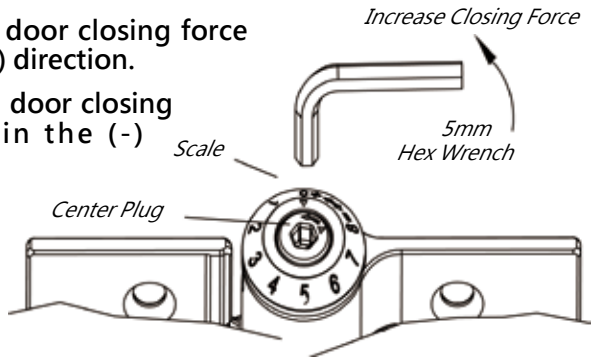


**1.3 Type B: Control closing force and “Hold-Open” function at 85°-90°**  
**Type B: to be mounted as the middle hinge**

**1.3.1 Control closing force:**

1.3.1.1 To increase the door closing force  
 Rotate in the (+) direction.

1.3.1.2 To decrease the door closing force  
 Rotate in the (-) direction.

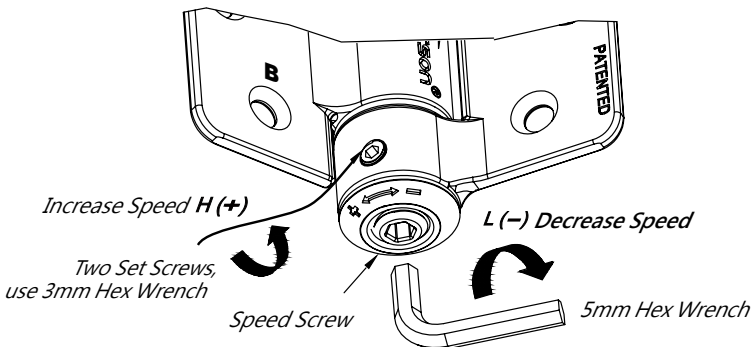


**1.3.2 Control “hold-open” at 85°~90°**

1.3.2.1 “Hold-open” Adjustment: Open the door to the 85° position, then adjust the speed screw on Type B hinges until the “hold-open” function is activated.

1.3.2.2 If the “hold-open” function is required, the speed screw on the Type B hinge must be adjusted, before any other adjustments of such functions are made.

1.3.2.3 If the “hold-open” function is not required, the speed screw on the Type A hinge must be adjusted to control the closing speed between the 20° – 90° range, before any other adjustments of such functions are made.



## 1.4 Type HB (originally, HA1) : Mechanical and Hydraulic Buffer Hybrid Type (With Hold-Open Function)

Control “hold-open” at 85°- 90°, and Control closing speed.  
Hydraulic buffer device is used to control the closing speed only.  
(Less closing force power)

### 1.4.1 Mechanical Hold-Open control device

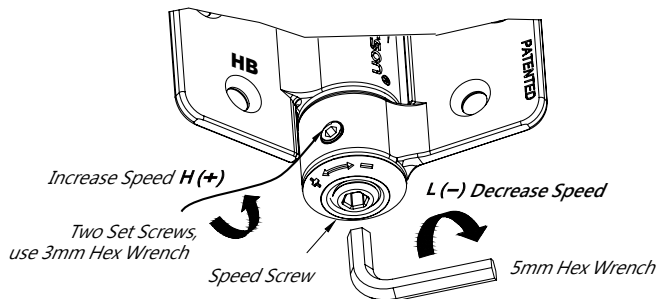
has symbols ( — ↔ + ) on one end of the hinge and a speed screw.

#### 1.4.1.1 Use a 5mm hex wrench to adjust the speed screw, and to control “Hold-open” function at 85°- 90°.

#### 1.4.1.2 “Hold-open” Adjustment: Open the door to the 85° position, and then adjust the speed screw on Type HB hinge until the “hold-open” function is activated.

#### 1.4.1.3 If the “Hold-open” function is required, the speed screw on a Type HB hinge must be adjusted first, then adjust the hydraulic buffer device as required; as necessary, other speed control adjustments may be used auxiliary.

#### 1.4.1.4 If the “Hold-open” function is not required, the speed screw on the Type A hinge, which control the closing speed during 20°– 90°, must be adjusted, before adjustments of the speed controls on other hinges are made. Alternatively, just use the hydraulic buffer device to control closing speed. (see 1.4.2)



## 1.4.2 Hydraulic buffer device has symbols ( — ← H → + ) on one end of the hinge

### 1.4.2.1 Adjustment procedures for hydraulic buffer device:

- 1) Use 3mm hex wrench, to slightly loosen the set screws on both sides of hydraulic buffer device.
- 2) Use 5mm hex wrench to make adjustments to the position of the hydraulic buffer zone. (see 1.4.3)
- 3) Use 3mm hex wrench to tighten the set screws on both sides of hydraulic buffer device to prevent settings from hanging.
- 4) Use 3mm hex wrench to adjust hydraulic buffer device to control closing speed as required. (see 1.4.4)

- 1.4.3 Use 5mm hex wrench to move the position of hydraulic buffer zone. (Open the door panel to 90 ° for suitable adjustment)**

**1.4.3.1 For doors with a dead latch:**

Rotate in the (–) ← direction until tightened. The hydraulic buffer zone is about 20°- 40°.

**1.4.3.2 For doors without a dead latch:**

Rotate in the (–) ← direction until tightened; Then rotate in the →(+)direction about 360°. **The hydraulic buffer zone will be moved to the 0°-20° position, thereby counteracting the pressure required to latch the door.**

- 1.4.3.3 In addition, as required by the operator, use a 5mm hex wrench to **fine-tune the hydraulic buffer zone** to the most desirable position.

**1.4.4 Use 3mm hex wrench to adjust the door closing speed.**

- 1.4.4.1 To increase the door closing speed:  
Rotate in the →(+) direction

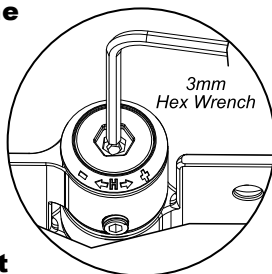
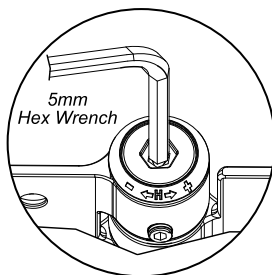
- 1.4.4.2 To decrease the door closing speed:  
Rotate in the (–)← direction.

**1.4.5 Ensure that the closing force is set to automatically close the door at 20°.**

- 1.4.6 Under special circumstances, such as increased air pressure or wind forces that cause interference with automatic door closing, the closing force of the door must be set at 10-20Kgs greater than normal (about 1-2 clicks). When the extra air pressure or wind forces cease or are disrupted, the door will close automatically. In the conditions described above, applying both the hydraulic and mechanical structure adjustments of the hinge will get the best effect.

**1.4.7 Under normal conditions, the door must be opened beyond 45° to activate the hydraulic buffer effect. If the door is opened less than 30°,the hydraulic buffer effect will not be activated.**

- 1.4.8 The hydraulic buffer device and the mechanical speed control of this type of hinge may be set independently or at the same time.



## 1.5 Type HA: Hydraulic Buffer and Mechanical Hybrid Type (without Hold-Open Function)

Hydraulic buffer control of door closing speed and mechanical control of door closing speed at 20°- 90°

Hydraulic buffer device is used to control the closing speed only. (Less closing force power)

### 1.5.1 Hydraulic buffer device has symbols ( — ← H → + ) on one end of the hinge

#### 1.5.1.1 Adjustment procedures of hydraulic buffer device:

- 1) Use 3mm hex wrench to slightly loosen the set screws on both sides of the hydraulic buffer device.
- 2) Use 5mm hex wrench to make adjustments to the position of hydraulic buffer zone. (see 1.5.2)
- 3) Use 3mm hex wrench to tighten the set screws on both sides of hydraulic buffer device to prevent settings from changing.
- 4) Use 3mm hex wrench to adjust hydraulic buffer device to control closing speed as required. (see 1.5.3)

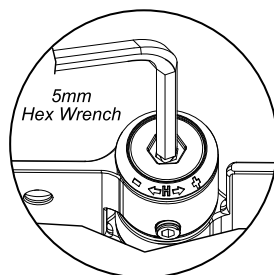
### 1.5.2 Use 5mm hex wrench to move the position of hydraulic buffer zone. (Open the door panel to 90 ° for suitable adjustment)

#### 1.5.2.1 For doors with a dead latch:

Rotate in the (-) ← direction until tightened.  
The hydraulic buffer zone is about 20°- 40°.

#### 1.5.2.2 For doors without a dead latch:

Rotate in the (-) ← direction until tightened;  
then rotate in the → (+) direction about 360°.  
**The hydraulic buffer zone will be moved to the 0°-20° position, thereby counteracting the pressure required to latch the door.**

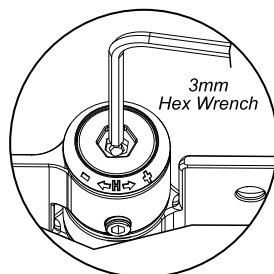


- 1.5.2.3 In addition, as required by the operator, use a 5mm hex wrench to fine-tune the hydraulic buffer zone to the most desirable position.

### 1.5.3 Use 3mm hex wrench to adjust the door closing speed.

- 1.5.3.1 Increase the door closing speed:  
Rotate in the → (+) direction.

- 1.5.3.2 Decrease the door closing speed:  
Rotate in the (-) ← direction.





**1.5.4 Ensure that the closing force is set to automatically close the door at 20°.**

1.5.5 Under special circumstances, such as increased air pressure or wind forces that cause interference with automatic door closing, the closing force of the door must be set at 10-20Kgs greater than normal (about 1-2 clicks). When the extra air pressure or wind forces cease or are disrupted, the door will close automatically. In the conditions described above, applying both the hydraulic and mechanical structure adjustments of the hinge will get the best effect.

**1.5.6 Under normal conditions, the door must be opened beyond 45° to activate the hydraulic buffer effect. If the door is opened less than 30°, the hydraulic buffer effect will not be activated.**

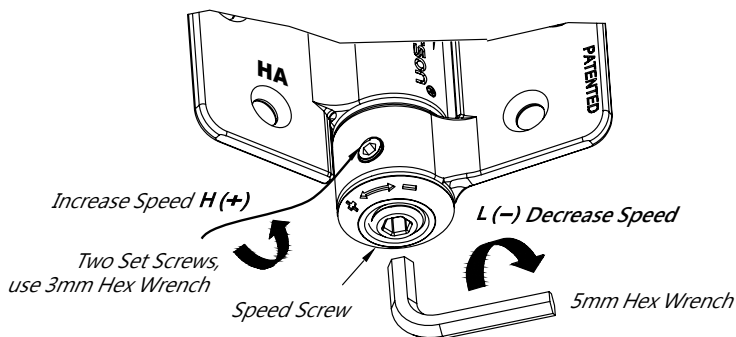
**1.5.7 Mechanical speed control device** has symbols (  $- \longleftrightarrow +$  ) on one end of the hinge and a speed screw.

1.5.7.1 Use a 5mm hex wrench to adjust the speed screw to control the door closing speed at 20°- 90°.

1.5.7.2 To increase the door closing speed: Rotate in the  $\rightarrow(+)$  direction.

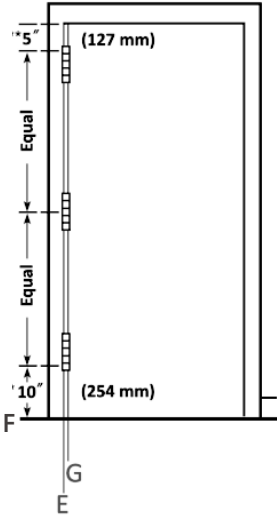
1.5.7.3 To decrease the door closing speed: Rotate in the  $(-)\leftarrow$  direction.

**1.5.8 The hydraulic buffer device and the mechanical speed control of this type of hinge may be set independently or at the same time.**



2 General Information

- 2.1 Conform to ANSI/BHMA A156.7 and ANSI/BHMA A156.17 Grade 1
- 2.2 The Waterson Hinge are non-handed.
- 2.3 Doors up to 60"(1500mm) in height should be installed with 2 Waterson hinges and an additional Waterson hinge for each additional 30"(750 mm) of door height per NFPA-80.
- 2.4 After the door panel is installed, be sure to confirm that the door is mounted vertically perpendicular to, and without interference from, the frame by inserting and sliding a piece of 0.3-0.5mm-thick metal through the full length of the gap. Line **E** must be parallel to Line **G**, with both lines perpendicular to Line **F**, which should be horizontally level (see figure on the right). Waterson hinges perform well, if the above mentioned instructions are followed.



- 2.4.1 If door Binding – Rubbing or Uneven Gap occurs after hinges are installed, please refer to 5.2.3.2 and 6.3 to resolve issues with interference.

3 Quantity and Position of Waterson hinges

After installation, ensure the center plug (0-7) faces up and the closing speed (+/-) faces down.

| Door Weight (lbs.)                           | Less than 50kgs<br>( 110 lbs ) | 50-100kgs<br>( 110 - 220lbs ) | 100-150kgs<br>( 220 - 330lbs ) | 150-200kgs<br>( 330 - 440lbs )   |
|--|--------------------------------|-------------------------------|--------------------------------|----------------------------------|
| The amount of<br>Waterson Hinges<br>required | 2                              | 3                             | 3 ( 4 )                        | 4 ( 5 )                          |
| Initial Setting for<br>Adjustment            | N,0                            | 0, N, 0                       | 0, 0, 0                        | 0, 0, 0, 0                       |
| Position (from top<br>to bottom)             | HB, A                          | A1, HB, A                     | A1, A, A                       | A1, A, A, A1                     |
|  |                                |                               | A1, B, A<br>(A1, HB, A, A)     | A1, B, A, A<br>(A1, HB, A, A, A) |

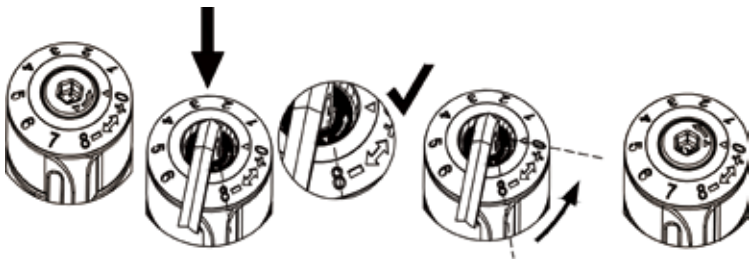
- 3.1 For outside door installation, please contact Waterson Corp. directly.
- 3.2 The mortising depth is the thickness of the Waterson hinge plate. The mortise depth for 4" & 4.5" type should be 3.3mm; 3.71mm (4.83mm is also available by request)for 5" type, and 4.1mm for 6 " type.
- 3.3 Three Waterson hinges are required on door panels with weights below 150 kgs (330 lbs.), and an additional Waterson hinge is required for each additional 50 kgs (110 lbs).
- 3.4 Depending upon the actual installation, the amount of hinges and the methods of installation required may be different. Please consult your Waterson Representative before placing orders.

**4 Setup Preparation and Basic Adjustment**

**4.1 Setup Preparation**

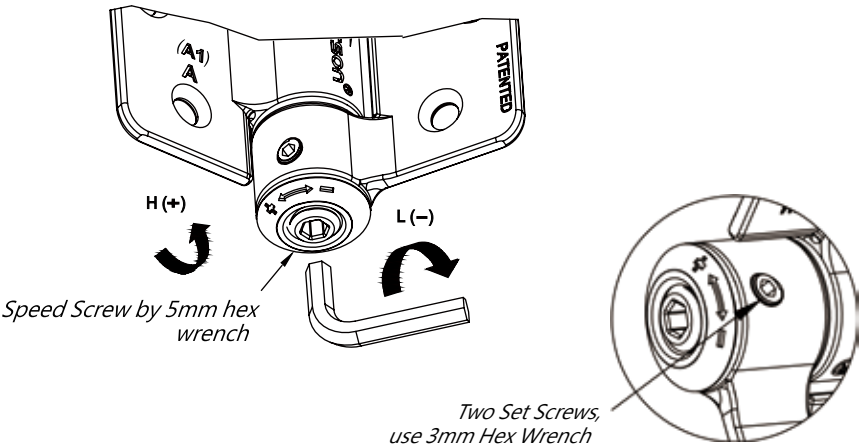
**4.1.1 Start from default scale settings:**

For easy opening and installation of the Waterson hinge, the default setting of center plug is 8. After installation is completed, use a 5mm hex wrench to press down the center plug and rotate counterclockwise from scale 8 to 0. If the center plug is not pressed down, the inner stopper will interfere with the turning.



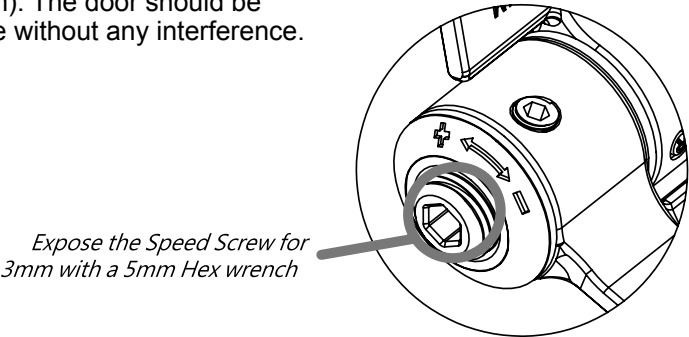
**4.1.2 Fixed angle for easy installation:**

Insert a 5 mm hex wrench into the speed screw on the bottom of the Waterson hinge and rotate in the (–) direction until the speed screw is tightened at the desired angle. This setting makes installation easier.



**4.1.3 Release speed screw:**

Before setting closing force, rotate speed screw in the (+) direction until it is released. The outer thread of the speed screw should be exposed by about 3mm (1/8 inch). The door should be movable without any interference.



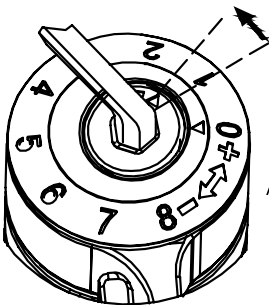
**4.2 Instruction for Closing Force Adjustment**

**4.2.1 Insert a 5mm hex wrench into the center plug of the Waterson hinge**

**4.2.1.1 Increase the door closing force:**

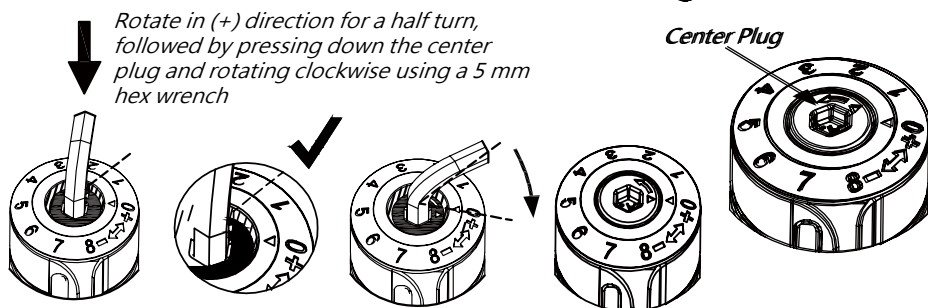
The closing force starts at scale 0. Rotate in counterclockwise (+) direction.

The larger the number, the greater the closing force .



**4.2.1.2 Decrease the door closing force:**  
**Rotate in (+) direction for half scale increment only, and then press down the center plug and rotate clockwise (-) back to the lower scale. If this step is not followed, it may be difficult to press down the center plug to change the setting.**

Below is an example showing how to turn scale 1 back to scale 0.



**4.2.1.3 Order of Setting :**

Increase the closing force (scale) for one Waterson hinge at a time sequentially to ensure balance. For example, start with all Waterson hinges at a scale setting of 0. Then proceed to adjust the Waterson hinges in the following sequence. 0, 0, 0 → 1, 0, 0 → 1, 1, 0 → 1, 1, 1

**4.2.1.4 Avoid Overturning:**

Maximum operating force is at scale position 7. Do not turn beyond 7, because overturning can cause permanent product damage, thereby voiding warranty.

### 4.3 Instruction for the Adjustment of Closing Speed

#### 4.3.1 Insert a 5mm hex wrench into the speed screw on the bottom of the Waterson hinge

Type A1 : Control closing speed at 0° – 20°

Type A : Control closing speed at 20° – 90°

Type B : Control "hold-open" at 85° – 90°

Type HA : Control closing speed at 20° – 90°

Type HB : Control "hold-open" at 85° – 90° , and  
Control closing speed

4.3.1.1 To decrease the door closing speed:  
Rotate in the (–) direction.

4.3.1.2 To increase the door closing speed:  
Rotate in the (+) direction.

4.3.1.3 "Hold-open" Adjustment: Open the door to the 85° position, then adjust the speed screw on Type HB or B hinge until the "hold-open" function is activated.

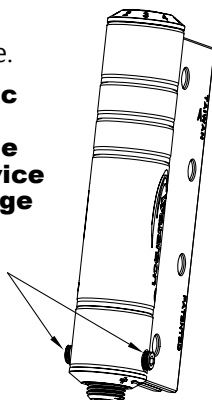
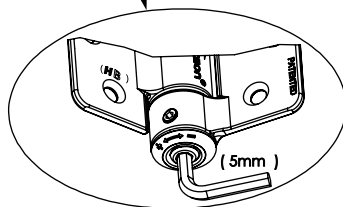
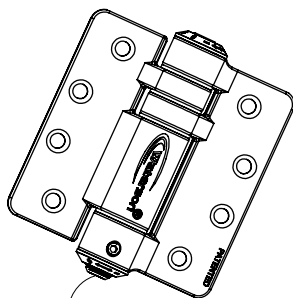
4.3.1.4 If the "hold-open" function is required, the speed screw on Type B or HB hinge must be adjusted, before any other adjustments of such functions are made. If Type HB is used, set Hold-Open function first and then set the hydraulic buffer. (Refer to step 1.4 on page 4-1)

4.3.1.5 If the "hold-open" function is not required, the speed screw on the Type A or HA hinge must be adjusted to control the closing speed between the 20° – 90° range, before any other adjustments of such functions are made.

**4.3.1.6 When using Type HA, both the hydraulic buffer device and mechanical speed control device may be used at the same time, or adjust the hydraulic duffer device independently. (Refer to step 1.5 on page 4-3).**

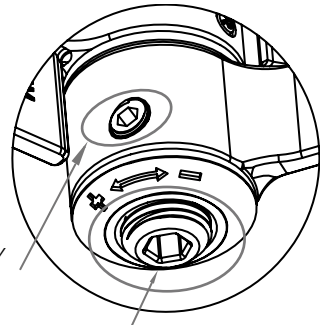
### 5 Setup Procedure:

#### 5.1 Preparation before Setup



### 5.1.1 **Note:**

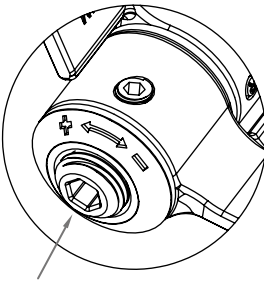
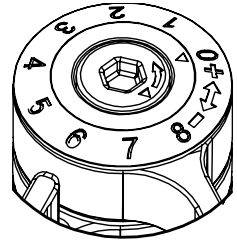
After the TWO set screws are tightened slightly, ensure the bottom SPEED screw is still adjustable. This speed screw must be adjustable to set the closing speed.



## 5.2 **Setup Procedure**

**5.2.1 Step 1:** Set the closing force for all Waterson hinges to zero. Use a 5mm hex wrench to adjust the scale back to 0. (See 4.2 on page 7)

**5.2.2 Step 2:** Use a 5mm hex wrench to release the bottom speed screws until the speed screws are exposed by about 3mm (1/8 inch) by turning in the (+) direction.



*Expose the Speed Screw by 3mm with a 5mm hex wrench*

**5.2.3 Step 3: After installation, ensure the door and the Waterson hinges do not interfere with each other**

**5.2.3.1** After installing the door, ensure the door and the Waterson hinges operate smoothly. Push the door edge lightly from 90° to 0° to ensure the door can be closed smoothly without any interference.



**5.2.3.2 If the door cannot be closed smoothly, the Waterson hinges may not have been installed properly, and the door panel may be askew to the frame. The following steps are required for making adjustments and reinstallation:**

#### **5.2.3.3 Step One:**

Refer to section 2.4 on page 5. Use a piece of 0.3-0.5mm-thick metal (or a 0.3mm card) or a gap gauge to verify. The clearances between the door and the frame / under the bottom of the door should be 0.3-0.5mm. Be sure that there is no interference between the door, the frame and the hinges.

#### **5.2.3.4 Step Two:**

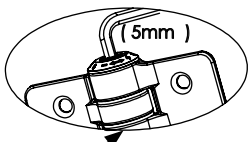
Use shims to make adjustments for any interference or askewness issues found. Ensure the clearances between the door and frame / under the bottom of the door are appropriate. For information of shim and shimming, please refer to **6.3 Waterson Hinge Tool**.

#### **5.2.3.5 Step Three:**

When installing more than two hinges, the parallel and perpendicular adjustments of the top and bottom hinges should be adjusted prior to proceeding with the same adjustments on other hinges of the door.

**5.2.3.6** If any interference issues still exist after the above adjustments are made, please refer to section 6.4 to gradually solve.

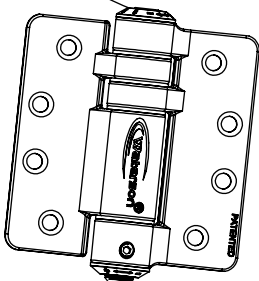
### **5.2.4 Step 4: Adjust the closing force to ensure the door can be closed at 20°, 60° and 90° automatically**



**5.2.4.1** Closing force adjustment  
Set up all Waterson hinges to scale 0 first.

**5.2.4.2** Use a 5mm hex wrench to adjust the closing force on the top of all the Waterson hinges to allow automatic door closing when the door is opened at a 20° -30° angle (this closing force is the minimum default setting), and then test to ensure that when the door is opened at 20° , 60° and 90° positions, there is enough closing force for automatic closure.

**5.2.4.3** After the test, if the closing force is not enough to close the door, increase the scale one click at a time, for example, from 0, 0, 0 → 1, 0, 0 → 1, 1, 0 → 1, 1, 1. Following this sequence, increase the closing force one by one to achieve perfect performance.

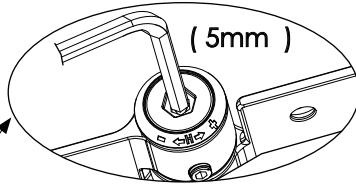




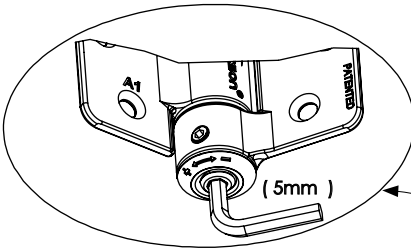
5.2.4.4 Ensure that the closing force is enough to close the door at 20°, 60° and 90° automatically.

5.2.4.5 **Note:**  
Please do not adjust the setting beyond 7, because it might render unexpected damage to the Waterson hinge.

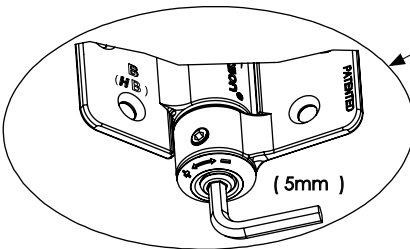
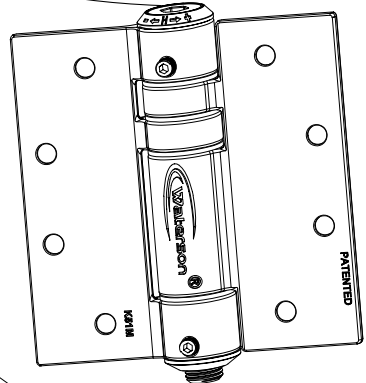
5.2.4.6 Adjustment of closing speed



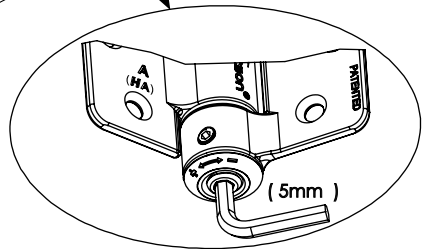
*Type HA & Type HB :  
Hydraulic buffer device offer to control the closing speed only.  
(Less closing force power)*



*Type A1 : Control closing speed at 0°-20°*



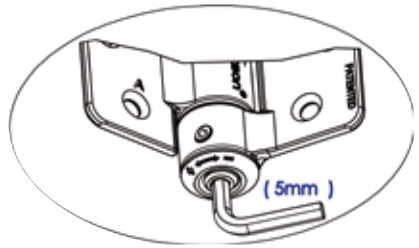
*Type B & Type HB :  
Control 'Hold-Open' at 85° - 90°*



*Type A & Type HA :  
Control closing speed at 20°- 90°*

### **5.2.5 Step 5: Adjust speed screw on Type A or HA to control closing speed at 20°-90°**

- 5.2.5.1 If the closing speed is too fast between 20° -90°, use a 5 mm hex wrench to adjust the speed screw on the **BOTTOM** of Waterson hinge in "-" direction slightly. If two or more types A Waterson hinges were installed at the same time, all of them must be adjusted equally at the same time. **When using**



**the Hydraulic buffer device of Type HA hinge to control 20°-90° closing speed, and the speed is satisfactory, there is no need to set other auxiliary speed control devices.**

- 5.2.5.2 After achieving the desired closing speed between 20° -90° , recheck that the door can be closed at 20° , 60° and 90° automatically.
- 5.2.5.3 If the door does not close automatically from around the 20° position after tightening the speed screw on the bottom of a Type A Waterson hinge, then loosen the speed control slightly, or increase the closing force on the top adjustment of the Waterson hinges. If the closing force is increased, Step 5 must be repeated to adjust the required closing speed at the 20° - 90° positions.

If the required closing speed is achieved by adjusting the speed screw of the Type A hinge, then there is no need to adjust the closing speeds on any of other hinges.

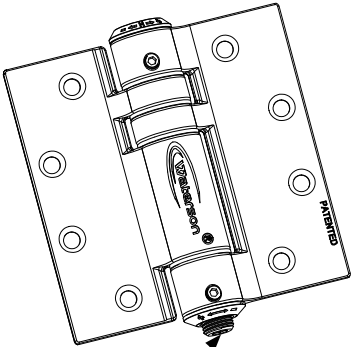
### **5.2.6 Step 6: Adjust closing speed of Type A1 Waterson hinge between 0° – 20°**

- 5.2.6.1 If the closing speed is too fast between 0° - 20° , use a 5mm hex wrench to adjust the **BOTTOM** speed screw of the type A1 Waterson hinge in "-" direction.
- 5.2.6.2 Ensure the door can still be closed automatically at 60° after decreasing the closing speed by adjusting the speed screw of type A1 hinge.
- 5.2.6.3 If the door cannot be closed automatically at 60° after decreasing the closing speed by means of adjusting the speed screw of type A1 Waterson hinge, use a 5mm hex wrench and adjust the speed screw of the type A Waterson hinge in "+" direction to slightly increase the closing speed, or increase the closing force first, then fine-tune the closing speed by type A1 and type A hinges.
- 5.2.6.4 Continue to adjust the speed screw on the bottom of Type A & Type A1 Waterson hinges until the door can be reliably closed automatically at 20° & 60° & 90° .

5.2.6.5 Note:

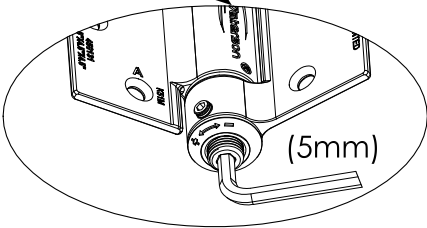
The speed screws on the bottom of Type A & Type A1 Waterson hinges interact with each other; if the adjustment of the speed screw on Type A Waterson hinge in the "-" direction is needed, please also adjust the speed screw on Type A1 Waterson hinge in the opposite direction ("+" ) simultaneously.

**If using the Hydraulic buffer device of Type HA to control closing speed is easier, then no other adjustments are required.**



5.2.7 **Step 7: Tighten the two set screws near the bottom of Waterson hinge**

After the closing speed adjustment is completed, use a 3mm hex wrench to tighten the TWO set screws near the bottom of Waterson hinge to hold the speed screw in place. If during installation one of the two set screws is difficult to tighten because of the lack of space, it is also acceptable to tighten only ONE of the set screws.

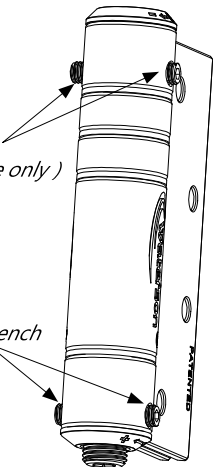


5.2.7.1 Note:

If subsequent closing speed adjustments are required, the two set screws have to be released first, before making adjustments. The Waterson hinge might malfunction if the set screws are not released before making adjustments.

*Two Set Screws,  
use 3mm Hex Wrench  
( for Hydraulic buffer device only )*

*Two Set Screws,  
use 3mm Hex Wrench*



### 5.3

#### **Protection Zone Function: Unique Protection Zone Function Designed for the Disabled, Elders, or Children**

When all set-up procedures are completed, the door will be closed smoothly at any angle. In this condition, the protection zone function designed for the disabled, elders, or children is activated. That is, when the closing path of the door is blocked by USERS in the 20° -45° range, the Waterson hinge will stop closing the door, unless the door is pushed back to 60° . This protection zone is specially designed for users with limited mobility, such as the disabled, elders, or children.

- 5.3.1 If this protection zone function is not required, please loosen the SPEED screw of the Type A Waterson hinge slightly to ensure the door can be closed automatically after stopping the door in the 20° -45° range. After the SPEED screw of the Type A Waterson hinge is loosened, the door will regain enough closing force to close the door automatically. At the same time, if the sound of door latching is louder than desired, please tighten the SPEED screw of the Type A1 Waterson hinge slightly. (After adjustment, please ensure the door can be closed at any angle)
- 5.3.2 If adjustment of SPEED screw does not deactivate the protection zone function completely, we suggest increasing the closing force by 1 or 2 scale positions. With stronger closing force, the protection zone function will be deactivated. However, if the scale setting is changed, the user should confirm that the door closes at 20° , 60° & 90° . If not, re-adjust the SPEED screws on the bottom of the Waterson hinges. See Steps 5 & 6 on page 13 to enable automatic door closing at any angle.

### **5.3.3 Compliance to ADA(American Disabilities Act) Compliant Door Hardware:**

Interior doors should require no more than 5 lbs. of force to open. This does not apply to the initial force needed to overcome the weight of a motionless door. Open the door gradually; do not "jerk" it open. Opening force for exterior doors is not specified in the ADA Standards, but exterior doors that need to be accessible should have the minimum force possible. Typical maximum opening force for exterior doors ranges from 8.5 to 10 lbs. Any door so heavy that it prevents the disabled from entering may impede their access to goods and services. This is included in ADA. Also, state or local government codes may have specific accessibility requirements for exterior doors. The closing or swing speed must not be faster than five seconds. The closing or swing distance is between the open position at 90° and the latch position at 12° . Latching speed is not specified, but should be fast enough to latch the door.

- 5.3.4 Use "ADA Accessibility Force Gauge" to test whether the door closer is ADA compliant. The following video demonstrates the testing method: <https://youtu.be/7-CYPdI3t9Q>



## 6 Appendix 1: Interference Adjustment

- 6.1 Installation quality is extremely important for Waterson hinges. To maximize the functionality of Waterson hinges, please carefully follow each installation step.
- 6.2 Refer to section 2.4 on page five. Use a piece of 0.3-0.5mm-thick metal (or a 0.3mm card) or gap gauge to verify the clearances. The clearances between the door and the frame / under the bottom of the door shall be 0.3-0.5mm. Ensure that there is no interference between the door, the frame and the hinges. (Refer to 6.3.6 NFPA-80 Door Assembly Clearance Requirements)

Use the shim to make adjustments for any found interference or askewness issues. Ensure the clearances between the door and frame / under the bottom of the door is appropriate. Information of shim and shimming, please refer to **6.3 Waterson Hinge Tool**.

### 6.3 Waterson Hinge Tool

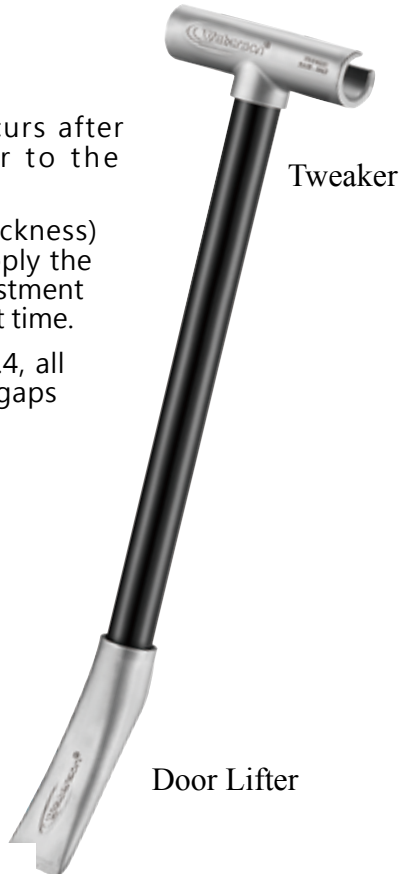
- 6.3.1 If interference or tilting occurs after hinges are installed, refer to the illustrations in the manual.

Use 16 gauge (1.65mm in thickness) steel shims for adjustment. Apply the Waterson Hinge Tool and adjustment can be completed within a short time.

As specified in NFPA-80, 6.4.3.4, all shims applied to adjust door gaps must be metal.



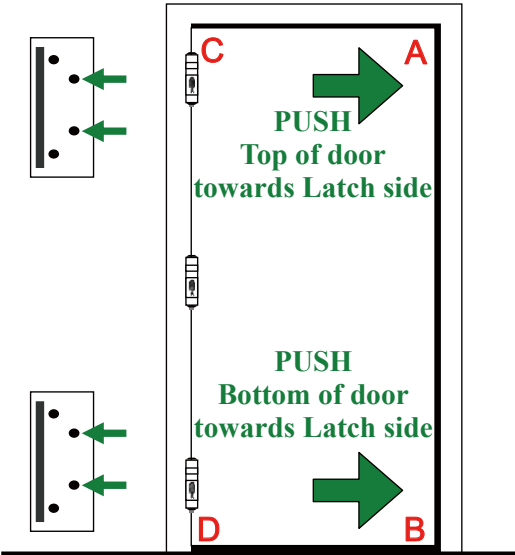
Removable & Restickable  
304 Stainless Steel Shim



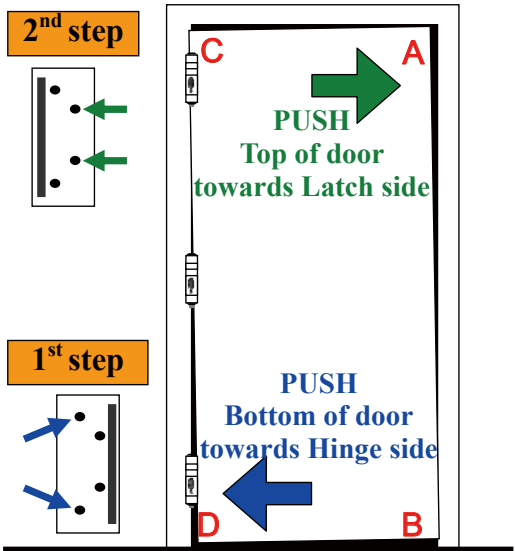
6.3.2 When a large gap is present on latching side of door but tight on hinge side then shims are recommended to create an even gap on all sides of door reducing hinge binding and improving latching capability.

**If door Binding – Rubbing or Uneven Gap occurs after hinges are installed , take the following steps to adjust:**

- 1 ) Loosen Screws
- 2 ) Adhere the shims as illustrated
- 3 ) **Fasten the two screws indicated with arrows. (not all the way)**
- 4 ) Using Waterson Hinge Tool to adjust the door to the correct position and tightening the two screws.
- 5 ) Tighten all the screws.
- 6 ) Why would we not first tighten screws before using tools– Clients will most likely bend or strip screws – When we use all other tools – screws are tightened first.



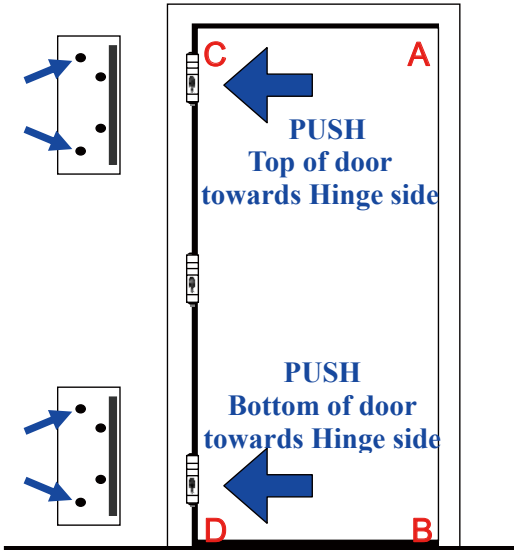
6.3.3 Door Panel may be tilted as illustrated below noted in the A-B or the C-D line



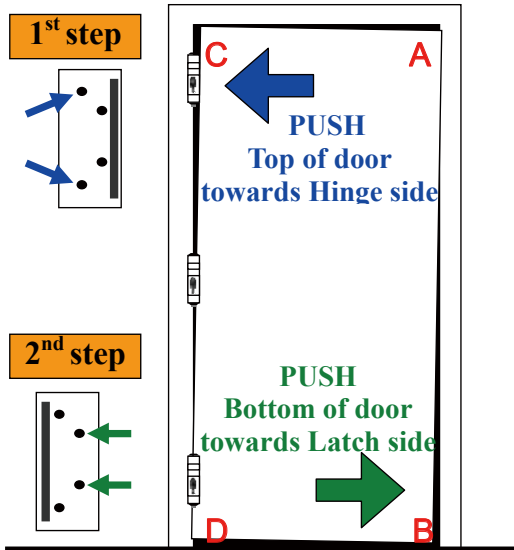
6.3.4 When a large gap is present on hinge side of door but tight on the latch side then shims may be recommended to create an even gap on all sides of door reducing hinge binding and improving latching capability.

If door Binding – Rubbing or Uneven Gap occurs after hinges are installed , take the following steps to adjust:

- 1 ) Loosen Screws
- 2 ) Adhere the shims as illustrated
- 3 ) **Fasten the two screws indicated with arrows. (not all the way)**
- 4 ) Using Waterson Hinge Tool to adjust the door to the correct position and tightening the two screws.
- 5 ) Tighten all the screws.
- 6 ) Why would we not first tighten screws before using tools– Clients will most likely bend or strip screws – When we use all other tools – screws are tightened first.

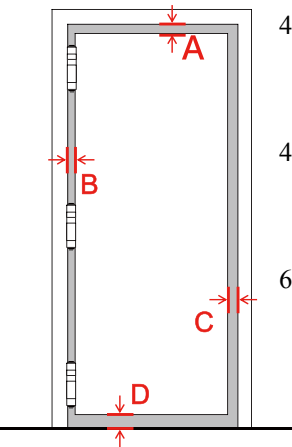


6.3.5 Door Panel may be tilted as illustrated below noted in the C-D or the A-B line





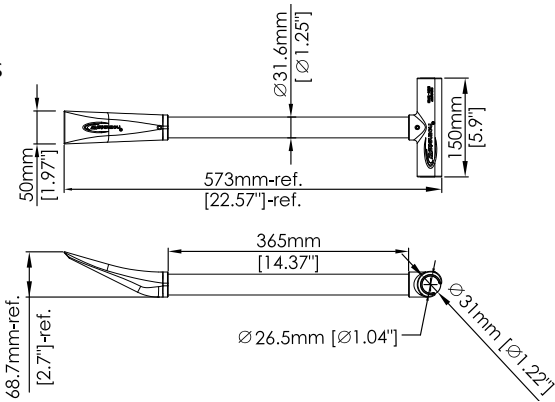
6.3.6 NFPA-80 Door Assembly Clearance Requirements



- 4.8.4.1 Clearance under the bottoms of doors shall be a maximum of ¾ in. (19 mm) over a flush or raised noncombustible sill where the sill is at floor level.
- 4.8.4.3 If the sill is not at floor level, the maximum clearance between the bottom of the door and the sill shall be 3/8 in. (9.5 mm) or as specified in the manufacturer’s label service procedure.
- 6.3.1.7.1 The clearances between the top and vertical edges of the door and the frame, and the meeting edges of doors swinging in pairs shall be 1/8 in. ± 1/16 in.(3.18 mm ± 1.59 mm) for steel doors and shall not exceed 1/8 in. (3.18 mm) for wood doors.

|             | A                            | B | C | D                          |                            |
|-------------|------------------------------|---|---|----------------------------|----------------------------|
|             |                              |   |   | Noncombustible surface     | Raised noncombustible sill |
| Steel Doors | 1/8"±1/16"<br>(3.18±1.59 mm) |   |   | Max 3/4"<br>(Max 19.00 mm) | Max 3/8"<br>(Max 9.50 mm)  |
| Wood Doors  |                              |   |   |                            |                            |

6.3.7 General Dimensions



6.3.8 Lifter and Tweaker — Stainless Steel  
Handle — Steel Tube with black powder coated

**6.4 If the interference cannot be rectified, please follow the instructions below to verify the quality of the door or frame.**

- 6.4.1 The squareness of the door and the frame.
- 6.4.2 See if there are any irregular surfaces (bent, convex, or other) on the frame and door construction.
- 6.4.3 See if there is any visible damage on the door or frame.
- 6.4.4 Verify all mounting screws are fully tightened.
- 6.4.5 Confirm that there is no interference from door closers, latches (ensure that the latch operates correctly and is not stopping the door from closing with minimal force), door stops, or any other similar devices.
- 6.4.6 Confirm that there is no interference on top, bottom, left & right sides when the door is closed.
- 6.4.7 Confirm the dimensions of all mortised surfaces, with respect to length, width, and depth between the frame and the door are conformity.
- 6.4.8 Confirm that each of the Waterson hinge plates is not positioned too deeply inside the mortise to prevent the door or frame from any rubbing interference.
- 6.4.9 Confirm that the thickness of the material of the Waterson hinge conforms to the mortise (too deep and too shallow are not acceptable) to avoid any damage to the Waterson hinge design.

If one of the conditions is present, please contact the door supplier for replacement or repair. When such problems are solved, you can continue the installation procedure.

## 7 Award Certificates :

- Ever Champion -

Silver Invention Award & Taiwan Casting Excellence and Technology Award &

Taiwan Excellence Award & Golden Pin Design Award

For details, visit the official website:

[http://www.waterson.com/c/product\\_1\\_8.html?p](http://www.waterson.com/c/product_1_8.html?p)



台灣精品 2013  
TAIWAN EXCELLENCE



金點設計獎



## **8 Fireproof Door Burning Test Certificates**

The United States:  
ANSI/BHMA A156.17 GRADE 1  
Top Grade Fatigue Test Standard for 1 Million Times of  
Switch  
UL Certification of the United States  
Qualified Waterson Hinge Applicable to Fireproof  
Door  
(Certificate No.: GEVE. R26997)  
Conformance to National Fireproof Door CNS 11227  
f(60B) Detection Applicable to Both f(60B) & f(60A)  
Standards





GVEV.R26997  
Swinging Fire Door Closers

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Swinging Fire Door Closers

[See General Information for Swinging Fire Door Closers](#)

WATERSON CORP  
8TH FL, 428 WUQUAN S RD  
SOUTH DISTRICT  
TAICHUNG, 402 TAIWAN

R26997

For self-closing doors, without hold-open feature, single acting spring hinge type, K51M Series with 3.5 in., 4.0 in., 4.5 in. and 5.0 in. leaf height.

For self-closing doors, without hold-open feature, single acting swing clear spring hinge type, K51L Series with 4.0 in., 4.5 in. and 5.0 in. leaf height.

Note:

Door closers of the spring-hinge type are investigated using the cycle endurance test in ANSI/BHMA A156.17, Grade 1, "Self Closing Hinges and Pivots".

[Last Updated](#) on 2015-10-21

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## GVEV.GuideInfo Swinging Fire Door Closers

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### [Fire Doors] (Fire Door Closers, Holders and Operators) Swinging Fire Door Closers

[See General Information for Fire Door Closers, Holders and Operators](#)

#### USE AND INSTALLATION

This category covers door-closing mechanisms of the self-closing and automatic types for swinging fire doors.

Self-closing door closers of either the surface mounted, floor mounted, concealed, semi-concealed, or spring-hinge type return the door to the closed position when opened.

Automatic door closers of either the surface mounted, concealed, or semi-concealed type employ a hold-open arm with a fusible link, which permits the door to close when a fire occurs. Fusible links on door closers are somewhat slower in action than links located at the top of the opening and at the ceiling.

Swinging-door closers are intended to be installed in accordance with the installation instructions packaged with the device. All closers are investigated for use with doors weighing a maximum of 100 lbs. When a closure is intended for use with a door weighing more than 100 lbs, the installation instructions will specify the maximum door weight. The use of sex bolts or through bolts to mount the closer to the door is required for wood or plastic-faced composite-type fire doors unless an alternate method is identified in the individual door manufacturer's certifications (and installation instructions). The use of sex bolts to mount the closers to the door is required for steel-covered composite type, sheet-metal type or hollow-metal-type fire doors provided without closer reinforcements. The use of steel machine screws to mount the closer to the door is required for steel-covered composite type, sheet-metal type or hollow-metal-type fire doors incorporating steel closer reinforcements. The use of wood screws, sheet-metal screws, sex bolts or through bolts to mount the closer to the door are required for metal-clad (Kalamein) type or wood-core-type fire doors. Some special closers are intended for use only in doors or door frames other than fire doors or fire door frames. The manufacturer of the product should be consulted to determine suitability of mounting the closer in the fire door or fire door frame.

Products identified as having been investigated to [ANSI/UL 10C](#) are intended for use on swinging fire doors and have a rating up to and including 3 h, unless otherwise noted in the individual certifications.

#### PRODUCT IDENTITY

One of the following product identities appears on the product:

Door Closer Arm

Door Closer Body

Door Closer Body Accessory - For Use With Model XXX Door Closer Body

Door Closer Hold-open Arm

#### ADDITIONAL INFORMATION

For additional information, see Fire Door Closers, Holders and Operators ([GTBT](#)), Fire Doors ([GSNV](#)) and Fire-resistance Ratings ([BXRH](#)).

#### REQUIREMENTS

The basic standard used to investigate products in this category is [UL 228](#), "Door Closers-Holders, With or Without Integral Smoke Detectors."

Door closers of the spring-hinge type are investigated using the cycle endurance test in ANSI/BHMA A156.17, "Self Closing Hinges and Pivots."

Where indicated in the individual certifications, products have additionally been investigated to [ANSI/UL 10C](#), "Positive Pressure Fire Tests of Door Assemblies."

#### UL MARK

The Certification Mark of UL on the product is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service. The [Certification Mark](#) for these products includes the UL symbol, the words "CERTIFIED" and "SAFETY," the geographic identifier(s), and a file number.