



# Senju Sprinkler

## Model FR-QR

K-Factor: 5.6 • SIN: SS2551, SS2552

Upright, Pendent, Recessed Pendent Sprinkler  
Quick Response, Standard Coverage



## GENERAL DESCRIPTION

The Model FR-QR 5.6 (80.6 LPM/bar<sup>1/2</sup>) K-factor, Upright, Pendent and Recessed Pendent Sprinklers are fusible link type automatic sprinklers. The Model FR-QR sprinklers are quick response standard coverage and are designed for use in light or ordinary hazard commercial occupancies.

They are to be installed per NFPA 13 guidelines.

The Model FR-QR Recessed Pendent Sprinkler is intended for use in areas with a finished ceiling, where applicable. This sprinkler can be used with our two-piece escutcheons to achieve the following results:

A D1 Recessed Escutcheon (two-piece) provides a total adjustment of 1/2 inch (12.7 mm).

A D2 Recessed Escutcheon (two-piece) provides a total adjustment of 3/4 inch (19.1 mm).

## WARNINGS

The Model FR-QR must be installed and maintained in accordance with the rules stated herein as well as in compliance with the applicable standards of the National Fire Protection Association regulations and the standards of any other authorities having jurisdiction.

In the event of this condition, consult the authorities having jurisdiction for guidance and approval. Failure to do so may impair the integrity of these devices.

It is the responsibility of the installing contractor to provide a copy of this document to the owner or their representative, and in turn, it is the obligation of the owner to provide a copy of this document to a succeeding owner.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any related questions.

# TECHNICAL DATA

- **Approvals:**

- cUL<sub>US</sub> Listed, FM Approved, Refer to Table A

- **Sprinkler Identification Number (SIN):**

- SS2551, SS2552, Refer to Table A

- **Maximum Working Pressure: 175 psi (12.1 bar)**

- **Discharge Coefficient (Nominal K-Factor):**

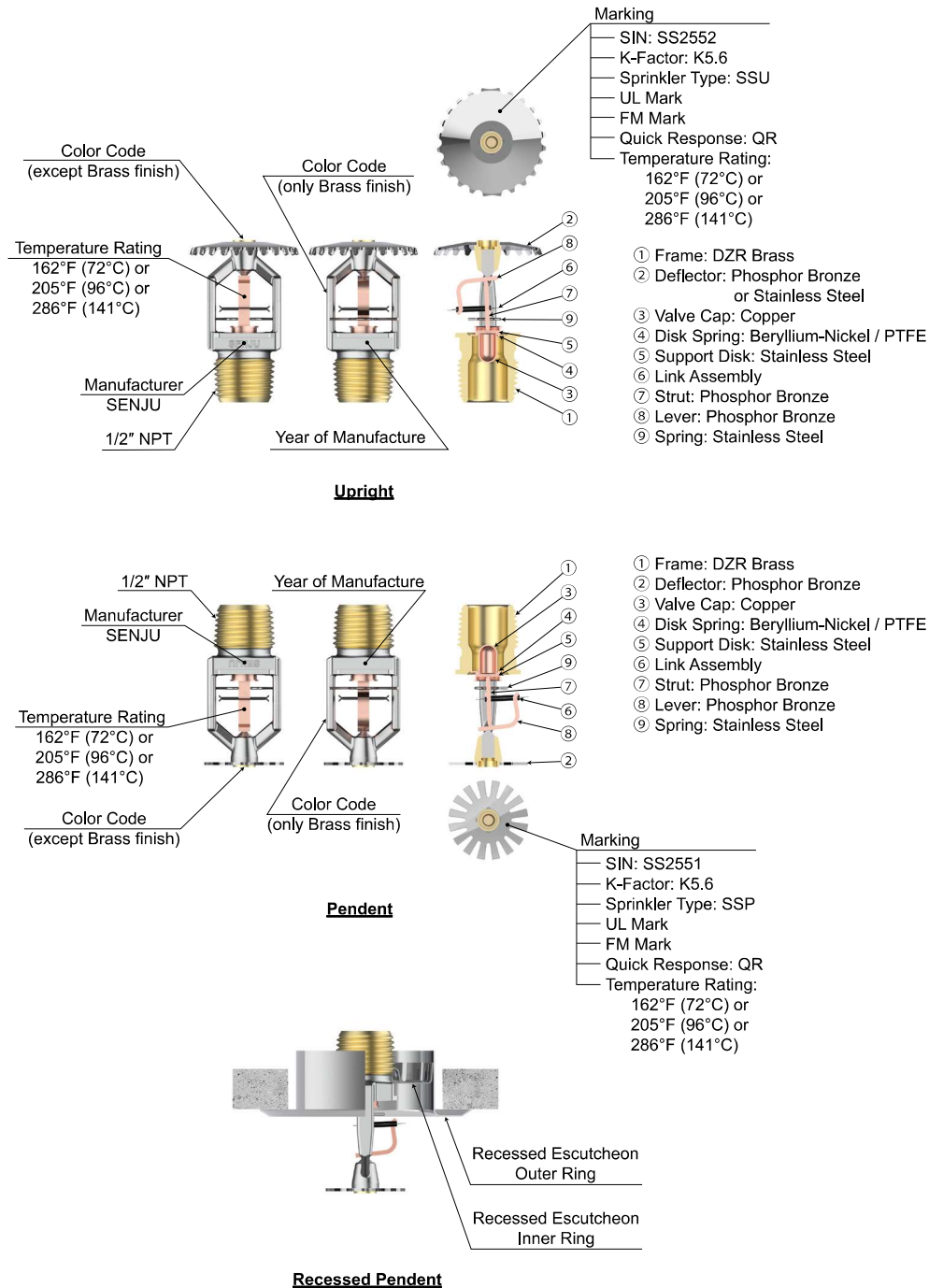
- K = 5.6 GPM / psi<sup>1/2</sup> (80.6 LPM / bar<sup>1/2</sup>)

- **Temperature Rating:**

- Refer to Table A

- **Finishes:**

- **Sprinkler:** Natural Brass, White Painted, Black Painted, Chrome Plated
- **Recessed Escutcheon:** Brass Plated, White Painted, Black Painted, Chrome Plated



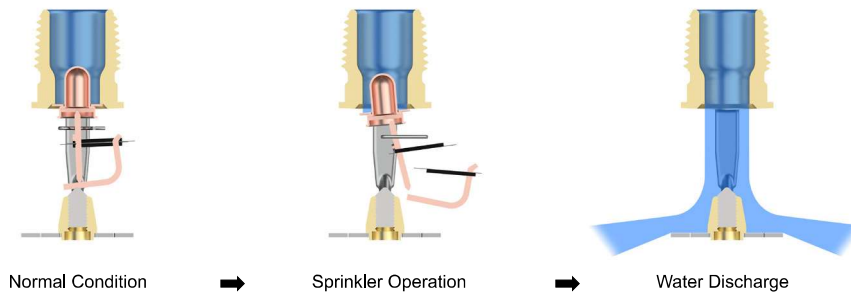
**Figure 1: Model FR-QR, K = 5.6**

Table A					
Type	SIN	Temperature	Frame or Deflector Color Code	Approvals	Remarks
Upright	SS2552	162°F (72°C)	None	cUL <sub>us</sub> *2, *3 FM *4	
		205°F (96°C)	White *1		
		286°F (141°C)	Blue *1		
Pendent	SS2551	162°F (72°C)	None	cUL <sub>us</sub> *2, *3 FM *4	
		205°F (96°C)	White *1		
		286°F (141°C)	Blue *1		
Recessed Pendent	SS2551	162°F (72°C)	None	cUL <sub>us</sub> *2, *3 FM *4	Installed with the D1 Recessed Escutcheon of 1/2" total adjustment
		205°F (96°C)	White *1		
		286°F (141°C)	Blue *1	cUL <sub>us</sub> *2, *3	
Recessed Pendent	SS2551	162°F (72°C)	None	cUL <sub>us</sub> *2, *3	Installed with the D2 Recessed Escutcheon of 3/4" total adjustment
		205°F (96°C)	White *1		
		286°F (141°C)	Blue *1		

\*1. Chrome Plated, White and Black Painted are indicated by a dot on the Deflector (Frame arms are colored for Natural Brass)  
 \*2. Listed by UL as Quick Response Sprinklers  
 \*3. Listed by UL for use in Canada as Quick Response Sprinklers  
 \*4. Approved by FM as Quick Response Sprinklers

## OPERATION

The sprinkler assemblies fusible link is comprised of two link halves that are joined together with a thin layer of solder. When the rated temperature is reached, the solder melts and the two link halves separate. This leads to the water flow to be distributed on the affected fire area.



**Figure 2:** Operation Process (For illustrative purposes only)

## DESIGN CRITERIA

The Model FR-QR, Upright, Pendent and Recessed Pendent Sprinklers are listed by UL and FM as quick response / standard coverage for use in accordance with NFPA. The herein stated rules for use and installation of Model FR-QR are provided by the manufacturer and must be strictly implemented for safe and full results. Only the D1 or D2 Recessed Escutcheon, as applicable, is to be used for recessed pendent installations.

## Notes

Fire Sprinkler Systems should only be designed and installed by individuals who are completely familiar with automatic sprinkler system design, installation procedures, and techniques.

Several criteria may apply to the installation and usage of each sprinkler. Consequently, it is recommended that the sprinkler system designer review and develop a working understanding of the complete list of criteria prior to initiating the design of the sprinkler system.

Questions concerning sprinkler installation and usage criteria, which are not covered by the following instructions, should be submitted to your contracted company. Include sketches and technical details, as appropriate.

In some instances, the requirements of this document may concern specifications which are more stringent, and which take precedence over those specified in NFPA 13 or by the authority having jurisdiction.

The spray from the sprinkler is distributed radially outward and downward from the sprinkler deflector. Consequently, the sprinklers must be located such that there will be no blind spaces shielded from spray by partitions, room dividers, overhangs or other parts of the dwelling structure.

The number of sprinklers within each compartment (as defined by NFPA 13) must be kept as few as possible while observing all guidelines relating to obstructions and spacing.

The sprinkler must be secured in place by firmly fastening the sprinkler system piping to the structure. If the sprinkler is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and its water distribution pattern.

## Obstruction to Water Distribution

Locations of sprinklers must follow the obstruction rules of NFPA 13.

## General Service Conditions

The Model FR-QR must only be utilized in sprinkler systems per NFPA 13 guidelines.

## Operational Sensitivity Criteria

For proper operational sensitivity, the Model FR-QR Recessed Pendent Sprinklers must be installed beneath a solid ceiling having a smooth or textured surface.

## Heat Source Criteria

Refer to NFPA 13 for the requirements relating to the prevention of possible activation of the Heat Responsive Element of Model FR-QR, due to the exposure of a heat source other than an actual fire.

## Precautionary Warnings for Corrosive Environments

Model FR-QR sprinklers should not be installed where they may be subjected to a corrosive environment including the following:

### 1. Chlorine ion and Chloride environment

Stress corrosion cracking may be caused by exposure to environments with Chlorine ion and Chloride. Exposure to this environment may result in sprinklers operating under Non-Fire conditions or Not Operating when exposed to an actual fire.

### 2. Sprinkler system piping with Copper

Sprinkler systems should be constructed in compliance with the applicable standards and the requirements for copper piping when copper piping is used in the sprinkler system. (Reference standards NFPA 13, ASTM B813, B828, and CDA (Copper Development Association) – Solder Joint)

All residual flux must be removed from the interior and exterior of the copper piping by thoroughly flushing before installation of the Sprinkler Heads. Otherwise, residues of flux may cause corrosion and/or leakage in the sprinkler system.

# INSTALLATION

The Model FR-QR, Upright, Pendent, and Recessed Pendent Sprinklers must be installed in accordance with the following instructions:

## NOTES

Do not use any sprinklers which have been subjected to potential mechanical damage. Do not use any sprinklers which show deformation or cracking in either the Sprinkler or the Protector.

Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to the sprinklers that could cause improper operation or non-operation.

The Protector must remain on the sprinkler during installation. After the installation is completed, the Protector must be removed to place the sprinkler in service.

Use a torque of 7 to 14 ft·lbs (9.5 to 19.0 N·m) to achieve a 1/2 inch NPT sprinkler joint. If you exceed the recommended maximum torque, this could result in damage to the sprinkler inlet, which may lead to leakage from the sprinkler.

Use only Spanner FR-S or Socket FR-H (or FR-H II) for installation of Model FR-QR sprinklers. Use of any other wrench or socket is prohibited and may cause damage to the sprinkler.

Do not over or under tighten the sprinkler due to an inadequate adjustment of the D1 or D2 Recessed Escutcheon. Re-adjust the sprinkler fitting to correct the position.

## Installation Steps

Install Model FR-QR sprinklers by the steps and figures shown below. Use only D1 or D2 Recessed Escutcheons with Model FR-QR Pendent sprinklers. Use of any other recessed escutcheon is prohibited and may void the warranty and approvals.

### **Model FR-QR Upright and Pendent Sprinkler**

**Step 1:** Install Upright sprinklers in the upright position. Install Pendent sprinklers in the pendent position. (Ref. Figures 3 and 4)

**Step 2:** Apply pipe-thread sealant to the threads. Begin hand-tightening the sprinkler into the sprinkler fitting.

**Step 3:** Using the Spanner FR-S, tighten the sprinkler into the sprinkler fitting with a torque of 7 to 14 ft·lbs (9.5 to 19.0 N·m). (Ref. Figure 5)

**Step 4:** Remove the Protector by hand. (Ref. Figure 6)

### **Model FR-QR Recessed Pendent Sprinkler**

**Step 1:** Install the Inner Ring of the D1 or D2 Recessed Escutcheon over the sprinkler threads. (Ref. Figures 3 and 4)

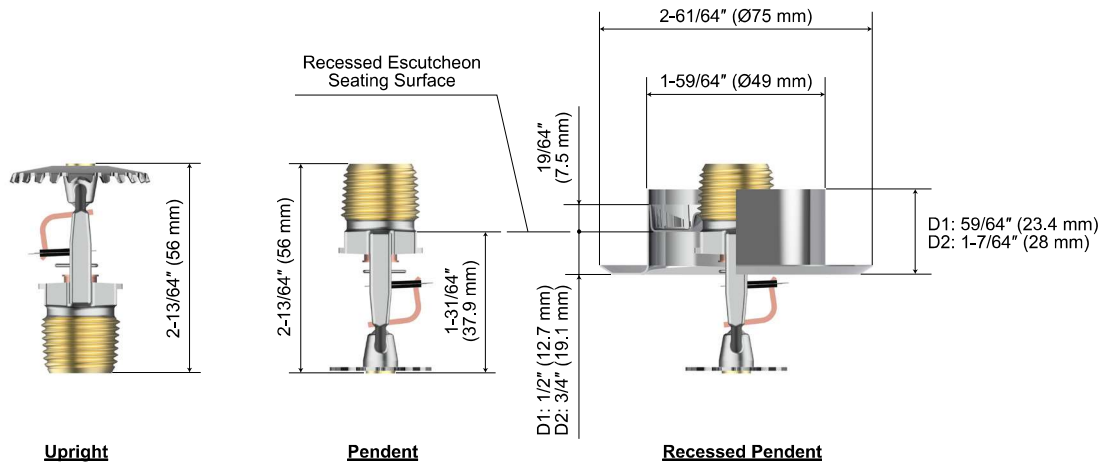
**Step 2:** Apply pipe-thread sealant to the threads. Begin hand-tightening the sprinkler into the sprinkler fitting in the pendent position.

**Step 3:** Using the Socket FR-H (or FR-H II) or Spanner FR-S, tighten the sprinkler into the sprinkler fitting with a torque of 7 to 14 ft·lbs (9.5 to 19.0 N·m). (Ref. Figures 5 and 7)

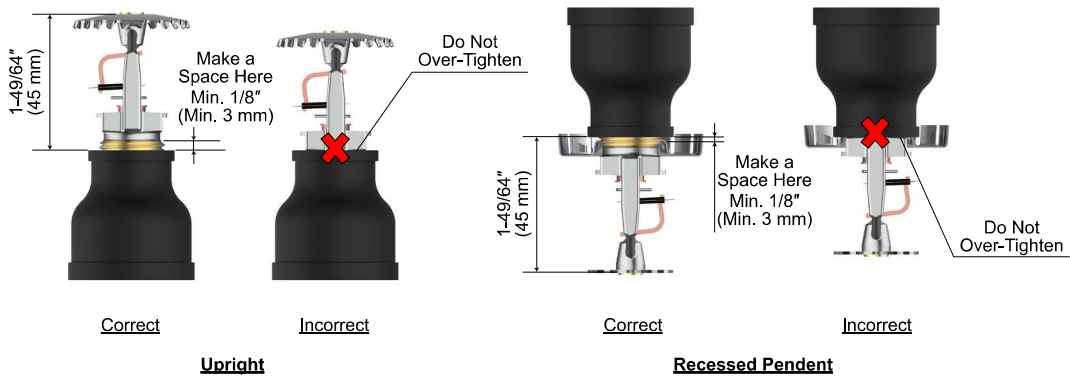
A 1/2" drive ratchet (not included) is required for use with the Socket FR-H (or FR-H II).

**Step 4:** Remove the Protector by hand. (Ref. Figure 8)

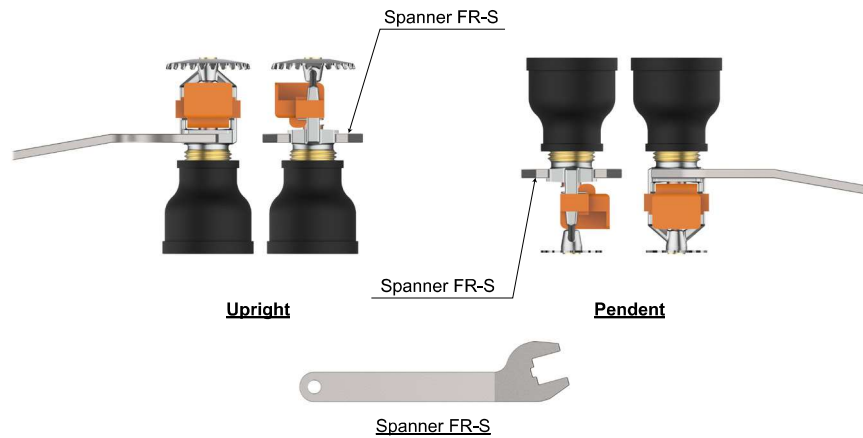
Slide on the Outer Ring of the D1 or D2 Recessed Escutcheon over the Sprinkler and push the Outer Ring over the Inner Ring until its flange comes in contact with the ceiling. (Ref. Figures 9 and 10))



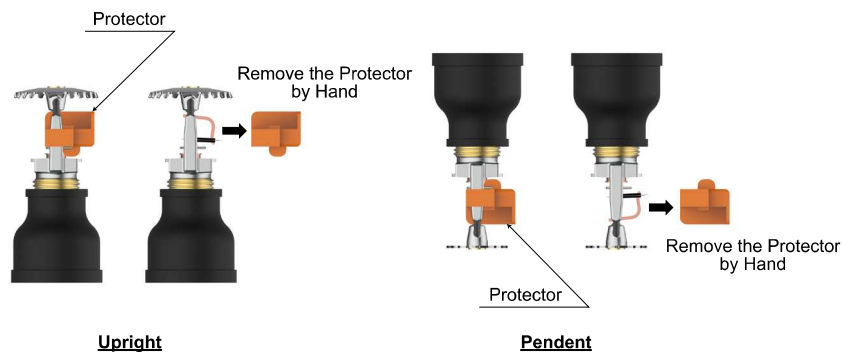
**Figure 3:** Upright, Pendent and Recessed Pendent Sprinklers



**Figure 4:** Installation (Correct and Incorrect)

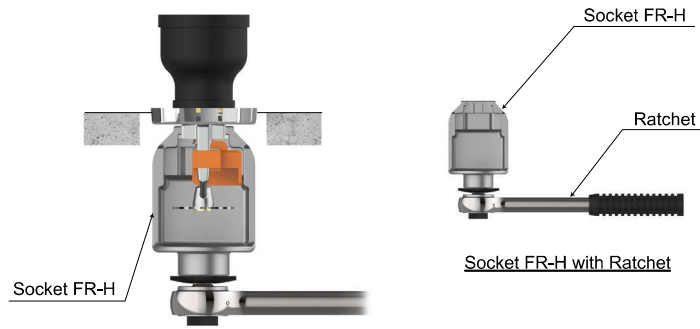


**Figure 5:** Installation (Spanner)



**Figure 6:** Protector Removal

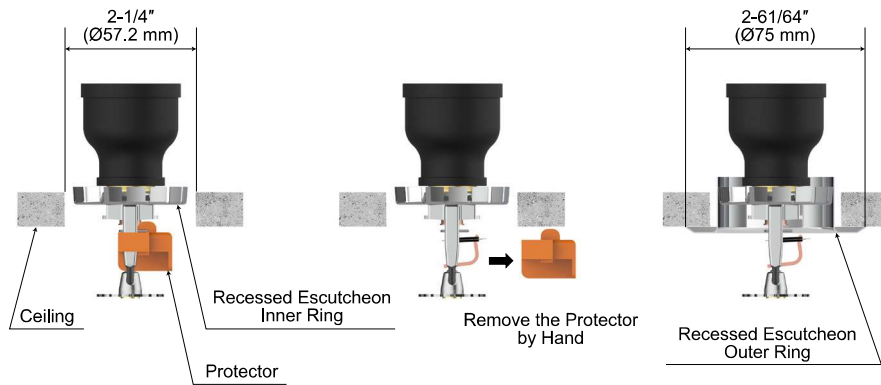




**Recessed Pendant**

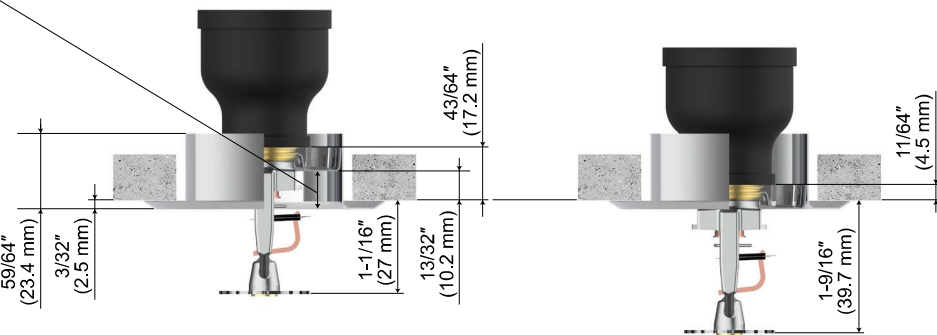
**Figure 7: Installation (Socket)**

A 1/2" drive ratchet (not included) is required for use with the Socket FR-H.



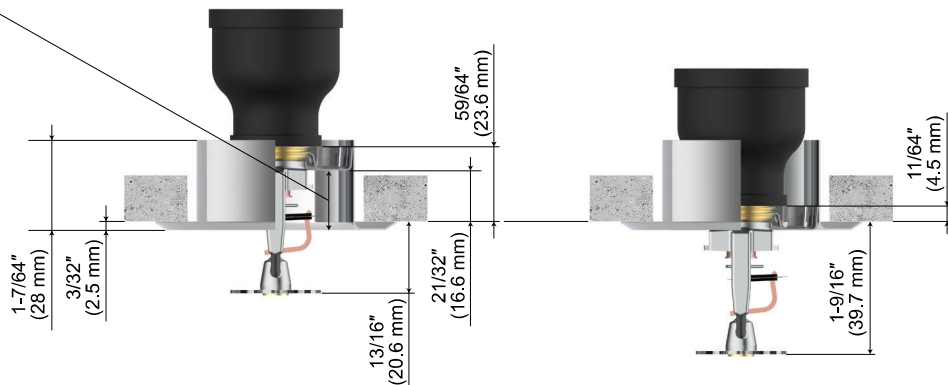
**Figure 8: Protector Removal**

D1 Recessed Escutcheon  
Total Adjustment of 1/2" (12.7 mm)



**Figure 9: Installation (D1 Recessed Escutcheon)**

D2 Recessed Escutcheon  
Total Adjustment of 3/4" (19.1 mm)



**Figure 10: Installation (D2 Recessed Escutcheon)**

## CARE & MAINTENANCE

The following instructions must be implemented for the maintenance and service of the Model FR-QR.

### Notes

Wet pipe sprinkler systems must be maintained at a minimum temperature of 40°F / 4°C to prevent freezing and bursting of the pipe and/or sprinklers.

Automatic sprinklers are not to be tested with a heat source. Operation of the heat responsive element can result.

Absence of the Outer Ring from the D1 or D2 Recessed Escutcheon, which is used to cover the clearance hole, can delay sprinkler operation in a fire situation.

In preparation for maintenance of the fire protection system, permission to close the main control valve must be obtained from the proper authorities, and all affected parties by this action, and must be informed before the maintenance session can commence.

Do NOT enclose any sprinklers within drapes, curtains, or valances.

Do NOT hang anything from the sprinklers.

Do NOT clean the sprinklers with soap and/or water, detergents, ammonia, cleaning fluids, or other chemicals. Remove dust, lint, cobwebs, cocoons, insects, and larvae by gently brushing with a feather duster or gently vacuuming with a soft bristle (i.e., dusting) brush attachment.

Exercise suitable safety precautions in the use and storage of highly flammable materials. The rapid rate of fire development and spread of these materials can reduce the ability of the sprinkler system to aid in the control of a fire involving such hazards.

Leaking or corroded sprinklers must be replaced.

Automatic Sprinklers must be kept in a cool and dry place.

Automatic sprinklers must never be physically altered, such as painted, plated, or coated, once shipped from the factory. If the sprinklers have been in any way modified, they must be replaced.

Great caution must be applied to prevent damage to the sprinklers at all stages - before, during, and after installation. Damaged units because of dropping, hitting, over-tightening, or wrench slippage, must be replaced.

When remodeling, such as by adding false beams or light fixtures or changing the location of compartment walls, first verify that the new construction will not violate the installation requirements of the applicable standards of NFPA. Alter the new construction and/or the sprinkler system to suit the requirements of this document and the applicable NFPA regulations.

The owner is responsible for the maintenance of the sprinkler system, including inspection and testing of its compliance with this document, as well as the standards of the National Fire Protection Association (e.g., NFPA 25), and the regulations of any other authorities having jurisdiction. The owner should direct any questions regarding the above rules and regulations to the installing contractors or the sprinkler manufacturer. It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with NFPA 25.

## ORDER PROCEDURE

When placing an order, please contact a local distributor with the following information (Model Name, Temperature Rating and Finish).

### Sprinkler

- Model: FR-QR K5.6
- Temperature: 162°F (72°C), 205°F (96°C) or 286°F (141°C)
- Finishes: Natural Brass, White Painted, Black Painted, Chrome Plated  
For Type, SIN, and Recessed Escutcheon, refer to the table below.



Type	SIN	Recessed Escutcheon	Temperature	Approvals
Upright	SS2552	--	162°F, 205°F, 286°F	cUL <sub>US</sub> , FM
Pendent	SS2551	--	162°F, 205°F, 286°F	
Recessed Pendent	SS2551	D1 (1/2" total adjustment)	162°F, 205°F	cUL <sub>US</sub>
			286°F	
Recessed Pendent	SS2551	D2 (3/4" total adjustment)	162°F, 205°F, 286°F	

## Recessed Escutcheon

- Model: D1 Recessed Escutcheon (Inner Ring and Outer Ring, 1/2" total adjustment)
- Model: D2 Recessed Escutcheon (Inner Ring and Outer Ring, 3/4" total adjustment)
- Finishes: Brass Plated, White Painted, Black Painted, Chrome Plated

## Tools and Accessories

- Spanner FR-S (Open-end wrench type)
- Socket FR-H or FR-H II (Socket wrench type).  
For use with a 1/2" drive ratchet (not included)