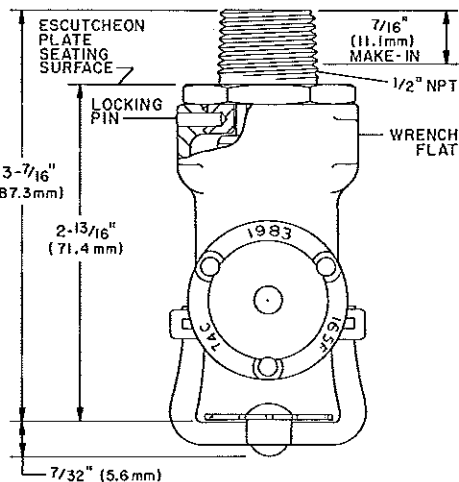
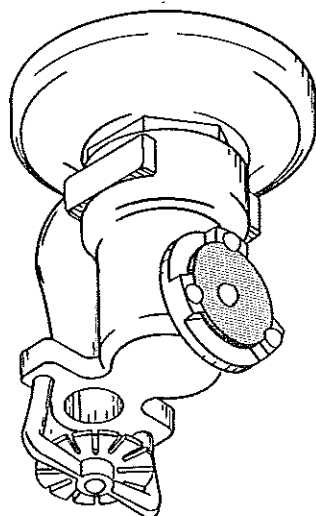


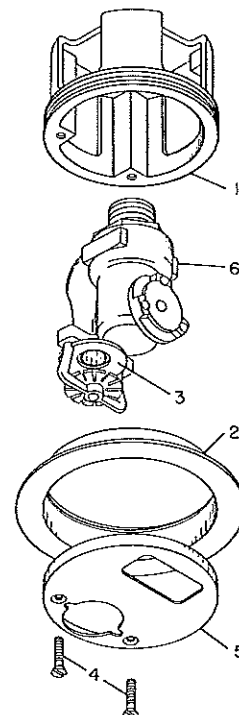


ON-OFF SPRINKLERS

MODEL F920C PENDENT AND F922C RECESSED AQUAMATIC



- 1—Housing
- 2—Adjusting Collar
- 3—Orifice Cover
- 4—Flat Head Screw, No. 6 32 UNC x 3/4" (2 req'd)
- 5—Cover Plate
- 6—F920C Aquamatic Sprinkler with chrome plated Snap Disc Retainer, Yoke and Deflector



DIM.	INCHES	MM
A	4-1/4	108.0
B	3-1/2	88.9
C-Nom.	2-3/8	60.3

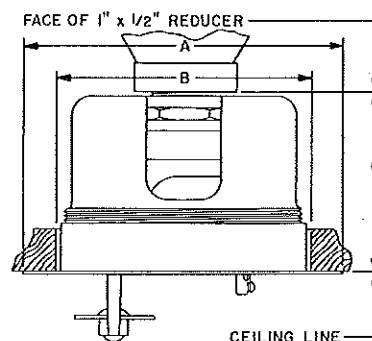


FIGURE B
MODEL F922C RECESSED AQUAMATIC SPRINKLER ASSEMBLY

- 1—Body
- 2—Yoke
- 3—Deflector
- 4—Inlet
- 5—Piston
- 6—Snap Disc Retainer
- 7—Snap Disc Retainer
- 8—Pilot Valve
- 9—Bias Spring
- 10—Check Spring
- 11—Strainer
- 12—Check Housing
- 13—Check Ball
- 14—Baffle Plate

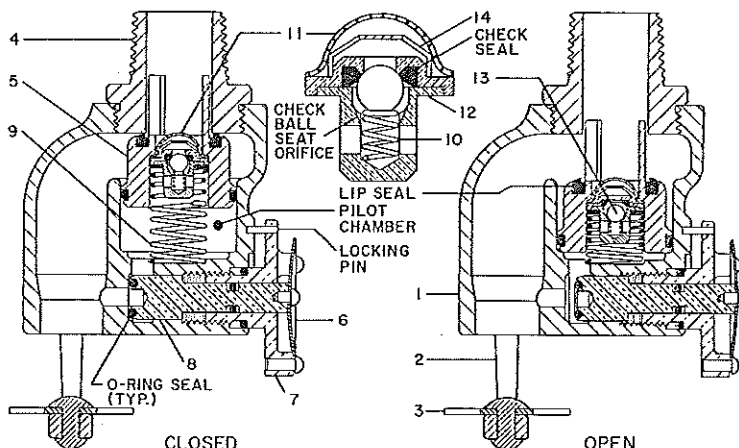


FIGURE A

MODEL F920C PENDENT AQUAMATIC SPRINKLER ASSEMBLY

GENERAL DESCRIPTION

The 1/2 inch orifice Model F920C Pendent and Model F922C Recessed Aquamatic Sprinklers are automatic sprinklers of the on-off type. An Aquamatic Sprinkler automatically operates (opens) when the temperature of its bimetallic snap disc is raised to the snap-over point and it will automatically reset (i.e., close) itself once the temperature of the disc is lowered to the snap-over point of approximately 100F/38C. If the fire flares back up, the sprinkler will operate as before.

The principal advantages associated with the use of Aquamatic Sprinklers are that: they eliminate the need to turn off the main control valve for the

post fire inspection; they minimize water damage; and, they do not need to be replaced after a fire is extinguished.

The Model F920C and F922C Sprinklers are only intended for use in wet pipe sprinkler systems with water supplies which are potable and free of debris. They are "standard sprinklers" and produce a hemispherical water distribution pattern below the deflector.

APPROVALS AND STANDARDS

The F920C Pendent and F922C Recessed Aquamatic Sprinklers are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada. The F920C is approved by Factory Mutual Research Corporation.

The F920C and F922C Aquamatic Sprinklers are approved by the New York City Board of Standards and Appeals under Calendar Number 281-73-SA.

WARNING

The F920C and F922C Aquamatic Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the

applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of this device.

The owner is responsible for maintaining his fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

The F920C and F922C Aquamatic Sprinklers must not be used in dry pipe, preaction, or anti-freeze sprinkler systems or with non-potable water supplies.

TECHNICAL DATA

The 1/2 inch orifice Model F920C Pendant Aquamatic Sprinklers (Ref. Figure A) are available in natural or chrome plated finishes and in a 165F/74C or 212F/100C temperature rating. The 1/2 inch orifice Model F922C Recessed Aquamatic Sprinklers (Ref. Figure B) are available in a chrome plated finish and in a 165F/74C or 212F/100C temperature rating. They are rated for use at a maximum service pressure of 175 psi.

The nominal discharge curve plotted in Figure C represents the flow "Q" in U.S. gallons per minute (gpm) for the F920C and F922C, as determined by the formula: $Q=K\sqrt{p}$; where the nominal sprinkler discharge coefficient "K" = 5.40 and "p" = pressure in pounds per square inch (psi). Listing standards permit the actual value of "K" to vary from 5.3 to 5.8.

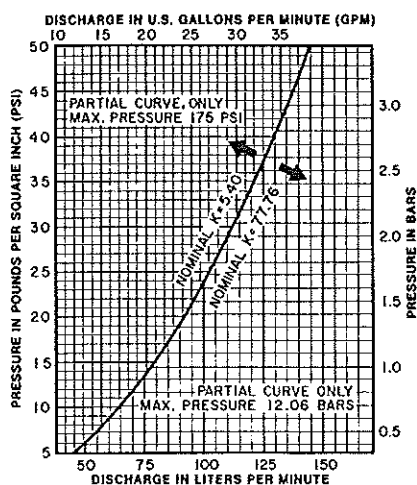


FIGURE C
NOMINAL DISCHARGE CURVE

The principal components of the F920C are illustrated in Figure A. The Body is bronze per ASTM B584

(C83600), the Yoke is bronze per ASTM B176(C87800), the Deflector is brass per ASTM B36(C23000), and both the Inlet and Piston are brass per ASTM B16(C36000). The external bearing (guide) surfaces of the Piston as well as the walls of the Piston Chamber in the Body are Teflon[†] coated.

The Snap Disc is thermostat metal per ASTM B388 (Type TM1), the Snap Disc Retainer is sintered brass (S.A.E. Alloy No. 890) and the Pilot Valve is brass per ASTM B16 (C36000).

The Bias and Check Springs are both beryllium-copper per ASTM B197 (C17200), the Strainer is a 150 mesh phosphor bronze, the Check Housing is brass per ASTM B16 (C36000), the Check Ball is a Type 316 stainless steel, and the Baffle Plate is phosphor bronze per ASTM B103 (C51000). The o-ring seals, lip seal and check seal are all silicone rubber.

The F922C which is illustrated in Figure B is made up of an F920C (with chrome plated Snap Disc Retainer, Yoke and Deflector) inside a chrome plated closure. The closure Housing is aluminum per ASTM B85(A03800) and the other closure components are chrome plated steel. The Adjusting Collar can be used to adjust for up to $\pm 1/8$ inch variation in the location of the sprinkler relative to the ceiling.

The separable two-piece design of the F922C Housing and Adjusting Collar allows installation of the sprinklers and pressure testing of the fire protection system/evaluation of leak tightness, prior to installation of a suspended ceiling or application of the finished coating to a fixed ceiling. The two-piece design also permits removal of suspended ceiling panels for access to building service equipment, without having to first shut down the fire protection system and remove sprinklers.

OPERATION

When the Aquamatic Sprinkler is in the closed position, water pressure in the Pilot Chamber (from the precharging operation described in the Installation Section) holds the Piston shut against the system water pressure. The Check Ball will open momentarily whenever the system pressure exceeds the pressure within the Pilot Chamber such as may occur during the initial system fill or a transient increase in supply pressure. However, the Piston will not open because of the incompressibility of the water filling the Pilot Chamber.

If the sprinkler is exposed to a temperature sufficient to operate its Snap Disc, the Pilot Valve will open and start to relieve the pressure in the Pilot Chamber. As the pressure is relieved, the Check Ball moves downward due to the force of the system water pressure and stops against the Check Ball Seat. With the ball seated, water can only flow into the Pilot Chamber through two small orifices which are coined in the Check Ball Seat. Since the area of the exit port past the Pilot Valve is much greater than the area of the two passageways in the Check Ball Seat, Pilot Chamber Pressure is fully relieved and the system water pressure automatically forces the Piston assembly open (down) permitting a full discharge. Full downward movement of the Piston actually takes place in a fraction of a second.

When the temperature of the Snap Disc has been lowered to its snap-back point of approximately 100F/38C it will close the Pilot Valve. Water will then fill the Pilot Chamber and automatically raise the Piston back to its closed position. Since water can still only enter the Pilot Chamber through the two small orifices in the Check Ball Seat, about a second is required to close the Piston. This slower closing action helps to permit any water borne debris passing above the Lip Seal to be flushed away before the Piston completely shuts. Once the Pilot Chamber and supply pressures are at essentially the same value, the Check Spring raises the Check Ball back to its closed position against the Check Seal.

The Aquamatic Sprinklers have been rigorously and repeatedly tested with water supplies containing silt and debris. Under such operational conditions, the Piston may either stick in the full open (failsafe) position or not fully close due to debris which may become trapped between the top of the Piston and the Inlet. Consequently, the Aquamatic Sprinklers are only recommended for use with debris free potable water supplies.

INSTALLATION

NOTES

Sprinkler systems containing Aquamatic Sprinklers must have a vent connection (which may also be used as an Inspector's Test Connection), piped from a cross main or branch line at the point most remote from the alarm valve. The vent line should be connected to the top of a cross main or to the end of a branch line and be located at the highest level of a multi-level installation.

Before the Aquamatic Sprinklers are installed, the system piping must be flushed and the sprinklers must be inspected and precharged as described below.

The Aquamatic Sprinklers are only to be used with wet pipe sprinkler systems having potable water supplies. Aquamatic sprinklers are not to be precharged with an anti-freeze solution or installed in sprinkler systems containing an anti-freeze solution.

FLUSHING OF SYSTEM PIPING

In order to ensure leak tight reclosing, the water supplied to the Aquamatic Sprinklers must be free of metal chips, rust flakes, pipe joint compound, silt, and all other foreign matter. Consequently, prior to installing the sprinklers:

- underground yard mains and lead-in connections must be flushed in compliance with the guidelines given in NFPA-13A; and,
- the system piping must be flushed sequentially through the cross mains, branch lines and drop nipples until all the piping is clean.

AQUAMATIC INSPECTION

Inspect each Aquamatic Sprinkler for physical damage. Special attention is to be given to the Snap Disc, Snap Disc Retainer and the Snap Disc Retainer Locking Pin. Damaged sprinklers are to be returned to the factory. No attempt is to be made to field repair any Aquamatic Sprinkler component.

AQUAMATIC PRECHARGING

NOTES

Do not precharge with air.

Once the Aquamatic Sprinklers are precharged with water, they must be maintained at a minimum temperature of 40F/4C.

Each Aquamatic Sprinkler must be precharged with water from a potable supply before installation in the system piping. This operation pressurizes the Pilot Chamber and prevents leakage past the Lip Seal, while the system is being filled.

1. Assemble a Precharging Manifold similar to that shown in Figure D. Larger Manifolds are permitted subject to the pressure requirements noted in Step 2. If the water supply is limited, such as in the case of a sink faucet, then only one sprinkler at a time can be precharged.

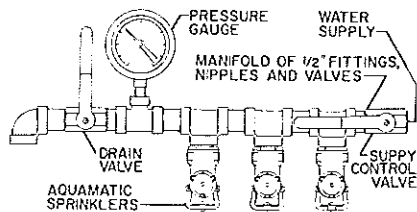


FIGURE D
PRECHARGING MANIFOLD

2. Close the Supply Control Valve and connect the Manifold to a water supply which has sufficient pressure and flow capacity to maintain a minimum residual (i.e., flowing) pressure of 10 psi at the Pressure Gauge, with all of the Aquamatic Sprinklers in the precharging manifold flowing full. A minimum residual pressure of 10 psi is required to ensure proper precharging of an Aquamatic Sprinkler.

NOTE

The Manifold must be located such that there will be no accidental damage to property or danger to persons, when water is discharged.

3. Install the sprinklers to be precharged.
4. Close the Drain Valve and then open the Supply Control Valve. As each sprinkler becomes precharged, it may spurt momentarily until its Pilot Chamber becomes pressurized.
5. Operate each sprinkler, one at a time, by applying heat to the Snap Disc (such as by using a Propane torch), until the sprinkler opens. Remove the source of heat as soon as the sprinkler opens and allow it to flow full for a minimum of four seconds. Wet the Snap Disc with a few drops of water so that it will snap back or allow the Snap Disc to naturally cool and snap back.

NOTE

If the sprinkler does not reset itself after the snap-back, check to see that the Pressure Gauge indicates a minimum of 10 psi.

6. Wait a few moments and check that each sprinkler has shut off tightly. If one does not, some foreign matter may have become trapped between the Piston and Inlet. Operate the sprinkler again. This should flush out any minor amount of debris. If leakage persists, the sprinkler will have to be replaced.
7. Close the Supply Control Valve, open the Drain Valve and remove the precharged sprinklers.

F920C PENDENT INSTALLATION

Apply pipe thread sealant sparingly to the sprinkler threads only.

Install the F920C Aquamatic Sprinklers in the system by using a 1½ inch open end wrench applied to the sprinkler wrench flats only.

F922C RECESSED INSTALLATION

The pipe nipple connected to the sprinkler fitting should be cut so that the bottom face of the sprinkler fitting is at the nominal 2-3/8 inch distance above the ceiling. The 1/4 (± 1/8) inch adjustment with the Adjusting Collar can then be used to compensate for the possible manufacturing variations in the take-out of the sprinkler fittings as well as in the make in of the sprinklers (as permitted by ANSI B2.1).

Proceed with the installation as follows:

- A. Position the precharged sprinkler in the Housing with its Yoke between the two tapped holes in the Housing.
- B. Apply pipe thread sealant sparingly to the sprinkler threads only.
- C. Hand tighten the sprinkler with the attached Housing into the sprinkler fitting.
- D. With the "U" of the F748 Wrench (Ref. Figure E) pushed up over the sprinkler wrench flats, tighten the sprinkler into the fitting.

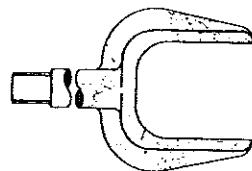


FIGURE E
MODEL F748
WRENCH

- E. Screw on the Adjusting Collar until it is flush with the ceiling. Attach the Orifice Cover and Cover Plate to the Housing with the Flat Head Screws.

SYSTEM FILL AND DRAIN

Use the following procedure when filling a sprinkler system which has Aquamatic Sprinklers.

- a. Open the remote cross main or branch line vent connection.
- b. Slowly open the main control valve until the sound of flowing water just begins and then open the valve one more turn.
- c. Close the remote vent connection after the discharge of aerated water



ON-OFF SPRINKLERS, MODEL F920C AND F922C AQUAMATIC

ceases and the outlet has flowed full for at least 15 seconds.

d. Fully open the main control valve.

Use the following procedure when draining a sprinkler system which has Aquamatic Sprinklers.

a. Close the main control valve.

b. Open the remote vent connection.

c. Open the main drain valve.

CARE AND MAINTENANCE

Automatic sprinklers must never be shipped or stored where their temperatures will exceed 100F/38C and they must never be painted, plated, coated or otherwise altered after leaving the factory.

Care must be exercised to avoid damage to the sprinklers both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

After being precharged with water, installed in a system, or after removal from a system, the Pilot Chamber of an Aquamatic Sprinkler contains water and, therefore, it must be maintained at a minimum temperature of 40F/4C.

NOTE

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

Sprinkler Assemblies:

Specify: (specify temperature rating), Model (specify), (specify Pendant or Recessed) Aquamatic Sprinkler with (specify type of finish), PSN (specify).

F920C Pendant-Natural Finish

165F/74C PSN 53-934-1-165
212F/100C PSN 53-934-1-212

F920C Pendant-Chrome Plated Finish

165F/74C PSN 53-934-9-165
212F/100C PSN 53-934-9-212

F922C Recessed-Chrome Plated Finish

165F/74C PSN 53-936-1-165
212F/100C PSN 53-936-1-212

Separately Ordered Parts

Specify: Model F748 Recessed Aquamatic Sprinkler Wrench, PSN 56-454-1-001.

Replacements parts

Specify: (description) for use with Model F922C Aquamatic Sprinkler, PSN (specify).

- 1-Housing PSN 91-782-1-001
- 2-Adjusting Collar PSN 91-782-1-002
- 3-Orifice Collar PSN 91-782-1-003
- 4-Flat Head Screw PSN 62-621-1-001
- 5-Cover Plate PSN 91-782-1-015
- 6-165F/74C Recessed Sprinkler w/o Accessories PSN 53-935-1-165
- 212F/100C Recessed Sprinkler w/o Accessories PSN 53-935-1-212

PATENT NOTICE

Certain features of the Aquamatic Sprinklers are covered by U. S. A. Patent No. Re 29,155.

CONVERSION FACTORS

Parenthetical metric conversions cited herein are approximate.

1 inch	=	25.400 mm
1 foot	=	0.3048 m
1 psi	=	6.895 kPa
	=	0.0689 bar*
	=	0.0703 kg/cm ² *
1 lb.	=	0.4536 kg
1 U.S. gallon	=	3.785 dm ³
	=	3.785 liters*

*Not recognized International System units.

WEIGHTS

The nominal weight of the F920C is 1.0 pounds and the nominal weight of the F922C is 1.3 pounds.