

Model QRS Quick Release Switch With Trim Electronic Accelerator (Quick Opening Device) For Dry Pipe Valves

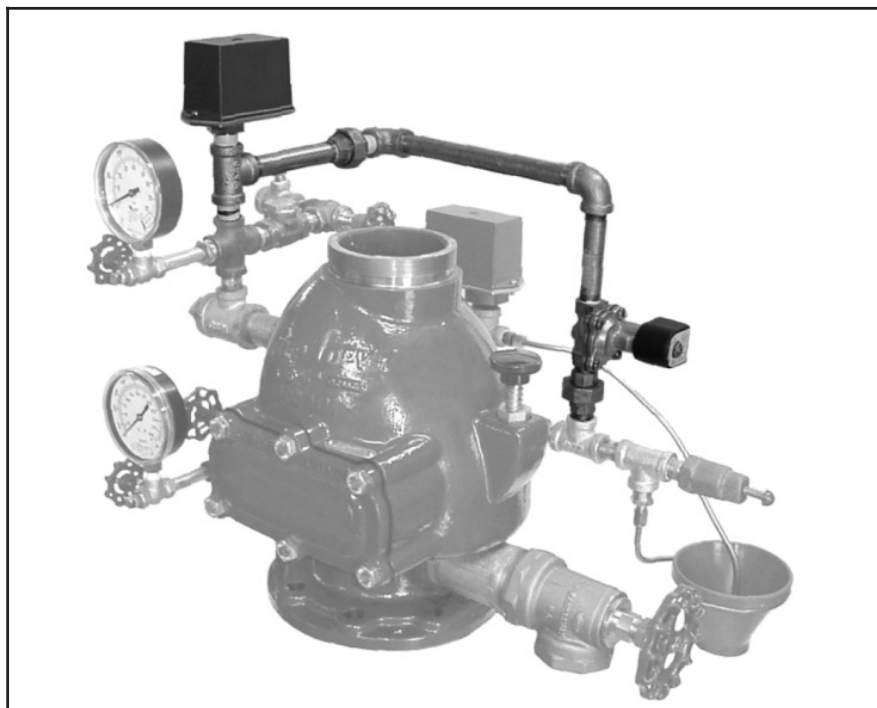
General Description

The Model QRS Electronic Dry Pipe Valve Accelerator is a quick opening device intended to reduce the time for dry pipe valve operation following the operation of one or more automatic sprinklers. The QRS may be used for attachment to the following dry pipe valves:

- Tyco Fire Products 4 & 6 inch (DN100/150) Model DPV-1 Dry Pipe Valves.
- Central 3 inch (DN80) Model AF or Central 4 & 6 inch (DN100/150) Model AF/AG Dry Pipe Valves.
- Gem 4 & 6 inch (DN100/150) Model F302/F3021 Dry Pipe Valves.
- Star 4 & 6 inch (DN100/150) Models A or A-1 Dry Pipe Valves.

The Model QRS Electronic Dry Pipe Valve Accelerator (Ref. Figure 1) utilizes a unique system air pressure monitoring device (UL and C-UL Listed, as well as FM Approved, Model QRS Extinguishing System Attachment) that continuously samples air pressure twice a second. When the air pressure is determined to have a sustained drop exceeding a rate of 0.1 psi (0,007 bar) per second as verified by three consecutive samplings, the QRS signals the Releasing Panel (Model PFC-100RC) via its "Dry Contact Initiating Zone" circuit, which in turn energizes the Solenoid Valve. The energized Solenoid Valve introduces system air pressure to enter the intermediate chamber of the dry pipe valve. This pressure neutralizes the differential pressure holding the dry pipe valve closed and permits it to open.

The Model QRS Electronic Dry Pipe Valve Accelerator automatically adjusts to both small and slow changes in system pressure, but trips when a steady drop in pressure (as in the case of sprinkler operation).



The QRS Electronic Accelerator features the following:

- Operation of the dry pipe valve within four seconds — independent of various combinations of system initial air pressures, system volumes, or sprinkler K-factors.
- Built-in low pressure and high pressure alarm supervision.
- Proven electric release technology as used for electrically operated deluge and preaction systems.
- Battery back-up in the event of primary power failure.

WARNING

The Model QRS Electronic Dry Pipe Valve Accelerator 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 their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

The QRS uses electronic components to monitor the system air pressure. Keep all radio transmitters or RF sources at least one foot from the QRS. Failure to do so could result in an unintended operation of the dry pipe system.

For additional information please refer to the Potter Electric Signal Company Data Sheet #5471131 for the QRS Quick Release Switch and/or Manual #5403524 for the PFC-100RC Releasing Panel.

THE QRS QUICK RELEASE SWITCH IS TO BE WIRED TO THE MODEL PFC100RC RELEASING PANEL USING SHIELDED CABLE IN METAL CONDUIT (RIGID OR FLEXIBLE). CONNECT DRAIN WIRE OF SHIELD TO EARTH GROUND OF THE PFC100RC ONLY. DO NOT CONNECT DRAIN WIRE TO QRS. SHIELDED CABLE: 6 CONDUCTOR, 22 AWG STRANDED, PVC JACKET, OVERALL FOIL SHIELD WITH DRAIN. (ALPHA WIRE TYPE 5196C OR EQUIVALENT.)

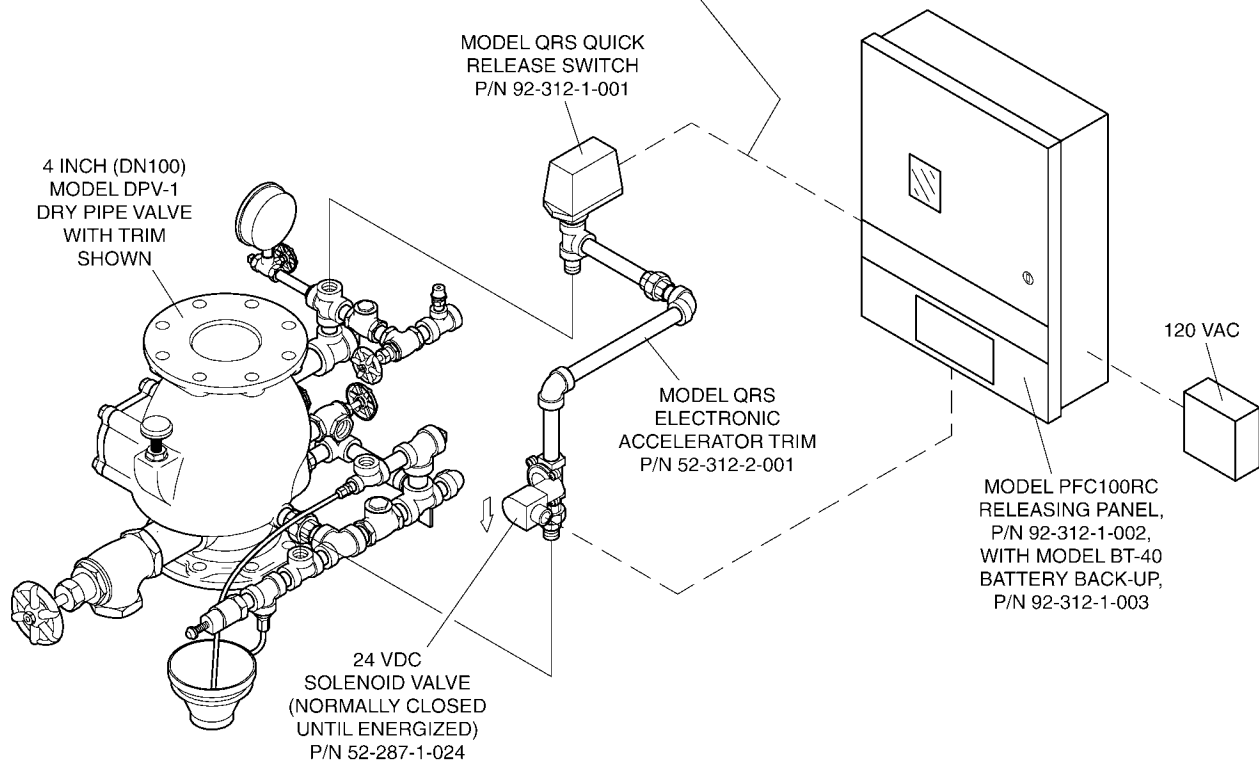


FIGURE 1
MODEL QRS ELECTRONIC DRY PIPE VALVE ACCELERATOR
— TYPICAL ARRANGEMENT —

Technical Data

Approvals

UL Listed:

The Model QRS Electronic Dry Pipe Valve Accelerator is UL Listed per UL1486 for a maximum system capacity of 1690 gallons (6397 litres) for a single nominal 5.6 K-factor sprinkler and a maximum working water pressure of 175 psi (12,1 bar).

FM Approved:

The Model QRS Electronic Dry Pipe Valve Accelerator is FM Approved based on the sensitivity criteria provided in Graph A and a maximum working water pressure of 250 psi (17,2 bar).

Listings and approvals are under the name of Potter Electric Signal Company.

NOTE

Quick operation of the Electronic Ac-

celerator does not ensure that the fire protection system will meet the water delivery time requirement of the authority having jurisdiction (following opening of the Inspector's Test Connection). The sprinkler system designer has to be aware that water delivery time is primarily determined by the configuration and volume of the piping network, system air pressure at time of Accelerator trip, number and orifice size of open sprinklers, and water supply characteristics.

Dry Pipe Valve Compatibility

The Model QRS Electronic Dry Pipe Valve Accelerator is UL Listed and FM Approved for use with the following dry pipe valves:

- 4 and 6" (DN100/150) TFP DPV-1
- 3" (DN80) Central AF
- 4 and 6" (DN100/150) Central AF/AG
- 4 and 6" (DN100/150) Gem F302/F3021
- 4 and 6" (DN100/150) Star Model A
- 4 and 6" (DN100/150) Star Model A-1

Maximum Working Air Pressure

70 psi (4,8 bar)

Pressure Decay For Trip Rating

0.1 psi/sec. (0,007 bar/s)

High/Low Pressure Settings

Refer to Table A

Environmental Specifications

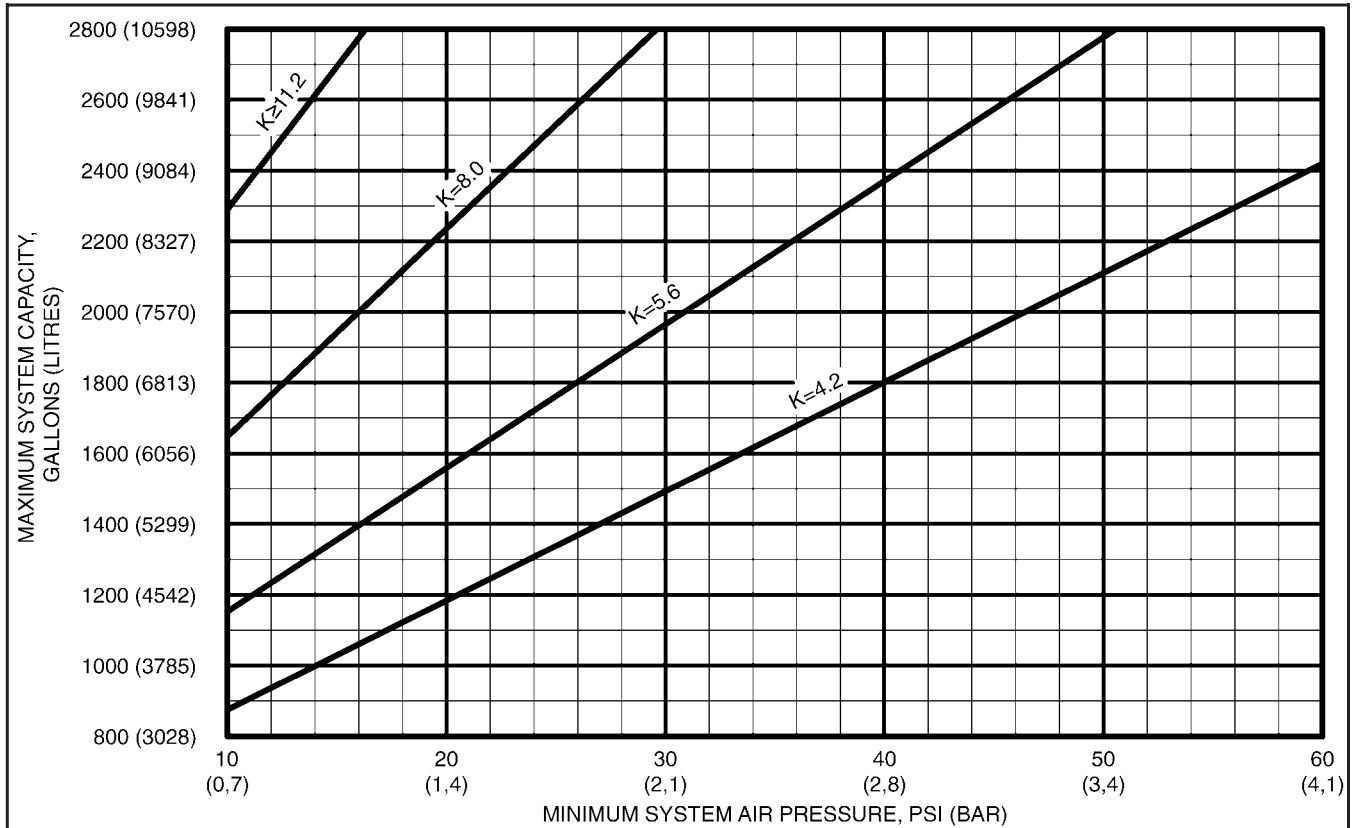
The QRS Quick Release Switch is for indoor use only (NEMA 1/IP50).

Battery Back-Up

24 hours with two BT-40 (4.0 AH) Batteries (90 hours of back-up can be achieved with two BT-120 (12 AH) Batteries)

Patent

U.S.A. No. 5,971,080



Note 1. Quick operation of the Electronic Accelerator does not ensure that the fire protection system will meet the water delivery time requirement of the authority having jurisdiction (following opening of the Inspector's Test Connection). The sprinkler system designer has to be aware that water delivery time is primarily determined by the configuration and volume of the piping network, system air pressure at time of Accelerator trip, number and orifice size of open sprinklers, and water supply characteristics.

Note 2. The sensitivity criteria for the Model QRS Electronic Accelerator is a function of its pressure decay for trip rating of 0.1 psi (0,007 bar) per second, as well as the system volume, the K-factor of the sprinklers being utilized, and the minimum initial air pressure. The larger the system volume combined with smaller sprinkler K-factor or lower initial air pressure results in a slower air decay rate upon the first sprinkler operation. Conversely, a smaller system volume combined with a larger sprinkler K-factor or higher initial air pressure results in a faster air decay rate.

Note 3. When the sprinkler system has been designed within the criteria provided by Graph A, operation of the Model QRS Electronic Accelerator and subsequent operation of the associated dry pipe valve can be expected in four seconds.

Note 4. The minimum system air pressure must be the greater of that required for the dry pipe valve as a function of the maximum expected water supply pressure or per Graph A when using the Model QRS Electronic Accelerator.

Note 5. When multiple sprinkler operations are being considered as in the case of using a dry system water delivery design per the 2002 edition of NFPA 13, Section 11.2.3.9, use the "11.2 K-factor and larger" curve as referenced in Example 3.

Example 1. Assuming a system volume of 1500 gallons (5680 litres) and the use of sprinklers having a K-factor of 5.6, the minimum system air pressure must be 18.5 psi (1,3 bar).

Example 2. Assuming a system volume of 2000 gallons (7570 litres) and the use of sprinklers having a K-factor of 8.0, the minimum system air pressure must be 16.0 psi (1,1 bar).

Example 3. Assuming the use of a dry system water delivery design per the 2002 edition of NFPA 13, Section 11.2.3.9, wherein the operation of two 5.6 K-factor sprinklers might be anticipated (and the effective K-factor is then 11.2), the "11.2 K-factor and larger" curve can be utilized. Consequently, assuming a system volume of 2400 gallons (9084 litres), the minimum system air pressure must be 11.5 psi (0,8 bar).

GRAPH A
MODEL QRS ELECTRONIC DRY PIPE VALVE ACCELERATOR
 — SENSITIVITY CRITERIA BASED ON FM APPROVAL —

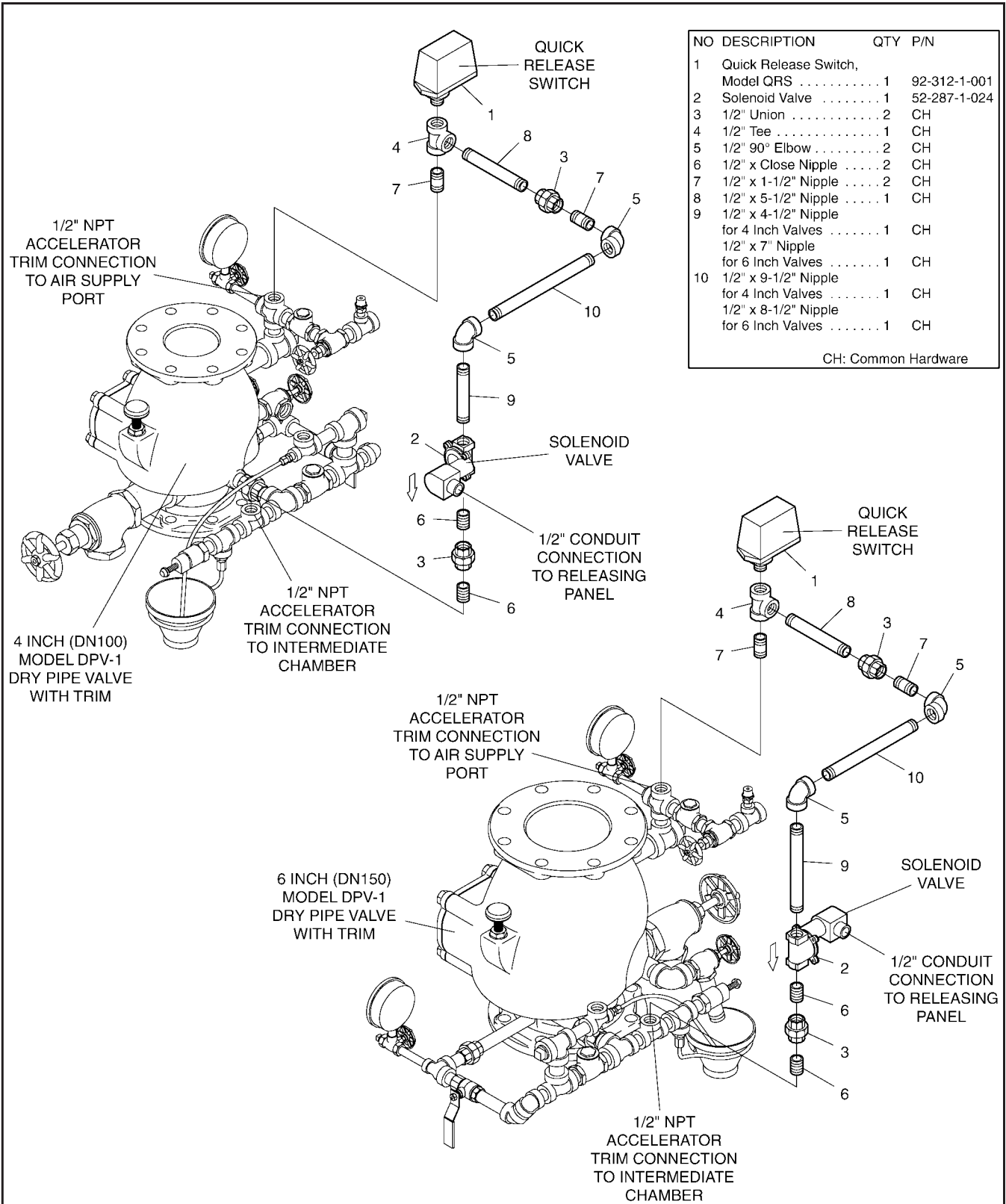


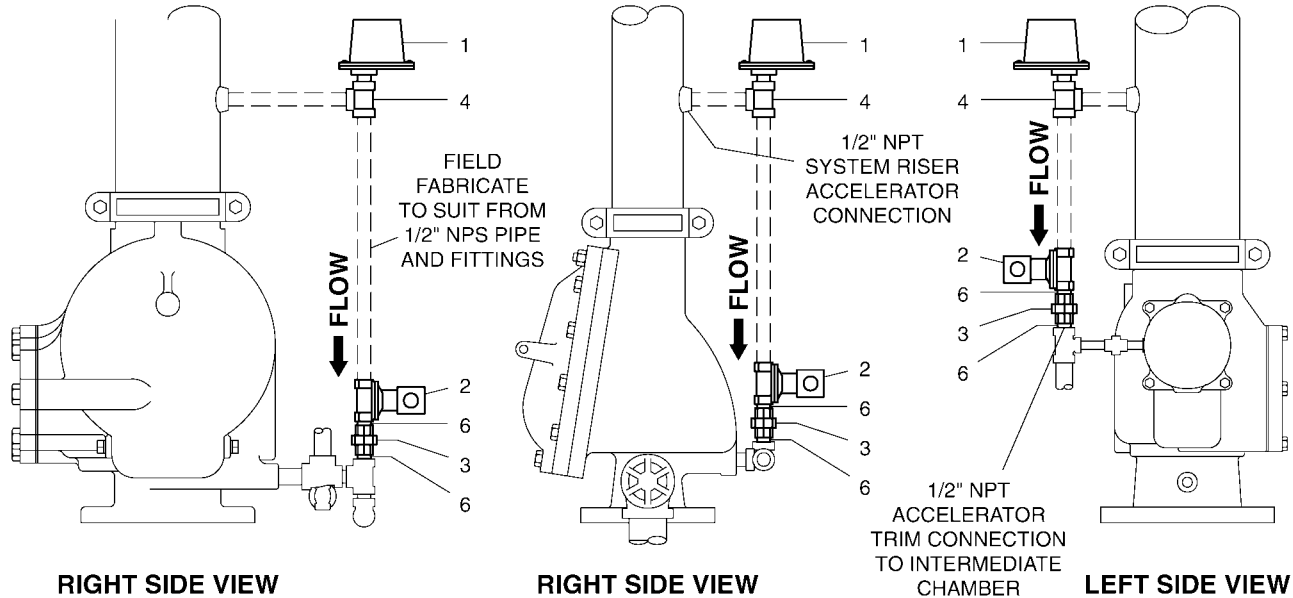
FIGURE 2
MODEL QRS ELECTRONIC DRY PIPE VALVE ACCELERATOR
INSTALLATION DIAGRAM FOR THE 4 AND 6 INCH MODEL DPV-1 DRY PIPE VALVES
P/N 52-312-2-001

NOTES:

1. Installation notes are typical of all Dry Pipe Valve models shown.
2. Some items provided with the Model QRS Trim (P/N 52-312-2-001) are not used and may be discarded. Field fabrication of additional materials will be required to facilitate connection to the existing system riser accelerator connection.

NO	DESCRIPTION	QTY	P/N
1	Quick Release Switch, Model QRS	1	92-312-1-001
2	Solenoid Valve	1	52-287-1-024
3	1/2" Union	2	CH
4	1/2" Tee	1	CH
6	1/2" x Close Nipple	2	CH

CH: Common Hardware



RIGHT SIDE VIEW

Refer to Data Sheets:
 Central 3 Inch Model AF, 10-3.2 (7-96),
 and 4 & 6 Inch Model AF/AG,
 10-4.0 (7-96) or 10-5.0 (7-96),
 Star Model A-1
 2-2.1.31 (2-00) 4 Inch
 2-2.1.41 (2-00) 6 Inch

RIGHT SIDE VIEW

Refer to Data Sheets:
 Star Model A
 2-2.1.30 (6-97) 4 Inch
 2-2.1.40 (6-97) 6 Inch

LEFT SIDE VIEW

Refer to Data Sheet:
 Gem 4 & 6 Inch
 Model F302/F3021
 TD107 (11-97)

FIGURE 3
MODEL QRS ELECTRONIC DRY PIPE VALVE ACCELERATOR
INSTALLATION DIAGRAM WITH DRY PIPE VALVES
MANUFACTURED BY TYCO FIRE PRODUCTS OTHER THAN THE MODEL DPV-1 DRY PIPE VALVE

Switch Setting	Low Air Threshold PSI (Bar)	Nominal Pressure PSI (Bar)	High Air Threshold PSI (Bar)
0	7 (0,5)	10 (0,7)	15 (1,0)
1	7 (0,5)	15 (1,0)	20 (1,4)
2	20 (1,4)	30 (2,1)	35 (2,4)
3	25 (1,7)	35 (2,4)	40 (2,8)
4	30 (2,1)	40 (2,8)	45 (3,1)
5	35 (2,4)	45 (3,1)	50 (3,4)
6	40 (2,8)	50 (3,4)	55 (3,8)
7	45 (3,1)	55 (3,8)	60 (4,1)
8	50 (3,4)	60 (4,1)	65 (4,5)
9	55 (3,8)	65 (4,5)	70 (4,8)

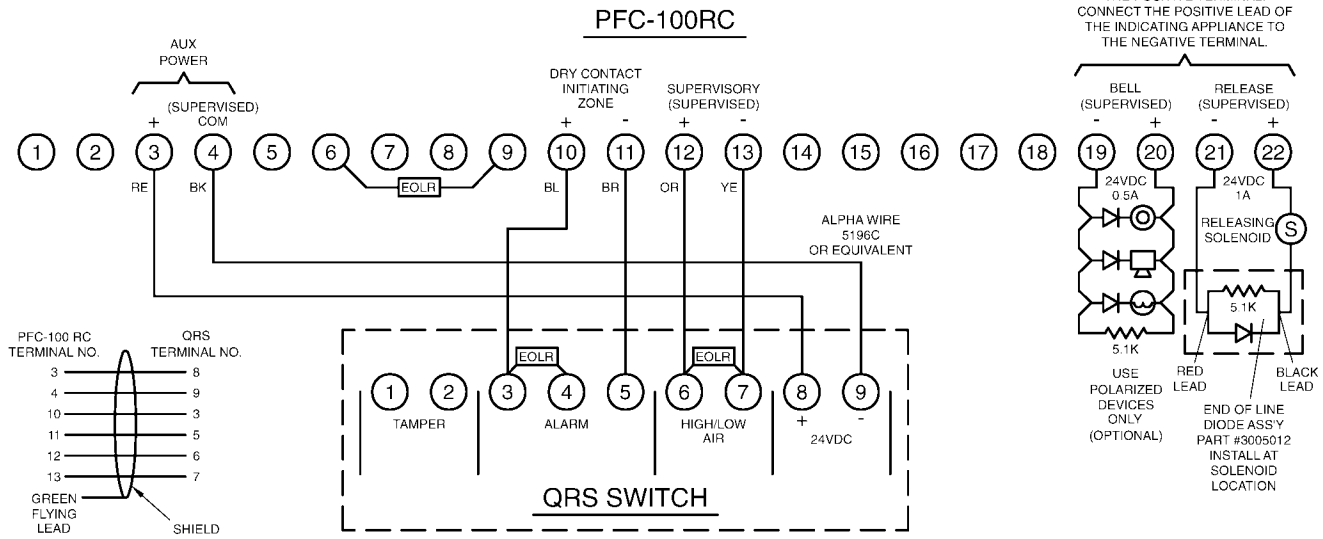
TABLE A
HIGH/LOW PRESSURE SETTINGS FOR THE MODEL QRS QUICK RELEASE SWITCH

CAUTION: THE QRS QUICK RELEASE SWITCH IS TO BE WIRED TO THE MODEL PFC100RC RELEASING PANEL USING SHIELDED CABLE IN METAL CONDUIT (RIGID OR FLEXIBLE). CONNECT DRAIN WIRE OF SHIELD TO EARTH GROUND OF THE PFC100RC ONLY. DO NOT CONNECT DRAIN WIRE TO QRS. SHIELDED CABLE: 6 CONDUCTOR, 22 AWG STRANDED, PVC JACKET, OVERALL FOIL SHIELD WITH DRAIN. (ALPHA WIRE TYPE 5196C OR EQUIVALENT.)

OTHER THAN THE QRS CONNECTED TO THE DRY CONTACT INITIATING ZONE "TERMINALS 10 & 11", DO NOT CONNECT ANY OTHER INITIATING DEVICES TO ANY INITIATING ZONE OF THE PFC-100RC. DOING SO MAY RESULT IN UNINTENDED OPERATION OF THE DRY PIPE SYSTEM, AND DOING SO WOULD HAVE A NEGATIVE IMPACT ON THE BATTERY BACK-UP CAPABILITY.

USE OF ANY DEVICES ON THE BELL ZONE "TERMINALS 19 & 20", WILL REQUIRE A RE-EVALUATION OF THE BATTERY BACK-UP CAPABILITY.

POLARITY SHOWN IS FOR STANDBY CONDITION. POLARITY REVERSES IN ALARM AND RELEASE CONDITION. CONNECT THE NEGATIVE LEAD OF THE INDICATING APPLIANCE TO THE POSITIVE TERMINAL. CONNECT THE POSITIVE LEAD OF THE INDICATING APPLIANCE TO THE NEGATIVE TERMINAL.



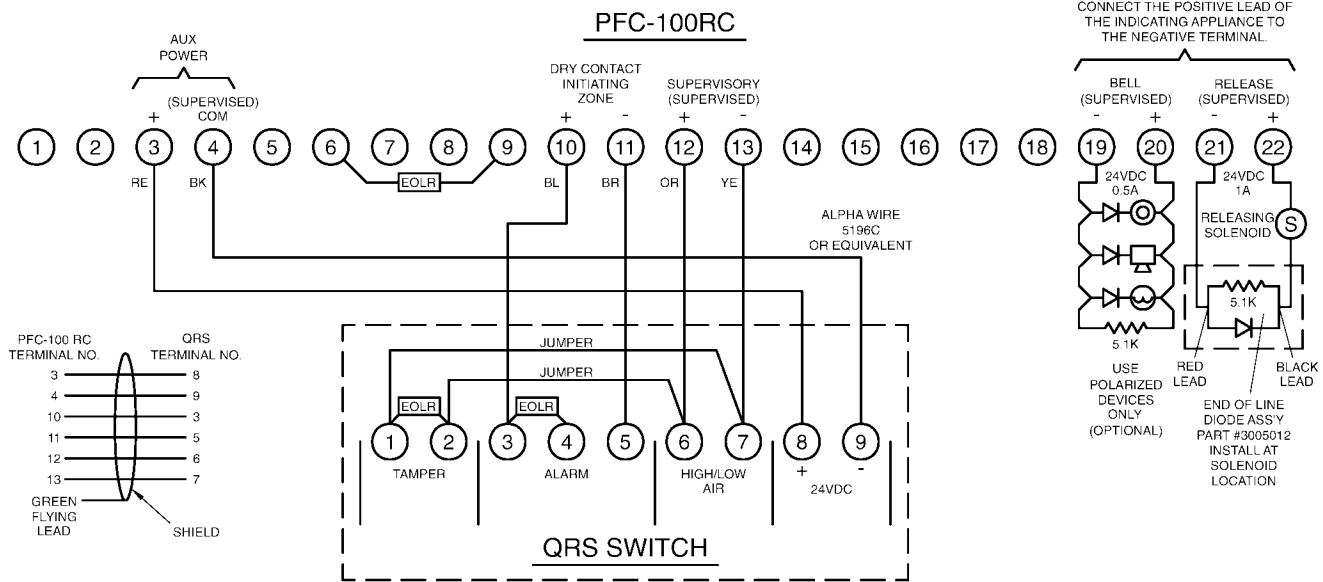
"When Internal QRS Cover Tamper Switch is Not Required"

CAUTION: THE QRS QUICK RELEASE SWITCH IS TO BE WIRED TO THE MODEL PFC100RC RELEASING PANEL USING SHIELDED CABLE IN METAL CONDUIT (RIGID OR FLEXIBLE). CONNECT DRAIN WIRE OF SHIELD TO EARTH GROUND OF THE PFC100RC ONLY. DO NOT CONNECT DRAIN WIRE TO QRS. SHIELDED CABLE: 6 CONDUCTOR, 22 AWG STRANDED, PVC JACKET, OVERALL FOIL SHIELD WITH DRAIN. (ALPHA WIRE TYPE 5196C OR EQUIVALENT.)

OTHER THAN THE QRS CONNECTED TO THE DRY CONTACT INITIATING ZONE "TERMINALS 10 & 11", DO NOT CONNECT ANY OTHER INITIATING DEVICES TO ANY INITIATING ZONE OF THE PFC-100RC. DOING SO MAY RESULT IN UNINTENDED OPERATION OF THE DRY PIPE SYSTEM, AND DOING SO WOULD HAVE A NEGATIVE IMPACT ON THE BATTERY BACK-UP CAPABILITY.

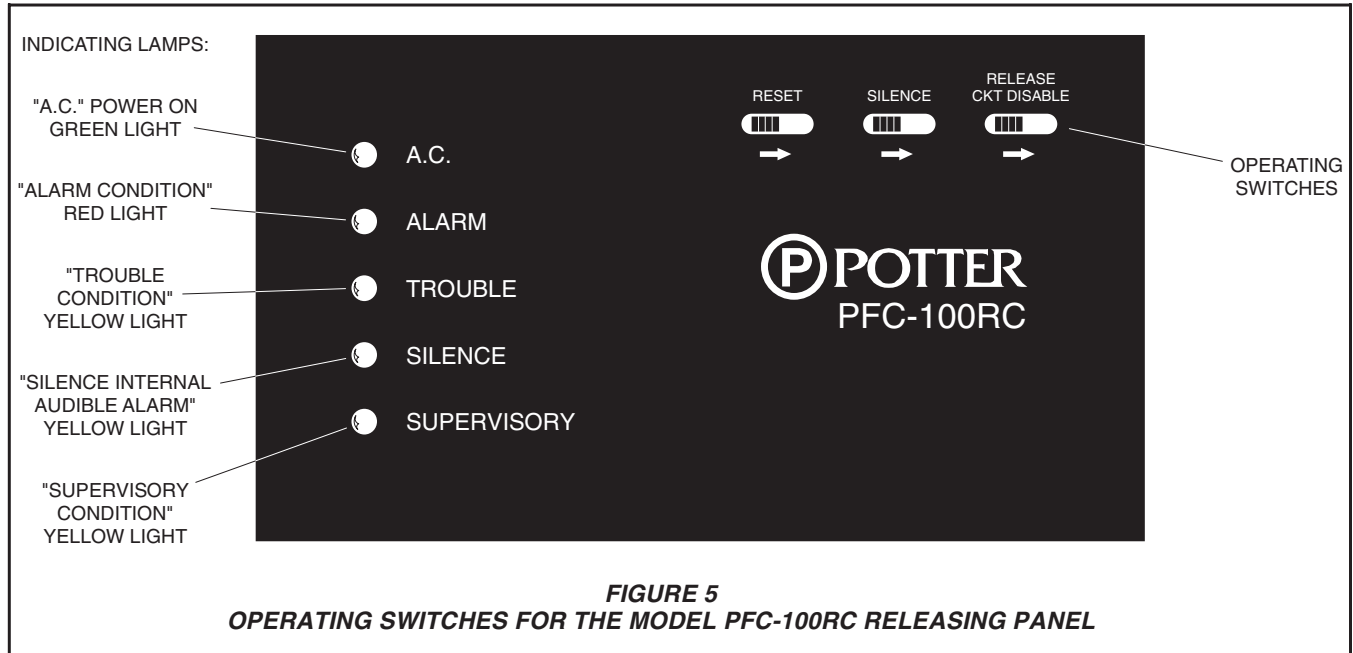
USE OF ANY DEVICES ON THE BELL ZONE "TERMINALS 19 & 20", WILL REQUIRE A RE-EVALUATION OF THE BATTERY BACK-UP CAPABILITY.

POLARITY SHOWN IS FOR STANDBY CONDITION. POLARITY REVERSES IN ALARM AND RELEASE CONDITION. CONNECT THE NEGATIVE LEAD OF THE INDICATING APPLIANCE TO THE POSITIVE TERMINAL. CONNECT THE POSITIVE LEAD OF THE INDICATING APPLIANCE TO THE NEGATIVE TERMINAL.



"When Internal QRS Cover Tamper Switch is Required"

FIGURE 4
WIRING DIAGRAM FOR MODEL QRS ELECTRONIC DRY PIPE VALVE ACCELERATOR
AND SERIES PFC-100RC RELEASING PANEL



Installation

The Model QRS Electronic Dry Pipe Valve Accelerator must be installed in accordance with the following instructions:

Step 1. The QRS Electronic Accelerator must be installed per Figure 2 or 3, as applicable; the solenoid valve must be installed with its flow direction arrow as indicated; and, pipe thread sealant is to be applied sparingly to male threads only.

Step 2. The Releasing Panel is to be located in a dry and protected area; however, it should be located in close proximity to the dry pipe valve.

Step 3. The QRS Electronic Accelerator must be wired per Figure 4. All electrical connections are to meet the requirements of NFPA 72.

NOTES

The QRS Quick release Switch is to be wired to the Model PFC-100RC Releasing panel using shielded cable in metal conduit (rigid or flexible). Connect drain wire of the shield to earth ground of the PFC-100RC only. Do not connect drain wire to the QRS. Shielded cable: 6 conductor, 22 AWG stranded, PVC jacket, overall foil shield and drain. (Alpha wire type 5196C or equivalent.)

The cover of the QRS Quick Release Switch must be securely fastened to the base to ensure metal to metal connect.

Step 4. As a function of the nominal air pressure to be maintained in the dry pipe system, set the 10 position,

high/low level, rotary switch setting of the QRS Quick Release Switch using the information provided in Table A on Page 5, as well as inside the cover of the QRS Quick Release Switch.

Setting Procedure

The Model QRS Electronic Dry Pipe Valve Accelerator must be reset and restored to service as soon as possible after an operation. Follow the procedure indicated below after the Releasing Panel has gone into an "Alarm Condition" (Red Alarm Light On) and the Solenoid Valve has opened to trip the dry pipe valve. (At this time there may also be a "Supervisory Condition" (Yellow Supervisory Light On) if the system has been de-pressurized after a system operation.)

Step 1. Push the Release Circuit Disable Switch (Fig. 5) to the right, and momentarily push the Silence Switch (Fig. 5) to the right (Yellow Silence Light On and Yellow Trouble Light On). The QRS Electronic Accelerator is now disabled and the PFC-100RC internal audible alarm is silenced.

NOTES

Do not attempt to reset the Releasing Panel at this time. Allowing the Releasing Panel to remain in the "Alarm Condition" will facilitate the remaining setting instructions.

During the remaining procedures and as necessary, the Silence Switch can be momentarily pushed to the right at

any time to silence the internal audible alarm.

Step 2. Reset the dry pipe valve in accordance with its resetting instructions (including pressurizing the system to its required air pressure); however, the system's Main Control Valve must remain closed and the system's Main Drain Valve open.

Step 3. With the Releasing panel still in the "Alarm Condition" (Red Alarm Light On), push the Release Circuit Disable Switch (Fig. 5) to the left and allow the Solenoid Valve to open. Opening of the Solenoid Valve at this time will allow any trapped debris in the pipe connections to the Solenoid Valve to clear through the dry pipe valve's Automatic Drain Valve.

After three seconds, return the Release Circuit Disable Switch (Fig. 5) to the right so that the Solenoid Valve will return to its normally closed condition.

NOTE

During this step, it may be necessary to hold the dry pipe valve's Automatic Drain Valve open to facilitate clearing of the pipe connections to the Solenoid Valve.

Step 4. Re-establish the system air pressure, as necessary, and after the pressure is stabilized, momentarily push the Reset Switch (Fig. 5) to the left for at least three seconds. At this time the "Alarm Condition" should clear (Red Alarm Light Off).

Step 5. Push the Release Circuit Disable Switch (Fig. 5) to the left. At this time the "Trouble Condition" should clear, and the only indicator light on

the PFC-100RC Releasing Panel that should be lit is the "Green AC" light.

Step 6. Partially open the system's Main Control Valve. Slowly close the system's Main Drain Valve as soon as water discharges from the drain connection.

Depress the plunger on the dry pipe valve's Automatic Drain Valve to make sure that it is open and that no water discharges. The absence of water discharge from the Automatic Drain Valve is an indication of a properly set water seat within the dry pipe valve. If water is discharging, refer to the Care and Maintenance section within the technical data sheet for the dry pipe valve to determine/correct the cause of the leakage problem.

If there are no leaks, the system's Main Control Valve must then be fully opened.

The system is now set for service.

NOTE

After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Care and Maintenance

The following procedures and inspections should be performed as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service.

The Model QRS Electronic Dry Pipe Valve Accelerator must be maintained and serviced in accordance with the following instructions:

NOTE

The QRS uses electronic components to monitor the system air pressure. Keep all radio transmitters or RF sources at least one foot from the

QRS. Failure to do so could result in an unintended operation of the dry pipe system.

If an Accelerator is to be temporarily taken out of service, then the proper authorities and all personnel who may be affected must be notified.

Before performing an alarm test, notify the proper authorities and all personnel who may be affected.

Before closing a fire protection system main control valve for inspection or maintenance work on the fire protection system that 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.

Model QRS Electronic Accelerator Testing Procedure

It is recommended that the following Accelerator test procedure be performed quarterly.

Step 1. When operation of the dry pipe valve is not intended during the Accelerator trip test, close the system's Main Control Valve and open the system's Main Drain Valve to relieve the supply pressure to the dry pipe valve. Otherwise proceed as follows.

Step 2. Open the Inspector's Test Connection. Verify that the time to Accelerator trip is essentially the same as in previous tests. A momentary burst of air from the Automatic Drain Valve indicates that the Accelerator has tripped. In addition the Release Panel will be in an "Alarm Condition" (Red Alarm Light On).

Step 3. Reset the Model QRS Electronic Accelerator in accordance with the Setting Procedure Section.

Release Panel and Batteries

Inspect, test, and maintain following the instructions provided for the Model PFC-100RC Releasing panel.

Limited Warranty

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with

Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS' LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Ordering Procedure

Electronic Accelerator Package:
Specify: Model QRS Electronic Dry Pipe Valve Accelerator Package, P/N 52-312-2-101.

The Model QRS Electronic Accelerator Package includes the following:

Model QRS Electronic Accelerator Trim (Qty. 1), P/N 52-312-2-001.

Model PFC-100RC Releasing Panel, (Qty. 1) P/N 92-312-1-002.

Model BT-40 4.0 AH Battery (Qty. of 2 provided and required), P/N 92-312-1-003.

Replacement Parts:
(Specify description) for use with Model QRS Electronic Accelerator, P/N (see Figure 1).