



AIR PRODUCTS AND CONTROLS INC. RWJ DUCT SMOKE DETECTORS

UNIVERSAL VOLTAGE

115 V.A.C., 24 V.A.C., 24 V.D.C.,

PRODUCT APPLICATION

The RWJ duct smoke detector provides early detection of smoke and products of combustion present in air moving through HVAC ducts in Commercial, Industrial and Residential applications. The RWJ is designed to prevent the recirculation of smoke in areas by the air handling systems, fans and blowers. Complete systems may be shut down in the event of smoke detection. With the "J" option jumper in place the RWJ will illuminate a remote LED when the detector head is removed.

The RWJ Universal Voltage Model will operate on any one of three input voltages (115 V.A.C., 24 V.A.C., or 24 V.D.C.).

PRODUCT DESCRIPTION

Continuing to expand on the reliable design utilized in the previous duct units, the compact RWJ contains 2 sets of form "C" alarm contacts rated at 10 amps. The trouble contact provides a 24 volt D.C. output to illuminate a remote LED when the detector head is removed.

The pilot and alarm visual indicators provided on the front of the RWJ duct unit, signal the operating status of the device. Power failure will cause the green LED to be extinguished. A manual test/reset switch is located along side the visual indicators.

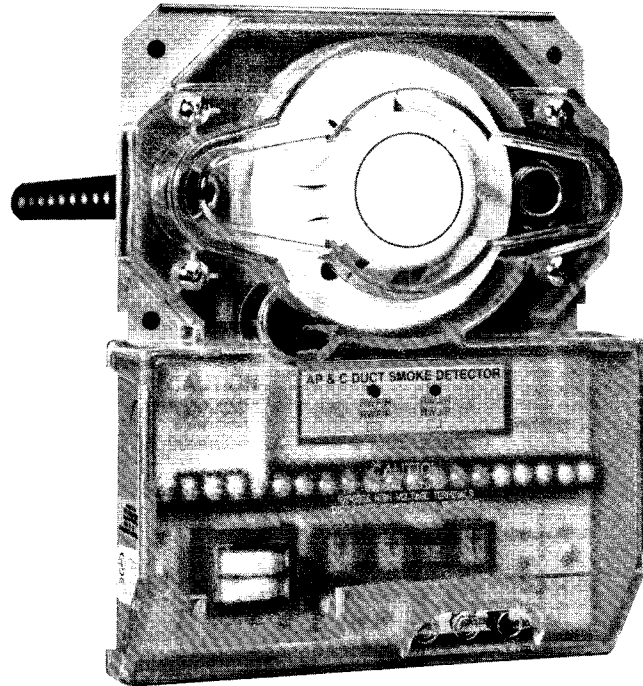
When removing the detector head the trouble output will operate. Power will be switched via the "J" option jumper to illuminate a remote "Fault/Trouble" (Yellow LED) fitted to terminals 13 positive and 20 negative. The RWJ, with jumper installed, will not allow for the monitoring of trouble contacts 13, 14, 15 by a fire control panel, as a 24 VDC will be present on terminal 13 when the head is removed. By removing the jumper, the RWJ unit will operate as an RWF Duct Unit, ie: there will be no voltage on terminals 13, 14, 15 when the head is removed.

The RWJ is designed and built to meet specific local requirements. Output terminals are provided for remote accessories such as a horn, strobe, remote status indicators and reset key switches or push buttons. The ionization and photoelectric detector heads are interchangeable. Air sampling is accomplished by two tubes which protrude into the duct. An exhaust tube of one standard length (7.5") is supplied in the installation kit with the duct smoke unit. Once the duct width has been determined the air intake sampling tubes must be ordered. Sampling tubes are supplied in three standard lengths 2.5ft, 5.0ft and 10.0ft and cut to size to fit the duct. Mounting the duct smoke unit is accomplished by the use of a template and 4 sheet metal screws, which are provided. Mounting can be achieved without the removal of the clear cover which is secured by 4 capture screws.

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- Operating voltages 115 V.A.C., 24 V.A.C., 24 V.D.C.
- Compact size
- 2 Sets of alarm contacts
- Head removed LED illumination
- Rugged steel backbox with clear cover
- Clear cover fitted with 4 capture screws
- Large terminal connection screws
- Interchangeable "Plug-In" photoelectric or ionization heads
- Compatible with building automation and fire alarm system
- Ease of installation without cover removal (Mechanical)
- Dust filtering Included in detector head
- No additional screens or filters to clean

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**UNDERWRITERS'
LABORATORIES LISTED**

CSFM Listing No. 3240-1004:105



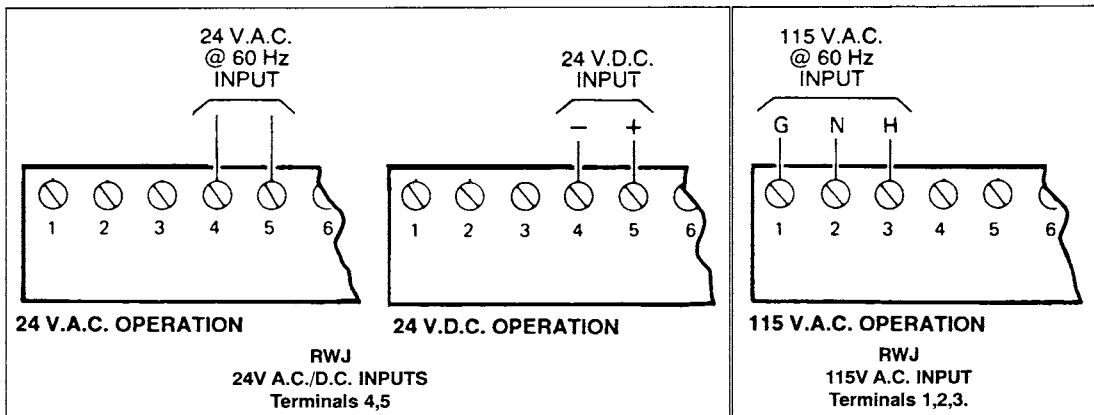
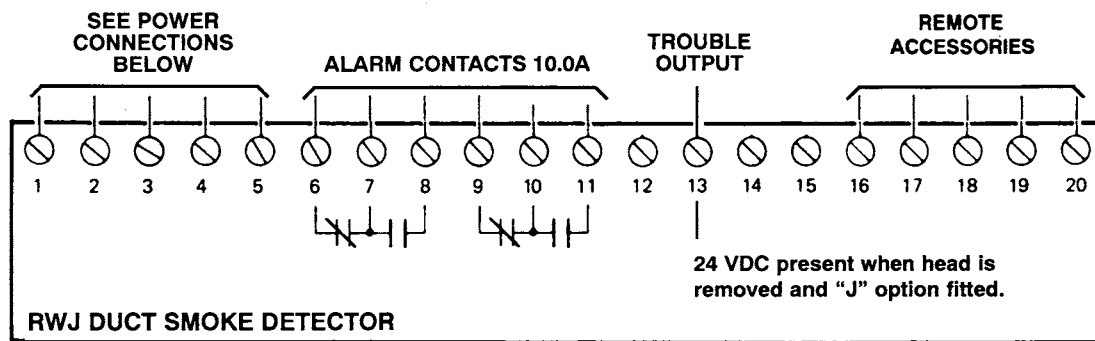
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PRODUCT SPECIFICATIONS

| | | |
|--------------------------------------|---|---|
| MODEL NUMBER: | RWJ - N | 115 V.A.C., 24 volt A.C., or 24 volt D.C. Ionization |
| | RWJ - P | 115 V.A.C., 24 volt A.C., or 24 volt D.C. Photoelectric |
| SAMPLING TUBES: | STS-2.5 | Sampling tube for 6" to 2.5' duct width |
| | STS-5.0 | Sampling tube for 2.5' to 5.0' duct width |
| | STS-10.0 | Sampling tube for 5.0' to 10.0' duct width |
| POWER REQUIREMENTS: Quiescent | 115 V.A.C. | 14.0 mA |
| (Without accessories) | 24 V.A.C. | 20.0 mA |
| | 24 V.D.C. | 13.0 mA |
| HEAD IN ALARM: | 115 V.A.C. | 28.0 mA |
| | 24 V.A.C. | 95.0 mA |
| | 24 V.D.C. | 62.0 mA |
| RELAY CONTACT RATING: | Alarm contacts, | 2 sets form "C" rated at 10 amps @ 115 V.A.C. Resistive |
| | Trouble output, | 24 VDC on term 13 with head removed (RWJ only) |
| AIR VELOCITY: | 300 to 4000 ft./min. | |
| AMBIENT TEMPERATURE: | 32°F to 120°F (0°C TO 49°C) | |
| HUMIDITY: | 10% to 85% R.H. No Condensation | |
| APPROVAL: | Underwriters Laboratories Listed, (UL268A) | |
| MATERIAL: | 18 G.A. steel backbox, clear plastic cover | |
| FINISH: | Grey paint | |
| DIMENSIONS: | L - 9 1/8" X W - 7 1/4" X H - 2 1/4" | |
| MAX. NET WT.: | 3 1/2 LBS | |
| RADIOACTIVE ELEMENT: | For RWJ - N (Ionization) Americium 241; 0.9 Micro-Curie | |

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ENGINEERS & ARCHITECTS SPECIFICATIONS

Air duct smoke detectors shall be Air Products And Controls Inc. RW-Series. For ionization detectors the model number is RWJ-N, for photoelectric detectors the model number is RWJ-P. The detectors shall be listed by Underwriters Laboratories per U.L. 268A. The detectors shall operate at air velocities from 300 feet per minute to 4000 feet per minute.

The duct detector housings shall be of metal construction and complete mechanical installation may be performed without removal of detector cover.

Visual indication of alarm and power must be provided on detector front.

A manual reset switch shall be located on front of the device.

Detector heads shall not require additional filters or screens which must be maintained.

The housing shall contain a detector base which will accept photoelectric or ionization detector heads.

Terminal connections shall be of the screw type and be a minimum of # 6 screw. Terminals shall be provided for remote pilot, remote alarm indication, remote head removed LED, strobe/horn and remote reset switch. All wiring must comply with local codes and regulations.



AIR PRODUCTS AND CONTROLS INC. INSTALLATION INSTRUCTIONS FOR RWF AND RWJ SERIES DUCT SMOKE DETECTORS

RWF-N or RWJ-N Ionization; 4-WIRE; 24VAC, 24VDC, OR 115VAC
RWF-P or RWJ-P Photoelectric; 4-WIRE; 24VAC, 24VDC, OR 115VAC

PRODUCT OVERVIEW

PRODUCT APPLICATION

RWF/J Series duct smoke detectors provide early detection of smoke and products of combustion present in air moving through an HVAC duct supply, return, or both in commercial, industrial, and residential applications. These devices are designed to prevent the recirculation of smoke in areas by the air handling systems, fans, and blowers. Complete systems may be shut down in the event of smoke detection.

NOTE: For the correct installation of a duct smoke unit, please refer to the NFPA 72 (National Fire Alarm Code), NFPA 90A (Standard for Installation of Air Condition and Ventilation Systems), NFPA 92A (Recommended practice for smoke control systems.), NFPA 5000 (Building Construction and Safety Code), IMC (International Mechanical Code), and IFC (International Fire Code).

This detector is not intended for open area protection nor should it be used for early warning detection or replace a regular fire detection system.

PRODUCT DESCRIPTION

The RWF/J Series smoke detector is fitted with a mounting base that will accept an Apollo Ionization detector head model 55000-225APO (or 55000-250APO) or Photoelectric detector head model 55000-328APO (or 55000-350APO). The duct unit supports 2 sets of form "C" alarm contacts and 1 form "C" trouble contact. The trouble contact supervises the presence of the input power and removal of the detector head.

THE TROUBLE CONTACTS (TERMINALS 13-14-15) ARE SHOWN IN THE NON-ENERGIZED CONDITION. IN NORMAL OPERATION, CONTACTS WILL BE REVERSED.

The trouble contacts **will not** operate in the event of a smoke alarm. The RWF/J Series duct detector will operate from various input voltage sources; namely 24VAC, 24VDC, and 115VAC.

SAMPLING TUBES

The operating principle of a duct detector is based on the Venturi effect. Two tubes extend into the HVAC duct. Air flowing through the duct is forced into the air intake (inlet) tube via the air intake holes, (facing the airflow) and passes over the detector head. The air will be drawn out via the exhaust tube back into the HVAC duct. (A 7" exhaust tube is provided in the installation kit.) When the concentration of smoke particles suspended in the air stream reach the alarm threshold of the detector head, the unit will go into alarm.

The duct smoke detector units are designed to operate in duct widths from 6" to 10' wide with an air velocity between 500 to 4,000 feet per minute. To verify correct installation, the pressure differential between

the sampling (high side) and exhaust (low side) tubes should be measured using a Magnehelic pressure gauge or equivalent. An acceptable reading is between 0.01 and 1.2 inches of water.

To minimize the impact of air turbulence and stratification on performance, a duct smoke detector should be located as far as possible downstream from any obstruction (i.e. deflector plates, elbows, dampers, etc.). In all situations, confirmation of velocity and pressure differential within specifications is required.

REMOTE ACCESSORIES

Audible and visual alarm indicators, remote status indicators, and remote reset/test switches can be accommodated by the RWF/J Series duct units by connecting to DC voltage output terminals 16 through 20. These terminals are not supervised and the voltage/current will only be present when the detector unit is in alarm. The remote pilot (green) LED will be permanently illuminated when connected to the output terminals as long as input power and detector head are present.

RWF/RWJ AT-A-GLANCE

MODEL NUMBER:

RWF-N or RWJ-N 4 Wire Ionization Duct Smoke Detector
RWF-P or RWJ-P 4 Wire Photoelectric Duct Smoke Detector

DETECTOR HEAD MODEL NUMBER:

Ionization Detector Head: **55000-225APO or 55000-250APO**
Photoelectric Detector Head: **55000-328APO or 55000-350APO**

POWER REQUIREMENTS:

| QUIESCENT CURRENT | | ALARM CURRENT | |
|-------------------|------|---------------|-------|
| 24VAC | 50mA | 24VAC | 180mA |
| 24VDC | 13mA | 24VDC | 62mA |
| 115VAC | 14mA | 115VAC | 28mA |

RELAY CONTACT RATINGS:

Alarm contacts: 2 Sets form "C" rated at 10A @ 115VAC resistive
Trouble contacts: 1 Set form "C" rated at 10A @ 115VAC resistive
Air velocity: 500 to 4,000ft/min.
Ambient temperature: RWF-N and RWJ-N: 32°F to 158°F (0°C to 70°C)
RWF-P and RWJ-P: 32°F to 100°F (0°C to 38°C)
Humidity: 10% to 85% RH Non-Condensing/Non-Freezing
Material: 18GA steel back box, clear plastic cover (Makrolon 94V-0)
Finish: Gray paint on black box
Dimensions: 9 1/8" L X 7 1/4" W X 2 1/4" H
Max. net wt.: 3 1/2 lbs.
Radioactive element: RWF/J-N (Ionization) - Americium 241, 0.9 micro curie. **Do not expose to corrosive atmospheres.**

MECHANICAL INSTALLATION

LOCATION PREREQUISITES

This guideline contains general information on duct smoke detector installation, but does not preclude the NFPA and/or ICC documents listed. Air Products and Controls Inc. assumes no responsibility for improperly installed duct detectors. To determine the correct installation position for an RWF/J Series duct smoke detector, the following factors must be considered.

- 1) A uniform non-turbulent (laminar) airflow between 500 ft/min. to 4,000 ft/min. must be present in the HVAC duct. To determine duct velocities, examine the engineering specifications that define the expected velocities or use an Anor model 6000AP velocity meter (or equivalent).
- 2) To minimize the impact of air turbulence and stratification on performance, a duct smoke detector should be located as far as possible downstream from any obstruction (i.e. deflector plates, elbows, dampers, etc.). In all situations, confirmation of velocity and pressure differential within specifications is required.

The pressure differential between the input sampling (high pressure) tube and exhaust (low pressure) tube for the RWF/J Series smoke duct detector should be greater than 0.01 inches of water and less than 1.2 inches of water.
- 3) Identify a code compliant location (supply or return side) for the installation of the duct unit that will permit easy access for viewing and serviceability.
- 4) When installing on the return side, install duct units prior to the air being exhausted from the building or diluted with outside "fresh" air.
- 5) When installing duct smoke units down stream of filters, fires occurring in the filters will be detected, but if the filters become blocked, insufficient air flow through the duct unit will prevent the correct operation of the duct detector. Duct units installed in the supply air side may monitor up-stream equipment and/or filters.
- 6) Where possible, install duct detectors upstream of air humidifiers and downstream of dehumidifiers.
- 7) To prevent false alarms, the duct detector should not be mounted in areas of extreme high or low temperatures, in areas where high humidity exists, or in areas where the duct may contain gases or excessive dust.

SAMPLING TUBE ASSEMBLY

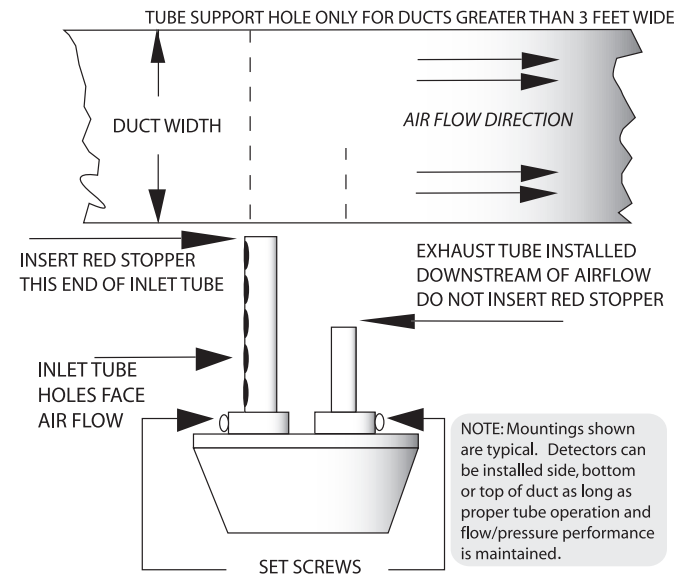
Sampling tubes are to be ordered separately in one of four standard lengths.

- STS-1.0** For duct widths of 6" TO 1.0'
- STS-2.5** For duct widths of 1.0' TO 2.5'
- STS-5.0** For duct widths of 2.5' TO 5.0'
- STS-10.0** For duct widths of 5.0' TO 10.0'

Standard sampling tubes are steel tubes with air intake holes drilled the entire length of the tube. These tubes must be cut to length and should span the entire width of the duct. Sampling tubes over 3.0' must be supported on the opposite side of the duct. To ensure the correct operation of the sensing tube, the red end

cap (red stopper in installation kit) must be inserted in the end of the air intake sampling tube. For custom duct widths, always use the next longest standard size and cut down to the exact requirement.

Once the airflow direction has been determined, insert the inlet and exhaust tubes into the sampling tube connectors fitted to the back of the duct smoke detector which are equipped with set screws. These connectors will allow the tubes to be correctly orientated and secured by tightening the set screw. Ensure air intake sampling tube is positioned so that the inlet holes are directly facing the airflow.



DUCT PREPARATION

Remove mounting template from the installation kit. Remove paper backing from the mounting template and affix it to the duct at the desired location. Using the template as a guide, drill (4) mounting holes (3/32" diam.) for the # 12 X 1/2" sheet metal screws packaged in the installation kit. Drill or punch (2) 1 3/8" holes for inlet sampling and exhaust tubes, using the template as a guide. Clean all holes.

MOUNTING

After securing the sampling and exhaust tubes to the duct smoke unit, (or initially placing the tubes through the 1 3/8" holes drilled or punched in the HVAC duct to accept the inlet sampling and exhaust tubes and then attaching them to the duct unit), hold the duct unit assembly in position and use (4) # 12 X 1/2" sheet metal screws (packaged in the installation kit) to secure the duct smoke detector to the HVAC duct sheet metal.

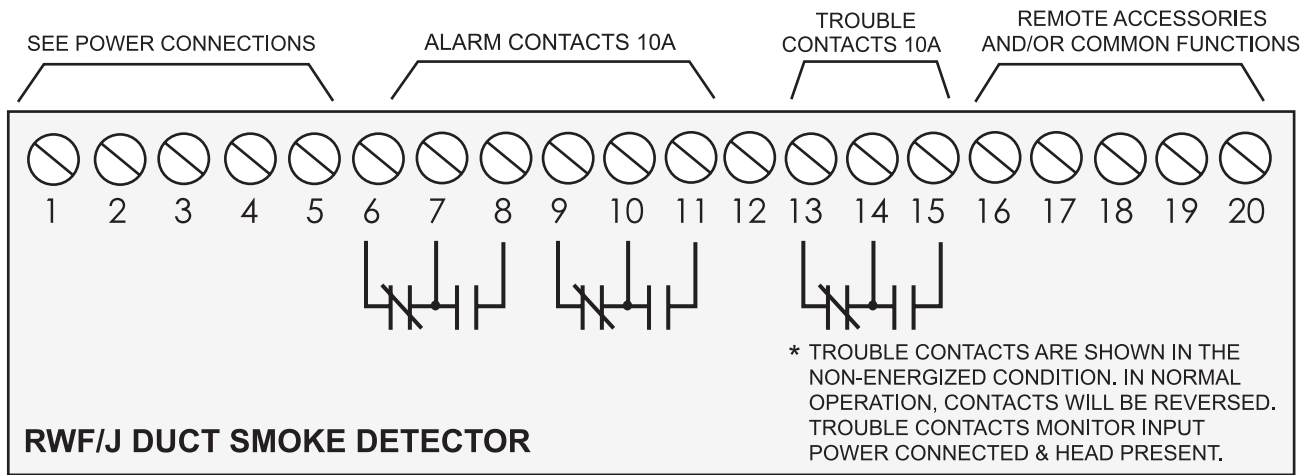
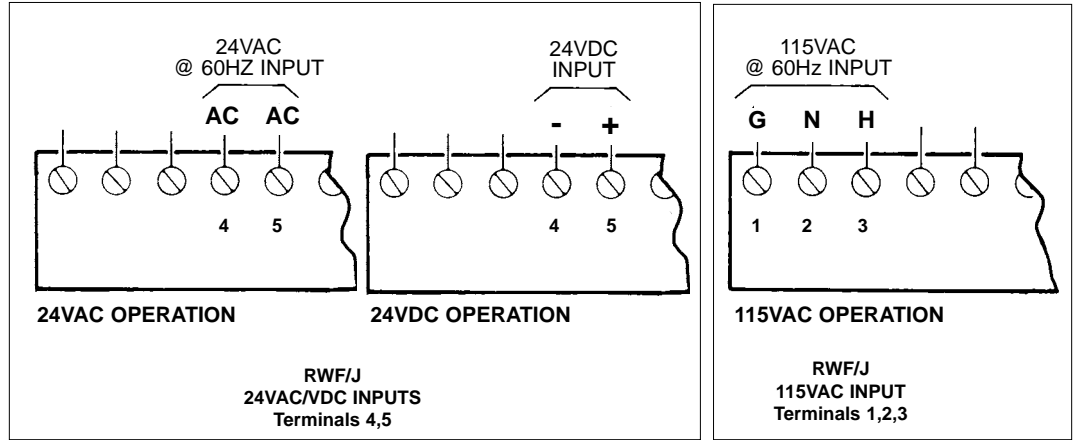
AIR SAMPLING VERIFICATION

To ensure correct operation of the duct unit use a Magnehelic differential pressure gauge, Dwyer 2000 or 4000 Series (or equivalent) to determine the differential pressure between the inlet (high side) and exhaust (low side) tubes. The differential pressure between the two tubes should be greater than 0.01 inches of water and less than 1.2 inches of water.

ELECTRICAL INSTALLATION

POWER CONNECTIONS

Prior to connecting input power to the duct unit, determine the correct input voltage/ current availability and ensure it is connected to the correct terminals.



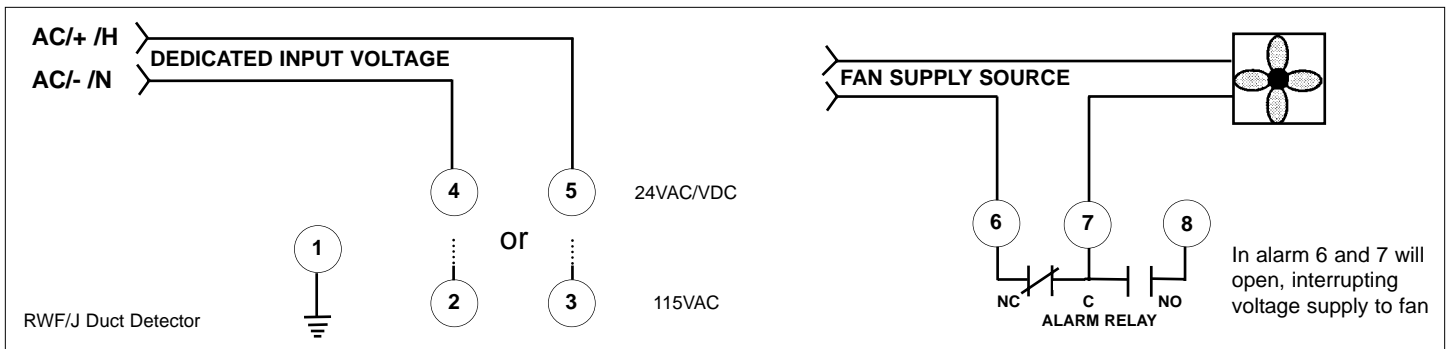
WIRING

CAUTION: For terminals 6-15 do not use looped wire under terminals. Break wire run to provide for proper supervision of connections.

With detector head removed, connect one of the appropriate dedicated power sources to the applicable terminals (see above). Replace detector head and the unit will be energized. The green pilot LED will be illuminated, and when pressing the test/reset button, the red alarm LED will be illuminated. This test confirms the correct basic operation of the duct smoke unit, excluding the detector head (see functional testing).

In the event of a fire alarm, certain equipment may be required to be shut down. For example, shut down may be achieved by interrupting the fan supply source to that particular piece of equipment when wired as indicated below.

EXAMPLE:



COMMON FUNCTIONS

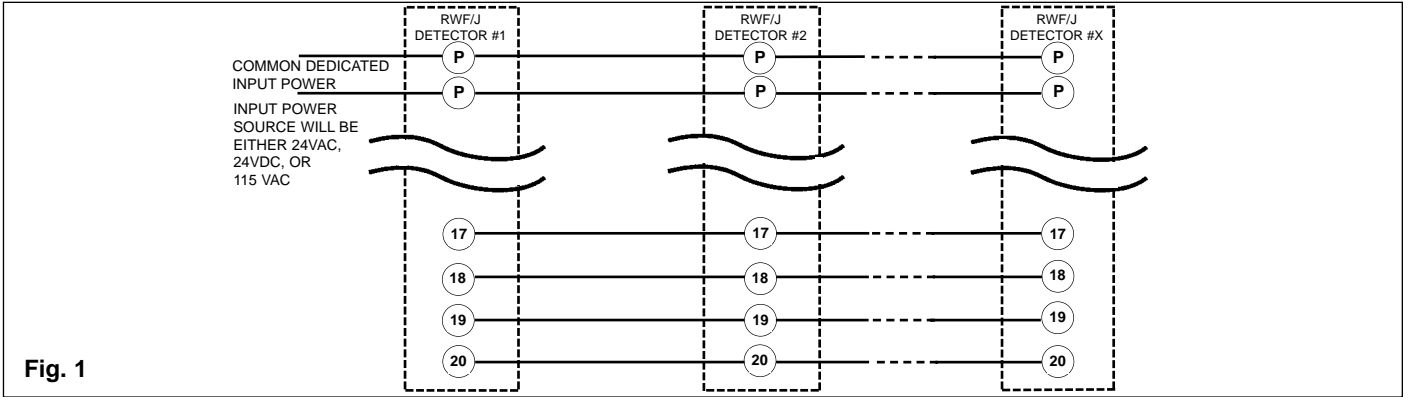
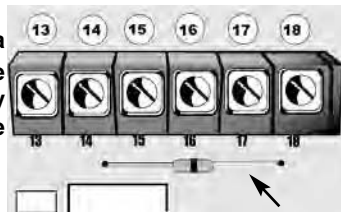


Fig. 1

⚠ IMPORTANT NOTE: The RWJ, with jumper installed, will not allow for the monitoring of trouble contacts 14-15 by a fire control panel, as a 24VDC voltage will be present on these terminals. By removing the jumper, the RWJ Duct unit will operate as a RWF Duct unit; i.e. there will be no external voltage on terminals 14-15.

⚠ NOTE: When wiring to a Fire Alarm Control Panel, the jumper option located directly below terminals 14 and 18 on the circuit board must be cut.



Above: RWJ jumper option (zero ohm resistor)

Installations requiring common functions must be wired as shown in fig. 1 (above). Common functions include one or all of the following:

- Remote common alarm indication
- Remote common test/reset
- Common shutdown
- Common alarm audible/visual indication.

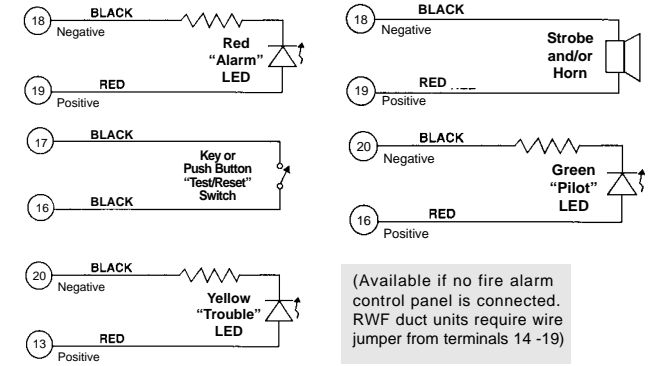
Common fault indication (when green pilot LED is extinguished or yellow trouble LED is illuminated) cannot be achieved on the RWJ/J Duct Units. Individual remote pilot, or fault trouble LED's must be installed to monitor detector head or power source removal for each unit. In a common scenario, in the event of an alarm, the detector head and duct unit alarm (red) LED's will be illuminated on the unit starting the alarm. All remaining duct unit alarm LED's will not be illuminated.

All remote alarm LED's fitted to the duct units will be illuminated when any of the units go into alarm. Only the duct unit in alarm will permit resetting of the system from the built in test/reset switch on that particular duct unit. A common remote reset switch will reset all common wired duct units.

⚠ NOTE: A maximum of 30 units may be interconnected under a common shutdown configuration. When connecting individual remote accessories, up to 15 units may be configured in this manner, except when connecting a SHP24-1575 Horn/Strobe. In this case, no more than 4 units may be configured.

REMOTE ACCESSORY WIRING

Remote accessory terminals 16 to 20 are not supervised and the output voltage (24VDC) will be present when the duct detector is in the appropriate condition monitored.



FIRE ALARM CONTROL PANEL WIRING

SAMPLE CONTROL PANEL WIRING - STYLE "D" / CLASS "A" IDC (Supervised - A fault condition will not inhibit an alarm response)

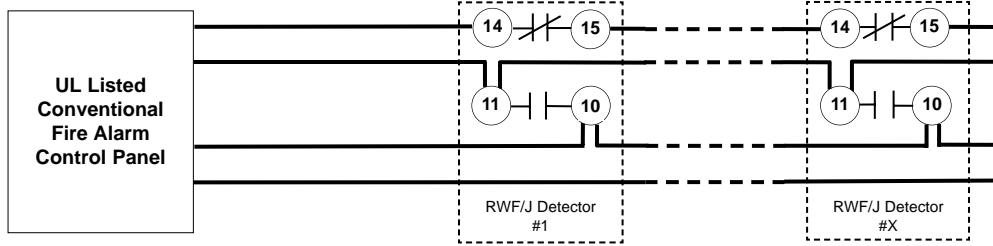


Fig. 2

SAMPLE CONTROL PANEL WIRING - STYLE "B" / CLASS "B" IDC (Supervised - A fault condition will not inhibit an alarm response)

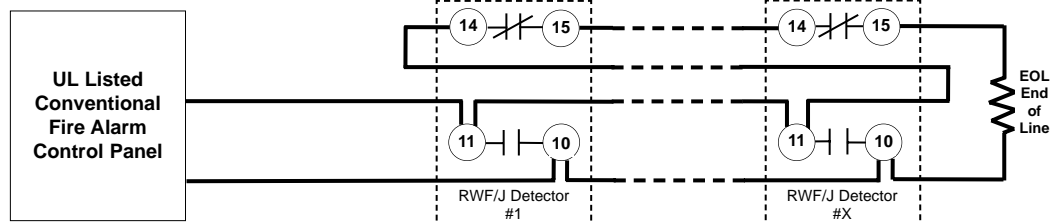


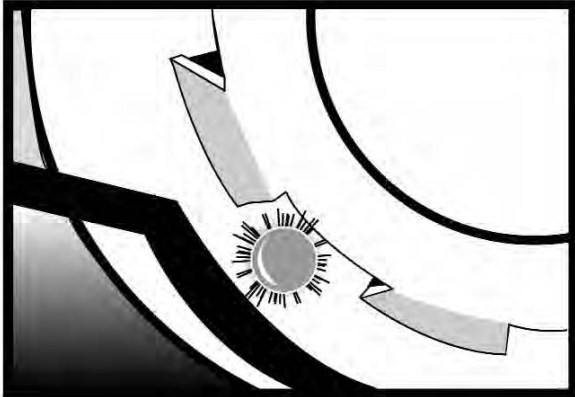
Fig. 3

TESTING PROCEDURES

OPERATIONAL TESTING

To determine the correct operation of the RWF/J-Series duct smoke detector, ensure input power is connected and the green pilot LED is illuminated.

The LED on the detector head of both the Ionization and Photoelectric models (55000-225APO and 55000-328APO) will flash while the unit is in standby mode. The LED on the detector head of both the Ionization and Photoelectric models (55000-250APO and 55000-350APO) will not flash while the unit is in the standby mode. The LED on all the above detector heads will be permanently illuminated when smoke is detected and the head is in alarm.



Above: The LED will be permanently illuminated when the unit is in alarm.

With the air handling unit shut down (not connected), and the clear cover removed, press and hold the test/reset button on the RWF/J duct unit. The red alarm LED on the circuit board will be illuminated and the alarm relay outputs will change state. Using a multimeter set to OHMS (or continuity buzzer function on the meter) place the meter probes on the following terminals, and ensure the contacts are closed (continuity) (7-8) and (10-11). When releasing the test/reset button these contacts will open.

The trouble contacts 13, 14, 15 on the RWF/J duct units will not change state in the event of a fire alarm, operational, or functional testing. The trouble contacts can be tested by rotating the Apollo detector head counter-clockwise and removing the detector head. This action will extinguish the green pilot LED and cause the trouble contacts to change state, (13-14) will be closed (continuity) and (14-15) will be open circuit. Replacing the detector head and rotating it clockwise until it locks, will cause the green pilot LED to be illuminated and the unit will be operational, terminals (13-14) will be an open circuit and (14-15) will be closed (continuity).

FUNCTIONAL TESTING

Once operational testing is concluded the unit requires functional testing to determine the correct operation of the detector head.

With the clear cover removed, air handling unit shut down, and using the aerosol test smoke Apollo test gas part # TG-1000, spray the test gas directly at the detector head from a distance of 12 inches for 2 seconds.

⚠ CAUTION: SPRAYING FROM A DISTANCE CLOSER THAN 12 INCHES MAY CAUSE DETECTOR CONTAMINATION.

After 15 to 20 seconds the detector head will go into alarm, illuminating the detector head LED and causing the duct unit functions to operate, alarm relays will change state, and the alarm related remote accessories, if attached, will function.

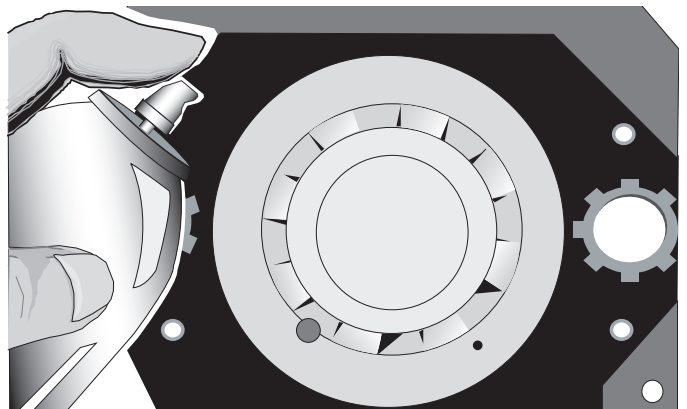
If no test gas is available to conduct functional testing, light a piece of clothesline (rope) and blow the flame out, hold the smoldering rope 3" from the detector head and lightly blow across the smoldering area towards the detector head, the alarm indicator should illuminate within one minute.

Should additional testing also be required for simulated fire conditions, smoke bombs placed in the duct may not be suited for the particular detector head (photoelectric or ionization) selected and installed. Consult the smoke bomb data for proper use and compatibility with detector type.

S65A Ionization detector head 55000-225APO and S60A Ionization detector head 55000-250APO utilize a radioactive source as its means of detection and will detect smoke particles of between .1 and 1 micron in size.

S65A Photoelectric detector head 55000-328APO and S60A Photoelectric detector head 55000-350APO operate on the principle of light scatter and will detect smoke particles of between 1 and 10 microns in size.

When purchasing smoke bombs for additional required functional testing, ensure smoke particle sizes comply with the criteria as described above.



Above: For factory recommended functional testing, spray the proper test gas directly at the detector head from a distance of 12 inches for 2 seconds.

MAINTENANCE

Each installation location must be assessed on its own merits. If the protected area is of a very dirty nature then the RWF/J Duct unit(s) will have to be checked and cleaned on a quarterly basis or when cleaning is required.

As a guideline the Apollo detector head should be cleaned every six months or as required. The best methods of cleaning are to vacuum the detector head thoroughly or to blow the detector head out using clean, dry compressed air.

Do not use chemicals or non-conforming air to clean the detector head housing as this could contaminate the detector head and damage the casing.

Sensing tubes must be inspected and cleaned in accordance with the schedule as determined above, to allow the free flow of air through both inlet and exhaust tubes.

Consult your local code and AHJ requirements for required maintenance schedules.



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AVAILABLE ACCESSORIES FOR USE WITH RWF AND RWJ SERIES DUCT SMOKE DETECTORS

| | |
|---------------------------|--|
| REMOTE ACCESSORIES | |
| MS-RA | Remote Alarm |
| MS-KA/P/R/T | Remote Pilot, Trouble, Key-Operated Test/Reset Switch |
| MS-RA/P | Remote Alarm, Pilot |
| MS-F/T | Remote Trouble |
| MS-RA/R | Remote Alarm, Push-Button Test/Reset Switch |
| MS-RH/P/A | Remote Alarm, Pilot, Horn |
| MS-RA/P/R | Remote Alarm, Pilot, Push-Button Test/Reset Switch |
| MS-RH/KA/P/R | Remote Alarm, Pilot, Horn, Key-Operated Test/Reset Switch |
| MS-RA/P/T | Remote Pilot, Trouble |
| MS-RH/KA/P/A/T | Remote Alarm, Trouble, Pilot, Horn, Key-Operated Test/Reset Switch |
| MS-RA/FT/P | Remote Pilot, Trouble, Push-Button Test/Reset Switch |
| MS-RH | Remote Alarm Horn |
| MS-KA/R | Remote Alarm, Key-Operated Test/Switch |
| MS-KA/P/R | Remote Alarm, Pilot, Key-Operated Test/Reset Switch |
| MS-RD | Remote Alarm |
| SHP24-15750 | Horn/Strobe, white housing, opaque cover |
| SHP24-1575R | Horn/Strobe, red housing, clear cover |
| SHP24-1575W | Horn/Strobe, white housing, clear cover |

SMOKE TEST GAS

TG-1000 Solo Aerosol Test Gas

SAMPLING TUBES

STS-1.0 For duct widths of 6" TO 1.0'
STS-2.5 For duct widths of 1.0' TO 2.5'
STS-5.0 For duct widths of 2.5' TO 5.0'
STS-10.0 For duct widths of 5.0' TO 10.0'

POWER SUPPLIES

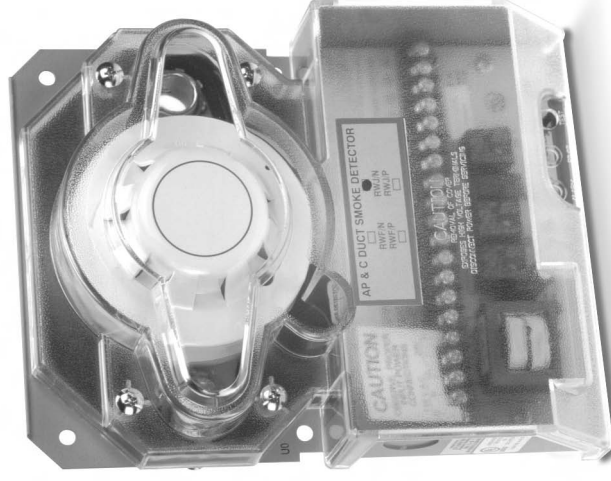
T-PB 202-1 24VAC, 4.0A (96VA) Class I Power Supply
T-PB 202-0 24VAC, 4.0A (96VA) Class I Power Supply
T-PB 303-1 24VAC, 3.0A (72VA) Class II Power Supply
T-PB 303-0 24VAC, 3.0A (72VA) Class II Power Supply

WEATHERPROOF ENCLOSURES

WP-1 Weatherproof Enclosure



DUCT SMOKE DETECTORS INSTALLATION INSTRUCTIONS



RWF-N or RWJ-N Ionization; 4-WIRE; 24VAC, 24VDC, OR 115VAC
RWF-P or RWJ-P Photoelectric; 4-WIRE; 24VAC, 24VDC, OR 115VAC

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