Simplex

*FM Approved**

Fire Alarm System Accessories

Intrinsically Safe Devices
Single and Dual Channel Isolated Barrier Modules

Features

Single or dual channel intrinsically safe, transformer isolated barrier modules:

- 2081-9062, Single channel
- 2081-9063, Dual channel

Meets requirements of National Electrical Code Articles 500-517 for Hazardous Locations:

- Classes I, II, & III
- Divisions 1 & 2
- Groups A, B, C, D, E, F, & G

Compatible with Simplex intrinsically safe products:

- Manual stations
- Smoke detectors
- Air duct smoke detectors
- Other simple apparatus (refer to page 2)

Required accessories (ordered separately)**:**

- 2975-9218, Red cabinet with solid door and lock
- 2081-9061, Module installation kit

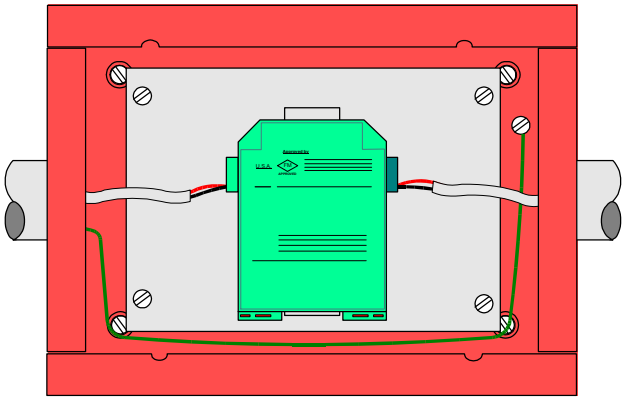
(Refer to page 8 for product selection summary)

Description

Simplex Intrinsically Safe Modules are for use with FM Approved Simplex control panels to make initiating device circuit wiring safe for use in locations where hazardous concentrations of flammable gases or other materials may exist. The intrinsically safe module is an isolated, power-limited barrier that limits the output current to a level below ignition for atmospheres defined by NEC Articles 500-517 for Classes I, II, & III, Divisions 1 & 2, Groups A, B, C, D, E, F, & G.

Installation Considerations. The installation of intrinsically safe modules requires strict adherence to product compatibility lists and must be in accordance with all product installation instructions and applicable codes and wiring practices.

Review all applicable references thoroughly before completing the intrinsically safe design.



Intrinsically Safe Barrier Module Mounted in Cabinet
(shown with cover removed, wiring and conduit shown for reference only)

Specifications

2081-9062/-9063 Barrier Module*:	
Input Voltage (V_{IN})	4 to 35 VDC
Input Current (I_{IN})	40 mA maximum, limited by module impedance
Output Voltage (V_{OUT})	
V_{IN} < 23.7 V	**V_{OUT} = V_{IN}** - (400 x **I_{IN}**) - 0.7 V
V_{IN} > 23.7 V	**V_{OUT} = V_{IN}** - (400 x **I_{IN}**)
Output Current	Transfer current ≤ 40 mA Short circuit current ≤ 65 mA
Operating Temperature	32° F to 120° F (0° C to 49° C)
Operating Humidity	up to 85% RH maximum @ 86° F (30° C)
Dimensions	4 1/2" H x 4 1/4" W (including terminal block) x 13/16" D (114 mm x 108 mm x 21 mm)
2975-9218 Cabinet (required, ordered separately)**:**	
Dimensions	12" W x 8 3/8" H x 3 1/2" D (305 mm x 213 mm x 89 mm)
Color	Red
2081-9061 Installation Kit (required, ordered separately)**:**	
Contents	Bracket for barrier module mounting (35 mm DIN rail type), mounting hardware, control drawing, and required end-of-line resistors

* This application is FM approved only. Contact Simplex for additional information.

* Refer to page 8 for listing of approved entity parameters and allowable wiring distances.

Intrinsically Safe Barrier Module Compatibility

Simplex 2081-9062 and 2081-9063 Intrinsically Safe Modules report alarms as a current limited condition. FM Approval is for use with the **Simplex** fire alarm control panels and peripheral devices described in the following selection chart.

NOTE: Intrinsically Safe applications are NOT COMPATIBLE with Alarm Verification operation.

Compatibility Reference

Compatible Simplex Fire Alarm Control Modules and Zone Adapter Modules

Fire Alarm Control Panel Modules	Zone Adapter Modules
• Class B, IDCs in the following: – 4004 and 4005 series fire alarm control panels, both standard and "high current" IDCs – 4002 series fire alarm control panels • 4100 series fire alarm control panels: – 4100-5004, Class B, IDC module	• Zone Adapter Modules (ZAMs) models: – 2190-9155, Class B (surface cover) – 2190-9156, Class B (flush cover) – 4090-9101, Class B, IDNet™ communications, for use with the Simplex model 4010 fire alarm control panel

Compatible Initiating Devices*

Manual Stations	Smoke Detectors**	Duct Housing**	Simple Apparatus
• 2099-9767, Single action station • 2099-9799, Double action (breakglass) station	• 2098-9212, Photoelectric detector • 2098-9826, Detector base (required)	• 2098-9214, Duct Detector Housing • Requires: – 2098-9212, Photoelectric detector – 2098-9811, Baffle – Sampling tube (refer to page 6)	• Any device which does not store or generate more than 1.2 V, 100 mA, or 20 μJ (typically a dry contact heat detector or pushbutton switch)

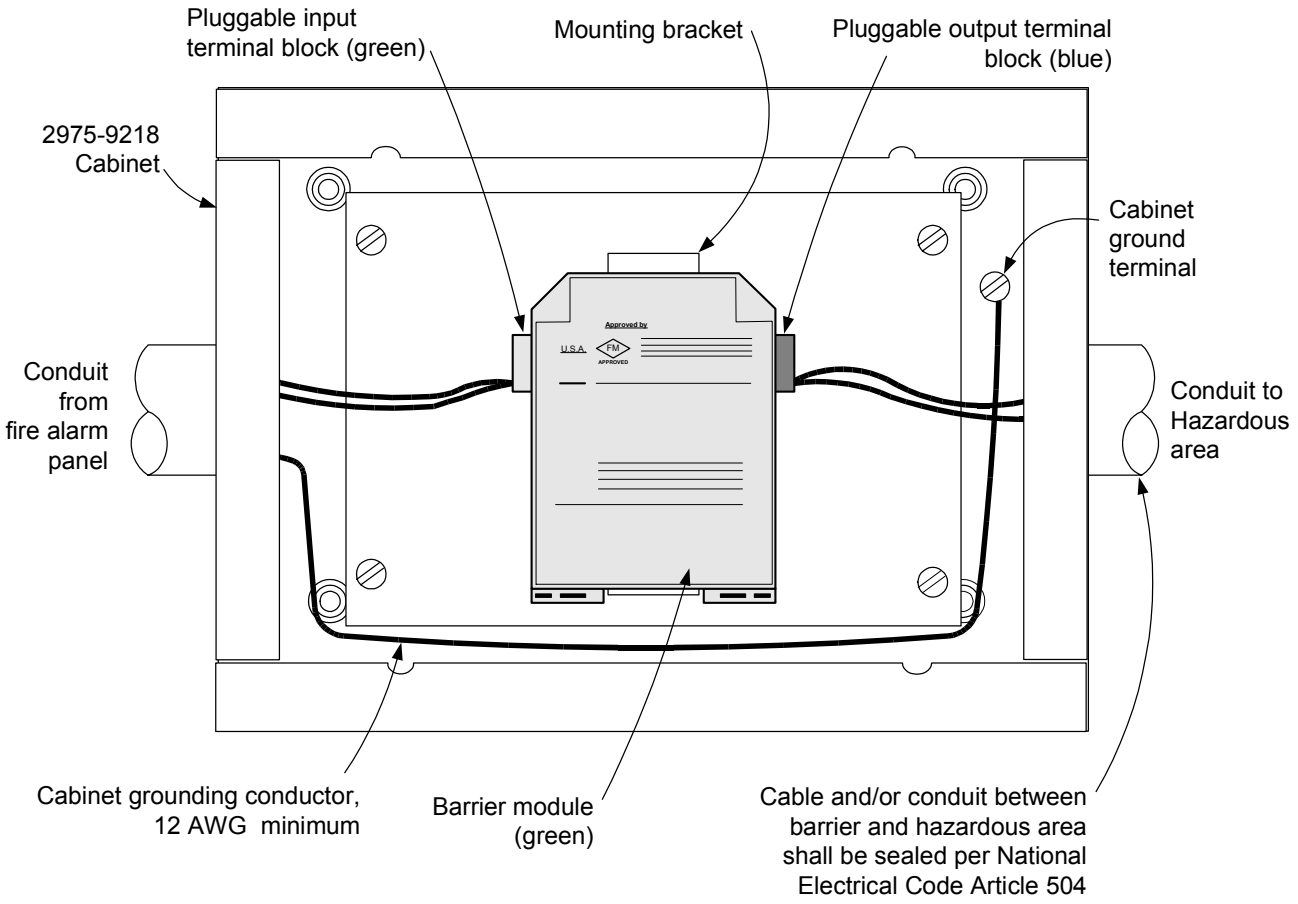
*** Although the above listed peripheral model numbers are FM Approved as Intrinsically Safe, *these peripheral devices and any simple apparatus must be selected for proper fire protection compatibility with the dust content and corrosion potential of the atmosphere to be protected.***

**** A maximum of 5 detectors and/or duct housings total can be connected to one barrier module channel.**

Installation Requirements

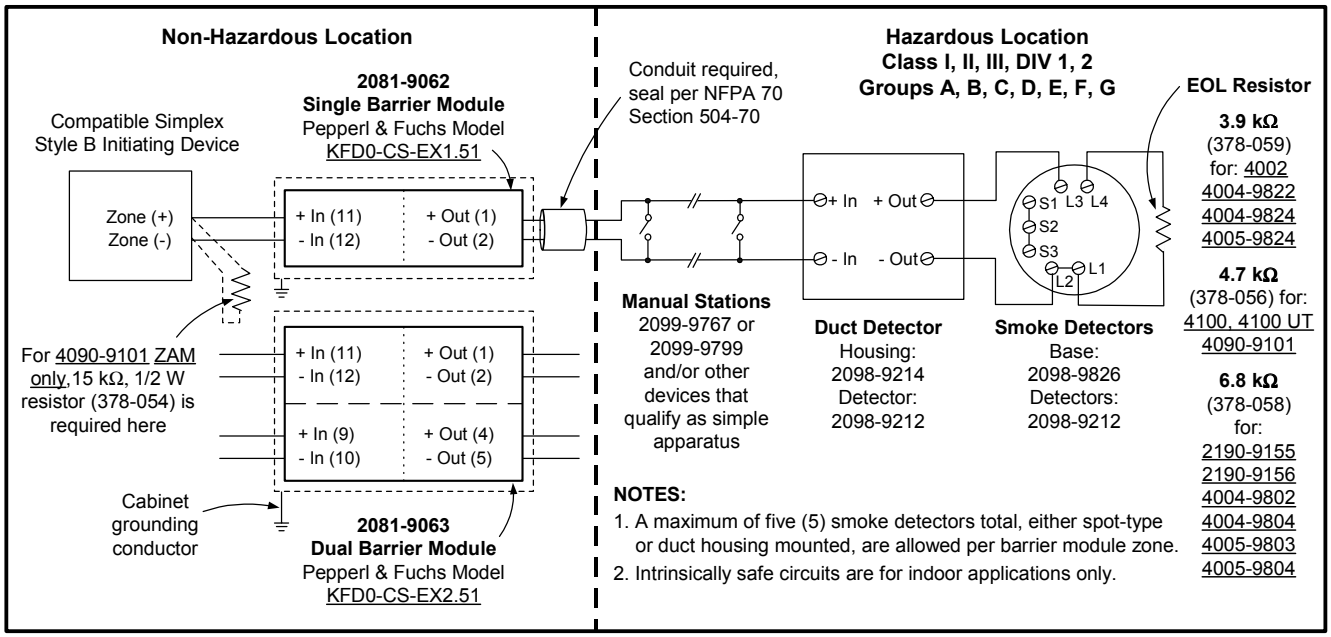
1. All equipment **MUST** be installed in accordance with the National Electrical Code, NEC ANSI/NFPA 70 Article 504, and ANSI/ISA-RP 12.6-1987.
2. Cable and/or conduit from Non-Hazardous and Hazardous locations **MUST** enter the barrier enclosure from opposite sides and **MUST** be sealed per National Electrical Code, Article 504.
3. Intrinsically Safe circuits **MUST NOT** be installed in the same cable, conduit, or raceway with non-intrinsically safe circuits.
4. Intrinsically Safe circuits are for indoor applications only.
5. Maximum line resistance from the Fire Alarm panel to the last device in the Hazardous location is 10 Ω.
6. The 2975-9218 cabinet must be equipped with a safety ground per NEC Article 250-42. The grounding conductor must be 12 AWG minimum (the barrier is not grounded).
7. For additional wiring information, reference the National Electrical Code, Articles 500 through 517 and **Simplex Control Drawing 842-070**.
8. Refer to page 8 for approved entity parameter information reference.

Installation Reference



Wiring Diagram Reference

Diagram below is for reference only, refer to Control Diagram 842-070 for complete installation details.



National Electrical Code Hazardous Location Classifications*

Class I Locations

Class I locations are those in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class I, Division 1

A Class I, Division 1 location is a location:

1. In which ignitable concentrations of flammable gases or vapors can exist under normal operating conditions; or
2. In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
3. In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

Class II Locations

Class II locations are those that are hazardous because of the presence of combustible dust.

Class II, Division 1

A Class II, Division 1 location is a location:

1. In which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures; or
2. Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes; or
3. In which combustible dusts of an electrically conductive nature may be present in hazardous quantities.

Class III Locations

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

Class III Division 1

A Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

General Note, Division 2 Categories

Equipment marked Division 1 is suitable for both Division 1 and Division 2 locations.

Group Definitions

Class I:

Group A. Atmospheres containing acetylene.

Group B. Atmospheres containing hydrogen, fuel and combustible process gases containing more than 30 percent hydrogen by volume, or gases or vapors of equivalent hazard such as butadiene, ethylene oxide, propylene oxide, and acrolein.

Group C. Atmospheres such as, ethyl ether, ethylene, or gases or vapors of equivalent hazard.

Group D. Atmospheres such as acetone, ammonia, benzene, butane, cyclopropane, ethanol, gasoline, hexane, methanol, methane, natural gas, naphtha, propane or gases, or vapors of equivalent hazard.

Class II:

Group E. Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment.

Group F. Atmospheres containing combustible carbonaceous dusts, including carbon black, charcoal, coal, or dusts that have been sensitized by other materials so that they present an explosion hazard.

Group G. Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals.

Reference

For additional information concerning these hazardous location classifications, refer to NFPA 70, the *National Electrical Code*. (A publication of NFPA, the National Fire Protection Association.)

** Please note that the above information is summarized from NFPA 70, Article 500 and is presented for reference only. Refer to NFPA 70 for further information.*

Intrinsically Safe Smoke Detectors

Features

Detector and base models:

- 2098-9212, Photoelectric detector
- 2098-9826, Detector base (required, one per detector)
- Detectors and bases are ordered separately

Up to five detectors per 2081-9036 module zone

- A maximum of five (5) smoke detectors total, either spot-type or duct housing mounted, are allowed per barrier module zone

Design features:

- Designed and identified as intrinsically safe system components
- Built-in insect protection screen
- Tamper-proof locking screw
- Magnet operational test feature
- Low profile outline
- Attractive off-white color

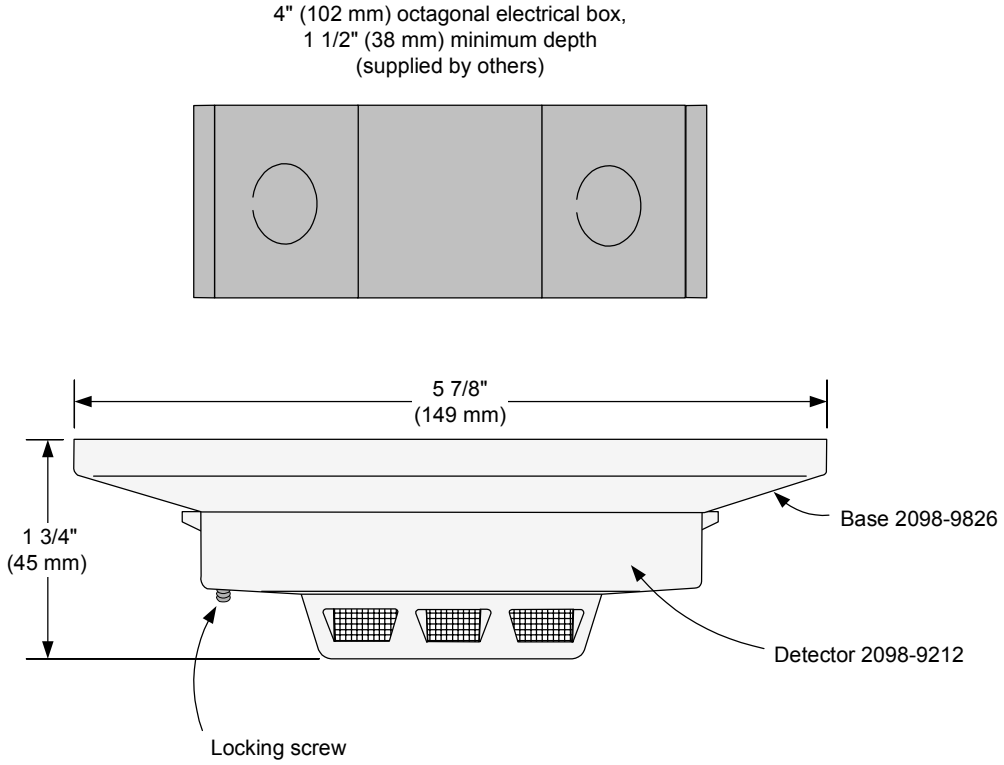
Description

Photoelectric smoke detector 2098-9212 has been designed specifically for use on intrinsically safe circuits in conjunction with the 2081-9062/9063 barrier modules (maximum of 5 detectors total, per intrinsically safe circuit). Detectors require the 2098-9826 detector base.

Detector Specifications

Voltage	15 to 32 VDC
Standby Current	40 μA
Alarm Current	100 mA maximum
Internal Capacitance	None
Internal Inductance	None
Operating Temperature Range	14° to 122° F (-10° to 50° C)
Humidity Range	10% to 95% RH from 32° to 122° F (0° to 50° C)
Color	Off-white

Dimensions and Mounting Reference



Intrinsically Safe Air Duct Housing Model 2098-9214

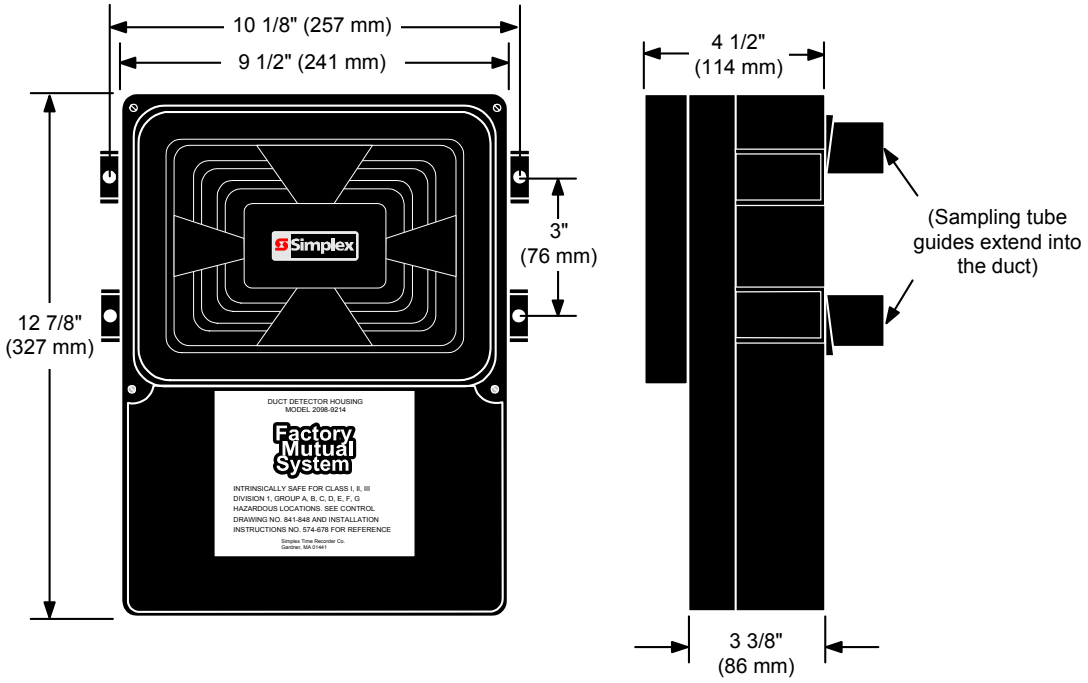
Description

The 2098-9214 air duct housing has been specifically designed for use in intrinsically safe applications when equipped with photoelectric smoke detector model 2098-9212 (maximum of 5 detectors total per intrinsically safe circuit).

Baffle 2098-9811 and sampling tube (see sampling tube selection chart below) are required, ordered separately. Duct housings, smoke detectors, and associated parts are all ordered separately.

NOTE: Smoke detection in air ducts only provides protection of the air duct system and does not replace the need for area smoke detection.

Dimensions



Sampling Tube Selection Chart (ordered separately)

Overall Duct Width	Tube Required	Suggested Cut Length
12” (305 mm)	2098-9796	1/2“ (12.7 mm) Longer than duct width
13” to 23” (330 mm to 584 mm)	2098-9804	1/2“ (12.7 mm) Longer than duct width
24” to 46” (610 mm to 1168 mm)	2098-9797	2“ (51 mm) Longer than duct width
46” to 71” (1168 mm to 1803 mm)	2098-9798	2“ (51 mm) Longer than duct width
71” to 95” (1803 mm to 2413 mm)	2098-9799	2“ (51 mm) Longer than duct width

Intrinsically Safe Manual Stations

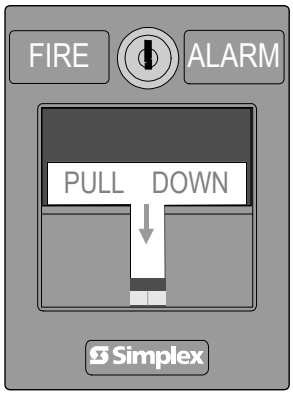
Description

Single action stations require a firm downward pull to break the plastic rod visible below the pull lever and actuate a switch to sound the alarm. The front of the station is hinged and must be opened to reset the station and to replace the plastic rod.

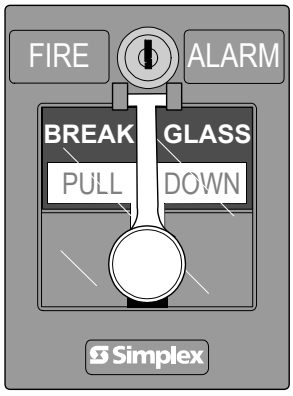
Double action stations require that the hammer, hung on the front of the station, be lifted and thrown downward against the glass window, thus breaking it to expose the recessed pull lever. As with the single action station, a firm downward pull of the pull lever actuates and locks in the alarm switch.

Single action station reset. To reset the single action station, a key unlocks and opens the station which then permits the handle to return to its normal position when the station is relocked. If a break-rod is used, it must be replaced in order to complete the reset process.

Double action station reset. The double action station is reset in a similar manner except that the glass window must be replaced to restore operation.



2099-9767 Intrinsically Safe
Single Action Manual Station

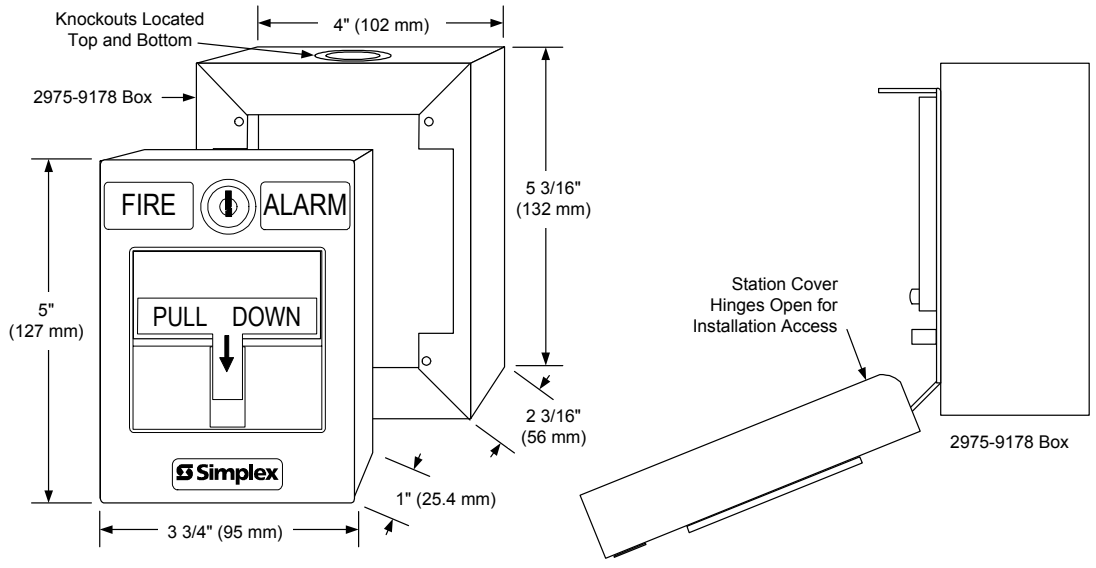


2099-9799 Intrinsically Safe
Double Action Breakglass Manual Station

Mounting Notes

1. For surface mounting, use a Simplex 2975-9178 red steel back box or a 2975-9022 aluminum back box. Do not substitute a box with a depth less than 2 3/16" (56 mm).
2. For semi-flush mounting, use a standard single gang 2 1/2" (64 mm) deep switch box. DO NOT RECESS BOX, mount box flush or with 1/16" (2 mm) maximum protrusion.
3. Wiring is 18 AWG minimum, 14 AWG maximum.

Surface Mounting Reference



Intrinsically Safe Product Selection

Barrier Modules

Model	Description	Notes
2081-9062	Single channel intrinsically safe barrier module	Each module requires an 2081-9061 installation kit, and a 2975-9218 cabinet
2081-9063	Dual channel intrinsically safe barrier module	

Required Accessories (ordered separately)

Model	Description	Notes
2081-9061	Intrinsically safe barrier installation kit	Includes barrier module mounting bracket, mounting hardware, control drawing, and required end-of-line resistors
2975-9218	Intrinsically safe barrier cabinet	Cabinet is red with solid door and keyed lock

Intrinsically Safe System Components (ordered separately)

Model	Description	Notes
2098-9212	Photoelectric smoke detector	A maximum of five (5) detectors are allowed on a single barrier module.
2098-9550	Ionization smoke detector	
2098-9826	Detector base (required, one per detector)	
2098-9214	Duct housing, black	Duct housing requires 2098-9212 Detector, 2098-9811 Baffle, and sampling tube per page 6, ordered separately
2098-9811	Duct housing baffle	
2099-9767	Single action manual station	
2099-9799	Double action manual station (breakglass)	

Entity Parameters and Maximum Total Wiring Lengths from Control Panel to Last Device in Hazardous Area*

Group	Maximum Capacitance	Maximum Inductance	Open Circuit Voltage (V_{OC})	Short Circuit Current (I_{SC})	18 AWG	16 AWG	14 AWG	12 AWG
A, B	0.14 µF	3.84 mH	28.4 V	97 mA	781 ft (238 m)	1250 ft (381 m)	2000 ft (610 m)	2000 ft (610 m)
C, E	0.42 µF	15.61 mH						3100 ft (945 m)
D, F, G	1.11 µF	31.49 mH						

* Refer to Control Drawing 842-070 for complete information. Wiring distances provided are for individual conductors in conduit with assumed parameters of 60 pF/ft and 0.2µH/ft. Consult Simplex for applications requiring cable.

S2081-0018-1 7/00
Westminster, Massachusetts 01441-0001 USA
visit us on the world wide web at ***www.simplexnet.com***