SILENT KNIGHT
SECURITY SYSTEMS®

Model 7181
Fire Zone Converter

Installation Manual

Part Number 150632
Revised February 1996

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1. Introduction

The Model 7181 Universal Zone Converter allows the conversion of zones from class A to class B, class B to class A and 4-wire to 2-wire on Silent Knight control panels (models 4720, 5104, 5204, and 5207).

These models can be used in UL fire installations as an approved Digital Fire Transmitter because they can provide Class A supervised loops for monitoring heat and waterflow sensors. Each Model 7181 module converts one zone.

2. Electrical Specifications

Contact type	Normally Open	
Smoke detector standby current	1 mA	
Maximum loop resistance	100 ohm	
Maximum loop current	70 mA	
Operating voltage on initiating circuit		
12V System	11 - 12 VDC	
24V System	15.2 - 27 VDC	
	Class A	**Class B**
Minimum trouble detect	0.94 V	0.90 V
Maximum alarm detect	0.20V	2.75 V
Regulated voltage	12.6 V - 13.8 V	
Supply voltage to 7181 from panel		
12V System	+12 VDC	
24V System	+24 VDC	
Max. output current or regulator	120 mA	
Tolerance for regulated voltage	4 percent	
Max. current for Class A to Class B configuration	**Alarm**	**Standby**
12V System	176 mA	38 mA
24V System	135 mA	24 mA
Max. current for Class B to Class A configuration	**Alarm**	**Standby**
12V System	90 mA	52 mA
24V System	65 mA	35 mA
Max. current for 4-wire to 2-wire configuration	**Alarm**	**Standby**
12V System	61 mA	38 mA
24V System	103 mA	24 mA
Max. ripple voltage	0.2 V	

3. Wiring Overview

Refer to UL 864 and NFPA 72 when installing a UL fire system.

An end-of-line (EOL) resistor must be connected to any Class B device—either the panel or the initiating device or both (if both are Class B). On the initiating device, this EOL must be a 4.7k ohm resistor. On the panel, the EOL can be a 4.7k ohm, 15k ohm or some other value resistor. (See the installation manual for the panel you are installing to determine resistor value.)

The Model 7181 is UL listed with compatibility identifier "B". The chart below shows the 2-wire smoke detectors that can be used with the Model 7181.

Note 1: All smoke detectors on a single loop must be the same model.

Note 2: Two-wire smoke detectors can be used only on Class B initiating circuits.

Manufacturer	Model	Identifier	Max. # Per Loop
12-V or 24-V Systems			
SYSTEM SENSOR	1400	A	8
SYSTEM SENSOR	1800	A	10
SYSTEM SENSOR	1851B (B101B)*	A (A)*	8
SYSTEM SENSOR	1851DH (DH1851DC)	A (A)	8
SYSTEM SENSOR	2800	A	10
SYSTEM SENSOR	2800TH	A	8
SYSTEM SENSOR	2851B (B101B)	A (A)	8
SYSTEM SENSOR	2851DH (DH2851DC)	A (A)	8
SYSTEM SENSOR	2851BTH (B101B)	A (A)	8
Detection Systems	DS200 (MB200-2W)	A (B)	12
Detection Systems	DS200HD (MB200-2W)	A (B)	12
ESL	425C	S10	20
ESL	425CT	S10	20
12-V System Only			
Hochiki	SLK-12	HSB-12-1 or HSB-12-1N	15
24-V Systems Only			
SYSTEM SENSOR	1451 (B401B)	A (A)	8
SYSTEM SENSOR	1451 (B406B)	A (A)	8
SYSTEM SENSOR	2400	A	8
SYSTEM SENSOR	2400TH	A	8
SYSTEM SENSOR	2451 (B401B)	A (A)	8
SYSTEM SENSOR	2451TH (B401B)	A (A)	8
*The base model number and identifier are shown in parentheses ().			

4. Class B to Class A Conversion

This application is required when a Class A initiating loop is to be used with a panel that has only a Class B zone. Figure 4-A shows how to connect the 7181 terminals.

The configuration described here is not compatible with two-wire smoke detectors.

The 7181 supervised Class A two-wire loops can detect an alarm after any single fault (open circuit or ground fault) has occurred in the loop wiring. The 7181 will detect an open in either of its sub-loops. The dialer will report the open as zone trouble.

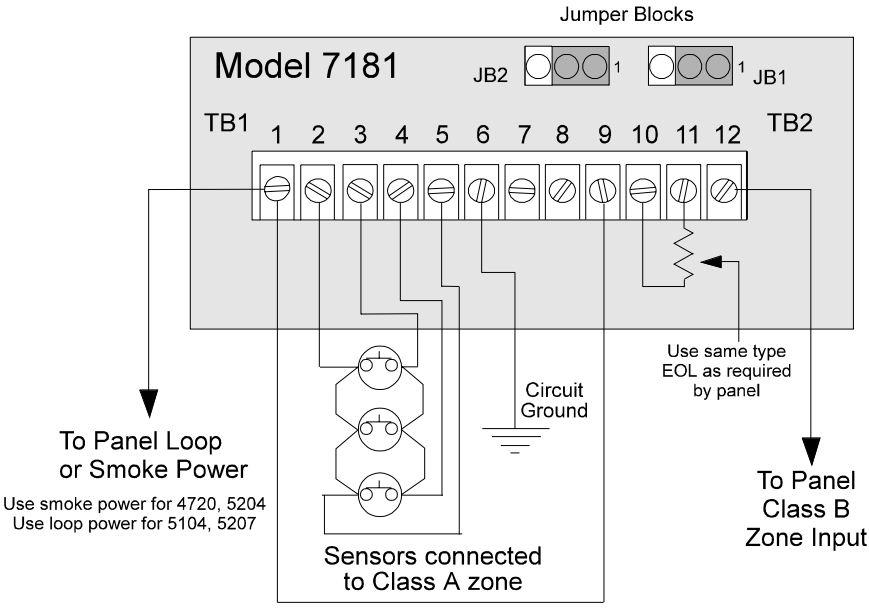

Figure 4-A: Class B Panel with Class A Initiating Loop

Note *Use the configuration shown above for the model 5204 which has Class B zones only. This connection creates a Class A, Subgroup style D circuit.*

Follow Steps 1-8 (next page) for wiring.

1. Connect 7181 terminals 1 and 9 to the panel's loop power terminal. Connect 7181 terminal 6 to ground.
2. Before making any other connections, test 7181 terminals 2, 3, 4, and 5 to make sure the voltage between circuit ground and each of the terminals is within the limits specified in the chart below.

7181 Terminals	Zone Voltage Limits
2	6.25 - 6.99
3	11.98 - 12.10
4	7.79 - 8.61
5	2.30 - 2.54

3. Run wires from terminals 2 and 3 of the 7181 to the first sensor, connecting one wire to each side of the normally open contacts on the sensors.
4. Connect the first sensor the second sensor, the second sensor to the third and so on. The maximum number of waterflow sensors that can be connected to each 7181 is 5.
5. Connect the last sensor to 7181 terminals 4 and 5. Be sure the loops run from terminal 2 to 5 and from terminal 3 to 4 on the 7181.
6. Connect the EOL resistor that is used with the panel. (Use the resistor value specified in the panel's installation manual.)

   Note 1: All sensors must be wired in parallel.

   Note 2: Each sensor has four wires connected (two wires from each side of the contacts).
7. Connect 7181 terminal 12 to the panel's Class B zone input.
8. Place jumper blocks JB1 and JB2 on pins 1 and 2 (pin 2 is on the right side).

5. Class A to Class B Conversion

This application is required when a Class B initiating loop is to be used with a panel that has only a Class A zone available. The chart below shows the Model 7181 terminal connections to the Model 5104 and 5207 fire panels. (Note: Silent Knight's 5204 is not included in the chart because it does not have any Class A zones.)

7181 Terminals	5104	5207 - 12V	5207 - 24V
1	Loop power	Loop power	Loop power/sensor 7181 EOL
2, 3, 4, 5	Not connected	Not connected	Not connected
6	Ground	Ground	Ground
7	Sensor / 7181's EOL	Sensor / 7181's EOL	Sensor / 7181's EOL
8	Sensor / 7181's EOL	Sensor / 7181's EOL	Not connected
9	2	3	3
10	Not connected	Not connected	Not connected
11	3	4	4
12	4 or 1	2 or 5	2 or 5

Steps 1-7 are general wiring instructions. Figures 5-A through 5-C, beginning on the next page, are individual wiring diagrams.

1. Connect 7181 terminal 1 to the panel's loop power terminal. Connect 7181 terminal 6 to ground.
2. Connect 7181 terminal 7 to the negative (-) side of the sensor.
3. Connect the positive (+) side of the sensor as follows:

   For 12-V smoke power panels: connect the positive (+) side of the sensor to 7181 terminal 8.

   For 24-V smoke power panels: connect the positive (+) side of the sensor to 7181 terminal 1. (7181 Terminal 1 should already be connected to the panel's loop power terminal.)
4. Connect the first sensor to the second sensor, the second sensor to the third and so on. Wire all sensors in parallel. Connect a 4.7 k ohm EOL resistor across the last sensor.
5. Connect 7181 terminals 9, 11, and 12 to the panel.

6. Connect the panel terminals as shown in the chart below. Refer also to the appropriate diagrams.

Panel	Terminals to be Connected
5104	1 and 4
5207 (12-V and 24-V)	2 and 5

7. Place jumper blocks JB1 and JB2 on pins 2 and 3 (pin 1 is on the right side).

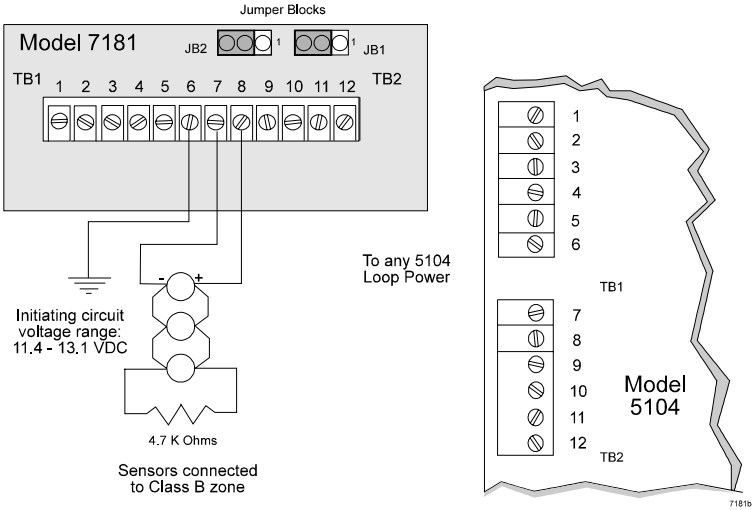

Figure 5-A: Class A Panel Connection to Class B Sensor, Model 5104

Note: This connection creates a Class B, Subgroup style B circuit.

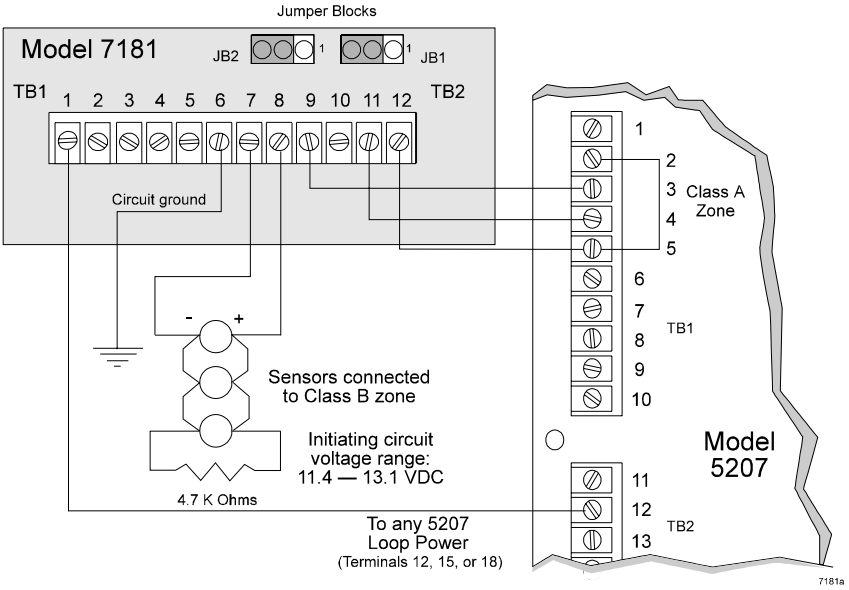

Figure 5-B: Class A Panel Connection to Class B Sensor, Model 5207-12V

Note: This connection creates a Class B, Subgroup style B circuit.

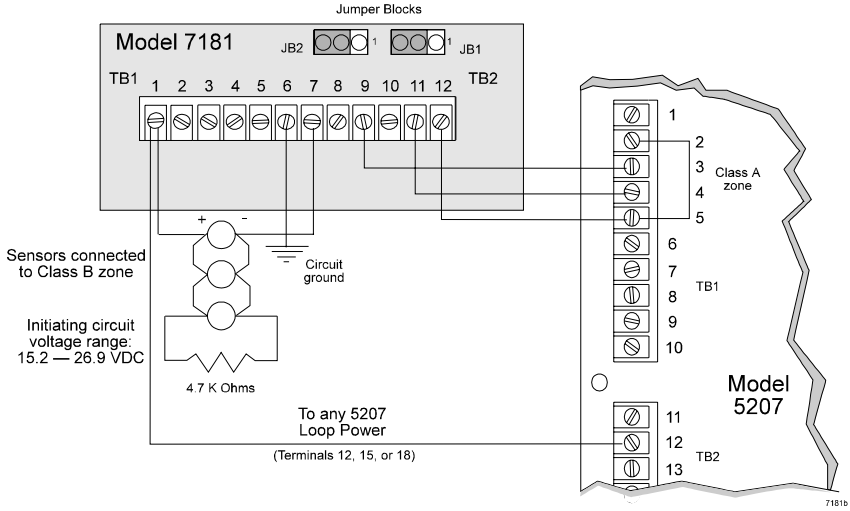

Figure 5-C: Class A Panel Connection to Class B Sensor, Model 5207-24V

Note: This connection creates a Class B, Subgroup style B circuit.

6. Four-Wire to Two-Wire Conversion

This conversion is used for connecting a two-wire smoke detector to a panel that has only four-wire zones. The chart below shows the 7181 terminal connections to the panels. (Only panels that have only four-wire zones are shown.)

Note: An EOL resistor is required on both the panel and the smoke detector because both are Class B devices in this conversion.

7181 Terminals	Control Panel Models 4720, 5104, 5204, and 5207
1	Panel loop (or smoke) power / 7181 terminal 9
2-5	Not connected
6	Ground
7	Smoke detector / 7181's EOL resistor
8	Smoke detector / 7181's EOL resistor
9	Panel loop (or smoke) power
10	Not connected
11	Panel's EOL resistor
12	Panel's EOL resistor / zone input

1. Connect 7181 terminal 1 to the control panel's loop (or smoke) power terminal. Connect 7181 terminal 6 to ground.
2. Connect the two-wire smoke detectors as shown in figures 6-A and 6-B (next page). The ESL 425CT smoke detector is used as an example.
3. Connect a 4.7k ohm EOL resistor across the last smoke detector.
4. Connect the EOL resistor that is used with the panel (using the resistor value specified in the panel's installation manual).
5. Connect 7181 terminal 12 to the panel's Class B four-wire zone input.
6. Place jumper blocks JB1 and JB2 on pins 2 and 3 (pin 1 is on the right side).

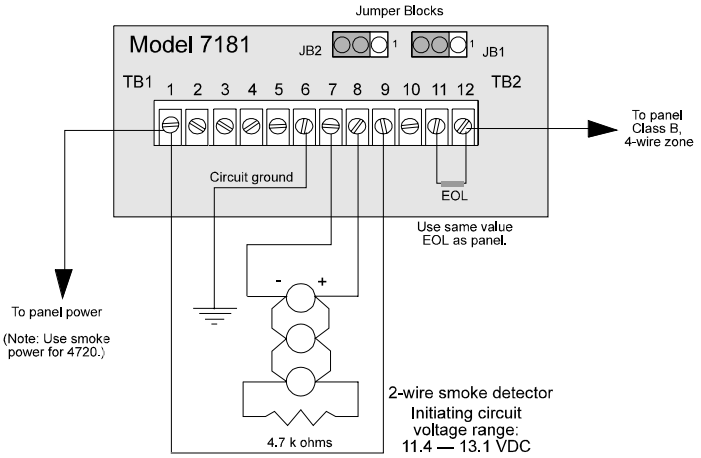

Figure 6-A: Four-Wire to Two-Wire Conversion, 12V Panel

Note: This connection creates a Class B, Subgroup style A (no earth fault detection) circuit.

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