SIGNALINK
TECHNOLOGIES INC.

FIRE-LINK®II

NMC Fire Alarm Wiring Guide

FIRE-LINK®II is a member of the FIRE-LINK product family

077.0048	Rev B
9 APR 2010	

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1.0 General Product Information

1.1 *** IMPORTANT *** Site Prequalification Requirement

The Fire-Link®II Site Prequalification form must be completed by the dealer or installer AND approved by Signalink Technologies prior to installation of any Fire-Link® equipment. Equipment and/or installation warranties may be void if this installation is not approved by Signalink Technologies.

1.2 Documentation Reference

The chart below lists the pertinent documentation to install Fire-Link®II equipment.
This is Document Number: **077.0048 - NMC Fire Alarm Wiring Guide**

Fire-Link® II	Documentation Reference	
Document Number	Document Name	Description
077.0024	NMC and TPC Installation Guide	Installation and 120V Wiring of the NMC, TPC and CHK-400
077.0050	TPC Installation Guide	TPC and CHK-400 Installation Instructions (Enclosed in TPC Unit Box)
077.0048	NMC Fire Alarm Wiring Guide	NMC Fire Alarm and Fire Alarm Control Panel (FACP) Interconnect Wiring
077.0049	ISD Installation, Operation and Maint. Guide	ISD Installation, Operations and Maintenance Guide
077.0045	NMC Programming Manual	NMC and ISD Programming and Set Up
077.0046	Signalink System Configurator User's Manual	System Configurator User's Guide for NMC Programming Via Laptop
077.0025	Building Manager's Guide	NMC and ISD Operation, Test and Inspection Guide

1.3 Applicable System Components

This document applies to the following system components:

Fire-Link® II	System Components		
	160kHz	132kHz	Color
NMC	NMC-101R	NMC-102R	RED
	NMC-101W	NMC-102W	WHITE

1.4 System Component Compatibility

The Fire-Link®II components are not compatible with previous Series 2.1 or Series 2.3 components. In addition, Fire-Link®II components are frequency dependent therefore one frequency series is not compatible with devices of a different frequency series. See Compatibility Chart below.

= Compatible	ISD-1000 Rev 2.1	ISD-1000 Rev 2.3	ISD-2501 160kHz	ISD-2502 132kHz	PPC-600	SPC-3P	TPC-101 160kHz	TPC-102 132 kHz
NMC-100 Rev 2.1	■				■	■		■
NMC-100 Rev 2.3		■			■	■		■
NMC-101 160kHz			■				■	
NMC-102 132kHz				■				■

1.5 UL / ULC Listing Information

Fire-Link® II	UL / ULC Listing Reference	
Model Number	UL / ULC Listing Standard	Description
NMC-101W, NMC-101R NMC-102W, NMC-102R	UL-985	Residential Fire Warning Systems
	UL-864 Accessory	Commercial Fire Alarm Applications (Accessory)
	ULC-S527	Commercial Fire Alarm Applications (Accessory)
	ULC-S545	Residential Fire Warning Systems
TPC-101, TPC-102, CHK-400	UL-508	Industrial Control Equipment

2.0 Pre-Wiring Check List

2.1 Location of Fire Alarm Equipment

It is important to how the NMC is to be configured and the location of the Building's Fire Alarm Equipment since this will determine the number of wires required, the size of wire and how the wiring is to be routed and installed. Different configurations have different wiring requirements. In addition, it is important to know what the Fire Alarm Panel has with regards to spare Bell and Input Zone circuits. Additional Fire Alarm equipment may be required depending on the NMC configuration.

3.0 NMC Configurations

3.1 NMC Configurations

There are three basic NMC configurations each having their own wiring requirements. These wiring requirements are largely based on what the building's Fire Alarm Control Panel (FACP) is equipped with and if there is any expandability within the FACP. The NMC must be capable of placing a trouble condition on the FACP as a code requirement. Therefore for each NMC Configuration Mode, there may be several different wiring methods to support trouble reporting.

3.2 Application

Accessory Mode and Accessory with Strobe Modes are approved for UL 864 and ULC S527 applications. NMCs configured as Accessory or Accessory with Strobe Modes **ARE NOT PERMITTED** to be installed with any initiating devices, such as smoke detectors, pull stations etc. connected to any of the NMC Detection Zone Inputs. NMCs configured in Stand Alone Mode are approved for UL 985 applications and are allowed to have initiating device inputs.

3.3 NMC Terminal Connections

Figure 1 shows the interconnect terminals on the NMC Main Board. Depending on the Configuration Mode, some of the inputs are used differently in one mode versus the other. From left to right, they are:

Terminal Block	Use
Bell Input / Output Terminals	Used in the Accessory and Accessory + Strobe Modes - connects to the FACP's bell circuit output
Alarm Output Relay	This relay is energized when the NMC is in Alarm
Trouble Output Relay	This relay de-energizes when a trouble condition exists with the Fire-Link® System
Input Detection Zone 1	Used in the Accessory with Strobe option or a normal input zone in the Stand-Alone Mode
Input Detection Zone 2	Used as a normal input zone in the Stand-Alone mode **ONLY**
12VDC Resettable Power	Used to power smoke detectors in the Stand-Alone mode. Power is reset upon NMC RESET

The table below shows which inputs are used for the different modes. The NMC will ignore the inputs indicated for the particular mode being used.

Mode	Bell Circuit I/O	Zone 1	Zone 2
Accessory	Used for Bell Input	Ignored	Ignored
Accessory + Strobe	Used for Bell Input	Used for Strobe Input	Ignored
Stand Alone	Ignored	Used for Normal Input	Used for Normal Input

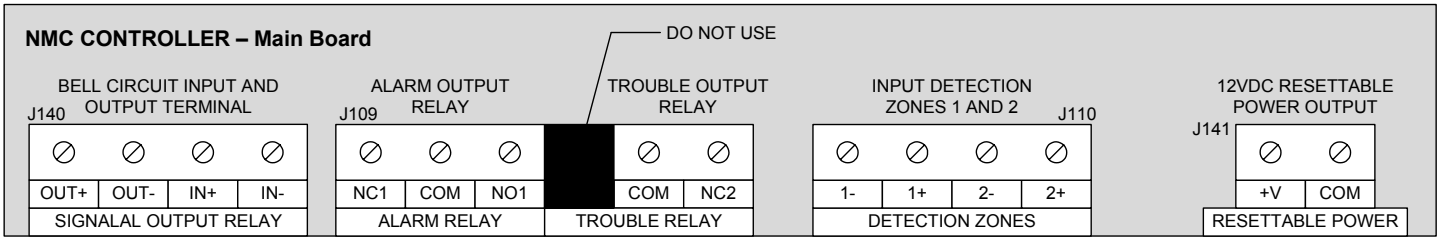

Figure 1: NMC Interconnect Terminals

NOTE: All unused NMC Detection Zones are to be terminated with a 3.9K, ¼ Watt End Of Line Resistor (EOLR). Use the manufacturer's recommended value of the of the End of Line Resistors for terminating FACP zones

3.4 Accessory Mode (Using ISD Horns Only)

When the NMC is configured in the Accessory Mode, the NMC receives its alarm input from the FACP bell circuit output. When the FACP's bell circuit goes active (into alarm), the NMC will go into alarm thus putting in ISDs into alarm, sounding their buzzers. When the FACP's bell circuit goes inactive (silenced or reset), the NMC will automatically reset and reset the ISDs to Normal, buzzers off. In short, the NMC and ISDs act as if they are just another bell on the FACP's bell circuit loop. In the Accessory Mode and Accessory with Strobe Mode, there is no need for user interaction with the NMC during or after a fire alarm condition. There are several possible wiring methods for the Accessory Mode which depends on the FACP configuration. Each method describes what is required of the FACP.

METHOD 1: (Preferred) Figure 2
FACP Requirement: One spare dedicated bell circuit
Wire Requirement: 1 pair FR-18
Supervision: NMC Trouble conditions will appear as an FACP bell circuit trouble

This is the simplest and most preferred method. A single pair of wires connected to the FACP bell circuit output is connected to the NMC's bell circuit input. A single wire is then connected from NMC's Bell Circuit Output (-) terminal to the NMC's Trouble Relay Common contact. The EOL resistor is connected to the NMC's Trouble Relay NC contact and then a single wire is connected to the other side of the EOL resistor back NMC's Bell Circuit Output (+) terminal. This method provides complete system operation and supervision with a single wire pair. With this method, the NMC will go into alarm when the FACP goes into alarm. If a Trouble condition exists on the NMC, the trouble relay opens, opening the FACP bell circuit thus placing a trouble on the FACP.

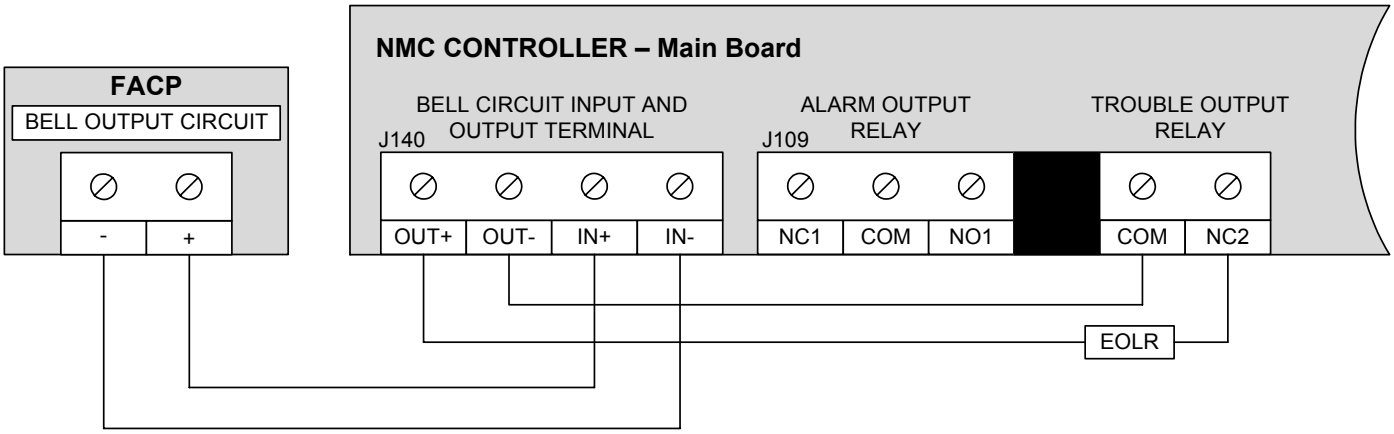

Figure 2: Wiring Method 1

METHOD 2: (No spare, dedicated FACP bell circuit) Figure 3
FACP Requirement: One spare input zone circuit.
Wire Requirement: Two pair bell circuit wire, 1 pair FR-18
Supervision: NMC Trouble conditions will appear as an FACP input zone circuit trouble

If a spare dedicated FACP bell circuit is not available, then the FACP will require one spare zone input circuit for NMC supervision. With this method, the NMC is connected in-line with the FACP alarm bells, just as if it was another bell on the circuit. The FACP bell circuit loop will be required to be broken then two pairs of wires, sufficient to carry the current of the entire bell circuit loop, will need to go to the NMC. One pair will be connected FROM the bell circuit loop to the NMC's Bell Circuit Input. The other pair will connect to the NMC's Bell Circuit Output and return TO the bell circuit loop. A third pair of wires (FR-18) is connected from the FACP's spare input zone to the NMC's Trouble Relay for NMC supervision. One wire of the pair connects to the NMC's Trouble Relay Common contact. The EOL resistor is connected to the NMC's Trouble Relay NC contact then the second wire of the pair is connected to the other side of the EOL resistor then back to the FACP's input zone. **NOTE: It is against codes and regulations to run the bell circuit loop through the NMC trouble relay since this will open the bell circuit loop in the event of an NMC trouble.**

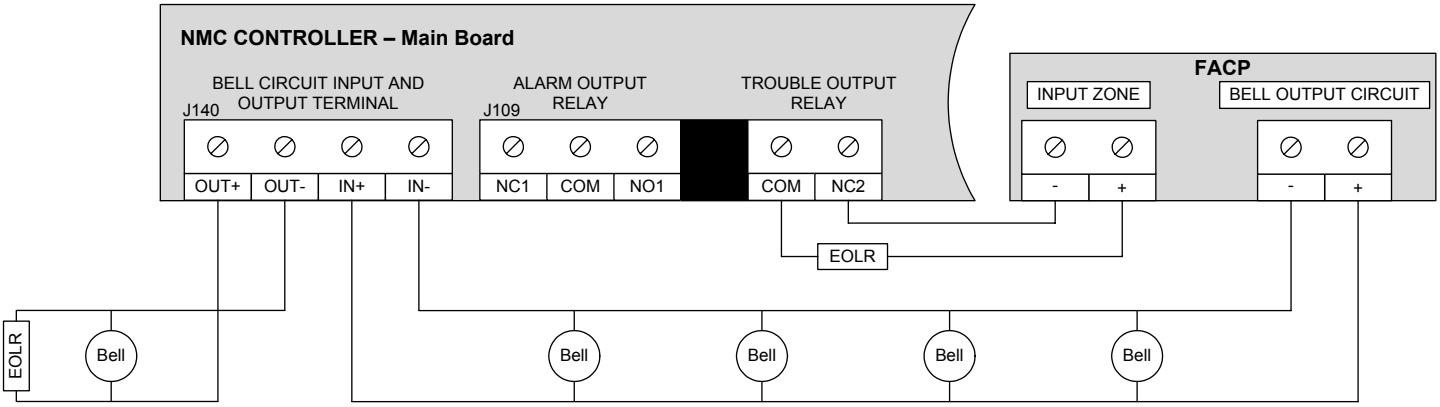

Figure 3: Wiring Method 2

METHOD 3: (No spare, dedicated FACP bell circuit, No spare FAPC zone circuit) Figure 4
FACP Requirement: None
Wire Requirement: One pair FR-18
Supervision: NMC Trouble conditions will appear as an FACP bell circuit trouble

If no spare FACP bell or zone input circuit is available, the NMC may be connect as in METHOD 1 **ONLY** if it is connected as the **LAST** bell in the bell circuit loop. The EOL resistor must be removed from the last bell on the bell circuit loop and connected at the NMC as indicated in METHOD 1.

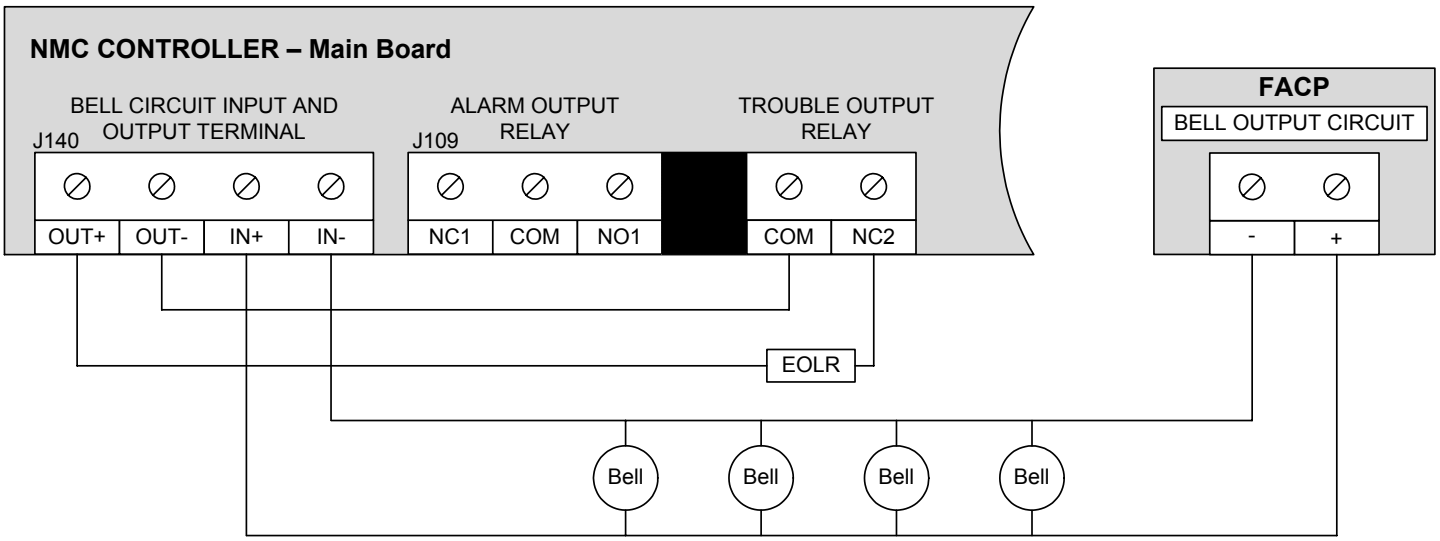

Figure 4: Wiring Method 3

3.5 Accessory Mode (Using ISD Horn / Strobes)

NOTE: This configuration mode is generally not acceptable. NFPA 72 and other fire alarm codes require that if the FACP has been Signal Silenced, the strobes must continue to flash until the FACP has been reset. In this configuration mode, the ISD Buzzers and Strobes follow the state of the FACP's bell circuit. If the FACP has been Signal Silenced, the FACP's bell circuits are inactive, thus the ISD's Buzzers **and** Strobes are inactive. To use ISD Horn / Strobe units, the **Accessory with Strobe Mode** must be used.

3.6 Accessory with Strobe Mode (Using ISD Horn / Strobes)

When the NMC is configured in the Accessory with Strobe Mode, the NMC receives it alarm input from the FACP's bell circuit, as outlined in Section 2.3, to sound the ISD Buzzers. However, provisions must be made for controlling the ISD Strobe. A relay contact must be available at the FACP and must be programmed or connected such that the contact is closed as long as the FACP is in alarm, regardless of whether the FACP has been Signal Silenced. This will keep the ISD Strobes active even though the ISD Buzzers are not. For the ISD Horn operation, follow the wiring METHODS 1, 2 and 3 outlined in Section 2.3.

METHOD 4: (One spare FACP alarm relay) Figure 5
FACP Requirement: One spare alarm relay or programmable relay
Additional Wire Requirement: One pair FR-18
Supervision: Same as outlined in Section 2.3. The NMC supervises the FACP alarm or programmable relay

This is the simplest and most preferred wiring method for ISD Horn / Strobe units. The Normally Open relay contact on the FACP is connected to the NMC's Zone 1 input. The EOL resistor is connect at the FACP and the circuit is supervised by the NMC. The FACP relay contact must be programmed or connect such that the contact is closed during a fire alarm condition even if the bells have bee Signal Silenced. When the alarm condition is cleared and the FACP is reset (Normal) the contact must open. The opening of this contact will turn off the ISD Strobes.

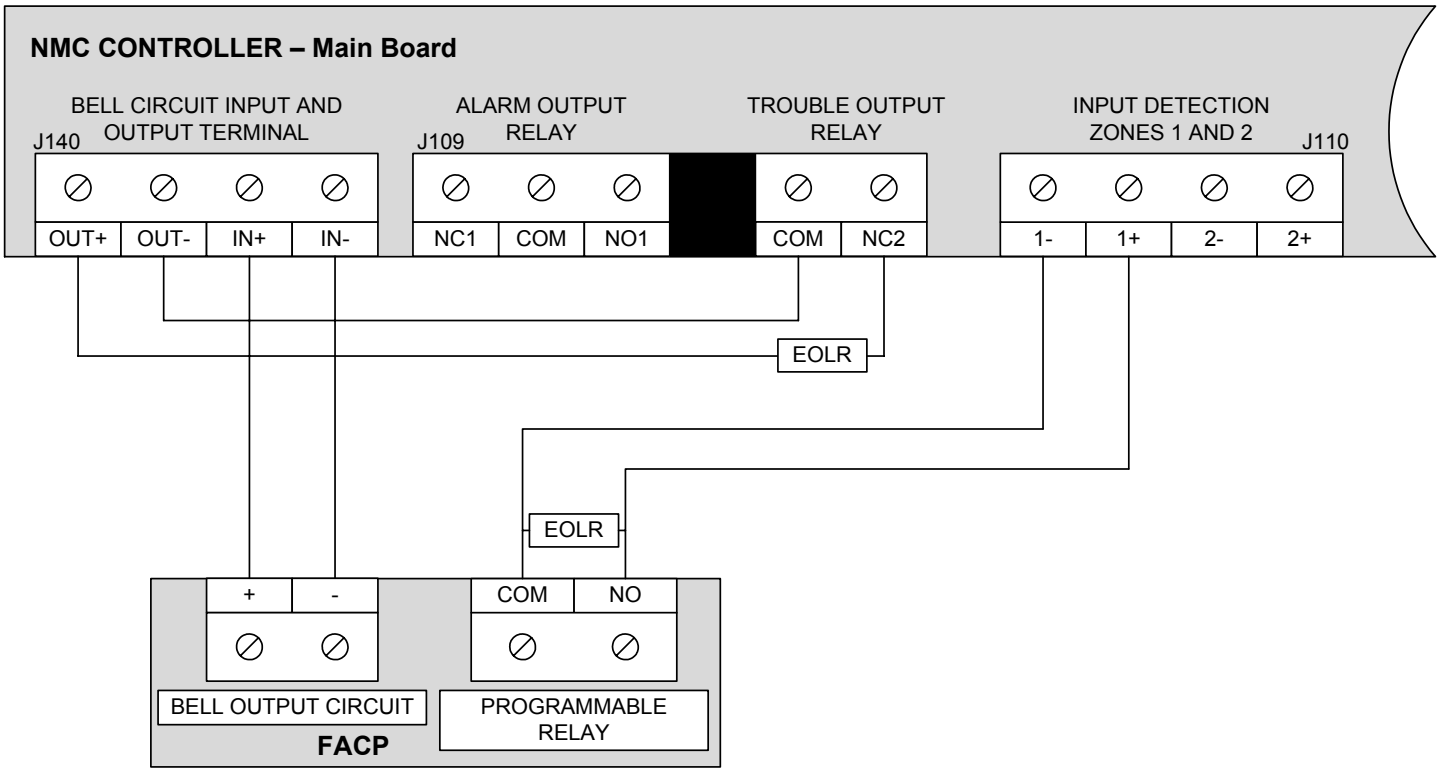

Figure 5: Wiring Method 4

METHOD 5: (No spare FACP relay, one spare, dedicated output circuit, programmable) Figure 6
FACP Requirement: One dedicated FACP bell circuits, one dedicated output circuit, one supervised relay
Additional Wire Required: Subject to the requirements of the relay
Supervision: Same outlined in Section 2.3. The NMC supervises the relay. The FACP may also have a supervision requirement of the relay

This method uses an external relay that is driven by the FACP output circuit. The FACP must be capable of programming its output circuit to remain active while the FACP is in alarm, regardless if the other bell circuits have been Signal Silenced. The relay output is connected to the NMC's Zone 1 input. The EOL resistor is connect to the relay and is supervised by the NMC. Additional requirements may be required by the FACP to supervise the relay. **DO NOT** connect the any FACP bell or strobe circuit outputs directly to any of the NMC Zone Inputs. Damage may occur to both the NMC and the FACP.

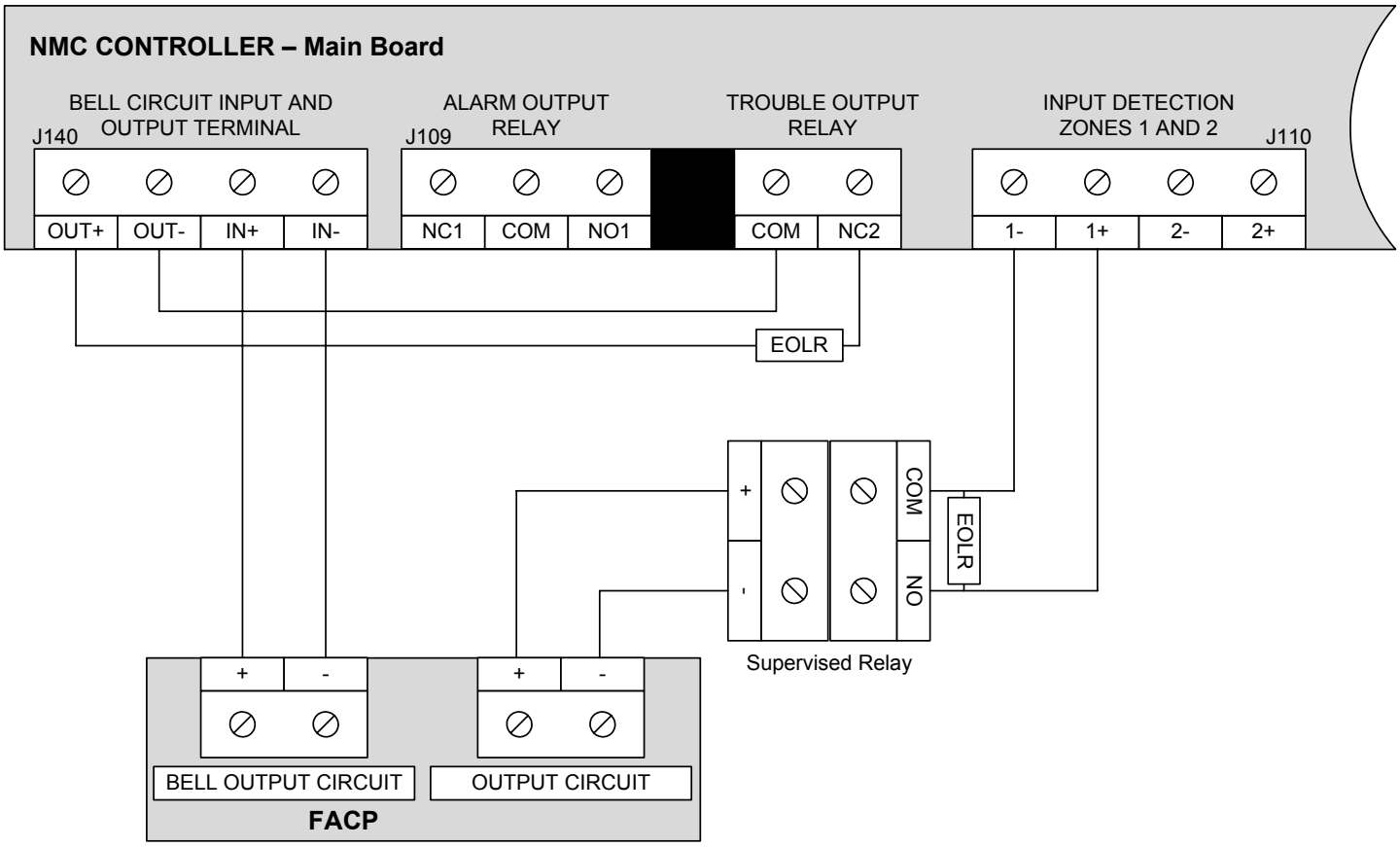

Figure 6: Wiring Method 5

3.7 Stand Alone Mode (Not Permitted in Canada)

When the NMC is configured as a Stand Alone unit, the NMC itself becomes the FACP. The NMC is capable of controlling two Class B – Style B initiating circuits. The NMC input zones support any normally open initiating devices such as pull stations, flow devices or 4 wire smoke or heat detectors. The recommended smoke detector is a System Sensor model C4W-BA detector. For proper supervision, a System Sensor model A77-176B End Of Line Relay is required to supervise the detectors power supply circuit. The NMC is capable of supporting any number of normally open, switch type initiating devices but is **ONLY** capable of supporting **TWO** smoke detectors. Power for the smoke detectors is provided at the NMC's 12VDC Resettable Power terminals. When the NMC is RESET from a fire alarm condition, the 12VDC Resettable Power circuit is de-energized for a period of 5 seconds to allow for smoke detector reset. Refer to the User Reference Guide for NMC operation in the Stand Alone Mode. Figure 7 below shows the method for connecting a 4-wire smoke detector and EOL Relay.

Note: The voltage range of the 12VDC Resettable Power is 10.7 to 20.3 VDC.

Note: Terminate all unused input zones with a 3.9K, ¼ watt resistor.

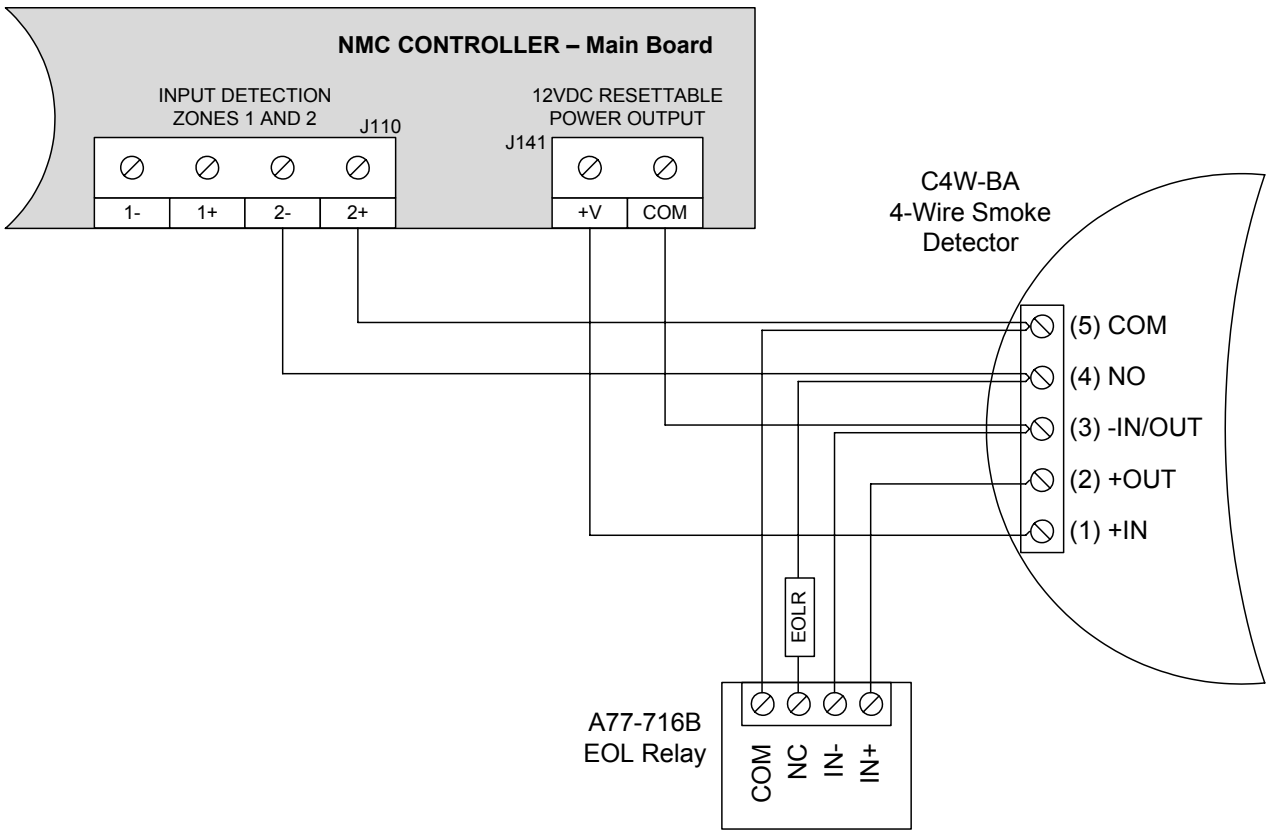

Figure 7: Four Wire Smoke Detector Wiring

User's Notes:

Customer Feedback

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