CAN/ULC-S1001 Life Safety Systems Integrated Testing Plan

Project Summary

Project Name: **ABC Daycare**

Site Address:

Area(s) Tested: Entire Building

Prepared on:

Number of Storeys Above & Below Grade: 1 above grade

Construction Type: Non-Combustible

Occupancy Classification(s): NBC 2015 Occupancy Class A2

Plan Introduction: The following life safety system integrations exist:

1- Fire Alarm to Sprinkler System

2- Fire Alarm to Fire Monitoring System

3- Fire Alarm to Hood Suppression

4- Fire Alarm to HVAC

Integrated Testing Coordinator Information

Company: **BR Design Ltd.**

Address: Regina, Sk S4S 4H5

Contact Number: 1-306-531-5512 Email: brett.roach@brdesignsask.ca

ITC Name(s): **Brett Roach**

ITC Signature(s):

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- Fire Alarm Design
- ULC S1001 Integrated Testing
- ULC Monitoring Design
- Advanced Detection Design
- Special Hazards Detection Systems Design

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Project Contact Information

Fire Alarm System

Sprinkler System

Fire Monitoring System

Kitchen Hood Suppression System

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HVAC System

Participation Record

Detail Drawings

Engineer of Record Contact Information

Project Contact Information

Role	Name of Representative	Contact Information	Responsibilities
General Contractor			Project Manager
Electrical Contractor			Project Manager
Electrical Engineer			Engineer of Record
Mechanical Contractor			Project Manager
Mechanical Engineer			Engineer of Record
Fire Alarm Contractor			Fire Alarm supply, programming & Verification
Sprinkler Contractor			Sprinkler system supply and Verification

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Fire Alarm System Overview

System Description: The Fire Alarm at ABC Daycare is an Edwards IO64 addressable single-stage system. The Fire Alarm system was verified in accordance with CAN/ULC-S537-13.

The system includes integration to the following systems:

1- Sprinkler System
2- Fire Monitoring System
3- Kitchen Hood System
4- HVAC Shutdown

A copy of the Fire Alarm Verification report has be received and reviewed by the Integrated Testing Coordinator.

System Integration & Functional Objectives:

Sprinkler System - Comprised of a single Wet system

1- All tamper switches shall report a supervisory signal to the Fire Alarm system.
2- All waterflow devices shall report an alarm signal to the Fire Alarm system.

S561 Fire Monitoring System

1- All Fire Alarm system troubles shall be reported to the Central Station.
2- All Fire Alarm system supervisories shall be reported to the Central Station.
3- All Fire Alarm system alarm shall be reported to the Central Station.

Kitchen Hood Suppression

1- Kitchen Hood system shall report a release signal to the Fire Alarm system.

HVAC Shutdown

1- HRV #1, 2 & 3 shall shutdown upon activation of the Fire Alarm system.

Sprinkler System Overview

System Description: The sprinkler system at ABC Daycare is comprised a single Wet system. There is a backflow preventer with two tamper switches and a single flow switch being monitored by the Fire Alarm system.

Reference detail drawings #1 & 2 for interconnection diagrams.

A copy of the Sprinkler Verification report has be received and reviewed by the Integrated Testing Coordinator.

System Integration & Functional Objectives:

Please reference the Sprinkler system matrix for details on each system connection. The function objectives will be as follows:

1- Confirm that both tamper valves report a supervisory to the Fire Alarm system.

2- Confirm that the waterflow switch reports a fire alarm to the Fire Alarm system.

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Testing Protocols / Procedures - Fire Alarm/Sprinkler System

Test Type #1		Testing Procedure
#1	**Normal/Standby State**	1- Review flow switch installation. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#1	**Fire/Off-Normal State**	1- Flow water through inspectors test connection of the sprinkler system associated with the flow switch being tested. 2- Record time delay between opening of inspectors test and when the waterflow event is received on the fire alarm control panel. 3- Close inspectors test connection upon activation of fire alarm control panel. 4- Confirm alarm description matches description for activated flow switch. 5- Reset flow switch and fire alarm panel to return system to the normal condition.
#2	**Normal/Standby State**	1- Review tamper valve installation. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#2	**Fire/Off-Normal State**	1- Operate the valve being tested two full turns or within 10% of closing on a stem type valve. 2- Confirm supervisory description matches description for activated tamper switch. 3- Fully reopen tamper valve and reset fire alarm panel to return system to the normal condition.

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Integration Matrix - Fire Alarm/Sprinkler System

System A	System B	Integration Type	Normal/Standby State	Fire/Off-Normal State
Fire Alarm	**Sprinkler System - Backflow Valve #1**	**Test #1 - Type #2 Tamper Valve Condition**	1- Valve in the open position. 2- No supervisory condition on the fire alarm control panel.	1- Supervisory condition on fire alarm control panel.
Fire Alarm	**Sprinkler System - Backflow Valve #2**	**Test #2 - Type #2 Tamper Valve Condition**	1- Valve in the open position. 2- No supervisory condition on the fire alarm control panel.	1- Supervisory condition on fire alarm control panel.
Fire Alarm	**Sprinkler System - Main System Waterflow Switch**	**Test #3 - Type #1 Waterflow Condition**	1- No water flowing through sprinkler system. 2- No waterflow condition on fire alarm control panel.	1- Alarm condition on fire alarm control panel.

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Integration Test Check List - Fire Alarm/Sprinkler System

Test #	System Integration	Record of Test		Notes	Initials
1	Tamper Valve	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**		**BR**
2	Tamper Valve	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**		**BR**
3	Waterflow	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**	Time Delay: 29 Seconds	**BR**

General Testing Notes:
Note 1: Complete operation of each switch was tested and confirmed to be in accordance with the design criteria.

***Reference Protocols and Procedures for testing instruction and method.**

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Fire Monitoring System Overview

System Description: The Fire Monitoring system installed at ABC Daycare is a DSC NEO HS2032 S561 fire kit. The Fire Monitoring system was verified in accordance with CAN/ULC-S561-13.

Reference detail drawing #5 for interconnection diagram.

A copy of the Fire Monitoring Verification report and ULC certificate has be received and reviewed by the Integrated Testing Coordinator.

System Integration & Functional Objectives:

Please reference the Fire Monitoring matrix for details on each system connection. The functional objectives will be as follows:

1- All Fire Alarm system troubles shall be reported to the Central Station.

2- All Fire Alarm system supervisories shall be reported to the Central Station.

3- All Fire Alarm system alarm shall be reported to the Central Station.

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Testing Protocols / Procedures - Fire Alarm/Fire Signal Receiving Centre

Test Type #		Testing Procedure
#1	**Normal/Standby State**	1- Review fire signal transmitter unit installation. 2- Review connections to fire alarm control panel. 3- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#1	**Fire/Off-Normal State**	1- Activate an alarm initiating device. 2- Confirm device description on fire alarm panel matches location of activated device. 3- Confirm alarm signal was received by central station. 4- Reset initiating device and fire alarm panel to return system to the normal condition.
#2	**Normal/Standby State**	1- Review connections to fire alarm control panel. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#2	**Fire/Off-Normal State**	1- Activate an supervisory initiating device. 2- Confirm device description on fire alarm panel matches location of activated device. 3- Confirm supervisory signal was received by central station. 4- Reset initiating device and fire alarm panel to return system to the normal condition.
#3	**Normal/Standby State**	1- Review connections to fire alarm control panel. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#3	**Fire/Off-Normal State**	1- Cause a fire alarm control panel system trouble. 2- Confirm trouble signal was received by central station. 4- Restore trouble to return system to the normal condition.

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Integration Matrix - Fire Alarm/Fire Signal Receiving Centre

System A	System B	Integration Type	Normal/Standby State	Fire/Off-Normal State
Fire Alarm	**Fire Signal Receiving Centre**	**Test #1 - Type #1 Alarm Condition**	1- No alarm condition on the fire alarm panel. 2- No signal at central station.	1- Alarm condition on fire alarm control panel. 2- Alarm signal transmitted to and received by the central station.
		Test #2 - Type #2 Supervisory Condition	1- No supervisory condition on the fire alarm panel. 2- No signal at central station.	1- Supervisory condition on fire alarm control panel. 2- Supervisory signal transmitted to and received by the central station.
		Test #3 - Type #3 Trouble Condition	1- No trouble condition on the fire alarm panel. 2- No signal at central station.	1- Trouble condition on fire alarm control panel. 2- Trouble signal transmitted to and received by the central station.

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Integration Test Check List - Fire Alarm/Fire Monitoring System

Test #	System Integration	Record of Test		Notes	Initials
1	Alarm Condition	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**	See note 2	**BR**
2	Supervisory Condition	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**	See note 2	**BR**
3	Trouble Condition	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**	See note 2	**BR**

***Reference Protocols and Procedures for testing instruction and method.**

General Testing Notes:
Note 1: Each signal was tested point-to-point from device to central station and confirmed to be operational in accordance with the design criteria.
Note 2: Signals were confirmed via central station dealer mobile app.

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Kitchen Hood Suppression System Overview

System Description: The kitchen at ABC Daycare is equipped with a 3 gallon Wet Chemical Hood Suppression system. As part of this system, there is an alarm integration to the Fire Alarm to activate the buildings Fire Alarm system upon activation of the hood suppression system. The system was commissioned in accordance with NFPA 96.

Reference detail drawing #4 for interconnection diagram.

A copy of the Hood Suppression commissioning report has be received and reviewed by the Integrated Testing Coordinator.

System Integration & Functional Objectives:

Please reference the Kitchen Hood matrix for details on each system connection. The functional objectives will be as follows:

1- The hood suppression unit shall report a release signal to the Fire Alarm control panel when activated and the Fire Alarm system shall activate.

Testing Protocols / Procedures - Fire Alarm/Kitchen Hood Suppression System

Test Type #		Testing Procedure
#1	**Normal/Standby State**	1- Review hood suppression installation and wiring connections to the Fire Alarm system. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel.
#1	**Fire/Off-Normal State**	Due to the non-restoring abilities of the hood suppression system once activated, the system shall be manually tested (simulated) as follows: 1- Manually activate micro switch to simulate the mechanical actuation of a release. 2- Confirm device description on fire alarm matches location of activated device. 3- Reset micro switch and fire alarm control panel to return system to the normal condition.

Integration Matrix - Fire Alarm/Kitchen Hood Suppression System

System A	System B	Integration Type	Normal/Standby State	Fire/Off-Normal State
Fire Alarm	**Kitchen Hood Suppression Release Alarm**	**Test #1 - Type #1 Release Condition**	1- Micro switch in the inactive state. 2- No alarm condition on fire alarm control panel.	1- Alarm condition on fire alarm control panel.

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Integration Test Check List - Fire Alarm/Kitchen Hood Suppression System

Test #	System Integration	Record of Test		Notes	Initials
1	Release Condition	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**	See note 1	**BR**

***Reference Protocols and Procedures for testing instruction and method.**

General Testing Notes:
Note 1: The hood suppression is comprised of a non-restorable fixed release control system. Because of this the test was simulated in order to confirm operation without activating the system. Simulating was done by means of activating the micro switch inside the controller that would normally be activated by the mechanical release. Installation confirmed to be in accordance with the design criteria.
Note 2: Complete operation of each switch was tested and confirmed to be in accordance with the design criteria.

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HVAC System Overview

System Description: The HVAC shutdown system at ABC Daycare consists of three HRV shutdowns, units #1, 2 & 3. Upon activation of the Fire Alarm system the units shall shutdown. The shutdown of all three units is done through a contactor controlled by a single Fire Alarm relay.

Reference detail drawing #3 for interconnection diagram.

System Integration & Functional Objectives:

Please reference the HVAC matrix for details on system connection. The functional objectives will be as follows:

1- Upon activation of the Fire Alarm system all HRV units shall shutdown.

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Testing Protocols / Procedures - Fire Alarm/HVAC System

Test Type #		Testing Procedure
#1	**Normal/Standby State**	1- Review relay and HVAC units controls installation and wiring connections. 2- Confirm that no fire/off-normal conditions exist on fire alarm control panel. 3- Confirm that the unit is running in auto and in normal operation.
#1	**Fire/Off-Normal State**	1- Activate the Fire Alarm system via any alarm initiating device. 2- Confirm device description on fire alarm matches location of activated device. 3- Confirm units has shutdown. 4- Reset alarm initiating device and Fire Alarm panel. 5- Confirm unit has returned to normal and is running in normal operation.

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Integration Matrix - Fire Alarm/HVAC System

System A	System B	Integration Type	Normal/Standby State	Fire/Off-Normal State
Fire Alarm	**HVAC Shutdown - HRV #1, 2 & 3**	**Test #1 - Type #1 Shutdown**	1- Units running in auto and normal operation. 2- No alarm condition on fire alarm control panel.	1- Alarm condition on fire alarm control panel. 2- HRV units shutdown.

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Integration Test Check List - Fire Alarm/HVAC System

Test #	System Integration	Record of Test		Notes	Initials
1	Shutdown	Normal State:	**Y - Pass**		**BR**
		Fire State:	**Y - Pass**		**BR**

***Reference Protocols and Procedures for testing instruction and method.**

General Testing Notes:
Note 1: Complete shutdown function was tested and confirmed to be in accordance with the design criteria.

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On-site Integrated Testing Log of Participants and Record of Completion

Role	Participants Company	Participants Name	Participants Signature
General Contractor			
Electrical Contractor			
Mechanical Contractor			
Fire Alarm Contractor			
Sprinkler Contractor			

Test performed on: _____

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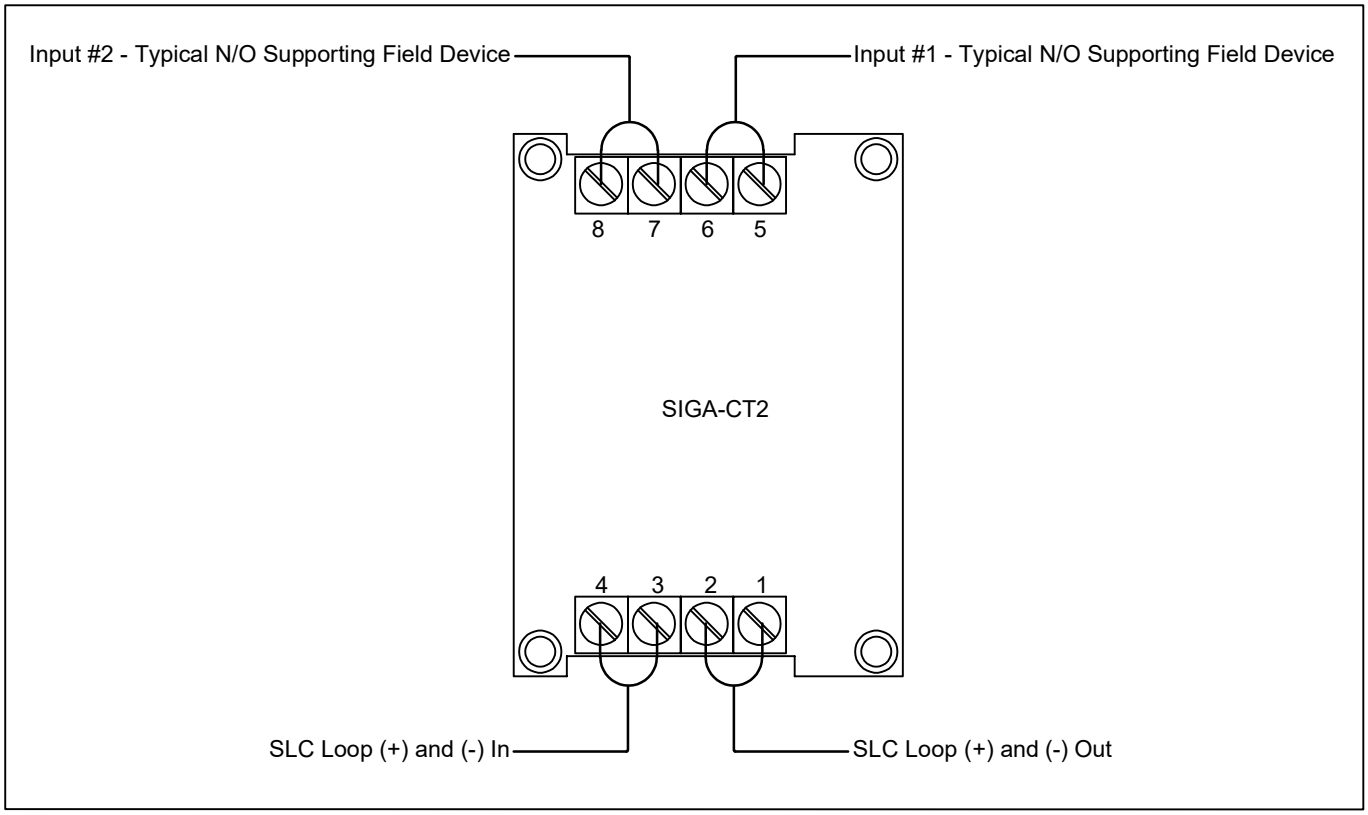
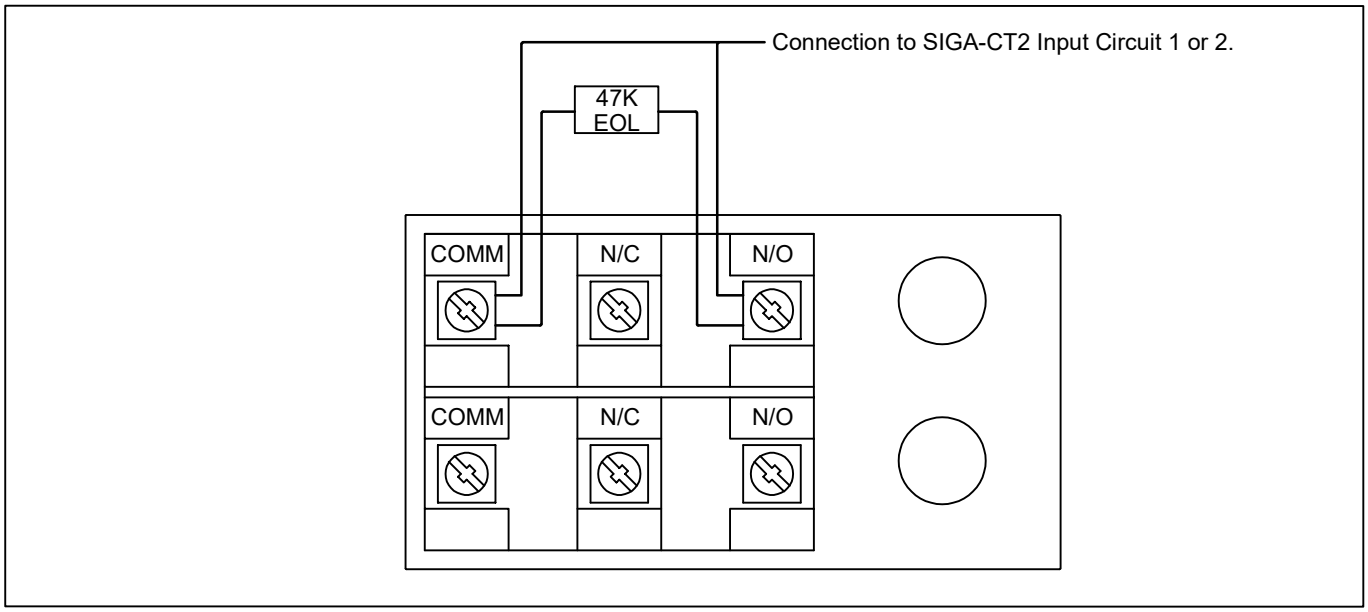


Typical Addressable Monitor Module SIGA-CT2



Typical Waterflow Switch Device

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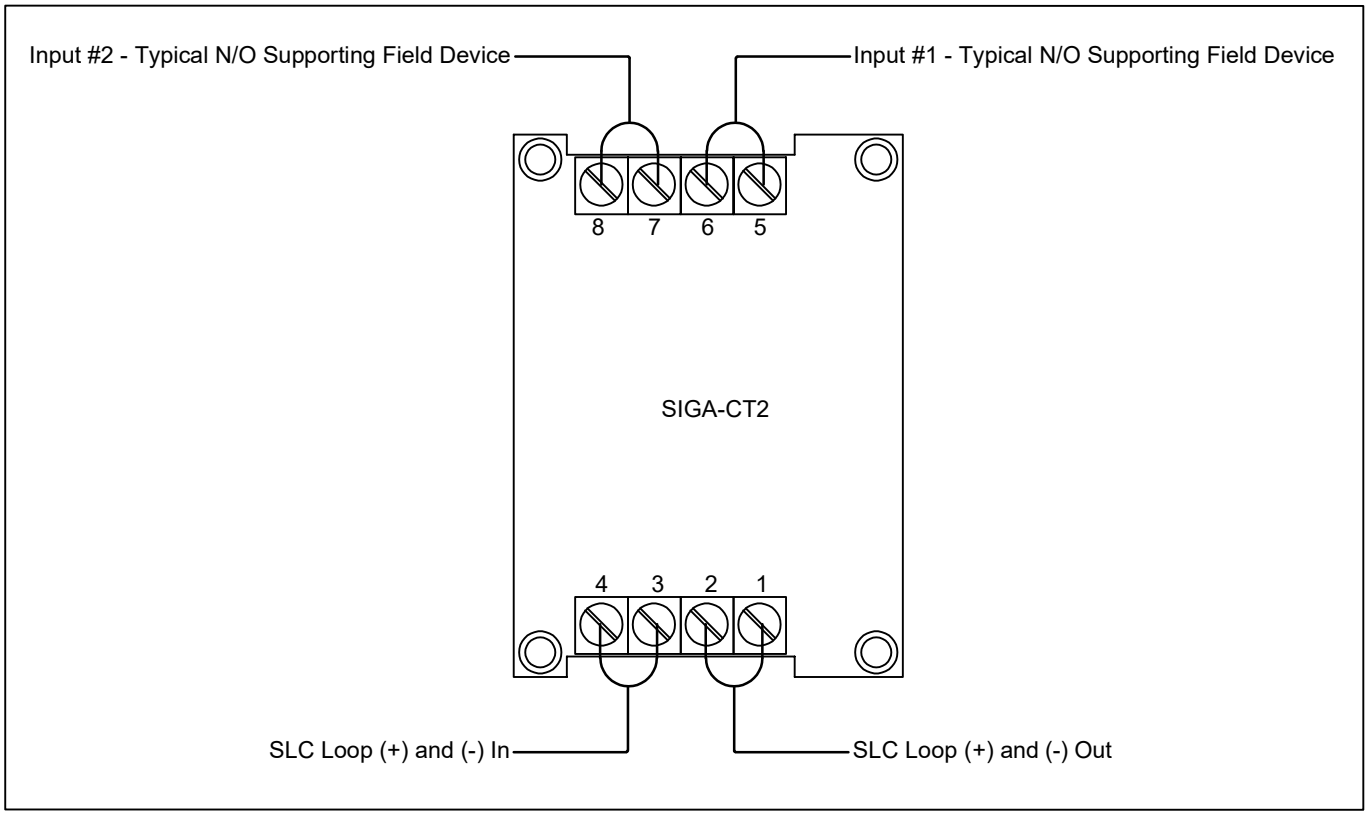
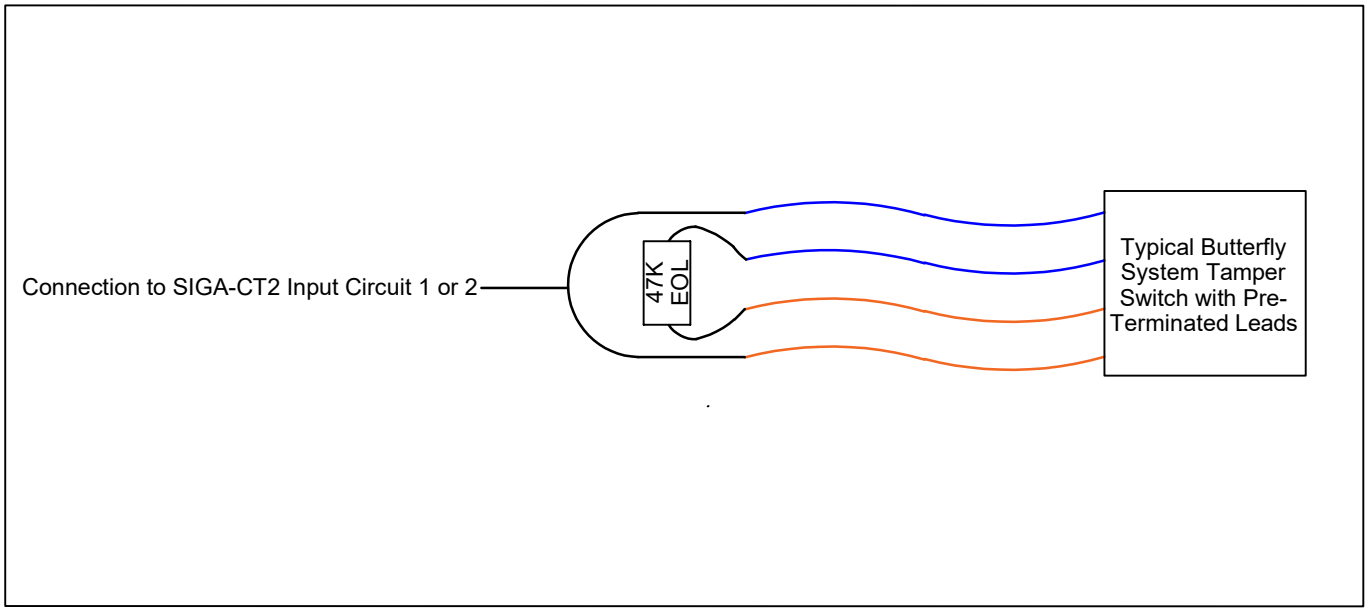
Scale: NTS		Approved By: BR	Project Name: xxx xxx Regina SK S4
			Drawing Title: IST Detail Drawing #1 - Flow Switch Connection to SIGA-CT2 Module
BR	Wiring Schematic	xx/xx/xx	
By	Drawing Revision	Date	



Typical Addressable Monitor Module SIGA-CT2



Typical Butterfly Tamper Switch Device

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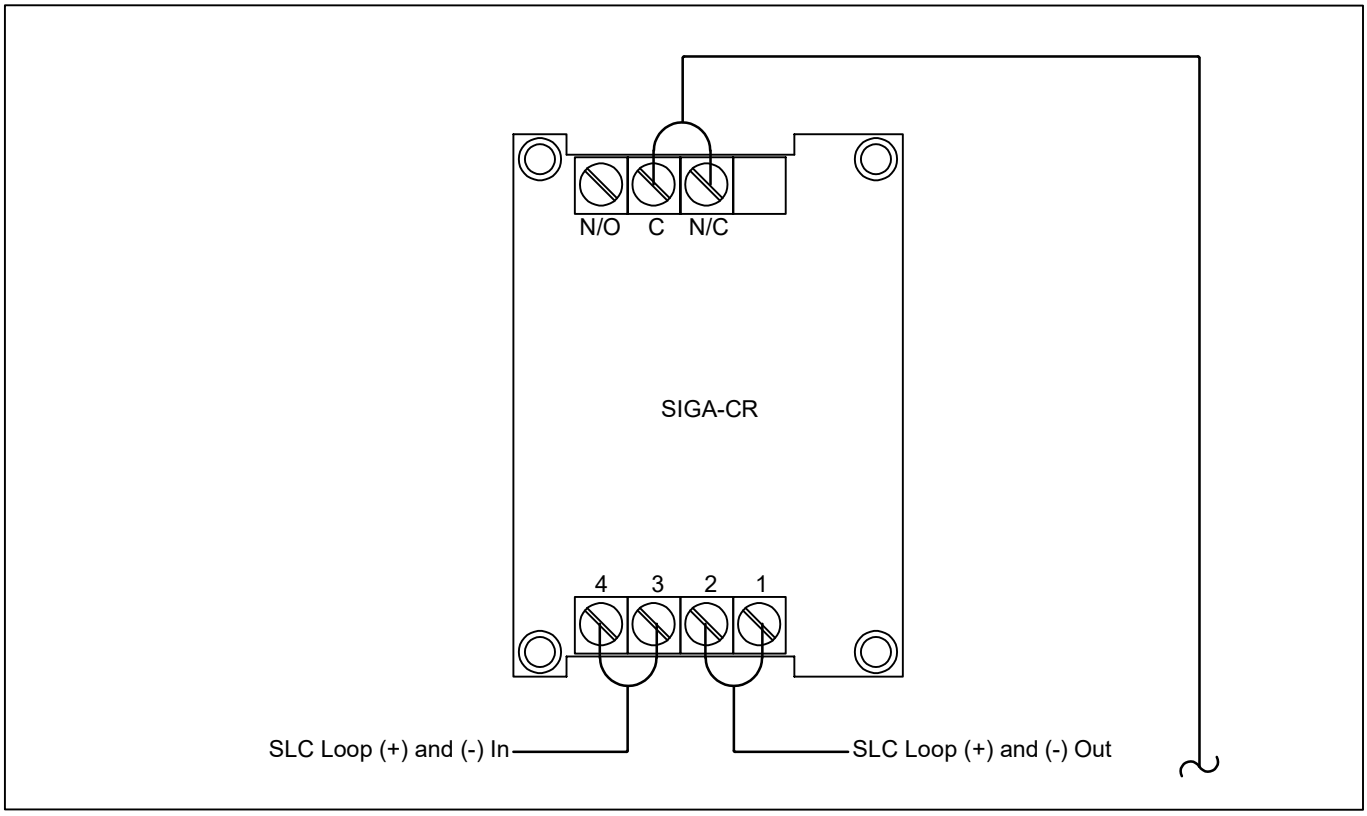
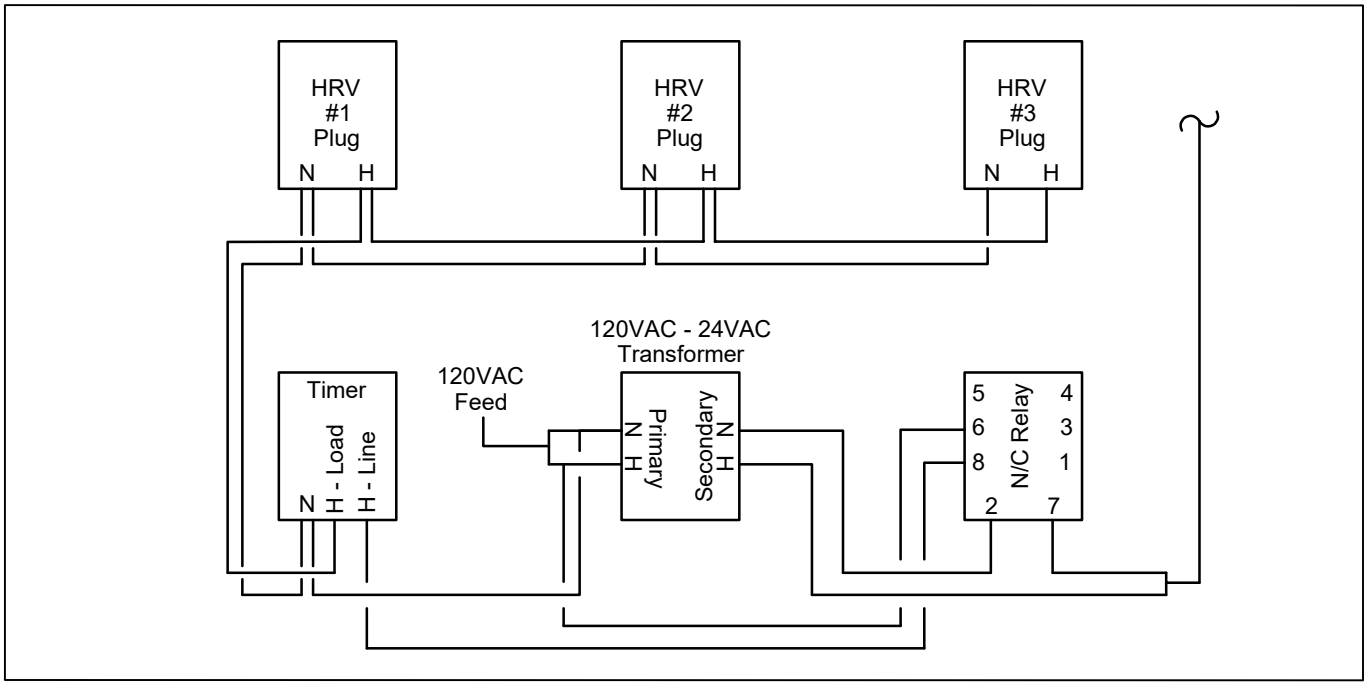
Scale: NTS		Approved By: BR
BR	Wiring Schematic	xx/xx/xx
By	Drawing Revision	Date

Project Name:
xxx
xxx
Regina SK S4

Drawing Title:
IST Detail Drawing #2 - Butterfly Valve Connection to SIGA-CT2 Module



Typical Addressable Relay Module SIGA-CR



Fan Shutdown Controls

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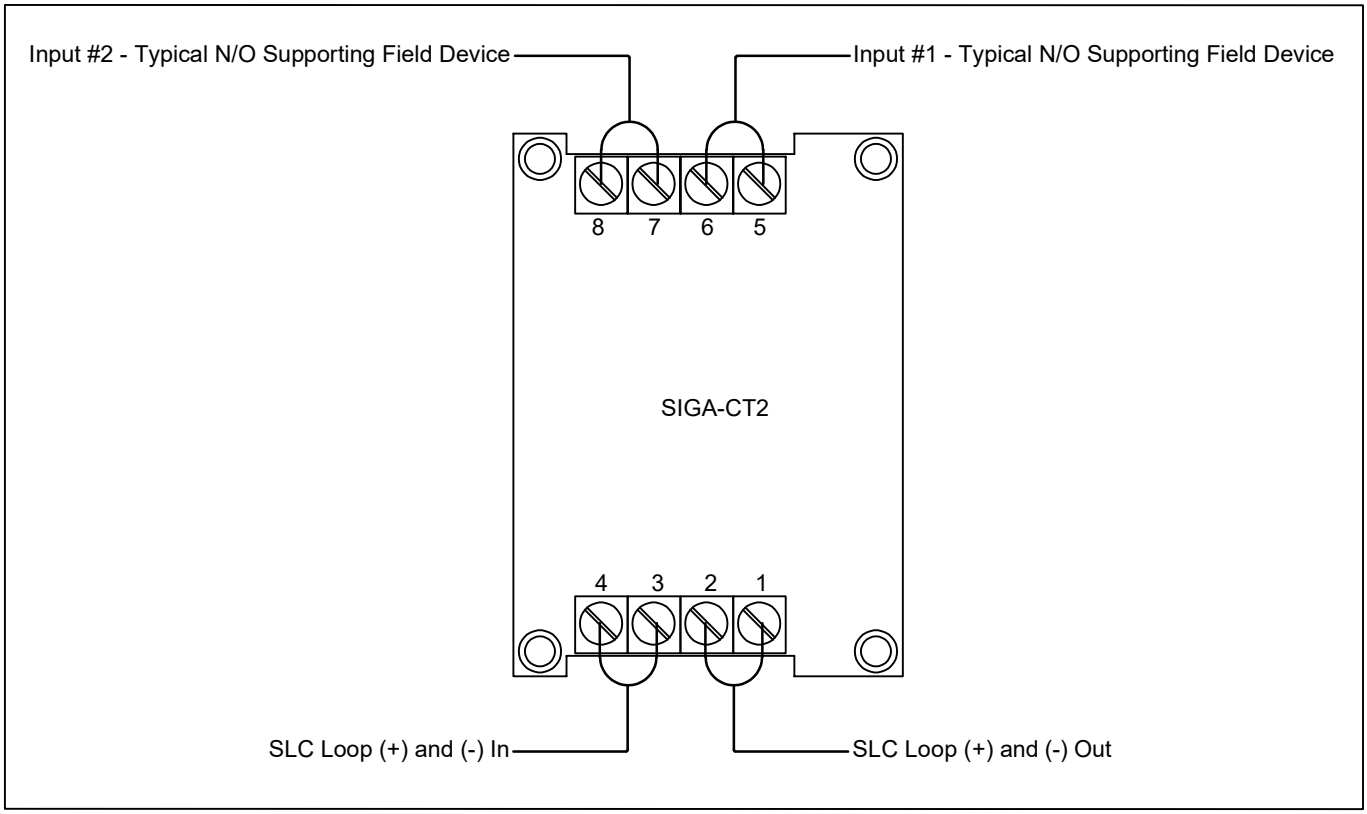
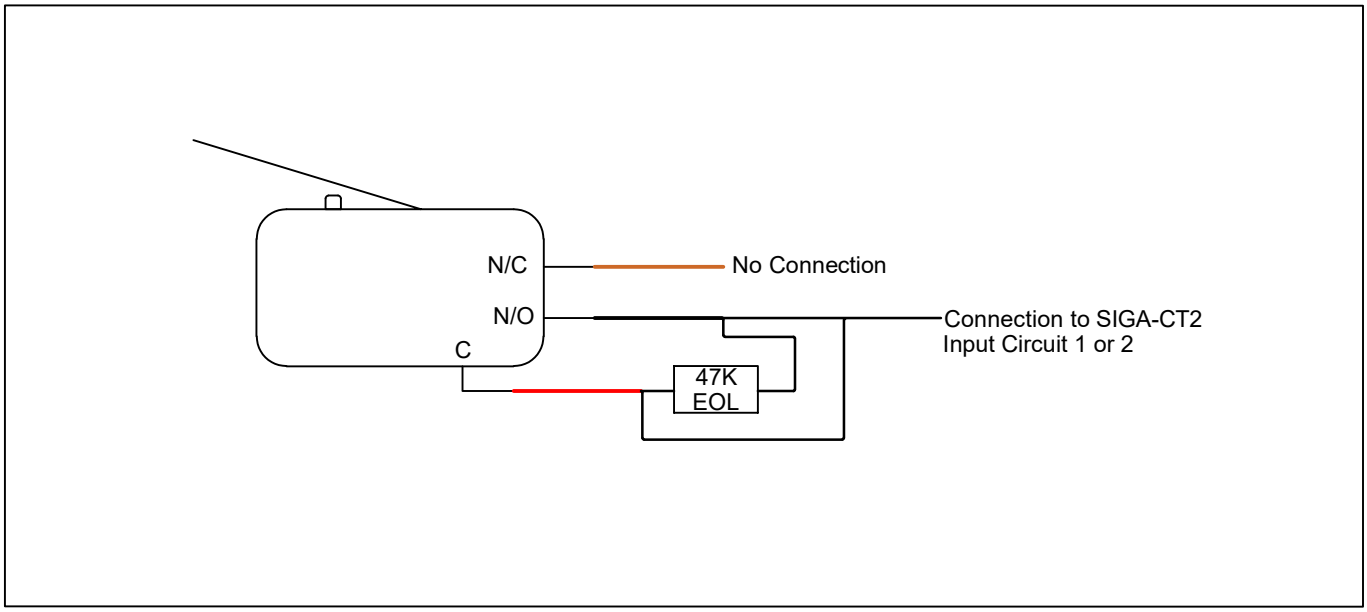
Scale: NTS		Approved By: BR
BR	Wiring Schematic	xx/xx/xx
By	Drawing Revision	Date

Project Name:
xxx
xxx
Regina SK S4

Drawing Title:
IST Detail Drawing #3 - HVAC Shutdown Connection to SIGA-CR Relay



Typical Addressable Monitor Module SIGA-CT2



Kitchen Hood Suppression System Micro Switch

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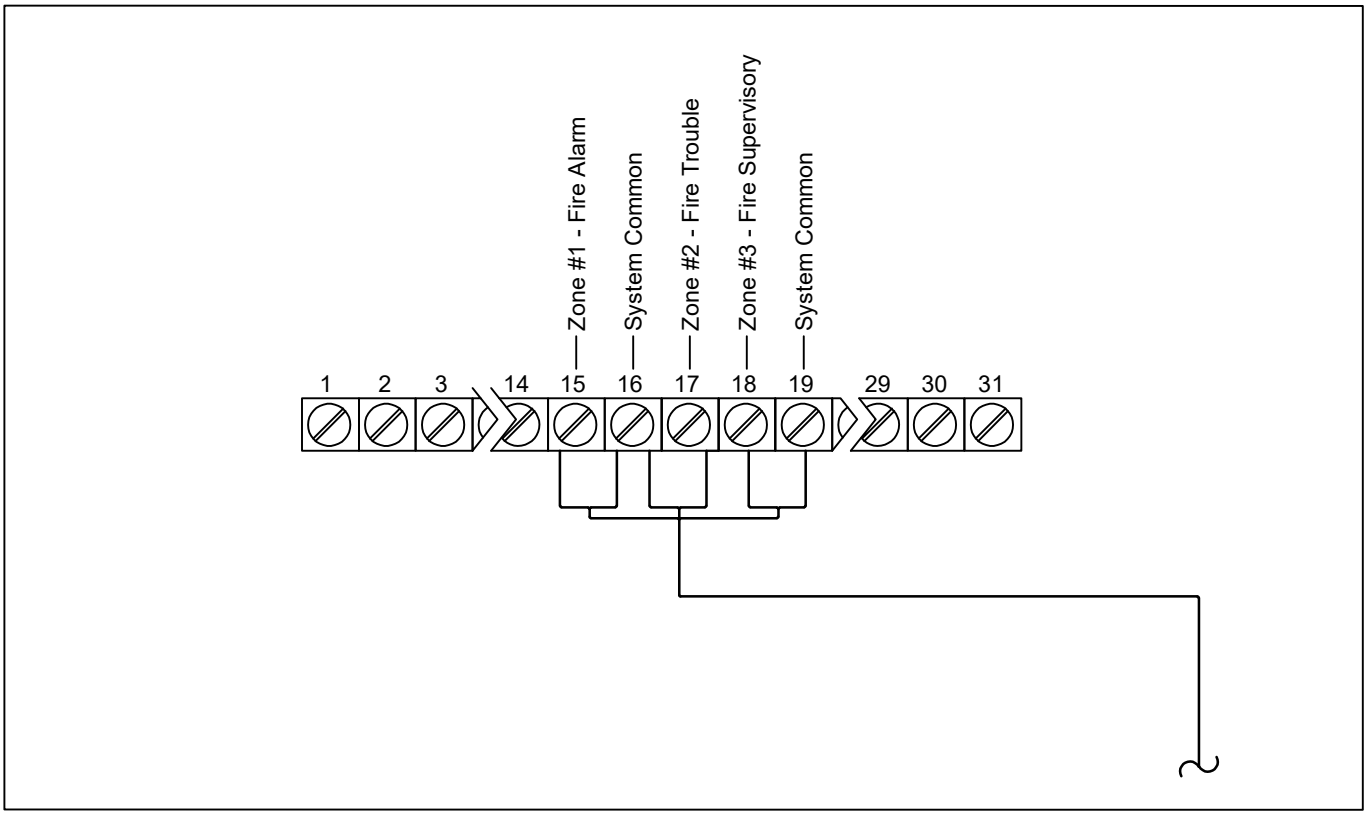
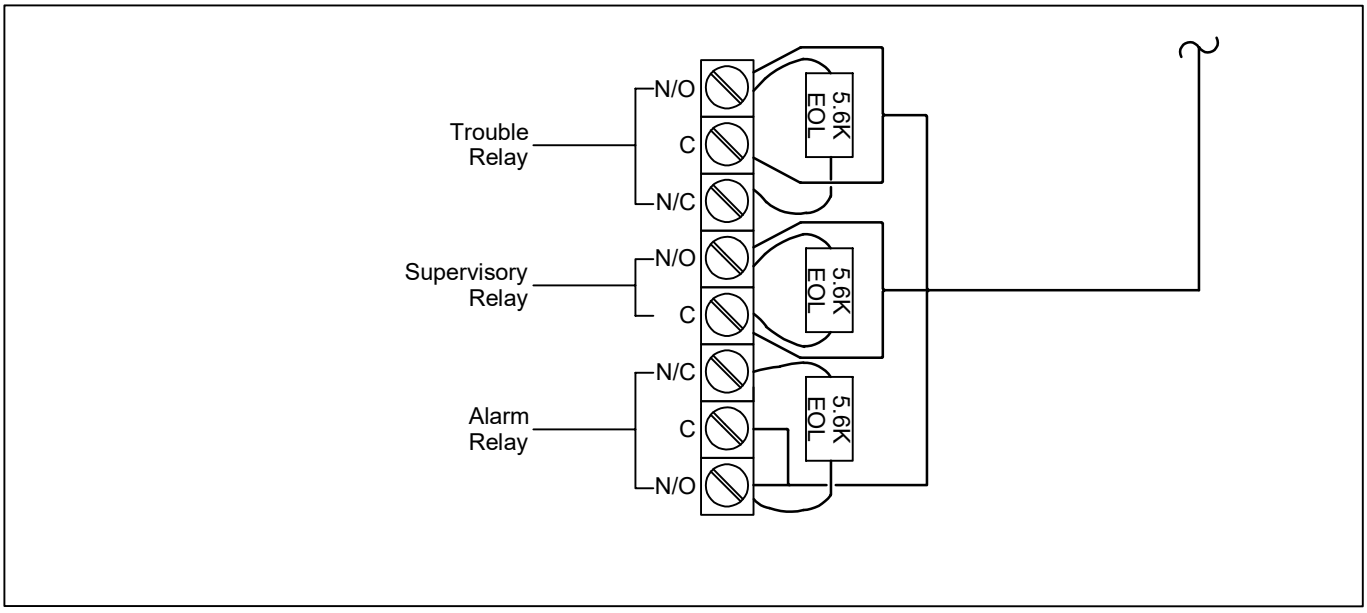
Scale: NTS		Approved By: BR	Project Name: xxx xxx Regina SK S4
			Drawing Title: IST Detail Drawing #4 - Kitchen Hood Connection to SIGA-CT2 Module
BR	Wiring Schematic	xx/xx/xx	
By	Drawing Revision	Date	



DSC HS2032 Fire Monitoring Control Panel - Zone Terminations



Edwards IO64 Fire Alarm Control Panel - TB3 Terminations

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BR	Wiring Schematic	xx/xx/xx
By	Drawing Revision	Date

Project Name:
xxx
xxx
Regina SK S4Y oC5

Drawing Title:
IST Detail Drawing #5 - FACP Connection to Fire Monitoring System

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By	Drawing Revision	Date

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