SIGA-REL Technical Reference Manual

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FCC compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

European Union directives

The European directive "Waste Electrical and Electronic Equipment" (WEEE) aims to minimize the impact of electrical and electronic equipment waste on the environment and human health. For proper treatment, recovery, and recycling, you can return the equipment marked with this symbol to your local supplier upon the purchase of equivalent new equipment, or dispose of it in designated collection points. Further information can be found on the following website: *www.recyclethis.info*.

European representative for manufacture: United Technologies Corporation, Kelvinstraat 7, 6003 DH Weert, Netherlands.

Versions

Information in this manual applies to the following versions of system development or configuration software.

EST2 Version 3.2
EST3 Version 3.6
QS-CU Version 1.8

Contact information

For contact information, see www.edwardsfiresafety.com.

Content

Important information

Limitation of liability

To the maximum extent permitted by applicable law, in no event will UTCFS be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of UTCFS shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether UTCFS has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTCFS assumes no responsibility for errors or omissions.

FCC compliance

This equipment can generate and radiate radio frequency energy. If the equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

WARNING: Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

Caution: Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

Note: Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

Related documents

EST2 documentation	*EST2 Installation and Service Manual* (P/N 270186)
	EST2 Network Supplement Manual (P/N 270894)
	EST2 System Operations Manual (P/N 270188)
	EST2 System Programming Manual (P/N 270187)
	EST2 Installation Sheets (P/N 3100056)
	2-SDU Online Help
EST3 documentation	*EST3 Installation and Service Manual* (P/N 270380)
	EST3 System Operations Manual (P/N 270382)
	EST3 Installation Sheets (P/N 3100051)
	EST3 International Supplement Manual (P/N 270925)
	3-SDU Help
QuickStart documentation	QS1 Technical Reference Manual (P/N 3100184)
	QS4 Technical Reference Manual (P/N 3100186)
	QuickStart Configuration Utility Online Help (P/N 7350047)
Signature Series documentation	Signature Series Intelligent Smoke and Heat Detectors Applications Bulletin (P/N 270145)
	Signature Series Component Installation Manual (P/N 270497)
	Serial Number Log Book (P/N 270267)
EST Publications: Speaker and strobe documentation	EST Speaker Application Guide (P/N 85000-0033)
	Handbook of Visual Notification Appliances for Fire Alarm Applications (P/N 85001-0541)

Installation codes and standards

The Signature Series fire detection devices are designed to meet the requirements of NFPA Standard 72, Underwriters Laboratories, Inc. Standard 864, and Underwriters Laboratories of Canada, Inc. Standard ULC S527. Other related codes and standards are listed below. Information contained in this document is intended to serve as a guide. Installation in accordance with the instruction sheets (provided with Signature Series devices), applicable codes, and the instructions of the AHJ is mandatory.

National Fire Protection Association (NFPA)	NFPA 11 *Low-Expansion Foam Systems* NFPA 12 *Carbon Dioxide Extinguishing Systems* NFPA 11A *Medium- and High-Expansion Foam Systems* NFPA 12A *Halon 1301 Fire Extinguishing Systems* NFPA 13 *Sprinkler Systems* NFPA 15 *Water Spray Fixed Systems for Fire Protection* NFPA 16 *Deluge Foam-Water Sprinkler and Foam-Water Spray Systems* NFPA 17 *Dry Chemical Extinguishing Systems* NFPA 70 *National Electric Code* NFPA 72 *National Fire Alarm Code* NFPA 2001 *Standard on Clean Agent Fire Extinguishing Systems*
Underwriters Laboratories, Inc. (UL)	QuickStart: UL 864 (9th Edition) *Control Units for Fire-Protective Signaling Systems* EST2: UL 864 (9th Edition) *Standard for Control Units for Fire Protective Signaling Systems* EST3: UL 864 (9th Edition) *Standard for Control Units and Accessories for Fire Alarm Systems*
Underwriters Laboratories, Canada (ULC)	ULC S527 *Standard for Control Units for Fire Alarm Systems*
Factory Mutual Research Corporation (FM)	1011-1012 *Deluge and Preaction Systems*
European standards	73/23/EEC *Low Voltage Directive* 89/336/EE *Electromagnetic Compatibility Directive* (as amended by 9/31/EEC) EN 50130-4; 1995 *Immunity requirements for Components of Fire, Intruder, and Social Alarm Systems* EN 55022:1995 *Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Components*
Other requirements	Other requirements that affect the installation of this system include: • State and local building codes • Instructions of the AHJ

Chapter 1
Product design

Summary

This chapter provides information for system designers. The SIGA-REL supports a variety of fire suppression applications. These applications include sprinkler systems and automatic fire extinguishing systems. The SIGA-REL works with manual and automatic inputs. This chapter explains how the SIGA-REL fits into a fire alarm system and how it behaves during fire alarms.

Content

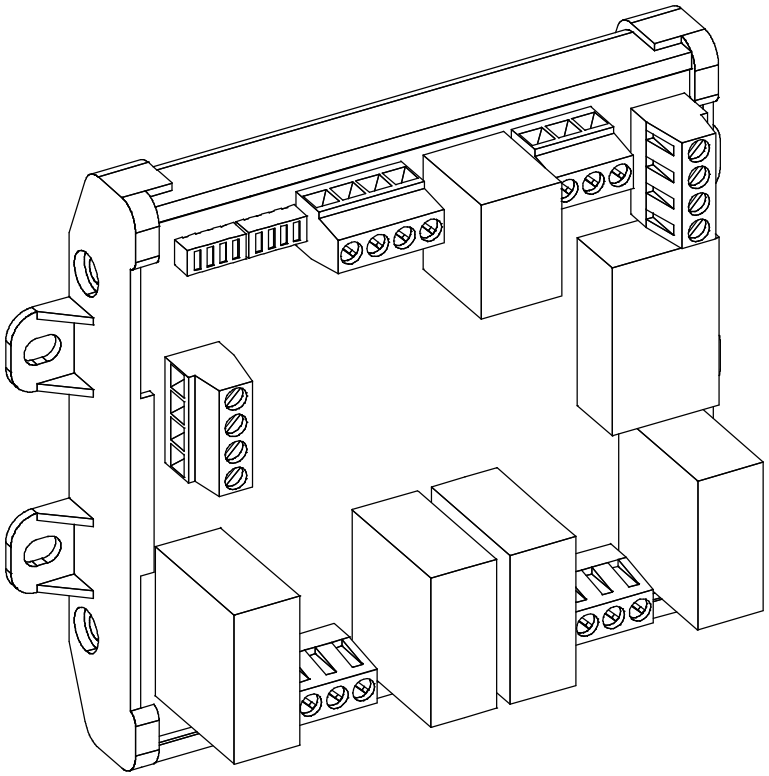
Introducing the SIGA-REL

Description

The SIGA-REL Releasing Module (Figure 1) is a Signature Series component consisting of:

- Two supervised release circuits
- Two supervised prerelease circuits
- One supervised manual release input circuit
- One zone relay output (Form C contact)
- One supervised abort circuit for a normally-open abort switch

Figure 1: SIGA-REL Releasing Module



The SIGA-REL controls operations for deluge, preaction, and automatic fire extinguishing systems. The release circuits control the release of gas and other fire suppression agents by controlling the release solenoids. The release circuits operate in unison and cannot be controlled separately.

Prerelease circuit 1 supports audible notification appliances that sound alert, prerelease, and release signals. Prerelease circuit 2 supports visual notification appliances.

Features

The SIGA-REL includes an intelligent microprocessor that supports:

- Deluge sprinkler operation
- Preaction sprinkler operation
- Automatic fire extinguishing operation
- Selectable abort modes

Fire suppression systems

Sprinkler systems

The SIGA-REL works with two types of sprinkler systems: deluge and preaction. The primary difference between these systems is the type of sprinkler head (or nozzle) that terminates the pipes. Table 1 outlines the Factory Mutual Research Corporation (FM) requirements for deluge and preaction systems. FM also requires FM Approved compatible release valves. See Table 4 in the topic “Compatible panels and devices.”

Table 1: FM requirements for deluge and preaction systems

Specification	Value
Standby operation	90 hours
Alarm operation	10 minutes
NFPA style	Class A (Style D or E) Class A (Style 2α, 5, 6, or 7)

Deluge sprinkler systems

In *deluge* sprinkler systems, open-valve sprinkler heads terminate pipes connected to a water supply controlled by a single valve. When the system detects a fire, it automatically opens the valve to allow the water to flow through all of the sprinkler heads. Deluge sprinklers are useful for applications that require the simultaneous discharge of water through every sprinkler.

The following fire detection systems meet FRMC requirements for deluge systems:

- Wet pilot sprinkler line
- Dry pilot sprinkler line
- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Preaction sprinkler systems

In *preaction* sprinkler systems, closed-valve sprinkler heads terminate pipes connected directly to a water supply. The water supply is usually in the same area as the sprinklers, and the pipes are supervised for air pressure. Preaction sprinklers are useful where it is important to prevent the accidental discharge of water.

The following fire detection systems meet FRMC requirements for preaction systems:

- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Automatic fire extinguishing systems

Automatic fire extinguishing systems automatically detect and extinguish fires. They require no manual input because detectors automatically activate releasing solenoids or sprinkler valves.

Improper application of fire suppression agents can lead to property damage, injury, or loss of life. Consult the applicable NFPA documents and the AHJ for more information.

Table 2 provides a list of the fire suppression agents and the applicable NFPA documents.

Table 2: Fire suppression agents and NFPA standards

Agent	NFPA standard
Low-expansion foam	NFPA 11
Medium- and high-expansion foam	NFPA 11A
Carbon dioxide	NFPA 12
Halon 1301	NFPA 12A
Sprinklers	NFPA 13
Water spray	NFPA 15
Foam-water	NFPA 16
Dry chemicals	NFPA 17
Clean agent	NFPA 2001

Table 3 outlines the FM requirements for automatic fire extinguishing systems.

Table 3: FM requirements for automatic fire extinguishing systems

Specification	Value
Standby operation	24 hours
Alarm operation	10 minutes
NFPA style	B or D
FM documentation	FMRC Approval Guide (Volume 1)

Compatible panels and devices

Panels

The SIGA-REL is compatible with EST2, EST3, and QuickStart fire alarm control panels.

SIGA-RELThe SIGA-REL must be installed in an enclosure dedicated to the releasing system. No other devices may be installed in the enclosure. You can install the SIGA-REL in any of the following enclosures:

- 2-WB series
- 3-RCC series
- 3-CAB series
- MFC-A
- RACCR series

Maintain a 1-inch (25.4 mm) minimum clearance all around the SIGA-REL. The clearance space must also comply with NFPA 70, the *National Electrical Code*.

Software

You will need the latest version of the system definition utility or configuration utility for your EST2, EST3, or QuickStart system. These are available from our website:

- For EST2: 2-SDU
- For EST3: 3-SDU
- For QuickStart: QS-CU

Power supplies

The SIGA-REL is compatible with the following power supplies:

- 2-PPS, 2-PPS/220
- 2-PPS/6A, 2-PPS/6A-220
- 3-BPS/M, 3BPS/M-230
- 3-PPS/M, 3-PPS/M-230
- BPS6A*, BPS6A/230*
- BPS10A*, BPS10A/230*

* Not compatible with FM sprinkler applications that require 90 hours of standby.

Note: The SIGA-REL is not compatible with the QuickStart power supply (PS6 Power Supply Card).

Notification appliances

The SIGA-REL prerelease circuits support audible and visible notification appliances. You must use appliances that are compatible with the fire alarm control panel. Refer to the control panel documentation for a list of compatible appliances.

Note that the SIGA-REL is not designed to generate an NFPA 72 standard alarm evacuation signal, and does not meet UL 864 requirements for an audible alarm notification circuit intended for evacuation.

Solenoid control relays

To activate the releasing solenoids, you must use RELA-EOL relays as solenoid control relays. These relays buffer the SIGA-REL from valve solenoid spikes. For more information, see the RELA-EOL installation sheet.

Manual release stations

For manual release stations, the SIGA-REL requires normally-open, dry contact signal initiating devices. The manual release station controls only the SIGA-REL to which it is connected.

Manual release stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies” on page 10.

The following manual release stations are approved by FM for use with the SIGA-REL:

- 276A-REL - Manual Release Station
- 278A-REL - Double Action Manual Release Station

When using NFPA 12A and NFPA 2001 suppression agents, a separate, mechanical manual release is required in addition to the release station connected to the SIGA-REL.

Abort stations

The SIGA-REL requires normally-open, momentary-action abort stations. The abort station controls only the SIGA-REL to which it is connected.

Abort stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies” on page 10.

The RELA-ABT - Manual Abort Station is approved by FM for use with the SIGA-REL.

Service disconnect stations

The SIGA-REL requires listed service disconnect stations that are normally closed (minimum 2.0 Amps).

Service disconnect stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies” on page 10.

The RELA-SRV-1 - Service Disconnect Switch is approved by FM for use with the SIGA-REL.

Releasing solenoid valves

Releasing solenoid valves must be listed with the appropriate agencies in your area. FM requires FM Approved release valve solenoids. Table 4 lists the FM Approved solenoid release valves that work with the SIGA-REL.

Table 4: FM Approved solenoid release valves

Group	Manufacturer	Model
A	Skinner	LV2LBX25
B	ASCO	T8210A107 R8210A107 8210A107
D	ASCO	8210G207 HV2648571 HV2648581
E	Skinner	73218BN4UNLVNOC111C2 73212BN4TN00N0C111C2
F	Skinner	73212BN4TNLVNOC322C2
G	Skinner	71395SN2ENJ1NOH111C2
H	Viking	HV-274-060-001

Table 5: UL/ULC Listed solenoid release valves

Manufacturer	Model/Part number
Ansul	73327 570537
ASCO	T8210A107 R8210A107 8210A107 8210G207
Fenwal	82-486500-01
Fike	02-13571 02-13279
Parker	V5L72750
SEVO Systems	PA-0036-3
Skinner	LV2LBX25 73218BN4UNLVNOC111C2 73212BN4TNLVNOC322C2 71395SN2ENJ1NOH111C2
Viking	11596

Listing agencies

Listing agencies whose codes and standards may apply in your area include:

- Factory Mutual Research Corporation (FM)
- Underwriters Laboratories, Inc. (UL)
- Underwriters Laboratories Canada (ULC)

Specifications

Table 6: SIGA-REL specifications

Power riser	
Input voltage	18.4 to 27.4 VDC
Supervisory current	25 mA, max.
Alarm current	190 mA min., 4 A max. (depends on output circuit loading)
Line resistance	See Table 7
UL rating	Must be power-limited
Release circuits, TB4	
Release circuit 1 (TB4-1, -2)	2 A at 24 VDC max. [1]
Release circuit 2 (TB4-3, -4)	2 A at 24 VDC, max. [1]
Valves per circuit	4 valves, max.
Line resistance	See Table 8
End of line device	47 kΩ resistor
Supervision	Open, short, and ground
UL rating	Special application, supervised and power-limited
Ground fault impedance	0.0 Ω
Prerelease circuits, TB5	
Prerelease circuit 1 (TB5-1, -2)	2 A at 24 VDC, max. [1]
Prerelease circuit 2 (TB5-3, -4)	2 A at 24 VDC, max. [1]
Line resistance	See Table 8
End of line device	47 kΩ resistor
Supervision	Open, short, and ground
UL rating	Special application, supervised and power-limited
Ground fault impedance	0.0 Ω
Manual release input circuit, TB3-1 and TB3-2	
Line resistance	25 Ω/wire, 18 AWG = 3,800 ft (0.75 sq mm = 1,158 m)
End of line device	47 kΩ resistor
Circuit capacitance	0.1 μF, max.
Supervision	Open and ground
Ground fault impedance	0.0 Ω

Abort circuit, TB3-3 and TB3-4	
Line resistance	25 Ω/wire, 18 AWG = 3,800 ft (0.75 sq mm = 1,158 m)
End of line device	47 kΩ resistor
Circuit capacitance	0.1 μF, max.
Supervision	Open and ground
Ground fault impedance	0.0 Ω
Zone relay output, TB2	
UL rating	Zone
Type	Form C
Contact rating:	3 A at 24 VDC, (resistive load)
Supervision	Not supervised
Signature data line, TB1	
Operating voltage	15.2 to 19.95 VDC
Supervisory current	1 mA
Alarm current	1 mA
Line resistance	See the installation sheet for the Signature loop controller
Maximum quantity	10 SIGA-REL modules per loop
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

[1] Riser current: The total current of the prerelease and release circuits is limited to 3.83 A. This is the power riser maximum input current of 4 A, minus 170 mA.

Table 7: Power riser

Total riser current (A)	Distance from SIGA-REL to power supply				Wire resistance [1]
	12 AWG	2.5 sq mm	14 AWG	1.5 sq mm	
4.0	29 ft	8.84 m	20 ft	6.10 m	0.050
3.5	34 ft	10.36 m	23 ft	7.01 m	0.057
3.0	39 ft	11.89 m	27 ft	8.23 m	0.067
2.5	47 ft	14.33 m	32 ft	9.75 m	0.080
2.0	59 ft	17.98 m	40 ft	12.19 m	0.100
1.5	78 ft	23.77 m	53 ft	16.15 m	0.133
1.0	118 ft	35.97 m	80 ft	24.38 m	0.200

[1] Wire resistance measured in Ω per wire

Table 8: Prerelease and release circuits (per circuit)

Total riser current (A)	Distance from SIGA-REL to signals				Wire resistance [1]
	12 AWG	2.5 sq mm	14 AWG	1.5 sq mm	
2.00	176 ft	53.64 m	120 ft	36.58 m	0.300
1.75	202 ft	61.57 m	137 ft	41.76 m	0.343
1.50	235 ft	71.63 m	160 ft	48.77 m	0.400

Total riser current (A)	Distance from SIGA-REL to signals				Wire resistance [1]
	12 AWG	2.5 sq mm	14 AWG	1.5 sq mm	
1.25	282 ft	85.95 m	192 ft	58.52 m	0.480
1.00	353 ft	107.59 m	240 ft	73.15 m	0.600
0.50	706 ft	215.19 m	480 ft	146.30 m	1.200

[1] Wire resistance measured in Ω per wire

Table 9: Compliance requirements

Item	Requirement
Power riser	When two or more SIGA-REL modules are powered from a single riser, those SIGA-REL modules must be in the same notification zone.
NAC synchronization	UL 864 requires synchronization of notification appliances when they are in the same notification zone. This means that when more than one SIGA-REL is installed, the audible and visible notification appliances controlled by each SIGA-REL must operate in separate notification zones. The notification appliance output from two SIGA-REL modules cannot be audible or visible within the same notification zone.
Evacuation tone	The SIGA-REL is not designed to generate an NFPA 72 standard alarm evacuation signal, and does not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. Notification zones must include additional NACs and appliances capable of producing the required evacuation tone to meet these requirements.
Horns	Horn signaling patterns are controlled by the SIGA-REL, so configurable horns must be set for steady output.
Manual release station	The manual release station controls only the SIGA-REL to which it is connected. When using NFPA 12A and NFPA 2001 suppression agents, a separate, mechanical manual release is required in addition to the release station connected to the SIGA-REL.
Abort station	The abort station controls only the SIGA-REL to which it is connected. However, activation of the abort switch must be annunciated at all panels in a network. UL 864 allows only one abort station per suppression area. This means you cannot install more than one SIGA-REL per suppression area.
Zone relay output	Zone relay output contacts cannot be used for a notification appliance circuit or a nonaddressable signaling line circuit.
Service disconnect station	Activation of the service disconnect must be annunciated as a supervisory event at all panels in a network.

Application block diagrams

System overview

The SIGA-REL is a Signature Series module that interfaces a Signature loop controller with fire suppression components. The SIGA-REL module works with sprinkler systems and automatic extinguishing systems. Sprinklers include preaction and deluge systems. Automatic fire extinguishing systems include the fire suppression agents listed in Table 2.

The SIGA-REL includes two releasing circuits. These control RELA-EOL relays, which in turn control the releasing solenoids. The releasing circuits act in unison and cannot be controlled separately.

Prerelease circuit 1 supports audible notification appliances in order to sound alert, prerelease, and release signals. The alert tone sounds at 15 pulses per minute; the prerelease tone at 60 pulses per minute. The release tone is a steady tone. Prerelease circuit 2 supports visual notification appliances.

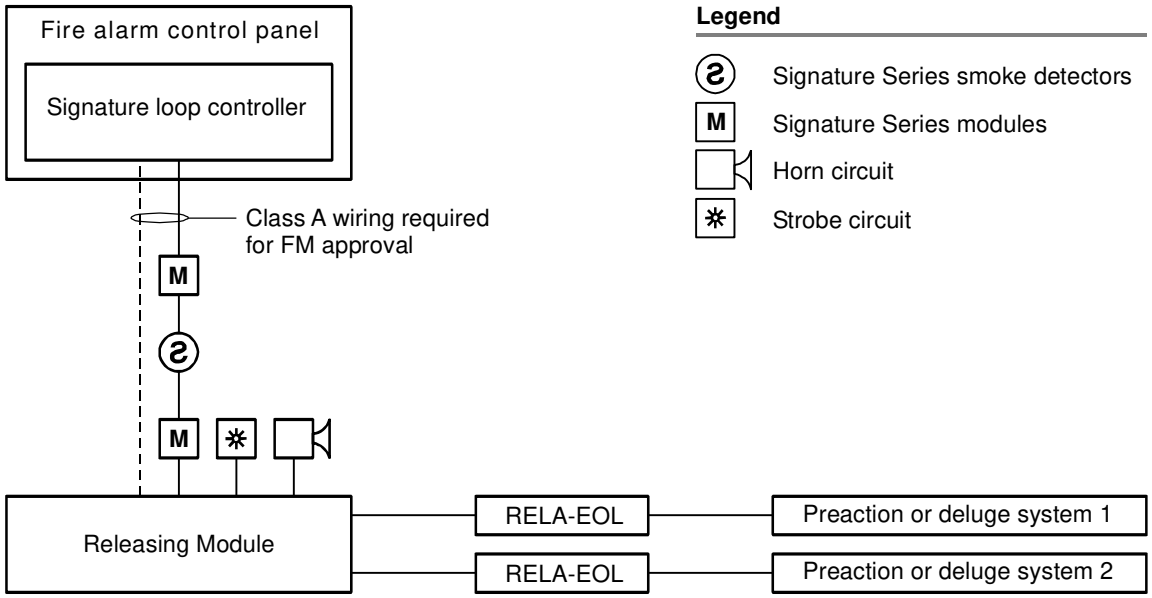
Note: These signals do not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. This application requires additional NACs and audible devices capable of generating the required NFPA 72 standard alarm evacuation signal pattern.

See Chapter 2 “Installation” on page 19 for details about SIGA-REL wiring, specifications, mounting, and abort mode settings. For wiring resistance calculations, see the topic “Specifications,” earlier in this chapter.

Preaction or deluge sprinkler systems

Figure 2 illustrates the integration of the SIGA-REL with the fire alarm control panel and a preaction or deluge sprinkler system. Sprinkler systems do not include service disconnect stations, abort stations, or manual release stations.

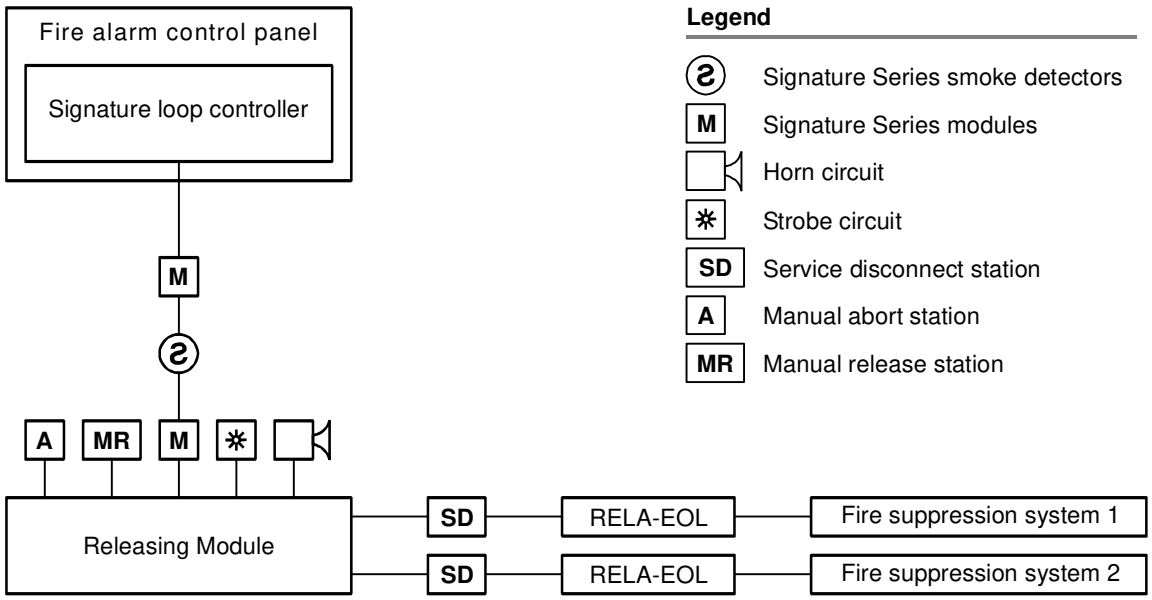
Figure 2: Integration of the SIGA-REL with a deluge or preaction sprinkler system



Automatic fire extinguishing systems

The SIGA-REL also supports automatic extinguishing systems, which provide manual actuation of abort, release, and service-disconnect functions. Figure 3 illustrates the integration of the SIGA-REL with a fire alarm control panel in an automatic fire extinguishing system.

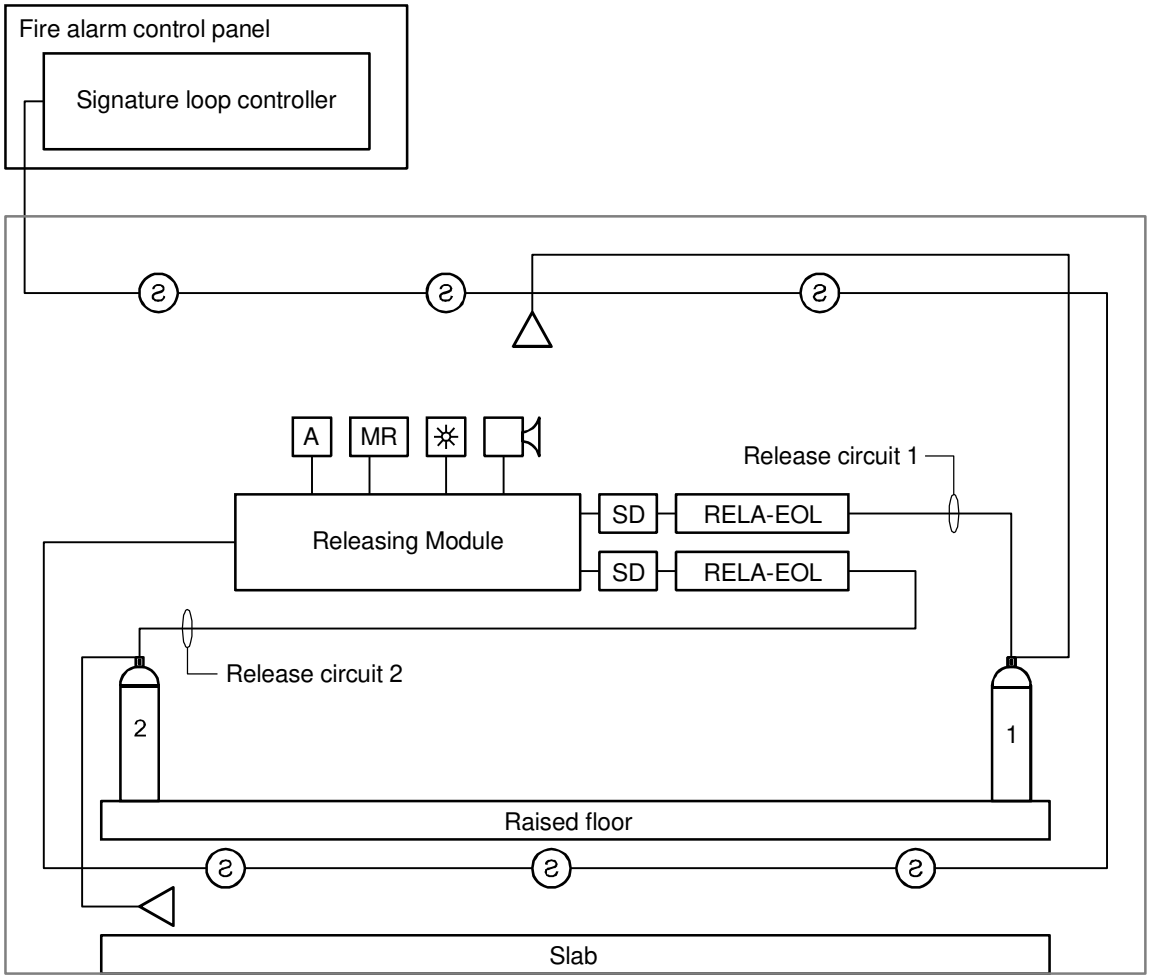
Figure 3: Integration of the SIGA-REL with an automatic extinguishing system



Fire suppression application

The SIGA-REL includes two releasing circuits, which can provide fire suppression in two separate areas. The releasing circuits operate in unison and cannot be controlled separately. The computer room illustrated in Figure 4 is a typical application for the Releasing Module.

Figure 4: Typical computer room application



Legend

- Signature Series smoke detectors
- Horn circuit
- Wall-mounted agent release nozzle
- Ceiling-mounted agent release nozzle
- MR — Manual release station
- SD — Service disconnect station
- A — Manual abort station
- Strobe circuit
- Extinguishing agent storage cylinder

Release sequences

Automatic release sequence

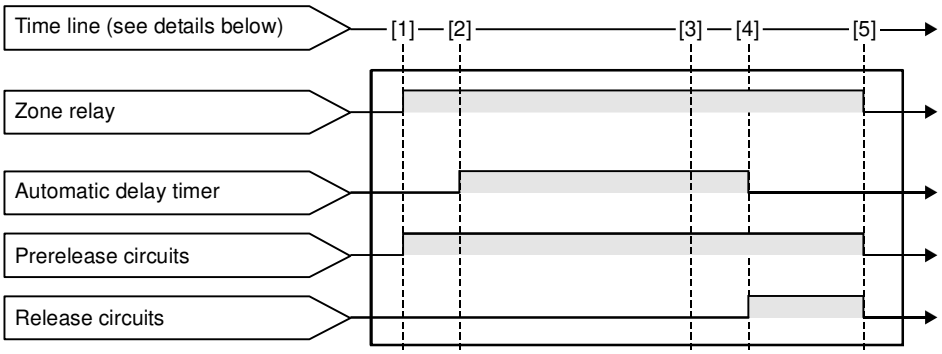
The automatic release sequence requires an AND group or a matrix group. AND groups and matrix groups require fire alarm signals from designated Signature Series devices.

These logic groups are programmed using a PC and the System Definition Utility (SDU) or Configuration Utility (CU) for your system. Figure 5 explains the automatic release sequence.

Note: EST2 systems do not support matrix groups. See Chapter 3 “Programming” on page 33 for details on AND group rules. To create AND groups, see the *EST2 System Programming Manual* and the *2-SDU Online Help.*

The SIGA-REL horn circuit is not designed to generate an NFPA 72 standard alarm evacuation signal, and does not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. Notification zones must include additional NACs and appliances capable of producing the required evacuation tone to meet these requirements.

Figure 5: Automatic release sequence



[1] A detector signals the first alarm. This event simultaneously activates the:

- Zone relay
- Strobe circuit (on steady)
- Horn circuit alert tone (15 pulses per minute)

[2] A detector in the protected area signals a second alarm and meets the AND group conditions.* After a ten-second delay, the automatic delay timer starts its countdown and the horn circuit changes to the prerelease tone (60 pulses per minute).

*AND group and matrix group conditions depend on programming.

[3] Ten seconds before the automatic delay timer expires, the horn circuit changes to the release tone (steady).

[4] The automatic delay timer expires and the release circuits activate.

[5] A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

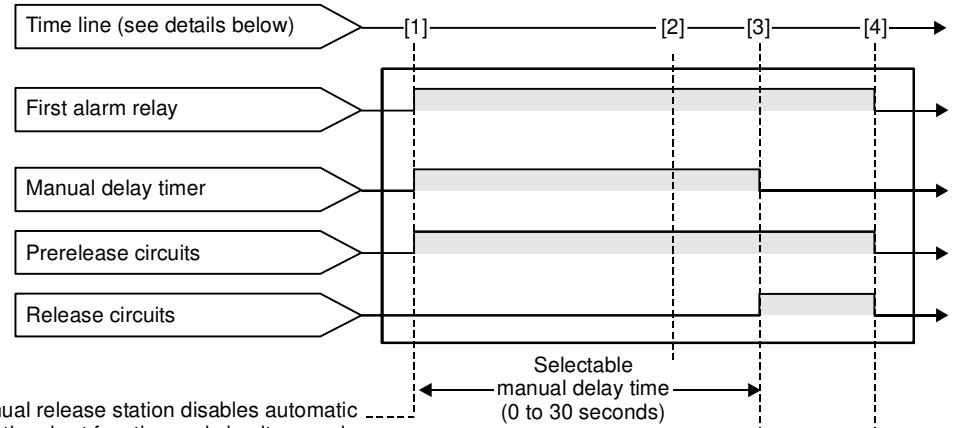
Manual release sequence

WARNING: You cannot abort the manual release sequence.

The operation of a manual release station initiates the manual release sequence. Figure 6 explains the manual release sequence.

A manual release overrides all other operations and sequences, including all modes of the abort function.

Figure 6: Manual release sequence



[1] An active manual release station disables automatic operation and the abort function and simultaneously activates the:

- Manual delay timer
- Strobe circuit (on steady)
- Horn circuit prerelease tone (60 pulses per minute)

[2] Ten seconds before the expiration of the manual delay timer, the horn changes to the release tone (steady).

[3] The manual delay timer expires and the release circuits activate.

[4] A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

Chapter 2
Installation

Summary

This chapter shows you how to mount and wire the SIGA-REL. When you install the SIGA-REL, be sure to follow agency and local requirements along with the instructions in this manual.

Content

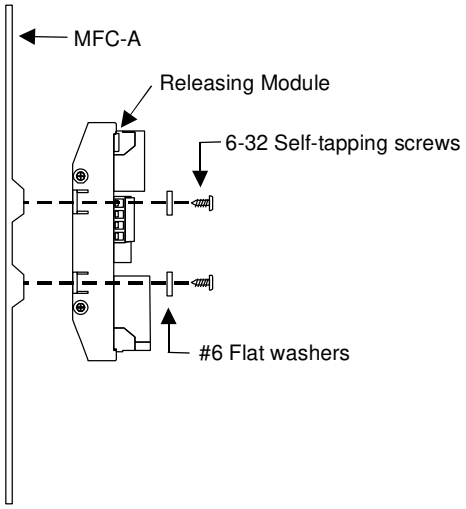
Mounting the SIGA-REL

The SIGA-REL and the MFC-A require separation between power-limited and nonpower-limited wiring. See the MFC-A installation sheet for details about power-limited wiring in that enclosure. See the topic “Wiring the ” later in this chapter for details about power-limited wiring on the SIGA-REL.

To mount the SIGA-REL in an MFC-A cabinet:

1. Align the SIGA-REL to the designated mounting holes in the MFC-A (Figure 7 and Figure 8).
2. Secure the SIGA-REL to the MFC-A using the screws and washers provided.
3. Run the wiring from the SIGA-REL to the fire suppression components through the conduit knockouts in the MFC-A.

Figure 7: Mounting the SIGA-REL



To mount the SIGA-REL in other enclosures:

1. Use the SIGA-REL to mark the mounting hole locations (Figure 9).
2. Drill the mounting holes at the marks made in step 1 (mounting hole diameter = 0.125 in or 3.175 mm).
3. Mount the SIGA-REL in the cabinet using the screws and washers provided.

Figure 8: MFC-A/SIGA-REL footprint

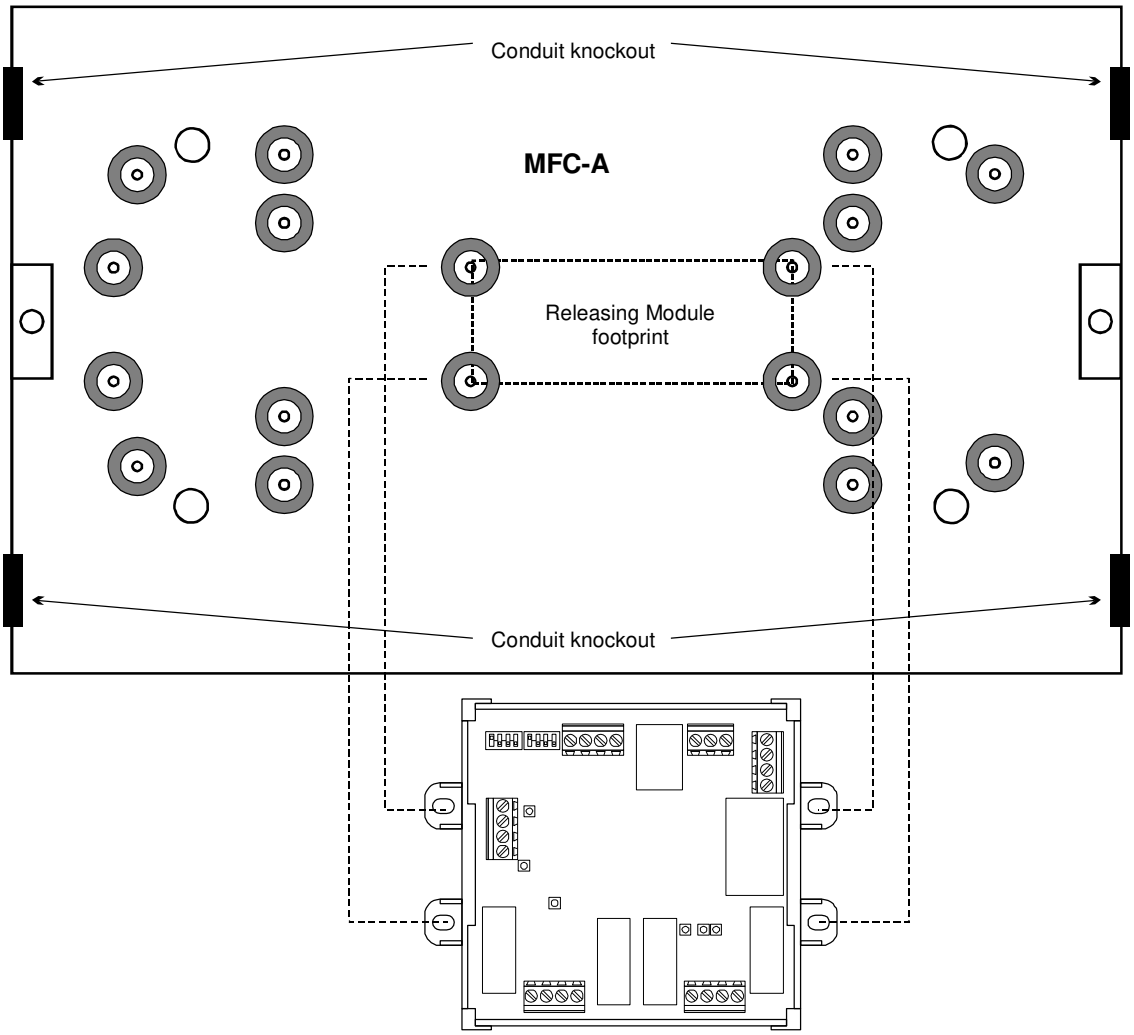
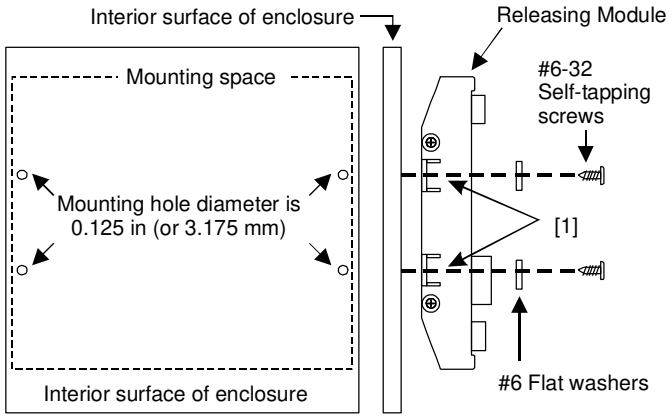


Figure 9: SIGA-REL mounting holes in compatible cabinets



Notes

[1] Mark the mounting hole locations here

2. See compatible enclosure installation sheets for the routing of power-limited and nonpower-limited wiring

Setting abort mode and delay times

Choosing the abort mode

Table 10 provides descriptions for the SIGA-REL abort modes.

Note: Abort modes 3 and 4 do not comply with UL or ULC.

Table 10: Abort mode descriptions

Mode	Description
1 (Factory default)	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer continues to run while the abort is active. When the abort is restored, the release occurs with the expiration of the automatic delay timer or the abort delay timer, whichever occurs last.
2	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer stops running. When the abort is restored, the automatic delay timer resumes and the release occurs with the expiration of the timer.
3 (Industrial Risk Insurers)	To be recognized as valid, the abort must be active when the second alarm is received. When the abort is restored, the release occurs with the expiration of the abort delay timer (set for 10 seconds). If the valid abort is held for more than 10 seconds, the automatic delay timer is inactive. If the valid abort is held for less than 10 seconds, the automatic delay timer operates as programmed.
4 (International)	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer stops running. When the abort is restored, the automatic delay timer resets and commences time from t = 0. The release occurs with the expiration of the timer setting minus 10 seconds.

Setting the DIP switches

Figure 10 shows the default DIP switch settings of the SIGA-REL. DIP switch settings for the SIGA-REL abort modes and delay time settings are shown in Table 11 through Table 14.

Note: If you change the DIP switch settings after completing your installation, programming, and testing, you'll need to reset the fire alarm control panel for the new settings to take effect.

Figure 10: SIGA-REL DIP switches

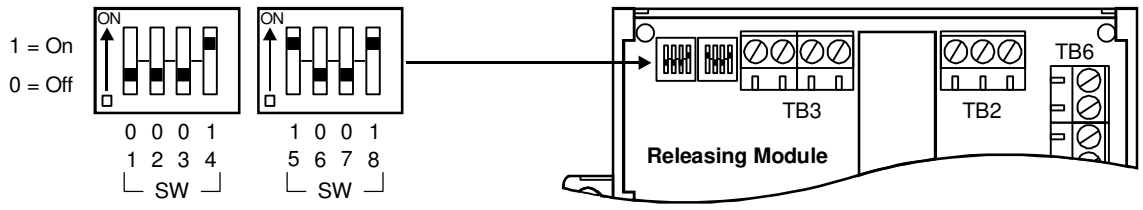


Table 11: Abort mode settings

Abort mode	SW1	SW2
1 (Default)	0	0
2	0	1
3 (IRI)	1	0
4 (International)	1	1

Table 12: Manual delay time settings

Time delay	SW3	SW4
No delay	0	0
10 seconds (Default)	0	1
20 seconds	1	0
30 seconds	1	1

Table 13: Automatic delay time settings

Time delay	SW5	SW6	SW7
10 seconds	0	0	0
20 seconds	0	0	1
30 seconds	0	1	0
40 seconds	0	1	1
50 seconds (Default)	1	0	0

Table 14: Abort delay time settings

Time delay	SW8
No delay	0
10 seconds (Default)	1

Reading the LEDs

Figure 11 shows the location of the LEDs on the SIGA-REL. These are labeled DS1 through DS7.

Figure 11: SIGA-REL LEDs

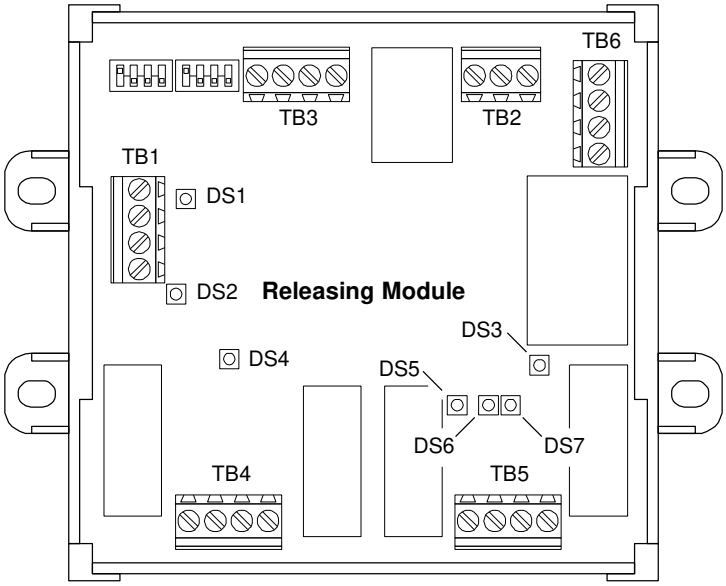


Table 15: SIGA-REL LEDs

LED	Color	Pattern	Function
DS1	Red	Flashing	Data (alarm conditions)
DS2	Green	Flashing	Data (normal conditions)
DS3	Red	Steady	Alarm
DS4	Green	Steady	Power
DS5	Yellow	Steady	Abort
DS6	Yellow	Steady	Trouble
DS7	Red	Steady	Release active

Wiring the SIGA-REL

Caution: Do not connect the releasing solenoids before the system has been programmed and tested, and the Signature loop controller and SIGA-REL have reached their normal state. See Chapter 3 “Programming” and Chapter 4, “Testing and troubleshooting” for details. Failure to follow these instructions can result in unexpected release of the fire suppression agent.

Observe static-sensitive material handling practices while installing or servicing the SIGA-REL. Electrostatic discharge may damage the equipment and activate the release circuits.

Ensure that you are using a compatible power supply, as listed in the topic “Compatible panels and devices” on page 6.

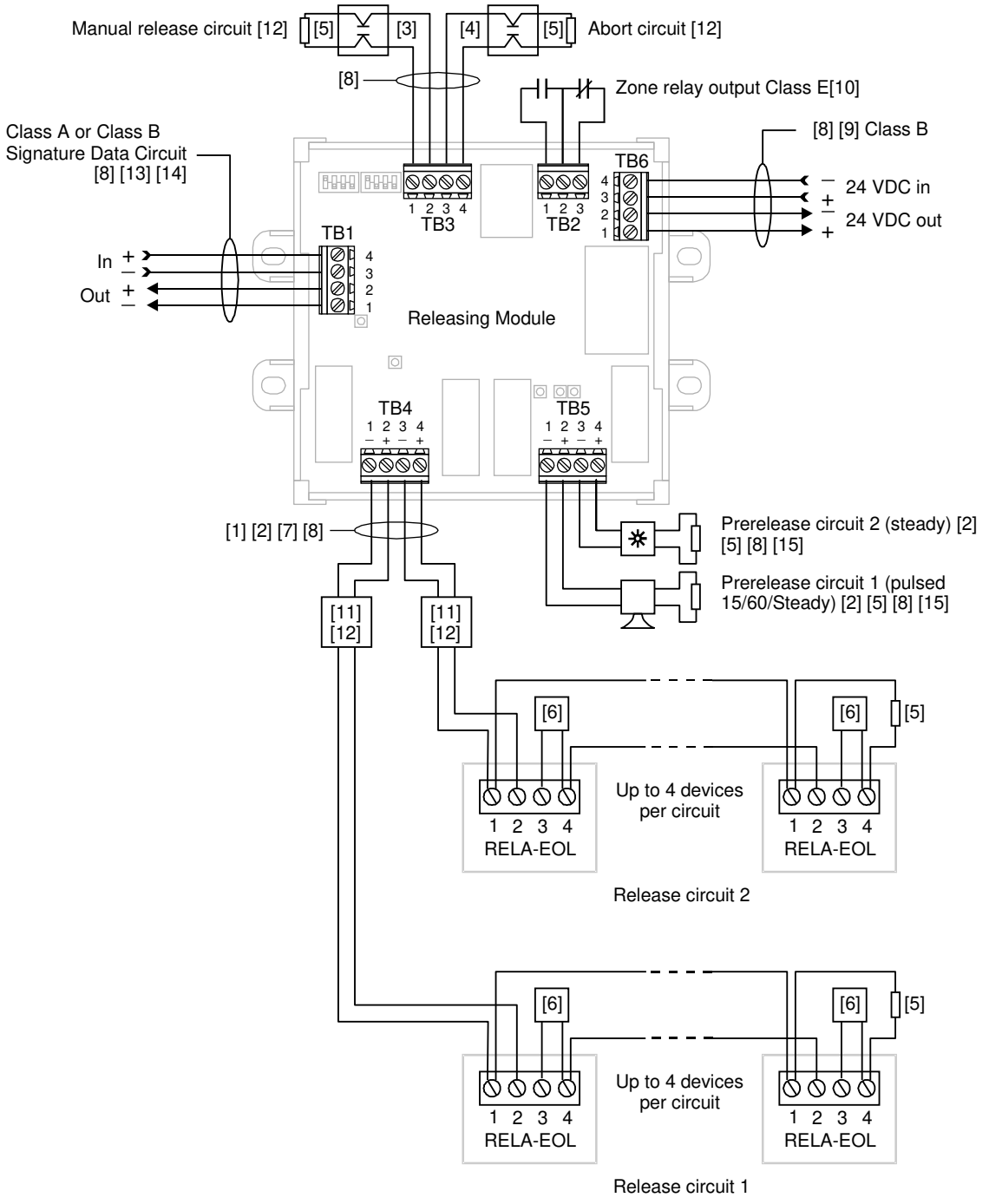
Wire the SIGA-REL according to Figure 13.

If your application requires supervision of the service disconnect station, install and wire components according to Figure 13.

EST2 and EST3 systems have a relay confirmation function that you can program to indicate activation of the prerelease and release relays at the panel. QuickStart systems do not offer relay confirmation, so additional components are required to indicate activation of the prerelease and release relays. See Figure 14 for component and wiring details.

Note: When you use monitor or supervisory event messages to indicate activation of the service disconnect station, prerelease relay, or release relay, you *must* route those messages to the panel.

Figure 12: SIGA-REL wiring



Wiring diagram notes

[1] Four RELA-EOLs per circuit, max.

[2] Class B, 24 VDC output.

[3] Class B, normally-open manual release station.

[4] Class B, normally-open abort station.

[5] Listed 47 kΩ EOL resistor.

[6] Listed 24 VDC nonpolarized valve. The releasing solenoid valve wiring is not supervised. Run the connection to the valve in conduit within 20 feet of the RELA-EOL relay.

[7] Polarity of circuit shown in supervisory state. On alarm, polarity reverses.

[8] Supervised and power-limited.

[9] See “Power supplies” on page 7 for a list of compatible power supplies.

[10] Zone relay output. Power-limited when connected to a power-limited source. If nonpower-limited, maintain 1/4 inch (6.4 mm) separation. Otherwise, use FPL, FPLR, or FPLP in accordance with the National Electric Code (NEC).

[11] Listed service disconnect station. Must be rated for regulated applications and 2A at 24 VDC. See Figure 13 on page 28 for details on supervision of the service disconnect station.

[12] Not used in preaction or deluge sprinkler systems.

[13] Ten Releasing Modules per loop, max.

[14] Class A required for FM-listed deluge or preaction systems.

[15] Compatible notification appliances as specified in the panel documentation. Configurable horns must be set for steady operation.

16. Installations that include other wiring require FPL, FPLR, FPLP, or equivalent NEC-approved wiring for all power-limited wiring.

Figure 13: Supervision of the service disconnect switch

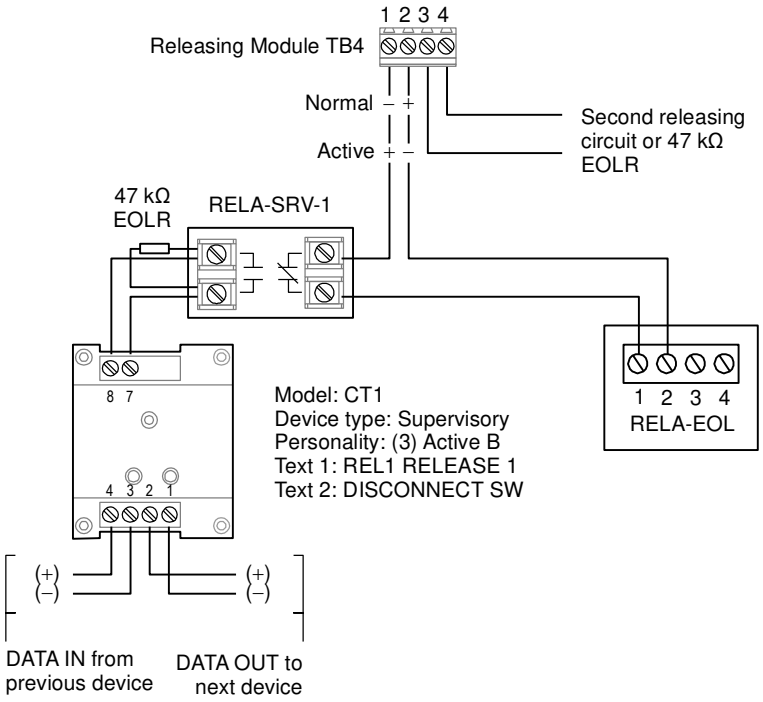
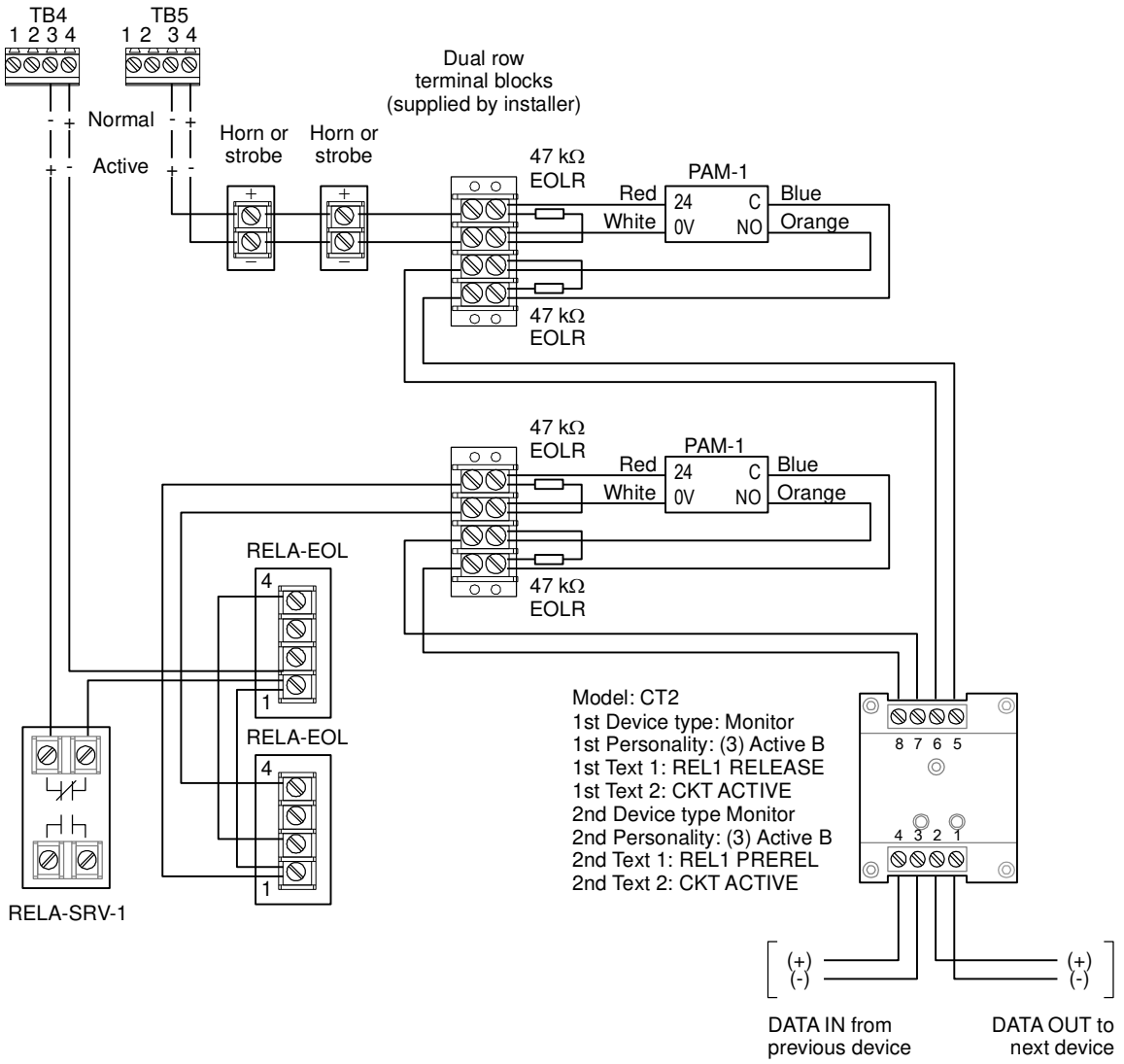


Figure 14: QuickStart annunciation of the prerelease and release relays



Warning notice placards

To ensure safety with the SIGA-REL:

- Copy Figure 15. Cut out the photocopied placard along the perforated line, and post it next to the SIGA-REL.
- Copy Figure 16. Cut out the photocopied placard along the perforated line, and post it next to the fire alarm control panel.
- Inform all appropriate personnel about the posted warnings, their locations, and their importance.
- Enforce compliance with these warnings during all installation, testing, and service procedures.

Figure 15: SIGA-REL warning notice

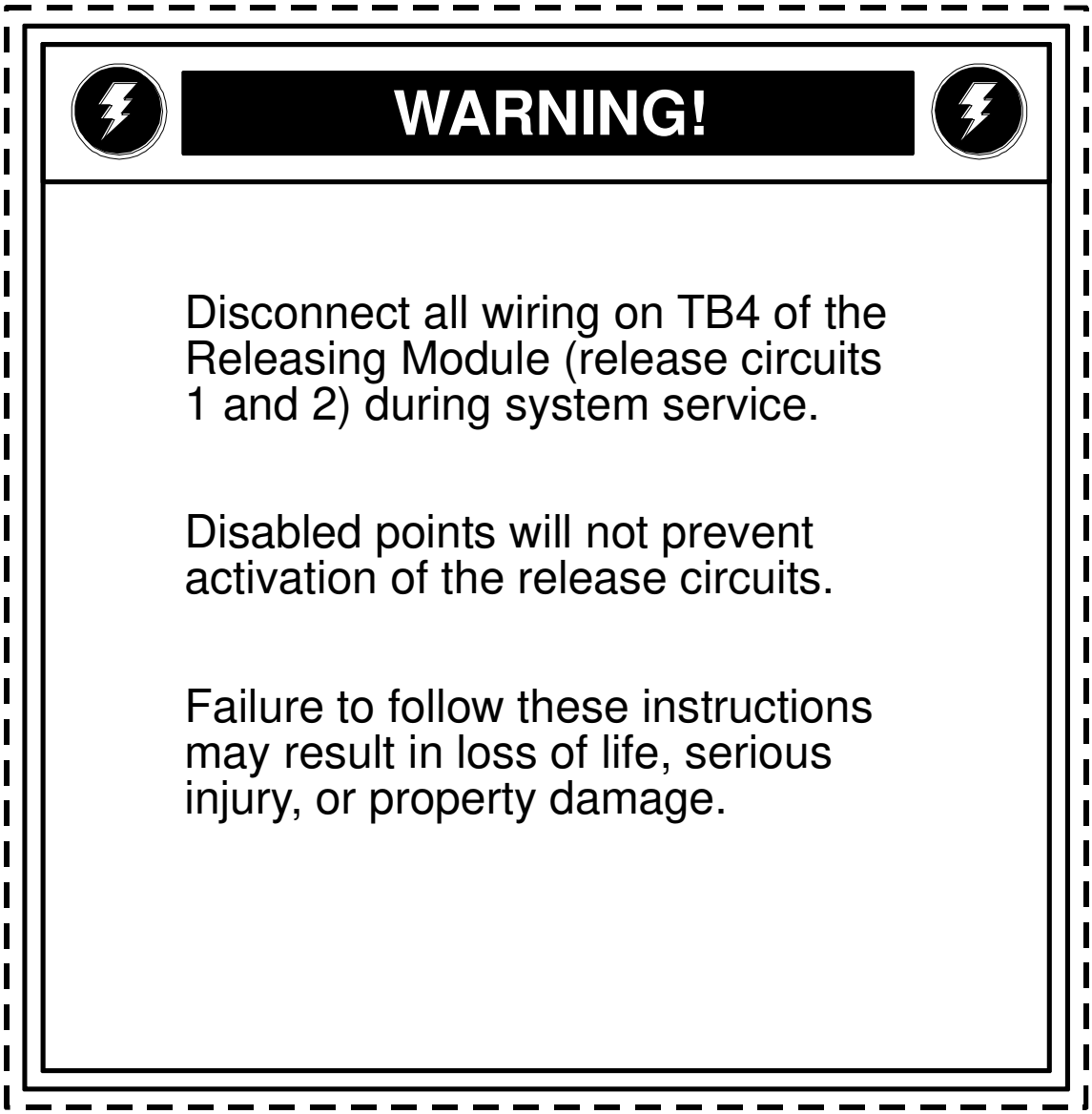
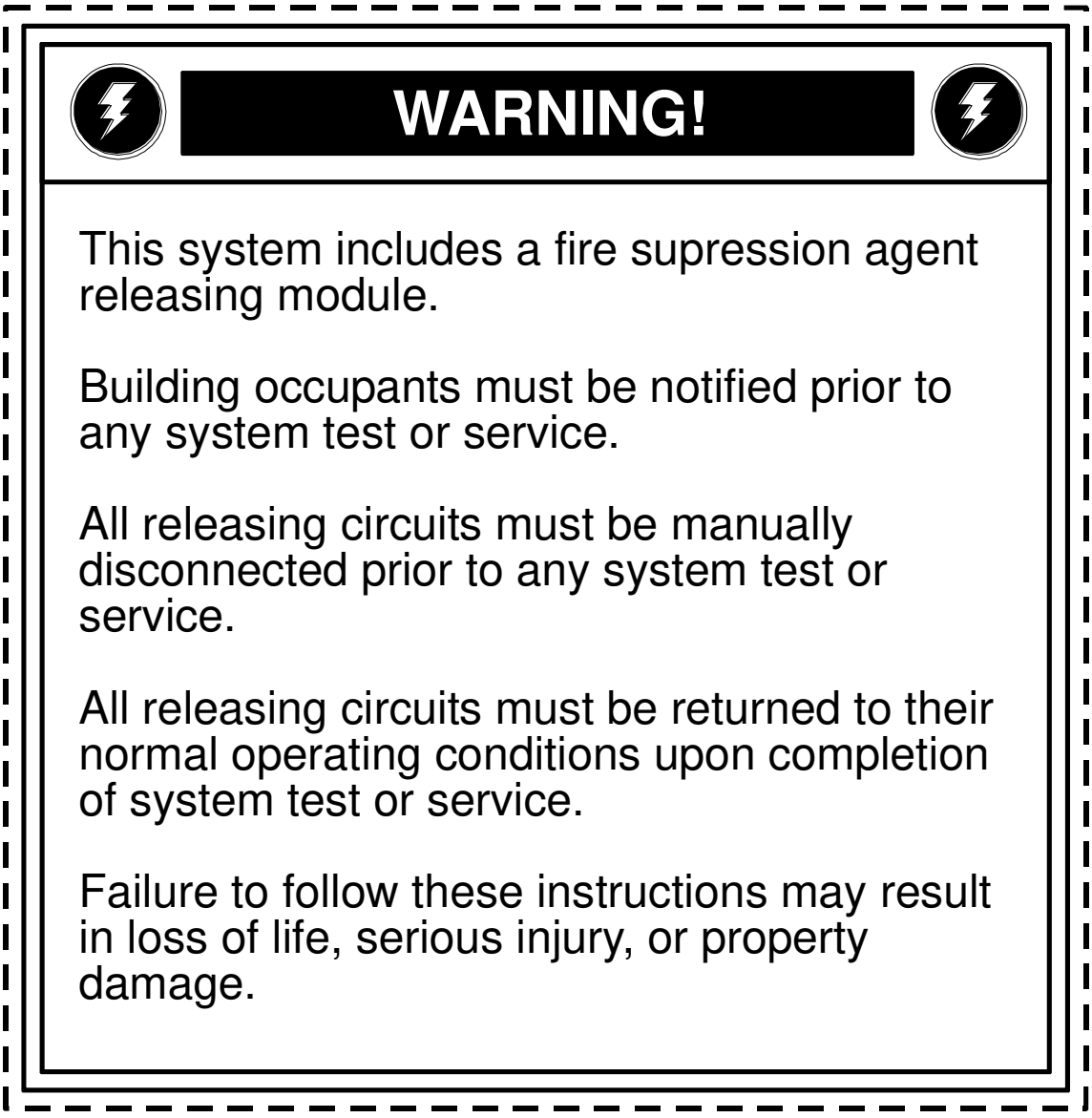


Figure 16: Panel warning notice



Chapter 3
Programming

Summary

This chapter contains configuration and programming instructions for system programmers. Read the configuration and programming topics that apply to your fire alarm system.

SIGA-REL programming is almost identical for all systems. The greatest differences exist in the rules required and the configuration of AND groups. The SIGA-REL programming steps require strict adherence. Follow each instruction carefully.

Content

Programming the SIGA-REL in the 2-SDU

Adding the SIGA-REL to the database

WARNING: This information was prepared for users who are proficient in every aspect of 2-SDU programming. Do not attempt to program the SIGA-REL if your certification is not current. Incorrect programming may result in loss of life, serious injury, or property damage.

The SIGA-REL is a single module with six serial numbers. Addresses will differ for each installation, but they must be consecutive.

Note: If you are adding other Signature Series devices to the project database, add the SIGA-REL last. Adding devices after the SIGA-REL may disrupt the addressing scheme.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the project database, you must add three SIGA-REL modules. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Note: You cannot have more than 10 SIGA-REL modules on one Signature loop.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

Caution: Do not use the Accept Actual function in the Signature Mapping tool. Accepted data may corrupt the database by causing it to see every device as two devices.

To add the SIGA-REL to the database:

1. Use the SDC Configuration dialog box to add three SIGA-REL modules:

   Device type = Monitor
   Model = SIGA-REL
   Personality code = 3
   Quantity = 3

2. Scan or enter the SIGA-REL serial number label in the first address slot.
3. Complete each SIGA-REL address as shown in Table 16. You don’t need to enter serial numbers for all addresses. This happens in a later step.
4. Use the Object Configuration dialog box to assign labels and messages to each SIGA-REL address, as shown in Table 17.

5. Connect to the panel and use the Communication Functions dialog box to upload the Signature loop.
6. In the Signature Series mapping tool, open the Actual vs. Expected Data dialog box (F9 key).
7. For the first two SIGA-REL devices, click Commit Expected.
8. For the third SIGA-REL device, click Break Chain, select the first available address (the release circuit), and click Commit Expected.

Break chain button

9. For the fifth SIGA-REL device, click Break Chain, select the next available address (the prerelease circuit), and click Commit Expected.
10. Close all Signature Series mapping tool dialog boxes and windows.
11. Perform a Signature Series conversion and download the database to the panel.

Table 16: SIGA-REL configuration settings

Typical address [1]	Typical serial number [1]	Device type	Model	Personality code
0207	5300411525	Monitor	SIGA-REL	N/O Active Nonlatching (Class B)
0208	5300411532	Pull	SIGA-REL	N/O Alarm Latching (Class B)
0209	5300411549	DoorControl	SIGA-REL	Signal Output (Class B)
0210	5300411556	LocalTrouble	SIGA-REL	No personality
0211	5300411563	DoorControl	SIGA-REL	Signal Output (Class B)
0212	5300411570	LocalTrouble	SIGA-REL	No personality

[1] Actual addresses in your system may differ, but they must be consecutive. Serial numbers must also be consecutive up to the second-to-last digit.

Table 17: SIGA-REL labels and messages

Device type	Example address [1]	Label	Message	Model
Monitor	0207	Abort	Abort	SIGA-REL
Pull	0208	Manual	Manual	SIGA-REL
DoorControl	0209	Release_1	Release_1	SIGA-REL
None	0210	Release_2	Release_2	SIGA-REL
DoorControl	0211	Prerelease_1	Prerelease_1	SIGA-REL
None	0212	Prerelease_2	Prerelease_2	SIGA-REL

[1] These addresses illustrate that the SIGA-REL should occupy six consecutive addresses. The actual addresses in your system may differ.

Creating an abort confirmation LED

WARNING: If the abort circuit is shorted, the system interprets this as a manual abort. This would prevent release of the fire suppression agent in the event of an actual fire alarm.

To guarantee supervision of the manual abort circuit, we suggest that you program an LED to light when the abort circuit is activated. This has the benefit of providing a clear visual indication to untrained site personnel that the abort circuit has been compromised due to a short circuit.

Programming an AND group

AND groups function as counting groups. For more information about programming AND groups, see the *EST2 System Programming Manual* and the *2-SDU Help*.

Every device contained in each (SIGA-REL) AND group must include a rule with an output statement like the one in [ALARM1]. See Figure 17 for the details.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

Reconciling the Signature map

Do not use the Accept Actual function in the Signature Series mapping tool. Accepted devices may appear as two devices in the SDC database and corrupt

it. Use the Break Chain and Commit Expected functions to reconcile the Signature map.

Writing rules for the SIGA-REL

To write the rules:

1. In the Rules Editor, write the rules shown in Figure 17.
2. Compile the rules and run the required conversions.
3. Download the new information.

Figure 17: EST2 rules for the SIGA-REL

```
[ALARM1]
ALARM SMK 'ALARM_1' : ON DOORCONTROL 'PRERELEASE_1';

[ALARM2]
ALARM SMK 'ALARM_2' : ON DOORCONTROL 'PRERELEASE_1';

[RELEASE]
DEFINE AND 'AND_GROUP1' : DELAY 10,
                          ON DOORCONTROL 'RELEASE_1';

[RESET]
DEFINE SYSRESET 'MCMN1' : OFF DOORCONTROL 'PRERELEASE_1',
                          OFF DOORCONTROL 'RELEASE_1';

[DUMP]
ALARM PULL 'MANUAL' : ON DOORCONTROL 'RELEASE_1';

[LED1]
CONFIRMATION DOORCONTROL 'PRERELEASE_1' : ON LED 'LED_1_1';

[LED2]
CONFIRMATION DOORCONTROL 'RELEASE_1' : ON LED 'LED_1_2';

[ABORT LED]
MONITOR MONITOR 'ABORT' : ON LED 'LED_1_3';
```

Caution: Do not program the Drill switch to test the SIGA-REL.

Notes

- [ALARM_1] and [ALARM_2] require the addition of two Signature Series alarm devices to the SDC Configuration. Make sure that the object labels in the rules match the labels assigned in the Object Configuration.
- [LED1] and [LED2] require the addition of an LED module to the MCM Configuration. Make sure that the labels for the LEDs match the labels assigned to them in the Object Configuration.

See “System testing” on page 52 for instructions on checking your work and testing your system.

Programming the SIGA-REL in the 3-SDU

Adding the SIGA-REL to the database

WARNING: This information was prepared for users who are proficient in every aspect of 3-SDU programming. Do not attempt to program the SIGA-REL if your certification is not current. Incorrect programming may result in loss of life, serious injury, or property damage.

The SIGA-REL is a single module with six serial numbers. Addresses will differ for each installation, but they must be consecutive.

Note: If you are adding other Signature Series devices to the project database, add the SIGA-REL last. Adding devices after the SIGA-REL may disrupt the addressing scheme.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the project database, you must add three SIGA-RELs. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Note: You cannot have more than 10 SIGA-RELs on one Signature loop.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

WARNING: Do not configure the third and fifth SIGA-REL addresses as common outputs or audio amplifiers. Any off-normal condition activates the automatic release sequence if these addresses are common outputs. The Drill switch activates the prerelease and the release circuits if they are audio amplifiers. You must select the device types and personality codes exactly as prescribed in Table 18.

To add the SIGA-REL to the database:

1. Use the Signature Series Configuration dialog box to add three SIGA-REL modules:

   Device type = Monitor
   Model = SIGA-REL
   Personality code = 3
   Quantity = 3

2. Scan or enter the SIGA-REL serial number label in the first address slot.

3. Complete each SIGA-REL address in strict accordance with Table 18. You don't need to enter serial numbers for all addresses. This happens in a later step.
4. Use the Object Configuration dialog box to assign labels and messages to each SIGA-REL address, as shown in Table 19.
5. Connect to the panel and use the Communication Functions dialog box to upload the Signature loop.
6. In the Signature Series mapping tool, open the Actual vs. Expected Data dialog box (F9 key).
7. For the first two SIGA-REL devices, click Commit Expected.
8. For the third SIGA-REL device, click Unmatched, select the first available address (the release circuit), and click Accept Actual.
9. For the fifth SIGA-REL device, click Unmatched, select the next available address (the prerelease circuit), and click Accept Actual.
10. Close all Signature Series mapping tool dialog boxes and windows.
11. Perform a Signature Series conversion and download the database to the panel.

Table 18: SIGA-REL configuration settings

Typical address [1]	Typical serial number [1]	Device type	Model	Personality code
126	5300411525	Monitor	SIGA-REL	(3) N/O Active Nonlatching (Class B)
127	5300411532	Pull	SIGA-REL	(1) N/O Alarm Latching (Class B)
128	5300411549	SupervisedOutput	SIGA-REL	(16) Signal Output (Class B)
129	5300411556	None	SIGA-REL	(0) No personality
130	5300411563	SupervisedOutput	SIGA-REL	(16) Signal Output (Class B)
131	5300411570	None	SIGA-REL	(0) No personality

[1] Actual addresses in your system may differ, but they must be consecutive. Serial numbers must also be consecutive up to the second-to-last digit.

Table 19: SIGA-REL labels and messages

Device type	Example address [1]	Label	Message	Model
Monitor	126	Abort	Abort	SIGA-REL
Pull	127	Manual	Manual	SIGA-REL

Device type	Example address [1]	Label	Message	Model
SupervisedOutput	128	Release_1	Release_1	SIGA-REL
None	129	Release_2	Release_2	SIGA-REL
SupervisedOutput	130	Prerelease_1	Prerelease_1	SIGA-REL
None	131	Prerelease_2	Prerelease_2	SIGA-REL

[1] The addresses in this table demonstrate the importance of ensuring that the SIGA-REL occupies six consecutive addresses. The actual addresses in your system may differ.

Programming an AND group

WARNING: Set the AND group activation number to 2 or greater. An activation number of 1 will cause the AND group to become an OR group, and any activation of Alarm_1 or Alarm_2 will activate the release sequence. Check only Q1 for each device in the list box labeled “Devices in Selected Group.” For Q1, only a detector in alarm will count as a device activation. If you check Q2, Q3, or Q4 the release circuit may accidentally activate for maintenance events.

AND groups function as counting groups; matrix groups function as counting zones. For more information about programming AND groups and matrix groups, see the 3-SDU Online Help.

Note: Every device contained in each (SIGA-REL) AND group must include a rule with an output statement like the one in [ALARM1]. See Figure 18 for the details.

Note: For preaction operation, set the activation number to 1. This will cause the AND group to become an OR group. Any activation of Alarm_1 or Alarm_2 will then activate the release sequence.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

Writing rules for the SIGA-REL

To write the rules:

1. In the Rules Editor, write the rules shown in Figure 18.
2. Compile the rules and run the required conversions.
3. Download the new information.
4. See “System testing” on page 52 before you test your system.

Figure 18: EST3 rules for the SIGA-REL

```
[RESET]
RESET:
   OFF -HIGH 'PRERELEASE_1', {turn off prerelease 1}
   DLYR 10; {delay after reset}

[PRERELEASE 1]
ALARM 'ALARM_1':
   ON 'PRERELEASE_1'; {turn on prerelease 1 on alarm}

[AND GROUP RELEASE]
ALARM 'AND_GROUP':
   DLYA 10, {delay time (user setting)}
   ON SUP 'RELEASE_1'; {turn on release}

[MANUAL RELEASE]
ALARM 'MANUAL':
   ON -HIGH 'RELEASE_1'; {turn on release}

[LED1]
RLYCFG 'PRERELEASE_1':
   ON 'LED_1_1';

[LED2]
RLYCFG 'RELEASE_1':
   ON 'LED_1_2';
```

Notes

- RESET rule: On reset, the prerelease circuit is forced to deactivate, which also deactivates the release circuit. The system determines whether an alarm is still present before making the decision to activate the releasing sequence again. In this situation, the system delay (the time necessary to test and analyze alarms) overrides the rule delay. When the system is reset and the alarm restored, the SIGA-REL turns off both the prerelease and release circuits (in that order).
- PRERELEASE rule: On alarm, the PRERELEASE rules activate the prerelease circuits. These rules require the addition of alarm devices to the panel configuration. Make sure that the object labels match the labels assigned to them in the Object Configuration.
- AND GROUP RELEASE rule: When the AND_GROUP activates, the release circuit is activated after the programmed delay, as per the rule.
- MANUAL RELEASE rule: If the manual release circuit on the SIGA-REL is activated, the SIGA-REL independently activates its releasing circuits. The MANUAL RELEASE rule forces the panel output to match the SIGA-REL output.
- [LED1] and [LED2] require the addition of an LED module to the Cabinet Configuration (Modules tab, operator layer). Make sure that the labels for the LEDs match the labels assigned to them in the Object Configuration.

If your application requires use of the Drill switch to test the SIGA-REL, write a custom rule to accomplish this. See Figure 19 for an example of the rules required.

Caution: Do not program the Drill switch to test the SIGA-REL.

Figure 19: Optional rules for using the Drill switch

```
[DRILL]
DRILL:
   ON 'PRERELEASE_1'; {turn on prerelease 1}
```

See “System testing” on page 52 for instructions on checking your work and testing your system.

Programming the SIGA-REL in the QS-CU

Minimum system requirements

- A QS1 with an SLIC card and appropriately sized standby batteries
- A compatible power supply with appropriately sized standby batteries to supply 24 VDC to the SIGA-REL
- The SIGA-REL, mounted in an MFC-A enclosure
- A SIGA-CT1 module to supervise the service disconnect switch
- A SIGA-CT2 module to indicate activation of the prerelease and release relays

When you use monitor or supervisory event messages to indicate activation of the service disconnect station, prerelease relay, or release relay, you must route those messages to the panel.

Note: You cannot have more than 10 SIGA-RELs on one SLIC loop.

Step 1: Read this first

WARNING: This information was prepared for users who are proficient in every aspect of QS-CU programming. Do not attempt to program the SIGA-REL without a complete understanding of QS-CU and SIGA-REL operation. Incorrect programming may result in loss of life, serious injury, or property damage.

This application requires the operation of at least two automatic detectors to activate the fire suppression system. In order to meet NFPA 72 requirements, you must program an AND group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their primary and alternate verification properties set to None.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the loop controller database, you must add three SIGA-RELs. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Using the QS-CU, perform the instructions that follow in order from beginning to end.

As a safety precaution, disconnect releasing devices from SIGA-REL TB4 before downloading setup data to the loop controller.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

Step 2: Add the abort and manual release switch circuits

Note: Enter the information exactly as shown to ensure that you program the application according to the manufacturer's specifications.

1. Click Configure, and then click Cabinets.
2. Select the SLIC connected to the SIGA-REL, and then click Configure.
3. Click the Modules tab, and then set the Quantity box to 1.
4. Enter the following information:

   First address
   Device type: Monitor
   Model: REL
   Personality: (3) Active B
   Message text: SIGA-REL1 A001 and ABORT SW

   Second address
   Device type: Pull
   Personality: (1) Alarm B
   Message text: SIGA-REL1 A002 and MAN RELEASE
5. Click Add.

Step 3: Add the two releasing circuits

1. Set the Quantity box to 1.

2. Enter the following information:

   First address
   Device type: Output
   Model: REL
   Personality: (16) Output B
   Message text: SIGA-REL1 A003 and RELEASE 1 & 2

   Second address
   Device type: Monitor
   Personality: (0) None
   Message text: SIGA-REL1 A004 and NOT USED

3. Click Add.

Step 4: Add the two prerelease circuits

1. Set the Quantity box to 1.
2. Enter the following information:

   First address
   Device type: Output
   Model: REL
   Personality: (16) Output B
   Message text: SIGA-REL1 A005 and PRERELEASE 1 & 2

   Second address
   Device type: Monitor
   Personality: (0) None
   Message text: SIGA-REL1 A006 and NOT USED

3. Click Add.

Table 20 shows how your entries in the Modules table should look. Your addresses may be different.

Table 20: SIGA-REL configuration settings

Address	Serial number	Device type	Model	Text 1	Text 2	Personality
126		Monitor	REL	SIGA-REL1 A001	ABORT SW	(3) Active B
127		Pull	REL	SIGA-REL1 A002	MAN RELEASE	(1) Alarm B
128		Output	REL	SIGA-REL1 A003	RELEASE 1 & 2	(16) Output B

Address	Serial number	Device type	Model	Text 1	Text 2	Personality
129		Monitor	REL	SIGA-REL1 A004	NOT USED	(0) None
130		Output	REL	SIGA-REL1 A005	PRERELEASE 1 & 2	(16) Output B
131		Monitor	REL	SIGA-REL1 A006	NOT USED	(0) None

Step 5: Create a prerelease response

In this step, you create a response that activates the prerelease circuits when any one detector in the protected area signals an alarm.

1. Click Configure > Correlations.
2. Click the Zones tab, and then click Add Zones.
3. Click the Members tab, and then click Add Device.
4. Select only the devices required to activate the SIGA-REL prerelease circuits, and then click OK.
5. Click the Responses tab, click the Response Type arrow, and then select Active.

Caution: Do not include the releasing circuits (RELEASE 1 & 2) in this response.

6. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.

   Make sure you select the PRERELEASE device, not the RELEASE device.

Step 6: Create an AND group release response

Here, you create a release response that activates the release circuits when two or more detectors in the protected area signal an alarm.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

1. Click the AND Groups tab, and then click Add AND Group.
2. Set the Activation Count box for 2.
3. Click the Members tab, and then click Add Device.

4. Select only the detectors required to activate the SIGA-REL release circuits then click OK.
5. Click the Responses tab, click the Response Type arrow, and then select Active.
6. Click Delays.
7. In the Delay On list, click Activation and Restoration.
8. Set the Seconds box to 10.
9. Click Outputs, select the device labeled SIGA-REL1 A003 RELEASE 1 & 2, and then click OK.

Step 7: Create a manual release response

In this step, you create a manual release response that activates the release circuits when someone presses the manual release switch. Add the prerelease response, create the delay, and then add the release response in that order.

1. Click the Devices tab, and then select the circuit labeled SIGA-REL A002 MAN RELEASE.
2. Click the Responses tab, click the Response Type arrow, and then select Active.
3. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.
4. Click Delays and set the delay options as follows:

   Delay On: Activation and Restoration
   Seconds: 0
5. Click Outputs, select the device labeled SIGA-REL1 A003 RELEASE 1 & 2, and then click OK.

Note: The delay is required so that the prerelease and release responses occur in the correct order. Prerelease must come before release.

Step 8: Supervise the service disconnect switch

If your application requires supervision of the service disconnect station, install and wire components according to Figure 13. A SIGA-CT1 module supervises the RELA-SRV-1 switch. Configure the SIGA-CT1 as follows:

Device Type: Supervisory
Personality: (3) Active B
Text 1: SIGA-REL1 RELEASE 1

Text 2: DISCONNECT SW

No further programming is necessary.

Step 9: Indicate active prerelease and release circuits

Two PAM-1 control relays and a SIGA-CT2 module are used to indicate activation of the prerelease and release relays.

Install and wire the components according to Figure 14. In this case, the 1st Device represents terminals 7 and 8, the release relay. The 2nd Device represents terminals 5 and 6, the prerelease relay.

Configure the SIGA-CT2 module as follows:

1st Device represents

1st Device Type: Monitor
1st Personality:(3) Active B
1st Text 1: REL1_RELEASE
1st Text 2: CKT_ACTIVE

2nd Device Type: Monitor
2nd Personality:(3) Active B
2nd Text 1: REL1_PREREL
2nd Text 2: CKT_ACTIVE

When a circuit is activated, the SIGA-CT2 module activates a monitor event. The corresponding event message identifies which circuit was activated. No further programming is necessary.

Step 10: Create a drill prerelease response

Here, you create a response that activates the prerelease circuits when someone presses the Drill switch.

Note: Create this response only if required. Pressing Drill will activate the prerelease circuits, but pressing Drill a second time will not restore the prerelease circuits. You must press Reset to silence the prerelease circuits.

1. Click Configure > Correlations.
2. Click the Devices tab, and then select the Show Pseudo Points check box.
3. Select the circuit labeled Drill (address 007).
4. Click the Responses tab, click the Response Type arrow, and then select Active.

Caution: Do not include the releasing circuits (RELEASE 1 & 2) in this response.

5. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.

Step 11: Retrieve the loop data from the SLIC

1. Click Configure, and then click Cabinets.
2. Select the SLIC connected to the SIGA-REL, and then click Configure.
3. Set the Communications Port setting for the COM port used to connect the service computer to the control panel.
4. Click Retrieve Signature Data.
5. After the upload has finished, click OK.

Step 12: Reconcile the actual and expected data

Caution: Clicking Accept Actual enters the selected device into the database with its current programmed parameters. This corrupts the database if you have already entered the device.

1. Click the Mapping tab, and then click Model.
2. Look for a string of at least six RELs marked with red backgrounds and double-click the first REL in the string.
3. If the serial number displayed in the Module Properties dialog is not the same as the serial number shown on the bar code attached to the SIGA-REL, click Close, and then double-click the next REL in the string.
4. If the serial numbers are the same:

   Click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Monitor device type and marked SIGA-REL1 A001 Abort SW, and then click OK.

   Click Close.
5. Select the next REL, and then click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Output device type and marked SIGA-REL1 A003 Release 1 & 2, and then click OK.

   Click Close.

6. Select the next REL, and then click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Output device type and marked SIGA-REL1 A005 Prerelease 1 & 2, and then click OK.

   Click Close.

Step 13: Send the reconciled data to the loop controller

Click the Controller tab, and then click Send Signature Data.

See “System testing” on page 52 for instructions on checking your work and testing your system.

Chapter 4
Testing and troubleshooting

Summary

This chapter contains testing instructions for system programmers. Read the testing topics that apply to your fire alarm system.

Content

Code requirements for testing

It is important that you understand and are familiar with the applicable code requirements for system testing. Perhaps the most important code is found in NFPA 72 *National Fire Alarm Code*, Chapter 7, “Inspection, Testing, and Maintenance.” Here are excerpts from this standard.

7-1.5.1: Testing personnel shall be qualified and experienced in the specific arrangement and operation of suppression systems and releasing functions and cognizant of the hazards associated with inadvertent system discharge.

7-1.5.2: Occupant notification shall be required whenever a fire alarm system configured for releasing service is being serviced or tested.

7-1.5.3: Discharge testing of suppression systems shall not be required by this code. Suppression systems shall be secured from inadvertent actuation, including disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof, for the specific system, for the duration of the fire alarm system testing.

7-1.5.4: Testing shall include verification that the releasing circuits and components energized or actuated by the fire alarm system are electrically supervised and operate as intended on alarm.

7-1.5.5: Suppression systems and releasing components shall be returned to their functional operating condition upon completion of system testing.

Further, both NFPA 2001 *Standard on Clean Agent Fire Extinguishing Systems*, which covers FM-200 releasing systems, and NFPA 12A *Halon 1301 Fire Extinguishing Systems*, require a manual disconnect mechanism for use when testing the fire system.

System testing

Checking your work

Caution: Some events after a download or an upload may destabilize the system enough to activate the release circuits. Do not connect the releasing solenoids until system testing is complete and the system is stable.

Check your installation and programming work before you connect the releasing solenoids.

Verify that the ‘Prerelease_1’ and ‘Prerelease_2’ LEDs extinguish after a panel reset. If not, a second Reset switch activation may be necessary.

Avoid using the Drill switch to test the SIGA-REL. If you activate a Drill, press the Reset switch to deactivate it. The deactivation of the Drill switch, alone, does not silence the prerelease tones.

Testing EST2 systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, access the SDC Status tool in the 2-SDU. Do not test the system if the status LEDs indicate activity that is in progress or pending. This includes:

- Mapping
- Device new starts
- Resets
- Restarts

Testing EST3 systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, check the Current Status tab of the Signature Series Status / Diagnostics tool in the 3-SDU. Do not test the system if the status LEDs indicate activity that is in progress or pending. This includes:

- Mapping
- Device new starts
- Resets
- Restarts

In the 3-SDU, you can test the system while the Device Supervision LED is on. The Device Supervision LED may remain on longer for large loops.

Testing QuickStart systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, check the Status tab of the Signature Series Configuration Form in the QS-CU. Do not test the system if the counters or Current Status messages indicate activity that is in progress or pending.

Connecting the releasing solenoids

Caution: Do not connect the releasing solenoids until the system has been programmed and tested, and the Signature loop controller and SIGA-REL have reached their normal state. Failure to follow the instructions given below can result in unexpected release of the fire suppression agent.

Follow these steps before you connect the releasing solenoids.

Before you connect the releasing solenoids:

1. After connecting all devices to the Signature data line (including the SIGA-REL), verify that you have downloaded the database to the correct panel and Signature loop controller.
2. Using your SDU or CU, browse to the Signature Series status tool. Verify that the loop is in its normal, inactive state.

   In the 2-SDU choose Tools > Signature Series > Status, then select the Current Status tab. All LEDs should be off.

   In the 3-SDU choose Tools > Signature Series > Status / Diagnostics, then select the Current Status tab. All LEDs should be off. Note that the Device Supervision LED may take up to 20 minutes to extinguish, depending on the number of devices connected to the Signature loop.

   In the QS-CU choose Configure > Cabinet, then select the Cards tab. Select the Signature loop controller card, then choose Configure to open the Signature Series Configuration Form. Select the Status tab. In the Mapping Progress group, the Expected and Actual numbers should match.
3. Check the DS1, DS3, and DS7 LEDs on the SIGA-REL to make sure that it is not active. There should be no red or yellow LEDs. Check the output terminals with a voltmeter prior to connecting the releasing solenoids. The voltage should be 10 VDC or less.

   When all yellow and red LEDs are off and all output voltages are 10 VDC or less, it is safe to connect the releasing solenoids to the RELA-EOL relays.

Note: When testing the system, make sure that it is safe to do so and that testing will not result in the release of agent.

SIGA-REL fault messages on EST2 panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

After the successful completion of the programming process, the fire alarm control panel resets itself. Upon reset, device supervision may cause the panel to generate a Dev/Line fault for each SIGA-REL circuit. This is a normal indication, and it should go away within minutes. Table 21 lists the indications you may see for the SIGA-REL on the 2-LCD.

Table 21: SIGA-REL fault messages

Device	Condition	LED	2-LCD message
Abort	Short	Monitor	None, unless there is another event
	Open	Trouble	Open Fault Abort [1]
Manual	Short	Alarm	1st Fire Alarm Manual [1]
	Open	Trouble	Open Fault Manual [1]
Prerelease_1	Short	Trouble	Short Fault Prerelease_1 [1]
	Open	Trouble	Open Fault Prerelease_1 [1]
Prerelease_2	Short	Trouble	Dev/Line Flt Prerelease_2 [1]
	Open	Trouble	Open Fault Prerelease_2 [1]
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	Dev/Line Flt Device (Abort, Manual, Prerelease_1, Prerelease_2, Release_1, or Release_2) [1]
Release_1	Short	Trouble	Short Fault Release_1 [1]
	Open	Trouble	Open Fault Release_1 [1]
Release_2	Short	Trouble	Dev/Line Flt Release_2 [1]

Device	Condition	LED	2-LCD message
	Open	Trouble	Open Fault Release_2 [1]

[1] Message requires user programming

SIGA-REL fault messages on EST3 panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

When programming is complete, the fire alarm control panel resets itself, reconstruct the line data card, and map it. Upon reset, device supervision may cause the panel to generate a common trouble active for each SIGA-REL circuit. This is a normal indication, and it should go away within minutes. Table 22 lists the indications you may see for the SIGA-REL on the 3-LCD.

Table 22: SIGA-REL fault messages

Device	Condition	LED	3-LCD message
Abort	Short	Monitor	MONITOR ACT (Abort)
	Open	Trouble	COMMON TRBL ACT Abort [1] Expanded message: TROUBLE OPEN ACT
Manual	Short	Alarm	PULL STATION ACT Manual [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Manual [1] Expanded message: TROUBLE OPEN ACT
Prerelease_1	Short	Trouble	COMMON TRBL ACT Prerelease_1 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Prerelease_1 [1] Expanded message: TROUBLE OPEN ACT
Prerelease_2	Short	Trouble	COMMON TRBL ACT Prerelease_2 [1] Expanded message: TROUBLE SHRT ACT

Device	Condition	LED	3-LCD message
	Open	Trouble	COMMON TRBL ACT Prerelease_2 [1] Expanded message: TROUBLE OPEN ACT
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	COMMON TRBL ACT Device (Abort, Manual, Prerelease_1, Prerelease_2, Release_1, or Release_2) [1] Expanded message: INTRNL TRBL ACT
Release_1	Short	Trouble	COMMON TRBL ACT Release_1 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Release_1 [1] Expanded message: TROUBLE OPEN ACT
Release_2	Short	Trouble	COMMON TRBL ACT Release_2 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Release_2 [1] Expanded message: TROUBLE OPEN ACT

[1] Message requires user programming

SIGA-REL fault messages on QuickStart panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

When programming is complete, the control panel resets itself and maps the line controller card. During the reset, device supervision may cause the panel to generate a common trouble message for each SIGA-REL circuit. This is a normal indication, and should clear within minutes. Table 23 lists other messages related to the SIGA-REL.

Table 23: SIGA-REL fault messages

Device	Condition	LED	LCD message
Abort	Short	Monitor	Monitor (Abort)
	Open	Trouble	Trouble ABORT SW [1] Help message: TROUBLE OPEN
Manual	Short	Alarm	Alarm Active MAN RELEASE [1]
	Open	Trouble	Trouble MAN RELEASE [1] Help message: TROUBLE OPEN
Prerelease_1	Short	Trouble	Trouble PRERELEASE 1 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble PRERELEASE 1 [1] Help message: TROUBLE OPEN
Prerelease_2	Short	Trouble	Trouble PRERELEASE 2 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble PRERELEASE 2 [1] Help message: TROUBLE OPEN
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	Trouble Device (ABORT, MAN RELEASE, RELEASE 1, RELEASE 2, PRERELEASE 1 PRERELEASE 2) [1] Help message: INTRNL TBL
Release_1	Short	Trouble	Trouble RELEASE 1 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble RELEASE 1 [1] Help message: TROUBLE OPEN
Release_2	Short	Trouble	Trouble RELEASE 2 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble RELEASE 2 [1] Help message: TROUBLE OPEN

[1] Message requires user programming

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