Field Notes Bulletin

EST3: Positive Alarm Sequence Programming

Introduction

This bulletin informs you of an issue with positive alarm sequence programming as described in the 3-SDU 5.02 Help topic "Positive alarm sequence."

Issue

There were some discrepancies introduced in the rules provided in 3-SDU 5.02 Help topic "Positive alarm sequence," which were easy enough to correct during rules compile. Upon further investigation, we found that the rules, as written, may cause subsequent activations of the positive alarm sequence to not work correctly if the EST3 is reset during the alarm investigation phase (Phase 2) of the sequence.

Solution

The following pages include updated instructions for programming positive alarm sequence. These instructions will be added to 3-SDU 5.10 Help.

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Positive alarm sequence

This topic describes how to program a positive alarm sequence feature that meets UL 864 9th edition requirements. Before you begin, you should also have a good understanding of the following:

- Command lists

- Logical outputs

- AND groups

- Priorities

- Activate and Restore commands

- Disable and Enable commands

This topic presents one method for programming this application. It is not the only method. It is your responsibility to make adjustments as needed to suit your particular project and to thoroughly test the application before putting it to use at the site.

Positive alarm sequence operation

UL 864 9th edition defines positive alarm sequence as an automatic sequence that results in an alarm, even when manually delayed for investigation, unless the system is reset.

Positive alarm sequence (PAS) provides a short delay so fire safety personnel can investigate the cause of an alarm before the fire alarm system automatically activates the alarm signals. Positive alarm sequence is divided into the following phases:

- Phase 1 (Alarm acknowledge) provides a 15-second delay during which time you must acknowledge the alarm event in order to prevent the alarm signals from activating automatically. Acknowledging the alarm event starts Phase 2 of the positive alarm sequence.

- Phase 2 (Alarm investigation) provides a 180-second delay during which time you must reset the control panel to prevent the alarm signals from activating automatically.

Alarm signals activate automatically without any delay, whenever:

- Two PAS smoke detectors activate when positive alarm sequence is not bypassed

- One PAS smoke detector activates when positive alarm sequence operation is bypassed

- Any alarm signal initiating device other than a PAS smoke detector activates

The control panel provides a PAS Bypass button and a PAS Acknowledge button. Pressing the PAS Bypass button switches bypass operation on and off. Pressing the PAS Acknowledge button acknowledges the alarm event.

The control panel also provides a PAS Bypass LED to indicate when bypass operation is on or off, and a Sequence LED that operates as follows:

- Fast blink — Positive alarm sequence phase 1. You have 15 seconds to acknowledge the alarm event.

- Slow blink — Positive alarm sequence phase 2. You have 180 seconds to reset the control panel.

- Off — Positive alarm sequence not active.

System configuration

For this application, you will need to configure the following:

- One toggle switch and LED for bypassing positive alarm sequence. Label the switch: Swi_PAS_Bypass. Label the LED: LED_PAS_Bypass.

- One momentary switch and LED for acknowledging positive alarm sequence. Label the switch: Swi_PAS_Ack. Label the LED: LED_PAS_Sequence.

- One logical output. Label the logical output: LogicOutput_PAS_Ack_Switch_Active.

- Two command lists. Label the command lists: Cmd_List_PAS_General_Alarm and Cmd_List_PAS_NonPAS_Devices.

- Three AND groups. Configure the AND groups as follows:

AND Group 1	Label: AND_Group_PAS1 Activation Number: 2 Activation Event: Q1 - Alarm Devices in Selected Group: All PAS devices. For each device, check Q1 and clear Q2, Q3, and Q4
AND Group 2	Label: AND_Group_PAS2 Activation Number: 1 Activation Event: Q1 - Alarm Devices in Selected Group: All PAS devices. For each device, check Q1 and clear Q2, Q3, and Q4
AND Group 3	Label: AND_Group_PAS3 Activation Number: 2 Activation Event: Q4 – Monitor (All Others) Devices in Selected Group: None

In addition:

- Set the Silence Inhibit option for 0 minutes (Configure > Project > Timing).

- Configure all outputs as Audible or Visible device types as required. Do not configure outputs as CommonAlarmOutput device types.

- For all PAS smoke detectors, set the Alarm Verify option and the Alt Alarm Verify option for None.

- Set the message routing options for the switches and the AND groups to the no message routing group.

Note: Depending on the marketplace, setting the message routing option to the no message routing group for alarm points may cause the compiler to stop.

Programming

This section provides the rules required to program this application. It also includes a description of the logic behind the rules.

Notes

- We labeled the PAS smoke detectors as *_PASSmk_* and the non-PAS devices as *_Smk_*, *_Pull_*, *_Heat_*, etc.

- You can only use smoke detectors to initiate a positive alarm sequence.

General Alarm Rules

```
[Non-PAS Smokes General Alarm – Rule 1]
Alarm Smoke '*_Smk*' :
   Activate 'Cmd_List_PAS_NonPAS_Devices' ;

[Non-PAS Heats General Alarm – Rule 2]
Alarm Heat '*_Heat*' :
   Activate 'Cmd_List_PAS_NonPAS_Devices' ;

[Non-PAS Pulls General Alarm – Rule 3]
Alarm Pull '*_Pull*' :
   Activate 'Cmd_List_PAS_NonPAS_Devices' ;

[Non-PAS Flows General Alarm – Rule 4]
Alarm Waterflow '*_Flow*' :
   Activate 'Cmd_List_PAS_NonPAS_Devices' ;

[Non-PAS Devices Active CmdList]
Activation 'Cmd_List_PAS_NonPAS_Devices' :
   Activate 'And_Group_PAS1' ,                  {See note 1}
   Activate 'And_Group_PAS1' ,
   Disable  'And_Group_PAS2' ;                  {See note 2}

{== AND Group PAS1 activation of 2 Alarm ==}
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```
[PAS Active General Alarm - AndGroup]
Alarm 'And_Group_PAS1' :                        {See note 3}
   Activate 'Cmd_List_PAS_General_Alarm' ,      {See note 4}
   Dly 0 ,
   -Enable 'Cmd_List_PAS_General_Alarm' ;

[PAS General Alarm Active CmdList]
Activation 'Cmd_List_PAS_General_Alarm' :
   Disable 'Cmd_List_PAS_General_Alarm'         {See note 5}
   Steady 'LED_PAS_General_Alarm' ,             {See note 6}
   LEDoff 'LED_PAS_Sequence' ,                  {See note 7}
   Disable 'Swi_PAS_Ack' ,                      {See note 8}
   Disable 'Swi_PAS_Bypass' ;                   {See note 9}

   {

   General Alarm Rules Notes

   1. Activates PAS 1 AND Group twice to force a general alarm.

   2. Disables the PAS2 AND Group without generating the phase
      1 sequence when a non-PAS device is alarmed.

   3. At this point, the system is in the PAS General Alarm
      state, meaning that phase 1 and 2 timers have expired.

   4. Puts the system in the PAS General Alarm active state.

   5. Disables the Gen Alarm command list, as we do not wish to
      run this again if other detectors go active.

   6. Instead of an LED, all corresponding audibles and
      visibles may be turned ON here.

   7. Indicates that the PAS sequence is not active and we are
      currently in the General Alarm state.

   8. Disables the PAS Ack switch so that the user may not
      interrupt the system. A reset is required at this point.

   9. Disables the PAS Bypass switch. The bypass no longer
      applies in this state. A reset is required at this point.

   }
```

PAS Bypass Rules

```
[PAS Bypass Toggle Switch]
SW 'Swi_PAS_Bypass' :
   Activate 'And_Group_PAS1' ,                  {See note 1}
   Steady 'LED_PAS_Bypass' ,                    {See note 2}
   Off -High 'LED_PAS_Sequence' ;               {See note 3}
```

```
{
PAS Bypass Rules Notes
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1. Activates the PAS1 And Group. This allows for any single
   active PAS sensor to put the system in alarm rather than
   waiting for two, as the sequence is now bypassed.

2. Indicates the fact that the PAS sequence is bypassed.

3. Turns Off the PAS Sequence LED with High priority so
   that any PAS device doesn't turn it On in any phase.

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}
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PAS Sequence Rules

```
[PAS Startup]
Startup :
   Disable 'Swi_PAS_Ack'  ;                     {See note 1}

{== AND Group PAS2 activation of 1 Alarm ==}

[PAS Phase 1 Active]
Alarm 'And_Group_PAS2' :
   Enable 'Swi_PAS_Ack' ,                       {See note 2}
   Fast  'LED_PAS_Sequence' ,                   {See note 3}
   Disable 'Swi_PAS_Bypass' ,                   {See note 4}
   +Dly 15 ,                                    {See note 5}
   Activate 'And_Group_PAS1' ;                  {See note 6}

{== Momentary Switch ==}

[PAS Ack Switch - Rule 2]
Switch 'Swi_PAS_Ack' :
   +On -High 'LogicOutput_PAS_Ack_Switch_Active' ; {See note
7}

[PAS Phase 2 Active]
RlyCfg 'LogicOutput_PAS_Ack_Switch_Active' :
   +Restore 'And_Group_PAS2' ,                  {See note 8}
   Activate 'And_Group_PAS3' ,                  {See note 9}
   Slow 'LED_PAS_Sequence' ,                    {See note 10}
   +Dly 180 , {See note 11}
   Activate 'And_Group_PAS1' ;                  {See note 12}

[PAS Reset - RULE 1]
Reset : Activate 'And_Group_PAS3' ;            {See note 13}

[PAS Reset - RULE 2]
Monitor 'And_Group_PAS3' :
   +Off -High 'LogicOutput_PAS_Ack_Switch_Active' ;
                                               {See note 14}
```

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PAS Sequence Rules Notes

1. Disable the PAS Ack switch upon startup, as there is nothing to acknowledge until the system is alarmed.

2. Enable the PAS Ack switch to allow the user to acknowledge the alarm.

3. Indicate that PAS phase 1 is active.

4. Disable the bypass switch so that the user may not bypass the PAS sequence once started.

5. Delay for 15 seconds to allow user to acknowledge the alarm.

6. Ack timer has expired. The system is now in the PAS General Alarm state. Activating AND Groups PAS1 again, will make it go active, thus PAS General alarm active.

7. Acknowledge the PAS alarm. This will start PAS phase 2.

8. Restoring AND Group PAS2 prevents the system from going into the PAS General Alarm state.

9. Activates AND Group PAS3 to set its activation counter to 1, thus allowing the reset rule to cancel the PAS Gen Alarm.

10. Indicates that PAS phase 2 is active.

11. Sets a 180-second delay to allow a system reset before going into the PAS General Alarm state.

12. PAS phase 2 timer expired. Puts system in PAS General alarm state.

13. Sets the AND Group PAS3 activation counter to 2.

14. Reset has occurred. Restores the PAS sequence operations by restoring the logical output.

}