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AEBN: 030512

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Subject: Elevator Control and Conventional FA Panel - Update

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## Introduction

This bulletin is an update to a previous one (AEBN 121410) describing how you can perform elevator control using the Edwards E-FSC conventional fire alarm system.

To review: The idea behind elevator recall is to bring the elevators to the lowest safe floor for exit during a fire so that people on the elevator do not step out into a smoke filled lobby. This will also make the elevators available to emergency personnel. To accomplish this, smoke detectors are located in the elevator lobbies of a building. If one of those smoke detectors alarm, the elevator will be sent to the proper floor. That floor will depend on which smoke detector went into alarm.

For example, if a smoke detector in the lobbies of the upper floors (2 and above) alarm, the elevator will be recalled to the designated (primary) level (usually the first floor). If a detector in the elevator lobby of the designated level alarms, the elevator will be recalled to an alternate level (usually the second floor). In addition to smoke detectors in lobbies, detectors are installed in the elevator machine room (and sometimes elevator shaft), which also recall the elevators. The machine room and shaft smoke detectors will also turn on a visual warning signal (“fireman’s hat”) located in the elevator or elevator lobbies, indicating the elevator is not safe to use. All these smoke detectors would be programmed to activate relays located in the elevator machine room that are used to control the elevators and turn on the warning light.

In buildings where the elevator shaft and/or machine room is protected by automatic sprinklers, a shunt trip circuit breaker is required to disconnect power to the elevator prior to the sprinkler heads in these areas activating. This is initiated by a heat detector located near the sprinkler head (or in some cases a waterflow switch with no delay) to insure the elevators shut down to prevent any further use of them. The heat detector(s) or waterflow switch then activate a relay, also located in the elevator machine room, used to trip the breaker. In addition, the power used to activate the shunt trip breaker must be supervised. The sprinkler system itself would also have to be monitored by the fire alarm panel.

The following will show a description of operation and recommended parts list.

## Elevator Block Diagram

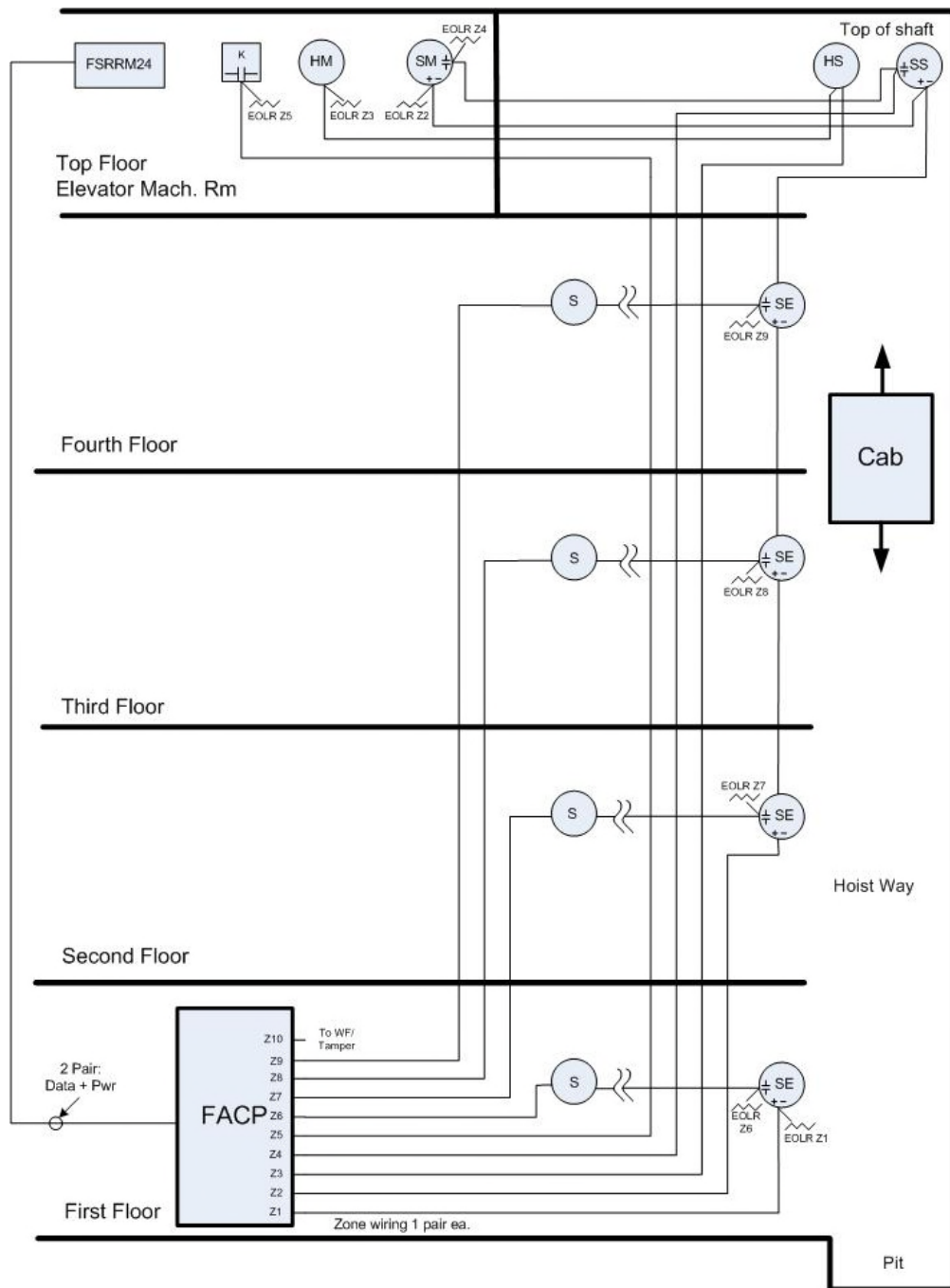


Figure 1

Legend:

- |   |   |
|---|---|
| 1. SE = smoke w/relay contacts in elevator lobbies      | 5. HS = heat detector in elevator shaft                           |
| 2. SM = smoke w/relay contacts in elevator machine room | 6. K = relay to monitor shunt trip power                          |
| 3. SS = smoke w/relay contacts in elevator shaft        | 7. S = other detectors in building (not part of elevator control) |
| 4. HM = heat detector in elevator machine room          | 8. FSRRM24 = 5 relay/output module                                |

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## Description of Operation

- The smoke detectors in the elevator lobbies (SE), top of shaft (SS), and machine room (SM) each have a set of normally open relay contacts.
- Zone 1 connects to the power terminals of the smoke detector in the primary (1<sup>st</sup>) floor elevator lobby. Zone 1 would activate relay 1 in the FSRRM24, recalling the elevator to the alternate level.
- Zone 2 connects to the power terminals of the smoke detectors in the elevator lobbies of floors 2 and up. Zone 2 would activate relay 2 in the FSRRM24, recalling the elevator to the primary level.
- The power terminals of the smoke detectors in the elevator machine room and elevator shaft would connect to either zone 1 or zone 2, depending on what floor they are required to recall the elevator to (they are connected to zone 2 in this example).
- Zone 3 connects to the heat detectors in the elevator machine room and top of shaft. Zone 3 would activate relay 3 on the FSRRM24, activating the shunt trip breaker. *Note: if a delay is required to bring the elevator to the lowest recall level prior to the shunt trip, you will have to interpose a time delayed relay, not supplied by Edwards.*
- Zone 4 connects to the **normally open contact** of the relay on the elevator shaft and elevator machine room smokes. Zone 4 would operate relay 4 on the FSRRM24, turning on the elevator warning light.
- Zone 5 would be configured as a supervisory input, and would connect to the K relay's normally closed (open while energized) relay contact.
- Zones 6 through 9 would connect to the remaining alarm initiating devices on floors 1 through 4 plus the **normally open contacts** of the smoke detectors in the elevator lobbies (SE), annunciating the floor of alarm.
- Zone 10 would connect to the sprinkler waterflow and tamper switches (you can configure a single circuit on the E-FSC panel as a waterflow/supervisory, giving you a separate indication for each).

### Suggested Parts List (using E-FSC system)

- Fire alarm panel: **E-FSC302, E-FSC502, or E-FSC1004** conventional panel (depending on actual requirements; 10 zone used on example; see notes\*).
- Smoke detectors for elevator lobbies, machine room, and shaft: **521NCRXT**.
- Heat detectors for elevator machine room and elevator shaft: **283B-PL**.
- Relays for elevator recall, warning, and shunt trip: **FSRRM24** (5 relays per module, configured for zone, 1:1, operation). *Note: the contact rating of the relays in the FSRRM24 is 1A at 30Vdc. If load does not conform to these ratings, you will have to interpose another relay with a higher contact rating. The FSRRM24 can also be configured as a non-supervised 24Vdc output to activate an external relay, such as an MR101/C.*
- Relay for shunt trip power supervision (K): **PAM-1** or **MR101/C**.

**Notes:** \* If the panel does nothing but elevator recall (no shunt trip, no sprinklers, not used as building's fire alarm/evacuation system), you might be able to get away with a 3 zone panel. But if the panel needs to do some or all of those other things, you will quickly move into a 5 zone, and probably need a 10 zone panel. The exact system design/requirements will ultimately determine what size panel is needed.

It is not the intent of this bulletin to cover all the details of what the codes require for proper elevator control. For that you should refer to the appropriate national and local codes, such as the ASME A17.1 *Safety Code for Elevators and Escalators* and NFPA 72 *National Fire Alarm and Signal Code*. This bulletin was written to describe one way to implement the most common method of elevator control using the Edwards E-FSC conventional system.