Elevator control ES switch

Contents

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>1</td>
</tr>
<tr>
<td>Danger and warnings</td>
<td>2</td>
</tr>
<tr>
<td>Overview</td>
<td>3</td>
</tr>
<tr>
<td>Standard features</td>
<td>3</td>
</tr>
<tr>
<td>Optional features</td>
<td>3</td>
</tr>
<tr>
<td>Agency information</td>
<td>3</td>
</tr>
<tr>
<td>Catalog numbering system</td>
<td>3</td>
</tr>
<tr>
<td>Other options</td>
<td>4</td>
</tr>
<tr>
<td>Shunt-trip operation</td>
<td>4</td>
</tr>
<tr>
<td>Supervisory indication</td>
<td>4</td>
</tr>
<tr>
<td>Typical control with wiring options for fire safety interface</td>
<td>5</td>
</tr>
<tr>
<td>Maintenance</td>
<td>13</td>
</tr>
<tr>
<td>Frequently asked questions</td>
<td>13</td>
</tr>
<tr>
<td>Disclaimer of warranties and limitation of liability</td>
<td>16</td>
</tr>
</tbody>
</table>

For more information, visit Eaton.com.
Danger and warnings

**DANGER**
HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH. WORKING ON OR NEAR ENERGIZED CIRCUITS POSES A SERIOUS RISK OF ELECTRICAL SHOCK. DE-ENERGIZE ALL CIRCUITS BEFORE INSTALLING OR SERVICING THIS EQUIPMENT AND FOLLOW ALL PRESCRIBED SAFETY PROCEDURES.

**IMPORTANT**
THESE PROCEDURES DO NOT CLAIM TO COVER ALL POSSIBLE DETAILS OR VARIATIONS ENCOUNTERED WITH THE ELEVATOR CONTROL SWITCH ELEVATOR DISCONNECT. NOR DO THEY PROVIDE FOR ALL POSSIBLE CONDITIONS THAT MAY BE ENCOUNTERED. IF FURTHER INFORMATION IS DESIRED OR NEEDED TO ADDRESS ANY PARTICULAR ISSUE NOT COVERED IN THIS DOCUMENT, CONTACT YOUR EATON REPRESENTATIVE. THE INFORMATION IN THIS DOCUMENT DOES NOT RELIEVE THE USER FROM EXERCISING GOOD JUDGMENT, NOR FROM USING SOUND SAFETY PRACTICES.

NOTE: BECAUSE EATON HAS A POLICY OF CONTINUOUS PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO CHANGE DESIGN SPECIFICATIONS WITHOUT NOTICE. SHOULD A CONFLICT ARISE BETWEEN THE GENERAL INFORMATION IN THIS DOCUMENT AND THE CONTENTS OF DRAWINGS OR SUPPLEMENTARY MATERIAL, OR BOTH, THE LATTER SHALL TAKE PRECEDENCE. FOR THE LATEST VERSION OF THIS INSTRUCTION LEAFLET, DOWNLOAD TD00801003E FROM THE EATON WEBSITE AT: WWW.EATON.COM.

THE CONTENTS OF THIS INSTRUCTION LEAFLET ARE NOT PART OF, NOR DO THEY MODIFY, ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT, OR RELATIONSHIP. THE EATON TERMS AND CONDITIONS OF SALE CONSTITUTE THE ENTIRE OBLIGATION OF EATON. THE WARRANTY IN THE TERMS AND CONDITIONS OF SALE IS THE SOLE WARRANTY OF EATON. ANY STATEMENTS IN THIS DOCUMENT DO NOT CREATE NEW WARRANTIES OR MODIFY ANY EXISTING WARRANTY.

**Signal words**
The signal words DANGER, WARNING, CAUTION, and NOTICE (along with their assigned symbol) throughout this manual indicate the degree of hazard the user may encounter. These symbols and words are defined as:

**DANGER:** Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING:** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION:** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE:** Indicates a hazardous situation which, if not avoided, could result in property damage.

**Safety concerns**
The following are important safety precautions that elevator control switch elevator disconnect users should observe at all times. This summary is not comprehensive. It is assumed the Elevator Control Switch elevator disconnect user will follow standard safety precautions for working in an electrical environment. For more information on safety precautions and procedures, consult the following website sources:

- Underwriters Laboratories (UL): www.ul.com
- National Electrical Manufacturers Association (NEMA): www.nema.org

**FOR THE PURPOSE OF THIS INSTRUCTION LEAFLET, A QUALIFIED PERSON:**

(A) IS FAMILIAR WITH THE SUBJECT EQUIPMENT AND THE HAZARDS INVOLVED WITH THEIR APPLICATION, USE, ADMINISTRATION, AND MAINTENANCE.

(B) IS TRAINED AND AUTHORIZED TO DE-ENERGIZE, CLEAR, GROUND, AND TAG CIRCUITS AND EQUIPMENT IN ACCORDANCE WITH ESTABLISHED SAFETY PRACTICES.

(C) IS TRAINED IN THE PROPER CARE AND USE OF PERSONAL PROTECTIVE EQUIPMENT SUCH AS RUBBER GLOVES, HARD HAT, SAFETY GLASSES OR FACE SHIELDS, ARC FLASH CLOTHING, ETC., IN ACCORDANCE WITH ESTABLISHED SAFETY PRACTICES.

(D) IS TRAINED TO RENDER FIRST AID.

(E) HAS RECEIVED SAFETY TRAINING TO RECOGNIZE AND AVOID THE HAZARDS INVOLVED.

(F) AS THE SKILLS AND KNOWLEDGE PERTAINING TO THE CONSTRUCTION AND OPERATION OF THIS EQUIPMENT AND ITS INSTALLATION.
Overview
The Eaton elevator control ES disconnect switch is designed for single cable or hydraulic elevator application to interrupt the incoming AC power upon receiving a signal from the Fire Alarm Control Panel (FACP).

The elevator control switch numbering system ensures you get all the right components, with the right ratings, properly assembled. The unit comes completely assembled for quick installation, eliminating the labor and time needed to assemble individual components. It is also easy to meet code requirements for selective coordination in a fully fused system. The Eaton elevator control ES switch uses Class J fuses that easily coordinate with any upstream fuse by simply using a 2:1 lineside-to-loads side fuse ratio.

The Eaton elevator control ES Switch meets prevailing ANSI/ASME, NEC and NFPA 72 requirements in a UL 98 Listed (enclosed switch) and UL 50 Listed (enclosure) unit. It comes in a standard NEMA1 enclosure or optional NEMA 3R, 4, or 12 enclosures. It is available in 30, 60, 100, 200 or 400 A configurations, for 208, 240, 480, or 600 Vac, three- or four-wire systems with a UL 98 Listed 200 kA assembly short-circuit current rating (SCCR).

Agency information
- UL 98 Enclosed and Dead Front Switch—Guide 96NK3917, File E182262
- NEMA 1, UL 50, listed enclosure cUL per Canadian Standards C22.1
- NEC 620.51(E) (Surge Protection on Emergency Systems) compliant when optional surge protection feature is selected

Catalog numbering system
The following catalog numbering system defines an elevator control switch construction.

Table 1. Eaton elevator control switch selector catalog numbering system

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Control transformer ①</th>
<th>Pilot light ON</th>
<th>Neutral lug</th>
<th>Enclosure options (NEMA 1 standard with no suffix designation required)</th>
<th>Fire alarm voltage monitoring relay (to monitor shunt trip voltage)</th>
<th>Options/modifications ④</th>
<th>Auxiliary contacts ⑤ and surge protection ④</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES</td>
<td></td>
<td></td>
<td>N = Isolated full capacity</td>
<td>3 = NEMA 3R</td>
<td>D = NEMA 12</td>
<td>P = NEMA 4 painted steel</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ampere rating</td>
<td></td>
<td>G = Green</td>
<td>R = Red</td>
<td>W = White</td>
<td>Options/modifications ④</td>
<td>Blank = No mods test</td>
</tr>
<tr>
<td>2</td>
<td>T2 = 208 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SS = 304 stainless steel</td>
</tr>
<tr>
<td>3</td>
<td>T3 = 240 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>T1 = 480 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>T2 = 600 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fire safety interface relay (3PDT, 10 A, 120 V)</td>
<td>R2 = 24 Vdc coil</td>
<td>R1 = 120 Vac coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

① 100 VA with primary and secondary fusing (120 V secondary)
② F3 option only available with R1 relay selection.
③ All elevator control switches come with 1NO/1NC auxiliary contact as standard.
④ For specific information on Eaton’s SP1 surge protective devices, refer to product aid PA01005006E.
⑤ Required by some codes in Arizona.
⑥ Not in Bid Manager® but available through the Flex Center (FlexSwitches@Eaton.com or 1-888-329-9272).
Additional options

Optional features include contact closure, i.e., battery lowering/door opening system. The B option offers support for the states of Arizona, Oregon, and Texas requirements to prevent “nuisance” fire alarms by overriding the “Control Power not Available” signal when the Eaton elevator control ES disconnect is manually (intentionally) turned off, and distinctive signaling for ON-OFF-TRIPPED conditions (option B).

All Eaton elevator control elevator disconnect switches are UL Listed and designed for safe access by qualified personnel. When maintenance or shutdown service is required, no energized parts are exposed inside the enclosure when the disconnect switch is manually turned to the OFF position. For proper maintenance safety precautions, always turn off incoming power to the Eaton elevator control ES switch when possible. When servicing any live electrical equipment, always wear appropriate personal protective equipment.

Shunt-trip operation

The disconnecting means is a shunt-trip operated switch. The control power source for the shunt-trip operator is a 120 Vac supply originating in the Eaton elevator control ES switch. Current to the shunt-trip device is switched by an isolation relay, which is in turn controlled by the FACP.

The control signal may be either 24 Vdc from the FACP (option R2) or a “dry” contact closure in the FACP (option R1). In the case of a “dry” contact closure, the sensing voltage is 120 Vac originating in the Eaton elevator control ES switch.

A key test switch (option K) is included for testing the shunt-trip circuit.

Supervisory indication

Additionally, an optional separate relay can be specified to monitor the 120 Vac control power source in the Eaton elevator control ES switch. This relay (option F1 or F3) is used to provide supervisory indication of “Control Power Available” as required by NFPA 72 Section 6.15.4.4.

Table 2. Transformer fuse ratings

<table>
<thead>
<tr>
<th>ECS voltage/transformer voltage</th>
<th>Primary fuse (amperes)</th>
<th>Secondary fuse (amperes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>208/120</td>
<td>FNO-R-2</td>
<td>FNM-1 1/4</td>
</tr>
<tr>
<td>240/120</td>
<td>FNO-R-2</td>
<td>FNM-1 1/4</td>
</tr>
<tr>
<td>480/120</td>
<td>FNO-R-1</td>
<td>FNM-1 1/4</td>
</tr>
<tr>
<td>600/120</td>
<td>FNO-R-1</td>
<td>FNM-1 1/4</td>
</tr>
</tbody>
</table>

Table 3. Lug torque specifications

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Ampacity</th>
<th>Wire size range</th>
<th>Main lugs (line)</th>
<th>Fuse base Main lugs (line)</th>
<th>Neutral mains Main lugs (line)</th>
<th>Torque Wire size</th>
<th>Torque Wire size</th>
<th>Torque Wire size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wire size</td>
<td>Main lugs (line)</td>
<td>Wire size</td>
<td>In-lb</td>
<td>Main lugs (line)</td>
<td>Wire size</td>
<td>In-lb</td>
</tr>
<tr>
<td>ES1</td>
<td>30 A</td>
<td>14–1/0</td>
<td>14–10 AWG</td>
<td>35</td>
<td>2–14 AWG</td>
<td>14–10 AWG</td>
<td>35</td>
<td>2–14 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 AWG</td>
<td>40</td>
<td>6–4 AWG</td>
<td>45</td>
<td>6 AWG</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3–4/0</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES2</td>
<td>60 A</td>
<td>14–1/0</td>
<td>14–10 AWG</td>
<td>35</td>
<td>2–14 AWG</td>
<td>14–10 AWG</td>
<td>35</td>
<td>2–14 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 AWG</td>
<td>40</td>
<td>6–4 AWG</td>
<td>45</td>
<td>6 AWG</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3–4/0</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES3</td>
<td>100 A</td>
<td>14–1/0</td>
<td>14–1/0</td>
<td>50</td>
<td>14–1/0</td>
<td>14–1/0</td>
<td>50</td>
<td>14–1/0</td>
</tr>
<tr>
<td>ES4</td>
<td>200 A</td>
<td>14–1/0</td>
<td>4–4/0</td>
<td>120</td>
<td>4–300 kcmil or (5/16 hex recess)</td>
<td>4–300 kcmil or (5/16 hex recess)</td>
<td>275</td>
<td>6–250 kcmil</td>
</tr>
<tr>
<td>ES5</td>
<td>400 A</td>
<td>(2) 2–500 kcmil</td>
<td>(2) 2–500 kcmil</td>
<td>375</td>
<td>(2) 1/0–300 kcmil or (1) 750 kcmil</td>
<td>(2) 1/0–300 kcmil or (1) 750 kcmil</td>
<td>500</td>
<td>(2) 1/0–300 kcmil or (1) 750 kcmil</td>
</tr>
</tbody>
</table>
Typical control with wiring options for fire safety interface

### OPTIONS R1 & F3
**TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFETY INTERFACE**

#### Auxiliary Switch Logic Table

<table>
<thead>
<tr>
<th>Main Switch Position</th>
<th>Option A</th>
<th>Option B</th>
<th>Option A *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO</td>
<td>NC</td>
<td>NO</td>
</tr>
<tr>
<td>Closed</td>
<td>O</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>Tripped</td>
<td>C</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>Open</td>
<td>C</td>
<td>O</td>
<td>C</td>
</tr>
</tbody>
</table>

* Auxiliary Switch Logic when blue wire with "+" marker is removed from NC terminal.

Where local authorities having jurisdiction permit, field removal of the blue wire identified by "+" marker will change the option A switch logic. Removal has the effect of disabling the battery lowering device when the switch is in the tripped position. Field installer must ensure this meets all local codes before removal.

**LEGEND:**

- **FACP** - Fire Alarm Control Panel
- **NOFA** - Normally Open Fire Alarm Contacts
- **SOLN** - Solenoid for Remote Trip of Switch, which is Activated by the Closing of the Fire Alarm Contacts or Key Test Switch.
- **OPTION R1** - Fire Alarm Interface Relay that is Operated at 120VAC from Secondary of Transformer, No Additional Power Needed.
- **CR** - Control Relay Used to Isolate the NOFA Contacts from the Duty of the Shunt Trip
- **FR** - Fire Alarm Voltage Monitoring Relay Used to Monitor the Status of Control Voltage from a Remote Location (i.e., Fire Alarm Control Panel).
- **PL** - Pilot Light to Visually Indicate Presence of Voltage on Outside of Switch Enclosure.
- **CPT** - Control Power Transformer Used to Step Down Line Voltage to 120VAC to Power Shunt Trip Coil.
- **SW AUX** - Option A or B, Normally Closed Contact When Switch is Closed. Opens as Power Switch Opens.
- **KEY TEST** - Key-to-Test Switch Used to Operate Shunt Trip from the Outside of Switch Enclosure. Can Be Used for Trouble-Shooting and Inspection.
- **CONTACT** - Contact Used to Disable Battery Lowering Device.
- **-** - Terminal Block Connection Point
- **-** - Pre-Wired Connection Points

Figure 1. Options R1 and F3
**OPTION R2**

**TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFETY INTERFACE**

---

**Figure 2. Option R2**

**AUXILIARY SWITCH LOGIC**

<table>
<thead>
<tr>
<th>MAIN SWITCH POSITION</th>
<th>OPTION A</th>
<th>OPTION B</th>
<th>OPTION C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOSED</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>TRIPPED</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>OPEN</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

*AUXILIARY SWITCH LOGIC WHEN BLUE WIRE WITH "+" MARKER IS REMOVED FROM NC TERMINAL

WHERE LOCAL AUTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY "+" MARKER WILL CHANGE THE OPTION A SWITCH LOGIC. SEE THE AUXILIARY SWITCH LOGIC TABLE.

REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION. Field installer must ensure this meets all local codes before removal.

---

**LEGEND**

- FACP - FIRE ALARM CONTROL PANEL
- NOAFAN - NORMALLY OPEN FIRE ALARM CONTROL INPUT
- NORA - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIPS
- SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH
- OPTION R1 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER, NO ADDITIONAL POWER NEEDED
- CR - CONTROL RELAY USED TO ISOLATE THE NOAFAN CONTACTS FROM THE DUTY OF THE SHUNT TRIP
- FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e., FIRE ALARM CONTROL PANEL)
- PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE
- CTRL - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL
- SW AUX - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED, OPENS AS POWER SWITCH OPENS
- KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE, CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION
- MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO ORACLE BATTERY LOWERING DEVICE

---

**NOTE:** TERMINAL 1 IS NOT PRESENT WHEN OPTION K IS ABSENT.
OPTIONS R1 & F1
TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFETY INTERFACE

Figure 3. Options R1 and F1
WHERE LOCAL AUTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY *+* MARKER WILL CHANGE THE OPTION A SWITCH LOGIC, SEE THE AUXILIARY SWITCH LOGIC TABLE, REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION.

WHERE LOCAL AUTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY *+* MARKER WILL CHANGE THE OPTION A SWITCH LOGIC, SEE THE AUXILIARY SWITCH LOGIC TABLE, REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION.

FIELD INSTALLER MUST ENSURE THIS MEETS ALL LOCAL CODES BEFORE REMOVAL.

LEGEND:
FFSN - FIRE ALARM CONTROL PANEL
NFAN - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SN - TRIP - SOLID STATE FOR REMOTE TRIP OF SWITCH WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH - OPTION R2 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE NOFFA CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (e.g., FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
OPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX - OPTION A OR B,NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED, OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLESHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.

- TERMINAL BLOCK CONNECTION POINT.
- PRE-WIRED CONNECTION POINTS.

NOTE: TERMINAL 1 IS NOT PRESENT WHEN OPTION K IS ABSENT.

Figure 4. Options R2 and F1
Elevator control ES switch

**Figure 5. Option F3**

**Legend:**
- FACP - Fire Alarm Control Panel
- NOFA - Normally Open Fire Alarm Contacts
- PL - Pilot Light
- CPT - Control Power Transformer
- SW AUX - Option A or B Normally Closed Contact
- **EOL** - Common Connection
- NC - NO
- COM - Contact Used to Disable Battery Lowering Device
- NO - Normally Open
- TO 120V - To 120V
- TO CR POINT A - To Contactor

**Option F3: Fire Alarm Voltage Monitoring Relay**

<table>
<thead>
<tr>
<th>FR</th>
<th>NO FA OUT</th>
<th>COM FA IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR</td>
<td>NO FA OUT</td>
<td>TO 120V</td>
</tr>
<tr>
<td>FR</td>
<td>NC</td>
<td>COM</td>
</tr>
</tbody>
</table>

**Option A: Battery Lowering Mechanically Interlocked Auxiliary Contact A**

<table>
<thead>
<tr>
<th>NC</th>
<th>COM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO 120V</td>
<td></td>
</tr>
</tbody>
</table>

**Option B Contacts**

<table>
<thead>
<tr>
<th>NC B</th>
<th>COM B</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECHANICALLY INTERLOKED AUXILIARY CONTACT</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Contacts for FR are shown in de-energized position.

**Note:** When Option B is present, Option A is also present.

**Note:** When Option B is present, Option A is also present.

**Technical Data**

- Eaton
- www.eaton.com

**Effecive March 2020**

**Note:** Effective March 2020.
OPTION F1: FIRE ALARM VOLTAGE MONITORING RELAY

VOLTAGE MONITORING

NC FR
**NC EL
COM FR

FR
NC FR
**NC EL
COM FR

NOTE: CONTACTS FOR FR ARE SHOWN IN DE-ENERGIZED POSITION.
**COMMON CONNECTION WITHOUT OPTION B, CONNECTION FOR WHEN A SUPERVISORY SIGNAL IS REQUIRED WHEN THE MAIN SWITCH IS IN THE OPEN POSITION, OR WHEN THE MAIN SWITCH IS CLOSED AND CONTROL POWER IS LOST.
TO MONITOR THE VOLTAGE THE CONTROL WIRING TO MEET NFPA 72-2002 SECTION 6.15.4.4

OPTION A: BATTERY LOWERING MECHANICALLY INTERLOCKED AUXILIARY CONTACT A

NC
COM
NO

BATTERY LOWERING

TO CONNECT THE BATTERY LOWERING FOR HYDRAULIC ELEVATOR, CONNECT TO POINTS NC AND COM.
NOTE: MECHANICALLY INTERLOCKED AUXILIARY CONTACTS ARE SHOWN FOR THE MAIN SWITCH IN CLOSED POSITION.
REQUIRED FOR HYDRAULIC ELEVATORS WITH AUTO RECALL AND LOWERING TO MEET NEC 2005 SECTION 620.9 (c)

OPTION B CONTACTS

NC B
COM B
NO B

MECHANICALLY INTERLOCKED AUXILIARY CONTACT

NOTE: WHEN OPTION B IS PRESENT, OPTION A IS ALSO PRESENT.
SHOWN WITH MAIN SWITCH IN CLOSED POSITION

LEGEND:
FACP - FIRE ALARM CONTROL PANEL.
NOFA - NORMALLY OPEN FIRE ALARM CONTROL INPUT.
NOFAM - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - 32VDC FOR REMOTE TRIP OF SWITCH WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER, NO ADDITIONAL POWER NEEDED. OR - CONTROL RELAY USED TO ISOLATE THE NOFAM CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e., FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
OPT - CONTROL POWER TRANSFORMERS USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED, OPEN AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-KEY SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE, CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.
- TERMINAL BLOCK CONNECTION POINT.
- PRE-WIRED CONNECTION POINTS.
NOTE: TERMINAL 1 IS NOT PRESENT WHEN OPTION K IS ABSENT.

Figure 6. Option F1
**Figure 7. Voltage monitoring with B-contact option**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC (B)</td>
<td>Terminal block connection point.</td>
</tr>
<tr>
<td>COM (B)</td>
<td>Contact used to disable battery lowering device.</td>
</tr>
<tr>
<td>NO (B)</td>
<td>Pre-wired connection points.</td>
</tr>
</tbody>
</table>

**LEGEND:**
- **FACP** - Fire Alarm Control Panel
- **NOFA** - Normally Open Fire Alarm Control Input
- **SHUNT TRIP** - Solenoid for remote trip of switch, which is activated by the closing of the fire alarm contacts or key test switch.
- **OPTION A** - Fire alarm interface relay that is operated at 12VAC from secondary of transformer. No additional power needed.
- **CR** - Control relay used to isolate the NO, FA, contacts from the duty of the shunt trip.
- **FR** - Fire alarm voltage monitoring relay used to monitor the status of control voltage from a remote location (i.e., fire alarm control panel).
- **PL** - Pilot light to visually indicate presence of voltage on inside of switch enclosure.
- **CPT** - Control power transformer used to step down line voltage to 120VAC to power shunt trip coil.
- **SW AUX** - Option A or B, normally closed contact when switch is closed, opens as power switch opens.
- **KEY TEST** - Key-to-test switch used to operate shunt trip from the outside of switch enclosure, can be used for trouble-shooting and inspection, mechanically interlocked auxiliary contact.
Figure 8. Common wiring scheme for AZ, TX, and OR applications—elevator control option B detail
Maintenance

Maintenance procedures
To properly maintain the Eaton elevator control ES switch, the operation of all components should be tested on an annual basis by a qualified person.

1. Take the necessary precautions to notify the occupants of the building that the elevator is under maintenance and has been taken out of service.
2. Verify that power is ON.
3. Activate the fire alarm system contacts for the shunt trip. This will energize the fire alarm isolation relay and close relay contact points 4 and 7.
   Note: A fire alarm technician may be required to exercise this step. If a key test switch is included with the elevator control ES switch, it can be used to shunt trip the unit without the fire alarm system.
4. The closure of points 4 and 7 will energize the shunt trip coil, open the contacts of the switch, and place the switch and handle into the TRIP position.
5. Verify that power has been disconnected and the handle is in the TRIP position.
6. Pull to the RESET position and allow handle to go to the OFF position.
7. Push to the ON position.
8. Verify that power has been restored.

The above sequence verifies that the contents of the Eaton elevator control ES switch are operating properly. If the above sequence is unable to be completed, please contact Eaton.

Preventive maintenance measures
- Periodically check lug torque values and keep them in specification
- An annual review of the Eaton elevator control ES switch is recommended. Preventive maintenance should include a thermal scan to uncover any portion generating excessive heat that indicates an underlying problem
- Any unexpected temperature increase not related to load variations or ambient temperature could signal a lug torque issue
- Maximum temperature at any lug should never exceed 75 °C under any operating condition or load
- Keep switch exterior and interior clean. Always follow prevailing safety rules when servicing this product throughout the year

Frequently asked questions

For more information or if you have additional questions, please contact EatonCare at 877-ETN-CARE (877-386-2273).

1. What UL listings and agency standards does the Eaton elevator control ES switch have?
   - NFPA-70 (NEC) 2008 Edition—Section 620.51(A)-(C), 620.62, 620.91(C)
   - ANSI/ASME A17.1-2007—Section 2.8.3.3.2 NFPA-72 2007 Edition—Section 6.16.4.4

All work shall be performed in accordance with the latest edition of applicable standards, codes, and laws.

2. What kind of fuses does Eaton recommend?

LPJ_SP or LPJ_SPI (indication version) dual-element, time-delay Class J fuses. The panel’s holders only accept this class of fuse. The fuses are current limiting for good short-circuit and motor overload protection, and minimizing arc flash hazards. For general fuse sizing the NEC Article 430.52 allows sizing time-delay fuses used in motor branch circuits to be sized for up to 175% of the motor full load amperes.

3. How does the mechanical auxiliary contact option (option A) work?

The “A” option is a set of auxiliary contacts that are mechanically interlocked to the main switch. The contacts are used to enable or disable the battery lowering device (BLD) for maintenance per NFPA code. It is important to note that these contacts can differentiate between manually turned OFF or shunted OFF (see Table 4). The most common contact is the NC, normally closed.

Table 4. Auxiliary switch logic

<table>
<thead>
<tr>
<th>Main switch position</th>
<th>Option A</th>
<th>Option B</th>
<th>Option A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO</td>
<td>NC</td>
<td>NO</td>
</tr>
<tr>
<td>Closed</td>
<td>0</td>
<td>C</td>
<td>0</td>
</tr>
<tr>
<td>Tripped</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Open</td>
<td>C</td>
<td>0</td>
<td>C</td>
</tr>
</tbody>
</table>

(C) Auxiliary switch logic when blue wire with “+” marker is removed from NC terminal.

4. How does the mechanical auxiliary contact option (option B) work?

The “B” option provides a second set of auxiliary contacts that are mechanically interlocked to the main switch. These contacts are generally used to monitor the status of the switch. It is important to note that these contacts will follow the state of the external handle (see Table 5 and Figure 5).

Table 5. Switch status

<table>
<thead>
<tr>
<th>Main switch</th>
<th>Contact state</th>
<th>FACP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO</td>
<td>NC</td>
</tr>
<tr>
<td>Off, power available</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>ON, power available</td>
<td>Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Off, no power</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>ON, no power</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>
5. How does the special wiring option for maintaining normal status signal to the FACP work?

For Arizona and other areas requiring this feature, internal wiring between the molded case switch's auxiliary contacts and the fire relay's contacts implements a logic circuit that monitors the availability of shunt-trip power. The FR relay closes only if the main switch is ON and the shunt-trip power fails. They will not close if the main switch is manually turned OFF for maintenance, the Series B contact will open, thus preventing a false alarm (see Table 5 and Figure 5).

6. Does the instantaneous trip feature built into the molded case switch create the potential to strand passengers when used on circuits with hydraulic elevators and auxiliary battery lowering?

No, the battery lowering device (BLD) remains operational under a shunt-trip condition. The shunt-trip mechanism within the switch is utilized, not the instantaneous trip feature of the switch. The proper fuse selection will prevent instantaneous trip. Even in the event of an instantaneous trip condition, the alarm relay will respond the same as when the switch is shunted OFF. There is no potential for stranding passengers when units are installed with the mechanical interlock auxiliary contact option (option A, battery backup feature).

7. During a power loss, will the state of the switch change state (F1 or F3 option)?

The Eaton elevator control ES switch will not change state. The Eaton elevator control ES voltage monitoring relay (F1 or F3 option) does meet NFPA 72 (National Fire Alarm Code) requiring control circuits to be monitored for presence of voltage. The unit is wired to sense the voltage available to initiate the shunt trip. It will change state if a power loss occurs. It does not rely on the shunt trip itself. It will send a signal to the FACP upon power loss.

8. How does the Eaton elevator control ES switch decide when the elevator needs to be lowered?

The Eaton elevator control ES switch does not make that decision. It provides a signaling means to the fire alarm controller and BLD. The elevator control switch receives a signal from the FACP to shunt trip, which in some cases results in the use of the BLD.

9. Does the Eaton elevator control ES switch require any periodic maintenance?

While no specific maintenance is called for, it is always a good practice to annually inspect the unit for any loose fuse clips or connections, or accumulation of foreign material. See “Maintenance” section on page 13 for more details.

10. How do you hook up the dry contacts for the battery backup (BLD) option?

This will depend on how the mechanical auxiliary contact (option A) will be connected. The A option will follow the truth table noted below. The most common connection will be between NC and COM.

### Table 6. Auxiliary switch logic

<table>
<thead>
<tr>
<th>Main switch position</th>
<th>Option A</th>
<th>Option B</th>
<th>Option A ⚫</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO</td>
<td>NC</td>
<td>NO</td>
</tr>
<tr>
<td>Closed</td>
<td>0</td>
<td>C</td>
<td>0</td>
</tr>
<tr>
<td>Tripped</td>
<td>C</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>Open</td>
<td>C</td>
<td>0</td>
<td>C</td>
</tr>
</tbody>
</table>

⚫ Auxiliary switch logic when blue wire with “+” marker is removed from NC terminal.

Where local authorities having jurisdiction permit, field removal of the blue wire identified by “+” marker will change the option A switch logic. Removal has the effect of disabling the BLD when the switch is in the tripped position. Field installer must ensure this meets all local codes before removal.

11. Where do you land the shunt-trip control wires on the terminal strip?

For the R1 option (120 Vac), land the wires on Terminals 1 and 3 or NOFAIN and NOFAIN (Normally Open Fire Alarm IN). For the R2 (24 Vdc) option, land the positive on Terminal 1 and the closure on Terminal 3, with the return on Terminal 7.

12. Where does the fire alarm get connected for monitoring the status of the switch?

This is commonly referred to as the FR relay and is option F1 or F3. NCFR/COM FR is the most common. If an end of line (EOL) resistor is used, install it parallel to the wires.

13. If an Eaton elevator control ES switch is ordered with a wrong component, can the component be changed in the field?

No. To comply with UL guidelines, product modifications can only be completed by authorized factory personnel. Other modifications will void the Eaton UL listing. One exception is the B option. It can be ordered and field installed; the part number is ECSBKIT.

14. Can the Eaton elevator control ES switch be used as a service entrance switch?

The Eaton elevator control ES switch is UL Listed per UL 98. Yes, it can be used as a service entrance if properly labeled as such and proper ground bond requirements are met.

15. Can the Eaton elevator control ES switch be fed in reverse with the line from the bottom and load out the top of the switch?

No, the Eaton elevator control ES switch will not properly function.
16. Can the Eaton elevator control ES switch be used in an application where no fire alarm exists and can a smoke detector be connected instead?

No, this is not in accordance with the fire code. Commercial smoke detectors must be connected through the FACP.

17. Does the FR relay (option F1 or F3) change state during a power loss?

Yes, the FR relay will change state. The FR relay is designed to monitor voltage that is available for the shunt trip. This is a requirement of NFPA 72.

18. Is the operating handle of the Eaton elevator control ES switch lockable in the OFF position only?

From the factory, the handle can only be locked in the OFF position and can accommodate a maximum of three padlocks. Field modification to drill the shroud can allow locking in the ON position. Check with your local AHJ for requirements. The switch will shunt trip as usual, even with the handle locked ON.

19. What enclosures are available for the Eaton elevator control ES switch?

All ratings of the Eaton elevator control ES switch come standard with a UL (NEMA) Type 1 enclosure. Optional enclosures include UL (NEMA) Type 3R, 4, and 12. Consult the factory for other options.

20. Is a CPT always required in an Eaton elevator control ES switch?

Yes, to meet NFPA codes, a CPT will be required to supply the 120 Vac for shunt tripping.

21. I lost the keyswitch, can I get another?

Yes. The part number is E22KS2 if the back of the switch says E22. If the back of the switch says M22, the part number is M22-ES-MS1.

22. Is surge protection available?

Yes. To facilitate compliance with NEC 620.51(E), an optional integral surge protective device is available. NEC 620.51(E) is related to any disconnecting means designated as supplying an emergency system load.
Disclaimer of warranties and limitation of liability

These technical data materials are published solely for information purposes and should not be considered all-inclusive. If further information is required, you should consult an authorized Eaton sales representative.

The sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between the parties. This literature is not intended to and does not enlarge or add to any such contract. The sole source governing the rights and remedies of any purchaser of this equipment is the contract between the purchaser and Eaton.

NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OR WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE, ARE MADE REGARDING THE INFORMATION, RECOMMENDATIONS, AND DESCRIPTIONS CONTAINED HEREIN. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations, and description contained herein.