

Emergency Stop Safety Modules

Model ES-UA-5A for 12-24V dc/115V ac operation; Model ES-VA-5A for 12-24V dc/230V ac operation



Features

- Monitors one dual-channel normally closed Emergency Stop switch circuit for a contact failure or wiring fault
- Four output switching channels for connection to control-reliable power interrupt circuits
- Auto reset or monitored manual reset
- Design complies with standards UL 991, EN 418, and EN 954-1 (Category 4)
- For use in functional stop category 0 applications per NFPA 79 and IEC/EN 60204-1
- 6 amp safety output contacts
- Plug-in terminal blocks
- 12-24V dc/115V ac or 12-24V dc/230V ac operation
- External Device Monitoring (one-channel EDM)

E-Stop Safety Module – Models ES-UA-5A and ES-VA-5A

Periodic Checkout Procedure

The functioning of the E-stop system must be verified on a regular periodic basis to ensure proper operation (see also the machine manufacturer's recommendations).

Procedure:

1. With the machine running, engage the E-stop switch (open its contact). Verify that the machine stops.
2. Return the E-stop switch to its closed-contact position. Verify that the machine does not restart.
3. Close and then open the Reset switch (if using manual reset mode). Verify that the machine can be restarted by normal initiation.

NOTE: If two or more E-stop switches are series-connected to one E-Stop Safety Module, this test must be run individually for EACH switch.

Repairs

NOTE: Do not attempt any repairs to the Emergency Stop Safety Module. It contains no field-replaceable components. Return the Safety Module to the factory for warranty repair or replacement.

If it ever becomes necessary to return an E-Stop Safety Module to the factory, please do the following:

1. Contact the Banner Factory Application Engineering Group at the address or at the numbers listed at the bottom of the back page. They will attempt to troubleshoot the system from your description of the problem. If they conclude that a component is defective, they will issue an RMA (Return Merchandise Authorization) number for your paperwork, and give you the proper shipping address.
2. Pack the E-Stop Safety Module carefully. Damage which occurs in return shipping is not covered by warranty.

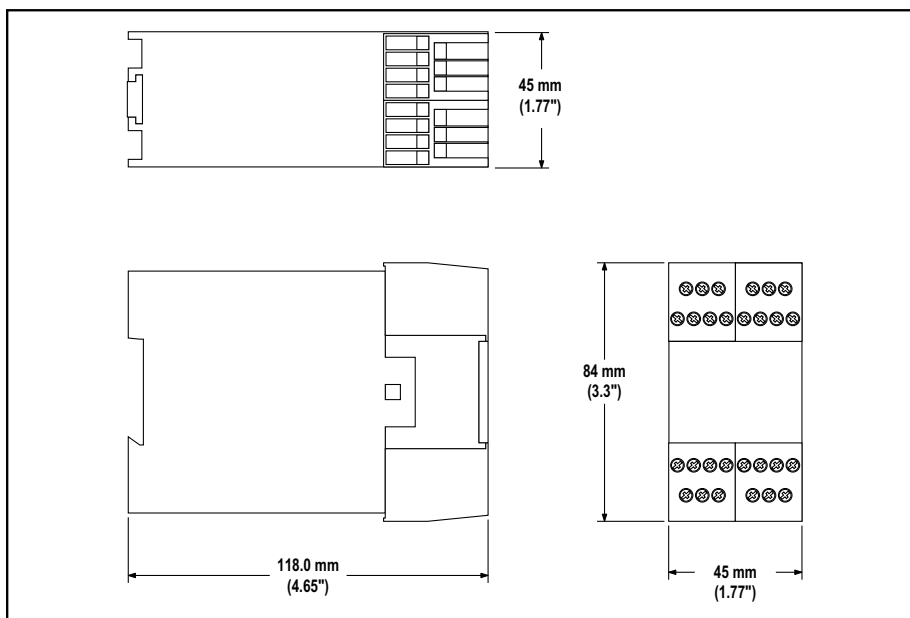


Figure 7. Model ES-UA-5A/ES-VA-5A E-Stop Safety Module enclosure dimensions



WARNING . . . Multiple E-Stop Switches

When two or more E-stop switches are used, each switch must be individually actuated (engaged), then re-armed and the E-Stop Safety Module reset (if using manual reset mode). This allows the monitoring circuits to check each switch and its wiring to detect faults. **Failure to test each switch individually in this manner could result in undetected faults and create an unsafe condition which could result in serious injury or death.**



CAUTION . . . Abuse of Module After Failure

If an internal fault has occurred and the ES-...A-5A will not reset, **do not tap, strike, or otherwise attempt to correct the fault by a physical impact to the housing.** An internal relay may have failed in such a manner that its replacement is required.

If the Module is not immediately replaced or repaired, multiple simultaneous failures may accumulate such that the safety function can not be guaranteed.

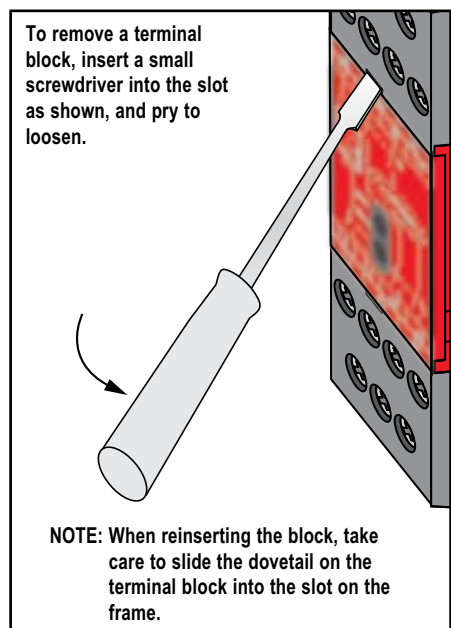





Figure 8. Removal of terminal blocks

E-Stop Safety Module – Models ES-UA-5A and ES-VA-5A

Specifications

Supply Voltage and Current	<p>A1-A2: 115V ac (Model ES-UA-5A) or 230V ac (model ES-VA-5A), $\pm 15\%$; 50/60Hz</p> <p>B1-B2: 12-24V dc, $\pm 15\%$, 10% max. ripple</p> <p>Power consumption: approx. 4W/7VA</p>												
Supply Protection Circuitry	Protected against transient voltages and reverse polarity												
Output Configuration	<p>Outputs (K1 & K2): four redundant (total of eight) safety relay (forced-guided) contacts – AgNi, 5 μm gold-plated, plus 1 N/C Auxiliary Monitor output – AgNi, 5 μm gold-plated</p> <p>Low Current Rating: Caution: The 5 μm gold-plated contacts allow the switching of low current/low voltage. In these low-power applications, multiple contacts can also be switched in series (e.g., “dry switching”).</p> <p>To preserve the gold plating on the contacts, the following max. values should not be exceeded at any time:</p> <table> <tr> <td>Min. voltage: 1V ac/dc</td> <td>Max. voltage: 60V</td> </tr> <tr> <td>Min. current: 5 mA ac/dc</td> <td>Max. current: 300 mA</td> </tr> <tr> <td>Min. power: 5 mW (5 mVA)</td> <td>Max. power: 7 W (7 VA)</td> </tr> </table> <p>High Current Rating: If higher loads must be switched through one or more of the contacts, the minimum and maximum values of the contact(s) changes to:</p> <table> <tr> <td>Min. voltage: 15V ac/dc</td> <td>Max. voltage: 250V ac/dc</td> </tr> <tr> <td>Min. current: 250 mA ac/dc</td> <td>Max. current: 6 A</td> </tr> <tr> <td>Min. power: 5 W (5 VA)</td> <td>Max. power: 200 W (1500 VA)</td> </tr> </table> <p>Mechanical life: 50,000,000 operations Electrical life: 150,000 operations (typical, @ 1,500 VA switched power, resistive load) 150,000 operations (typical, @ 200 W switched power, resistive load)</p> <p>NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts (see Warning, page 6).</p> <p>Solid-State Monitor Outputs: Two non-safety solid-state dc outputs Output at Y32 monitors state of outputs – conducts (output high) when both K1 and K2 are energized Output at Y35 conducts (output high) when internal power supply is OK Output circuits require application of +12-24V dc $\pm 15\%$ at terminal Y31; dc common at Y30 Maximum switching current: 100 mA at 12-24V dc Both outputs are protected against short circuits</p>	Min. voltage: 1V ac/dc	Max. voltage: 60V	Min. current: 5 mA ac/dc	Max. current: 300 mA	Min. power: 5 mW (5 mVA)	Max. power: 7 W (7 VA)	Min. voltage: 15V ac/dc	Max. voltage: 250V ac/dc	Min. current: 250 mA ac/dc	Max. current: 6 A	Min. power: 5 W (5 VA)	Max. power: 200 W (1500 VA)
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Output Response Time	25 milliseconds typical												
Input Requirements	<p>E-stop switch must have normally closed contacts each capable of switching 20 to 50mA @ 12 to 30V dc; and must be open ≥ 10 ms for a valid stop command. Maximum input resistance 250 Ω per channel.</p> <p>Reset switch must have one normally open contact capable of switching 20 to 50mA @ 12 to 30V dc.</p>												
On-Time Delay	100 ms; time from the E-stop contacts to close (Auto Reset) or the reset button to open (Manual Reset) and the safety outputs to close.												
Status Indicators	<p>3 green LED indicators: Power ON, K1 energized, K2 energized</p> <p>1 red LED indicator responds to fault of internal power supply, ground fault, or cross-short of input channels (see “Troubleshooting” on back cover for LED condition descriptions).</p>												
Housing	Polycarbonate. Rated NEMA 1 (IEC IP20)												
Mounting	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IEC IP54), or better.												
Vibration Resistance	10 to 55Hz @ 0.35 mm displacement per IEC 68-2-6												
Operating Conditions	<p>Operating Temperature: 0° to +50° C (+32° to 122° F)</p> <p>Maximum Relative Humidity: 90% @ +50° C (non-condensing)</p> <p>Heat Dissipation Considerations: See page 5</p>												
Dimensions	See Figure 7, page 10												
Certifications	   <p>EMERGENCY STOP DEVICE 231L</p>												