



the machine safety specialist

# DUO-TOUCH® SG Two-Hand Control Module

Model AT-FM-10K, for use with two actuating devices



## Features

- Diverse-redundant microcontrollers
- Monitors two Banner STB Self-Checking Optical Touch Buttons, or two mechanical push buttons
- Two redundant, forced-guided (mechanically linked) output contacts rated at 6 A
- Two auxiliary solid-state outputs (NPN and PNP), plus auxiliary N.C. relay output
- Feedback input monitors external machine control elements
- 5 indicator LEDs for Power, Fault, Input 1, Input 2 and Output
- 24V ac/dc operation
- DIN-rail-mountable 22.5 mm-wide housing with removable terminal blocks
- 500 ms (max.) simultaneity requirement for touch-/push button operation

## Description

A DUO-TOUCH SG Two-Hand Control Safety Module may be used with:

- Two Banner STB Self-Checking Optical Touch Buttons, each with one normally open and one normally closed relay output contact, or
- Two Banner STB Self-Checking Optical Touch Buttons, each with two current-sourcing PNP outputs, or
- Two mechanical push buttons, each with one normally open and one normally closed contact (Form C contact)

If the machine operator removes one or both hands from the actuating device(s), the Duo-Touch SG relays de-energize, causing the output contacts to open. The relays will not re-energize until both actuating devices are deactivated and then simultaneously reactivated.

**The Duo-Touch SG Two-Hand Control Kit system has been designed to meet:**

- Type IIIC requirements of ISO 13851 (EN 574) Safety of Machinery – Two-Hand Control Devices, and
- Category 4 requirements of ISO 13849-1 (EN 954-1) Safety of Machinery – Safety-Related Parts of Control Systems – Part 1: General Principles of Design

The Safety Module's output signal consists of two sets of redundant, forced-guided (mechanically linked) contacts (see Figure 4). Circuitry within the Safety Module monitors these internal contacts and prevents an output signal from occurring if a fault is detected. A feedback loop is offered for monitoring the status of the machine control elements.

**DUO-TOUCH SG Safety Module LED Indicators** (see Figure 1)

- Power On:** ON when power is applied
- Fault:** ON if simultaneity is not met or external wiring fault  
Flashing when internal fault condition is detected
- Input 1 (2) Status:** ON if touch button is activated  
OFF when button is not activated  
Flashing if external wiring fault is detected
- Output Status:** ON if both relays (K1 and K2) are energized  
Flashing if feedback error has occurred

# DUO-TOUCH® SG – Model AT-FM-10K Two-Hand Control Module

## Repairs

**NOTE: Do not attempt any repairs to the DUO-TOUCH SG Two-Hand Control Module. It contains no field-replaceable components. Return it to the factory for warranty repair or replacement.**

If it ever becomes necessary to return a DUO-TOUCH SG 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 component carefully. Damage which occurs in return shipping is not covered by warranty.



### CAUTION ... Abuse of Module After Failure

If an internal fault has occurred and the Module 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.**

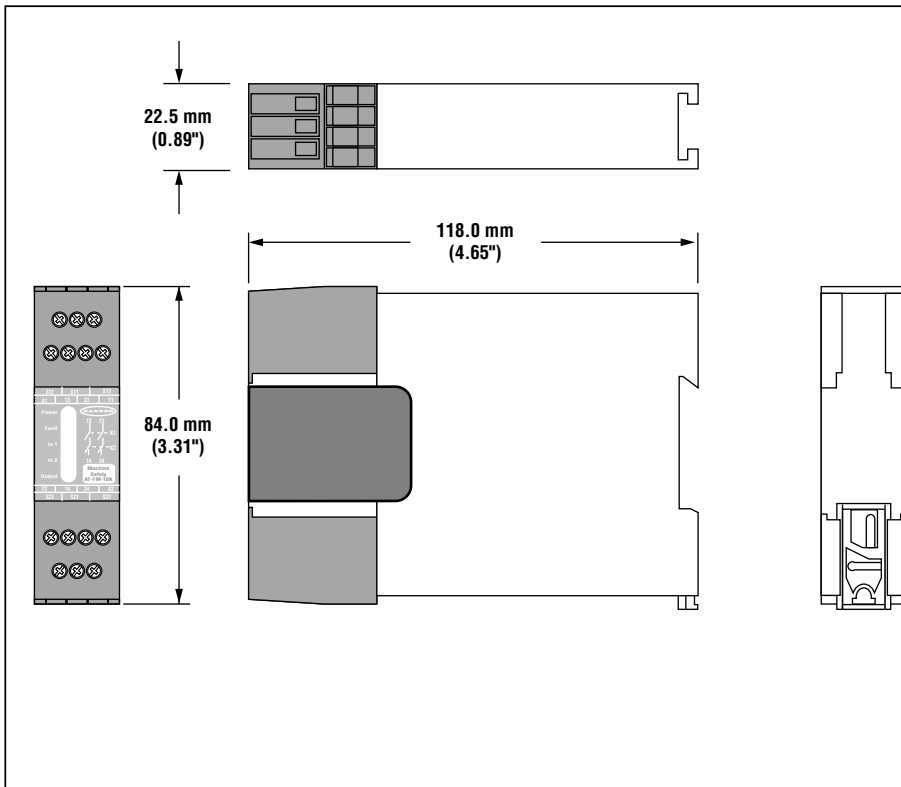


Figure 5. DUO-TOUCH SG Safety Module dimensions

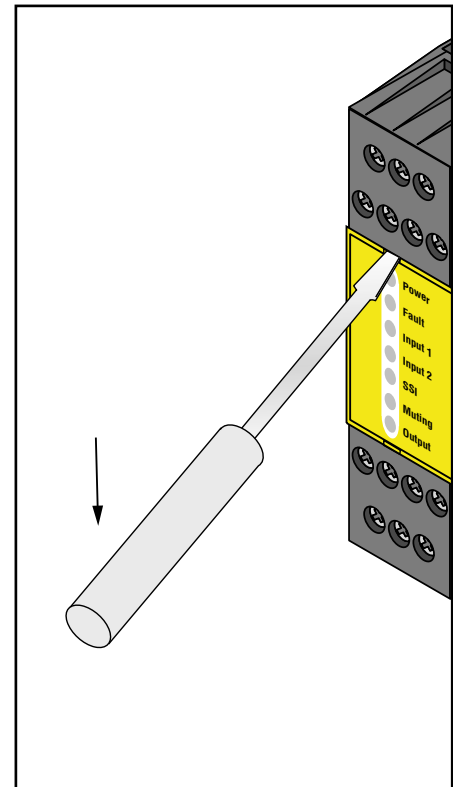





Figure 6. To remove a terminal block, insert a small screwdriver into the slot as shown, and pry to loosen.

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## Specifications

|                                       |  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
|---------------------------------------|--|--------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|-------------------------------|--------------------------------|---------------------------------|-----------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Supply Voltage and Current</b>     | 24V ac/dc ±15% @ 150 mA  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Supply Protection Circuitry</b>    | Protected against transient voltages and reverse polarity  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Output Configuration</b>           | <p>Each normally open output channel is a series connection of contacts from two forced-guided (positive-guided) relays, K1-K2.</p> <p><b>Contacts:</b> AgNi, 5 µm gold-plated</p> <p><b>Low Current Rating:</b><br/> <b>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”).</b></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><b>Min. voltage:</b> 1V ac/dc</td> <td><b>Max. voltage:</b> 60V</td> </tr> <tr> <td><b>Min. current:</b> 5 mA ac/dc</td> <td><b>Max. current:</b> 300 mA</td> </tr> <tr> <td><b>Min. power:</b> 5 mW (5 mVA)</td> <td><b>Max. power:</b> 7 W (7 VA)</td> </tr> </table> <p><b>High Current Rating:</b><br/>           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><b>Min. voltage:</b> 15V ac/dc</td> <td><b>Max. voltage:</b> 250V ac/dc</td> </tr> <tr> <td><b>Min. current:</b> 250 mA ac/dc</td> <td><b>Max. current:</b> 6 A</td> </tr> <tr> <td><b>Min. power:</b> 5 W (5 VA)</td> <td><b>Max. power:</b> 200 W (1,500 VA)</td> </tr> </table> <p><b>Mechanical life:</b> 50,000,000 operations<br/> <b>Electrical life:</b> 150,000 operations typical, @ 200 W (1,500 VA) switched power, resistive load.</p> <p><b>Note: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts (see Warning, page 7).</b></p> | <b>Min. voltage:</b> 1V ac/dc  | <b>Max. voltage:</b> 60V    | <b>Min. current:</b> 5 mA ac/dc | <b>Max. current:</b> 300 mA | <b>Min. power:</b> 5 mW (5 mVA) | <b>Max. power:</b> 7 W (7 VA) | <b>Min. voltage:</b> 15V ac/dc | <b>Max. voltage:</b> 250V ac/dc | <b>Min. current:</b> 250 mA ac/dc | <b>Max. current:</b> 6 A | <b>Min. power:</b> 5 W (5 VA) | <b>Max. power:</b> 200 W (1,500 VA) |
| <b>Min. voltage:</b> 1V ac/dc         | <b>Max. voltage:</b> 60V   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Min. current:</b> 5 mA ac/dc       | <b>Max. current:</b> 300 mA  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Min. power:</b> 5 mW (5 mVA)       | <b>Max. power:</b> 7 W (7 VA)  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Min. voltage:</b> 15V ac/dc        | <b>Max. voltage:</b> 250V ac/dc  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Min. current:</b> 250 mA ac/dc     | <b>Max. current:</b> 6 A   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Min. power:</b> 5 W (5 VA)         | <b>Max. power:</b> 200 W (1,500 VA)  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Output Response Time</b>           | 35 milliseconds maximum ON and OFF   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Input Requirements</b>             | Outputs from actuating devices must each be capable of switching up to 20 mA @ 12V dc.   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Simultaneity Monitoring Period</b> | ≤ 500 milliseconds   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Status Indicators</b>              | <table> <tr> <td><b>4 green LED indicators:</b></td> <td><b>1 red LED indicator:</b></td> </tr> <tr> <td>Power ON</td> <td>Fault</td> </tr> <tr> <td>Input 1 energized</td> <td></td> </tr> <tr> <td>Input 2 energized</td> <td></td> </tr> <tr> <td>Output</td> <td></td> </tr> </table>  | <b>4 green LED indicators:</b> | <b>1 red LED indicator:</b> | Power ON                        | Fault                       | Input 1 energized               |                               | Input 2 energized              |                                 | Output                            |                          |                               |                                     |
| <b>4 green LED indicators:</b>        | <b>1 red LED indicator:</b>  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| Power ON                              | Fault  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| Input 1 energized                     |  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| Input 2 energized                     |  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| Output                                |  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Housing</b>                        | Polycarbonate. Rated NEMA 1 (IEC IP20)   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Mounting</b>                       | Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IEC IP54), or better.   |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Vibration Resistance</b>           | 10 to 55 Hz @ 0.35 mm displacement per IEC 68-2-6  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Operating Conditions</b>           | <p><b>Temperature:</b> 0° to +50°C (+32° to 122°F)</p> <p><b>Maximum Relative Humidity:</b> 90% @ +50°C (non-condensing)</p> <p><b>Heat Dissipation Considerations:</b> See page 4.</p>  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Dimensions</b>                     | See Figure 5.  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Safety Category</b>                | 4 per ISO 13849-1; Type IIIC per ISO 13851 (EN574) (when used with STBs or hard contacts)  |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |
| <b>Certifications</b>                 |     |                                |                             |                                 |                             |                                 |                               |                                |                                 |                                   |                          |                               |                                     |