Banner DUO-TOUCH® two-hand control safety relay shown with two optional OPTO-TOUCH™ switches - see page 165.

- Banner DUO-TOUCH two-hand control safety relays provide a degree of protection for the hands of a machine operator; they are used with two normally-open input switches in the form of “hand controls” such as push buttons, optical touch buttons, etc.

- The DUO-TOUCH circuitry requires simultaneous actuation of both hand controls to generate an output signal.

- The output signal from DUO-TOUCH safety relays is used to start and maintain a machine cycle.

- Design complies with UL 491 category QUHP, when used to control part revolution clutched machinery.

- The design of the Banner DUO-TOUCH two-hand safety relay qualifies for the highest ranking: safety category 4, per EN 954.

- A feedback loop is offered for monitoring the status of machine control elements.

---

**WARNING** When properly installed, a DUO-TOUCH® two-hand control relay and its associated hand controls provide protection only for the hands of the machine operator. It is necessary to install point of operation guarding devices, such as safety light curtains and/or hard guards, to protect personnel from hazardous machinery.

**SECTION CONTENTS**

| **DUO-TOUCH® Two-Hand Safety Relays** | 160 |
| **DUO-TOUCH® Accessories** | 165 |
DUO-TOUCH Safety Relays

- Simultaneous actuation of both hand controls generate an output signal; if either hand is released, the output signal from the DUO-TOUCH is canceled and cannot be reestablished until both hand controls have been released, and simultaneously actuated again
- Redundant forced-guided (positive guided) output contacts which are monitored to prevent an output signal from occurring if a fault is detected
- Fault recognition safety control circuitry design qualifies the DUO-TOUCH as a safety category 4 control device, per European standard EN 954
- Models available for 24V ac/dc, 120V ac, and 240V ac operation
- Design complies with UL 491 category QUHP, device type 4, when used to control part revolution clutched machinery

Kits are available which include one DUO-TOUCH safety relay and two OPTO-TOUCH switches. Note that cables for quick disconnect OPTO-TOUCH switches are ordered separately (see page 170 for cable information). Individual OPTO-TOUCH switches are also available (see DUO-TOUCH Accessories, page 165).

### DUO-TOUCH Safety Relays

<table>
<thead>
<tr>
<th>Models</th>
<th>Enclosure</th>
<th>Response</th>
<th>Supply Voltage</th>
<th>Output Type</th>
<th>Timing Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-AM-2A</td>
<td>Poly-carbonate NEMA 1 (IEC IP20)</td>
<td>25 ms</td>
<td>115V ac</td>
<td>Two-redundant N.O. safety relays</td>
<td>Power Feedback Loop</td>
</tr>
<tr>
<td>AT-BM-2A</td>
<td></td>
<td></td>
<td>230V ac</td>
<td></td>
<td>Input SW1 Input SW2 Feedback Open SW1 tied down SW2 tied down</td>
</tr>
<tr>
<td>AT-FM-2A</td>
<td></td>
<td></td>
<td>24V ac or dc</td>
<td></td>
<td>Output &lt; 20 ms (Typ.) &lt; 150 ms &lt; 150 ms Feedback Open SW1 tied down SW2 tied down</td>
</tr>
</tbody>
</table>

### DUO-TOUCH Kits

<table>
<thead>
<tr>
<th>Models</th>
<th>Supply Voltage</th>
<th>DUO-TOUCH Model</th>
<th>OPTO-TOUCH Models</th>
<th>OPTO-TOUCH Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-AM-K5</td>
<td>115V ac</td>
<td>AT-AM-2A</td>
<td>(2) OTBA5</td>
<td>SPDT Electromechanical Relay</td>
</tr>
<tr>
<td>AT-AM-K5Q</td>
<td></td>
<td></td>
<td>(2) OTBA5QD</td>
<td></td>
</tr>
<tr>
<td>AT-BM-K5</td>
<td>230V ac</td>
<td>AT-BM-2A</td>
<td>(2) OTBB5</td>
<td>Normally-open Solid-state</td>
</tr>
<tr>
<td>AT-BM-K5Q</td>
<td></td>
<td></td>
<td>(2) OTBB5QD</td>
<td></td>
</tr>
<tr>
<td>AT-FM-K81</td>
<td>24V ac/dc</td>
<td>AT-FM-2A</td>
<td>(2) OTBVR81</td>
<td></td>
</tr>
<tr>
<td>AT-FM-K81Q</td>
<td></td>
<td></td>
<td>(2) OTBVR81QD</td>
<td></td>
</tr>
<tr>
<td>AT-FM-K6</td>
<td>24V dc</td>
<td>AT-FM-2A</td>
<td>(1) OTBVN6 (1) OTBVP6</td>
<td></td>
</tr>
<tr>
<td>AT-FM-K6Q</td>
<td></td>
<td></td>
<td>(1) OTBVN6QD (1) OTBVP6QD</td>
<td></td>
</tr>
</tbody>
</table>
## DUO-TOUCH Product Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
</table>
| **Supply Voltage and Current**   | AT-FM-2A: 24 V ac/dc ±15%, 50/60 Hz, Power Consumption: approx. 4.5 W  
AT-AM-2A: 115V ac ±15%, 50/60 Hz, Power Consumption: approx. 4.5 W  
AT-BM-2A: 230V ac ±15%, 50/60 Hz, Power Consumption: approx. 4.5 W |
| **Supply Protection Circuitry**  | Protected against transient voltages and reverse polarity (dc hookup is without regard to polarity)                                           |
| **Output Configuration**         | Outputs (K1 and K2): two redundant (i.e. total of four) safety relay (forced-guided) contacts  
Contact ratings:  
Maximum voltage: 250V ac or 250V dc  
Maximum current: 4A ac or dc (resistive load)  
Maximum power: 1000VA, 20 watts  
Mechanical life: 10,000,000 operations  
Electrical life: 100,000 at full resistive load  
NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.  
Auxiliary Monitor Output (K3): One non-safety relay contact  
Maximum switching voltage: 125V ac or V dc  
Maximum switching current: 500 mA (resistive load) |
| **Output Response Time**         | 25 milliseconds maximum                                                                                                                        |
| **Input Requirements**           | Inputs must each be capable of switching 40 to 100 mA @ 12 to 18V dc.                                                                          |
| **Simultaneity Monitoring**      | 250 milliseconds (typical), 170 milliseconds min.  
<500 milliseconds under all fault conditions                                                                                           |
| **Status Indicators**            | 3 green LED indicators:  
Power ON  
K1 energized  
K2 energized                                                                                                                               |
| **Housing**                      | Polycarbonate. Rated NEMA 1, IEC IP20                                                                                                           |
| **Mounting**                     | Mounts to standard 35 mm DIN rail track. Safety relay must be installed inside an enclosure rated NEMA 3, IEC IP54, or better.               |
| **Vibration Resistance**         | 10 to 55 Hz @ .35 mm displacement per IEC 68-2-6                                                                                               |
| **Operating Temperature**        | 0° to 50°C (32° to 122°F)                                                                                                                      |
| **Dimensions**                   | See diagram, below                                                                                                                             |
| **Safety Category**              | 4 per pr EN 954                                                                                                                               |
| **Certifications**               | Models: AT-AM-2A  
AT-FM-2A  
LISTED  
Presence Sensing Devices                                                                                                                 |

## DUO-TOUCH Dimensions

**Bottom View**

![Dimensions Diagram](image-url)
**DUO-TOUCH Safety Relays**

**DUO-TOUCH Hookup with Mechanical or Electromechanical Input Switches Diagram**

---

**Model**
- AT-AM-2A 115V ac
- AT-BM-2A 230V ac
- AT-FM-2A 24V ac or dc

**DUO-TOUCH**

**SW1**

**SW2**

**L**

**N**

**A1 S13 S14 S23 S24 41**

**A2 X1 X2 42**

**Monitor Contact**
- MPCE1
- MPCE2

**Internal Redundant Safety Relay Outputs**
- K1A 4A max.
- K2A

**Non-safety Auxiliary Monitor Contact**
- 0.5A max.
- K3 Non-safety

**Machine Primary Control Elements**

**WARNING**

If arc suppressors are used, they **MUST** be installed as shown across the coils of the safety relays. **NEVER** install suppressors directly across the output contacts of the DUO-TOUCH relay. It is possible for suppressors to fail as a short circuit. If installed directly across the output contacts of the DUO-TOUCH relay, a short-circuited suppressor will create an unsafe condition which could result in serious injury or death.

---

**IMPORTANT!** Refer to instruction manual p/n 47550 for complete installation information.
NOTE: One switch has current sourcing output and one has current sinking output.

Solid-state switches must draw no more than 25 milliamps, each.

Inputs S13 and S23 are rated at 12 to 18V dc (max.)

IMPORTANT! Refer to instruction manual p/n 47550 for complete installation information

WARNING (Reference ANSI B11.1 – 1988, Appendix B4)
NEVER wire an intermediate device (for example, a programmable logic controller - PLC), other than a safety relay, between safety relay outputs and the master stop control element it switches. To do so sacrifices the control reliability of the control-to-machine interface, and creates an unsafe condition. Whenever a safety relay is added as an intermediate switching device, a normally-closed forced-guided monitor contact of that relay must be added to the series feedback loop.