**OPTO-TOUCH™ Switches**

- Photoelectric touch switches provide a superior substitute or replacement for mechanical push buttons
- Ergonomically-designed to eliminate hand, wrist and arm stresses associated with repeated switch operation; no physical pressure is required to operate the switch
- Totally immune to ambient light interference and highly immune to the effects of multiple simultaneous interference sources of EMI and/or RFI
- Very high excess gain cuts through heavy contamination
- Two LED’s indicate switch status
- Choice of polysulfone or Lexan® polycarbonate upper housing (see Specifications); rugged and totally sealed housings are suitable for even wet environments
- All models are supplied with a black polycarbonate-PET polyester field cover designed to prevent inadvertent switch activation; red, yellow or green field covers are available as options

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**OPTO-TOUCH (OTB) Momentary Action Switches**

<table>
<thead>
<tr>
<th>Models</th>
<th>Cable</th>
<th>Upper Housing</th>
<th>Supply Voltage</th>
<th>Output Type</th>
<th>DUO-TOUCH® Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTBVN6</td>
<td>2 m (6.5 ft)</td>
<td>Polysulfone</td>
<td>10-30V dc</td>
<td>Complementary NPN</td>
<td>AT-FM-2A (Requires one NPN and one PNP model OTB)</td>
</tr>
<tr>
<td>OTBVN6QD</td>
<td>4-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBVNL</td>
<td>2 m (6.5 ft)</td>
<td>Lexan®</td>
<td></td>
<td>Complementary PNP</td>
<td></td>
</tr>
<tr>
<td>OTBVNLQD</td>
<td>4-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBVPL</td>
<td>2 m (6.5 ft)</td>
<td>Polysulfone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBVPLQD</td>
<td>4-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBVR81</td>
<td>2 m (6.5 ft)</td>
<td>Polysulfone</td>
<td>20-30V ac or dc</td>
<td></td>
<td>AT-FM-2A (Requires 2 OTBs)</td>
</tr>
<tr>
<td>OTBVR81QD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBVR81L</td>
<td>2 m (6.5 ft)</td>
<td>Lexan®</td>
<td></td>
<td></td>
<td>AT-AM-2A (Requires 2 OTBs)</td>
</tr>
<tr>
<td>OTBVR81LQD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBA5</td>
<td>2 m (6.5 ft)</td>
<td>Polysulfone</td>
<td>120V ac</td>
<td>SPDT Electromechanical Relay</td>
<td>AT-BM-2A (Requires 2 OTBs)</td>
</tr>
<tr>
<td>OTBA5QD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBA5L</td>
<td>2 m (6.5 ft)</td>
<td>Lexan®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBA5LQD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBB5</td>
<td>2 m (6.5 ft)</td>
<td>Polysulfone</td>
<td>220/240V ac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBB5QD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBB5L</td>
<td>2 m (6.5 ft)</td>
<td>Lexan®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTBB5LQD</td>
<td>5-Pin Mini QD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lexan® is a registered trademark of General Electric Co.

For OPTO-TOUCH Switches:

1) 9 m (30 ft) cables are available by adding suffix “W/30” to the model number of any cabled OTB (e.g., - OTBA5 W/30)
2) A model with a QD connector requires an optional mating cable. See page 170 for more information.
3) Red, green or yellow field covers are available as options. See page 171 for more information.
IMPORTANT Information Regarding Use of OPTO-TOUCH Switches for Two-Hand Machine Control

Requirements for Anti-tiedown Circuitry

Two-hand control has been a popular means for actuation of single-stroke presses and other single-cycle machinery for many years. Optical Touch Switches (OTBs) provide an ergonomic (stress-free) alternative to conventional mechanical push buttons used as actuators in two-hand controls.

OSHA Requirements for Anti-tiedown Control

Use of OTBs for two-hand machine actuation must include “anti-tiedown” control to prevent any means of defeating one or both actuators to create a one-hand trip. Federal law mandates the use of anti-tiedown control when two-hand trip actuators are used for cycle initiation of a single stroke part revolution clutched mechanical power press. OSHA Code of Federal Regulation, 7-1-92 Edition, CFR Title 29, Part 1910.217 (b) (6) (i) states:

“A two-hand trip shall have the individual operator's hand controls protected against unintentional operation and have the individual operator's hand controls arranged by design and construction and/or separation to require the use of both hands to trip the press and use a control arrangement requiring concurrent operation of the individual operator's hand controls.”

Concurrent or “synchronous” actuation of two-hand controls is the most popular approach to anti-tiedown. European Standard EN 574, title “Safety of Machinery - Two-handed Control Device”, defines synchronous actuation as follows:

“6.7 Synchronous actuations
In synchronous actuation, an output signal shall be generated only when both control actuating devices are actuated – in a time which is less than or equal to 0.5 seconds...
...If the control actuating devices are not actuated synchronously the output signal shall be prevented and it shall be necessary to release both actuating devices and to reinitiate both input signals.”

WARNING! In the United States, the functions that a two-hand control device is intended to perform are regulated by the Occupational Safety and Health Administration (OSHA). Whether or not any particular two-hand control system installation meets all applicable OSHA requirements depends upon the details of how the two-hand control device is applied, installed, operated, and maintained.

When properly installed, a two-hand control device using OPTO-TOUCH OTB Series Optical Touch Switches can 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 dangerous machine motion.

WARNING! Never use an OPTO-TOUCH Optical Touch Switch as an actuator in an emergency stop (E-Stop) circuit. E-Stop actuators must be purely mechanical devices that require no power to operate. OPTO-TOUCH Optical Touch Switches require power to operate and must not be used as E-Stop actuators under any circumstances.

NOTE: In addition to the standards and regulations mentioned above, there are numerous regulations and machine safety standards that apply to specific industries. For assistance in obtaining copies of any of these standards, contact Banner at the address or numbers listed on inside front cover.
## OPTO-TOUCH Product Specifications

### Supply Voltage and Current
- **OTBVR81** models: 20 to 30V ac/dc
- **OTBA5** models: 105 to 130V ac
- **OTBB5** models: 210 to 250V ac
- **OTBVN6/VP6** models: 10 to 30V dc
All models require less than 25 mA (exclusive of load)

### Supply Protection Circuitry
Protected against reverse polarity and transient voltages

### Output Configuration
- **OTBVR81**, **OTBA5**, and **OTBB5** models: SPDT electromechanical relay
- **OTBVN6** models: Complementary (SPDT) NPN (sinking) open-collector transistor
- **OTBVP6** models: Complementary (SPDT) PNP (sourcing) open-collector transistors

### Output Rating
Models with electromechanical relay:
- **Maximum switching current**: 7 amps (resistive load), 1 HP maximum
- **Minimum load**: 0.05 watts (dc), 0.05 VA (ac)
- **Mechanical life of relay**: 50,000,000 operations (minimum)
- **Electrical life of relay**: 100,000 operations (min.) at full resistive load
  Transient suppression is recommended when switching inductive loads
Models with solid-state outputs:
- **150 mA maximum load** (each output)
- **On-state saturation voltage**: <1 volt at signal levels; <1.5 volts at full load
- **Off-state leakage current**: <1 microamp

### Output Protection
All models protected against false pulse on power-up
Models with solid-state outputs have overload and short circuit protection

### Indicators
Two red indicator LEDs: one lights whenever power is applied; the other lights whenever the normally-open output is conducting

### Construction
Totally encapsulated, non-metallic enclosure. Black polysulfone or red Lexan® polycarbonate upper housing (see Application Notes below); fiber-reinforced VALOX® base. Electronics fully epoxy-encapsulated.
Supplied with a field cover of polycarbonate-PET polyester.

### Environmental Rating
Meets NEMA standards 1, 3, 4, 4X, 12 and 13; IEC IP66

### Connections
PVC-jacketed 2 m (6.5 ft) or 9 m (30 ft) cables, or mini-style quick disconnect (QD) fitting are available. QD cables are ordered separately. See page 170.

### Ambient Light Immunity
120,000 lux (direct sunlight)

### EMI/RFI Immunity
Highly resistant to both single and mixed EMI and RFI noise sources

### Operating Temperature
- **Temperature**: -20° to +50°C (-4° to +122°F)
- **Maximum relative humidity**: 90% at 50°C (non-condensing)

### Application Notes
**Environmental Considerations for models with polysulfone upper housings:**
The polysulfone upper housing will become embrittled with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight.

**Environmental Considerations for models with Lexan® polycarbonate upper housings:**
Avoid prolonged exposure to hot water and moist high-temperature environments above 66°C (150°F). Avoid contact with aromatic hydrocarbons (such as xylene and toluene), halogenated hydrocarbons and strong alkalies.
Clean periodically using mild soap solution and a soft cloth. Avoid strong alkaline materials.

### Certifications
- CE
- UL

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**Quick Disconnect (QD) Option**

OPTO-TOUCH switches are sold with either a 2 m (6.5 ft) or a 9 m (30 ft) attached PVC-covered cable, or with a 4- or 5-pin mini-style QD cable fitting.

OPTO-TOUCH switches are identified by the letters “QD” in their model number suffix. Information on mating cables for QD OPTO-TOUCH switches can be found on page 170.
4-Pin Mini-Style Pin-out (Cable Connector Shown)

- White Wire
- Black Wire
- Blue Wire
- Brown Wire

5-Pin Mini-Style Pin-out (Cable Connector Shown)

- White Wire
- Black Wire
- Blue Wire
- Brown Wire
- Yellow Wire

4- or 5-Pin Mini-Style Side View

- 61 mm max.
- 7/8-16UN-2B
- Ø15 mm

OPTO-TOUCH Dimension Information

**OPTO-TOUCH with Attached Cable**

- Cover: Black Polysulfone or Red Lexan
- Base: Black Fiber Reinforced Valox
- Indicator LEDs are Visible in These Areas

**OPTO-TOUCH with Quick Disconnect**

- Cover: Black Polysulfone or Red Lexan
- Base: Black Fiber Reinforced Valox
- Indicator LEDs are Visible in These Areas

Indicator LED States:
- LED 1 Turns On When the Unit is Powered Up
- LED 2 Follows the Action of the Output

Opto-Touch Hookup Diagrams

- 4-Pin Mini-Style Pin-out
- 5-Pin Mini-Style Pin-out

Wire Colors:
- Black Wire
- Blue Wire
- Brown Wire
- Yellow Wire
- White Wire

**OPTO-TOUCH Hookup Diagrams**

- 4-Pin Mini-Style Pin-out
- 5-Pin Mini-Style Pin-out

**OPTO-TOUCH with Attached Cable**

- 43.2 mm (1.70 in)
- 27.9 mm (1.09 in)
- 15.0 mm (0.59 in)
- 13.0 mm (0.50 in)

**OPTO-TOUCH with Quick Disconnect**

- 43.2 mm (1.70 in)
- 22.1 mm (0.87 in)
- 22.9 mm (0.89 in)
- 13.0 mm (0.50 in)
## OPTO-TOUCH Modifications

<table>
<thead>
<tr>
<th>Model Suffix</th>
<th>Modification</th>
<th>Description</th>
<th>Example of Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/30</td>
<td>9 m (30 ft) cable</td>
<td>All OPTO-TOUCH switches may be ordered with an integral 9 m (30 ft) cable in place of the standard 2 m (6.5 ft) cable</td>
<td>OTBVN6 W/30</td>
</tr>
</tbody>
</table>

## OPTO-TOUCH Quick Disconnect (QD) Cables

Following is the selection of cables available for OPTO-TOUCH QD models. See the Accessories section for more cable information.

<table>
<thead>
<tr>
<th>Style</th>
<th>Model</th>
<th>Length</th>
<th>Connector</th>
<th>Used with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Pin Mini</td>
<td>MBCC-406</td>
<td>2 m (6.5 ft)</td>
<td>Straight</td>
<td>All 10-30V dc OPTO-TOUCH QD models</td>
</tr>
<tr>
<td></td>
<td>MBCC-412</td>
<td>4 m (12 ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MBCC-430</td>
<td>9 m (30 ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-Pin Mini</td>
<td>MBCC-506</td>
<td>2 m (6.5 ft)</td>
<td>Straight</td>
<td>All OPTO-TOUCH QD models with electromechanical relay</td>
</tr>
<tr>
<td></td>
<td>MBCC-512</td>
<td>4 m (12 ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MBCC-530</td>
<td>9 m (30 ft)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## OPTO-TOUCH Mounting Brackets

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
</table>
| SMB30MM    | • 30 mm, 11-gauge, stainless steel bracket with curved mounting slots for versatility and orientation  
              • Clearance for M6 (1/4 in) hardware                                           |            |
| SMB30S     | • 30 mm swivel, black VALOX® bracket                                          |            |
|            | • Stainless steel mounting hardware included                                  |            |
| SMB30C     | • 30 mm split clamp, black VALOX® bracket                                     |            |
|            | • Stainless steel mounting hardware included                                  |            |
**OPTO-TOUCH Field Covers**

OPTO-TOUCH field covers are designed to prevent inadvertent activation of OPTO-TOUCHs due to objects (loose clothing, debris, etc.) which might accidentally block their sensing beam. Field covers are constructed of rugged polycarbonate-PET polyester blend and highly resistant to abrasion and to damage by most chemicals. NOTE: Each OPTO-TOUCH is supplied with a black field cover.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTC-1-BK</td>
<td>Black cover</td>
</tr>
<tr>
<td>OTC-1-GN</td>
<td>Green cover</td>
</tr>
<tr>
<td>OTC-1-RD</td>
<td>Red cover</td>
</tr>
<tr>
<td>OTC-1-YW</td>
<td>Yellow cover</td>
</tr>
</tbody>
</table>

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**35 mm DIN Rail Track for Safety Relays**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN-35-70</td>
<td>Track designed to hold one DUO-TOUCH safety relay</td>
<td>DIN - 35-70: Approx. 70 mm (2.7 in)</td>
</tr>
<tr>
<td>DIN-35-105</td>
<td>Track designed to hold two DUO-TOUCH safety relays</td>
<td>DIN - 35-105: Approx. 140 mm (5.5 in)</td>
</tr>
<tr>
<td>DIN-35-140</td>
<td>Track designed to hold three DUO-TOUCH safety relays</td>
<td>DIN - 35-140: Approx. 210 mm (8.3 in)</td>
</tr>
</tbody>
</table>

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