OPTO-TOUCH™
OTB Series

Momentary Action Optical Touch Buttons

BANNER®
the photoelectric specialist

Banner Optical Touch Buttons are **touch-activated photoelectric switches designed to replace capacitive touch switches and mechanical push buttons.** The OPTO-TOUCH's SPDT electromechanical relay or solid-state output (depending upon model) is activated for as long as a finger, introduced into the "touch area" (yoke) of the switch, interrupts the OPTO-TOUCH's infrared sensing beam.

Banner Optical Touch Buttons are ergonomically designed to eliminate the hand, wrist, and arm stresses associated with mechanical push buttons. They require absolutely no physical pressure to operate. LED indicators light for "power on" and "output activated".

All models are highly resistant to EMI, RFI, and ambient light interference. OTBs have either a black polysulfone (or red Lexan®) upper housing and VALOX® base. Lexan® models have the letter "L" in their model number suffix. Environmental considerations for use of the two types differ; see specifications below. The 30-mm threaded base on all models provides easy mounting, and Banner Optical Touch Buttons are easily retrofitted to existing machines. See pages 2 and 5 for model listings.

OTB Series Momentary Action Optical Touch Button (QD model shown)



E71083

LR41887-24

ISO9002 DOCUMENTED QUALITY

Specifications

Supply Voltage: Models for 105 to 130V ac, 210 to 250V ac (50/60 Hz), 10 to 30V dc, or 20 to 30V ac/dc (at 25 mA, exclusive of load).

Output Configuration:
AC and ac/dc models: All models have SPDT electromechanical relay (one N.O. contact, one N.C. contact).

DC-only models:
OTBVN6 models have complementary NPN sinking outputs;
OTBVP6 models have complementary PNP sourcing outputs.

Output Rating:
AC and ac/dc models: *Maximum voltage* is 250V ac or 30V dc.
Maximum current is 7 amps (resistive load), 1 HP max.
Minimum load is .05 watts (dc), .05VA (ac).
Mechanical life of relay is 50,000,000 operations (minimum).
Electrical life of relay is 100,000 operations (min.) at full resistive load.
Transient suppression recommended when switching inductive loads.

DC models: 150 mA maximum load (each output).

Ambient Light Immunity: 120,000 lux (direct sunlight).

EMI/RFI Immunity: The OPTO-TOUCH is highly resistant to both single and mixed EMI and RFI noise sources.

Operating Temperature Range: -20 to +50°C (-4 to +122°F).

Indicator LEDs: Two indicator LEDs. One lights whenever power is "on"; the other lights whenever the output relay is activated.

Construction: Black polysulfone (or red Lexan®) upper housing and fiber-reinforced VALOX® base. Electronics fully epoxy-encapsulated. Totally sealed, non-metallic enclosure. Threaded base has M30 x 1,5 external threads and 1/2" NPSM internal threads. Base requires a 1-3/16" diameter mounting hole (fits most standard automotive-size "jumbo" legend plates and oiltight pushbutton holes). Supplied with a field cover of Polypropylene copolymer. OPTO-TOUCH OTBs are rated NEMA 1, 3, 4, 4X, 12, and 13.

Cable: *DC-only Quick-disconnect (QD) models* require model MBCC-412 4-conductor mini-type cable (p/n 25226); *AC and ac/dc Quick-disconnect (QD) models* require MBCC-512 5-conductor cable (p/n 25496; cables are purchased separately). Mini-type QD cables are 12 feet long. *Models with attached cable* (non-QD models) are supplied with 6 feet of PVC-jacketed, 22 AWG 4- or 5-conductor cable.

Environmental Considerations (models with **polysulfone** housing):
Prolonged exposure of the OPTO-TOUCH to ***direct outdoor sunlight*** will cause embrittlement of the polysulfone housing. Window glass effectively filters longer wavelength ultraviolet and provides excellent protection from sunlight. Contact the factory Application Engineering Department regarding outdoor applications.

Environmental Considerations (models with **Lexan®** housing):
Prolonged exposure of the OPTO-TOUCH to ***hot water and moist high-temperature environments*** above 150°F (66°C) should be avoided. ***Aromatic hydrocarbons*** (such as xylene and toluene), ***halogenated hydrocarbons,*** and ***strong alkalis*** should be avoided. Clean periodically using mild soap solution and a soft cloth. *Avoid strong alkaline materials.*

Read all WARNINGs carefully.

WARNING. Banner OPTO-TOUCH™ OTB and OTBL Series Optical Touch Buttons are intended as general-purpose initiators, and are *not* safety devices. Like most solid-state devices, they are as equally likely to fail in the conducting ("on") state as in the non-conducting ("off") state. If OPTO-TOUCH Optical Touch Buttons are used to initiate machines or operations in which false operation of an Optical Touch Button could be dangerous, *point-of-operation guarding devices* or related safety controls must be installed and maintained to meet all appropriate OSHA regulations and ANSI B11 machine safety standards.

OTB Series *Momentary Action* OPTO-TOUCH

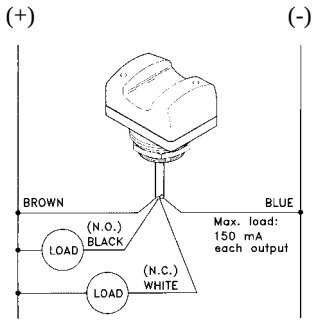
Hookup Information and Model Listing

10-30V DC models (see page 5 for ordering information)

Add "L" to specify Lexan® upper housing (others are polysulfone); "QD" in model suffix indicates Quick Disconnect base.

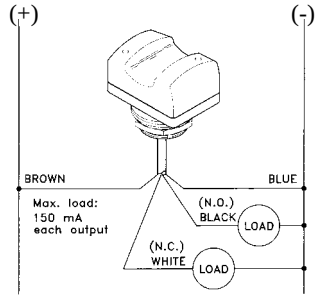
OTBVN6(L) and OTBVN6(L)QD
complementary sinking outputs

Model OTBVN6(L)QD requires MBCC-412 cable (p/n 25226, purchase separately).



OTBVP6(L) and OTBVP6(L)QD
complementary sourcing outputs

Model OTBVP6(L)QD requires MBCC-412 cable (p/n 25226, purchase separately).



Hookup Information and Model Listing

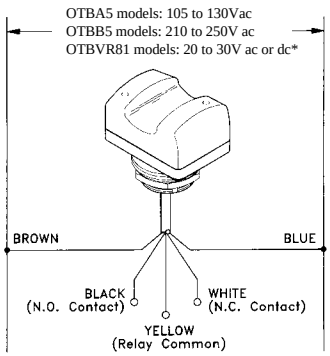
AC and AC/DC models (see page 5 for ordering information)

Add "L" to specify Lexan® upper housing (others are polysulfone); "QD" in model suffix indicates Quick Disconnect base.

Models

OTBA5(L)	120V ac, SPDT electromechanical relay output, 6-foot attached cable
OTBA5(L)QD	120V ac, SPDT electromechanical relay output, QD base (use MBCC-512 cable)
OTBB5(L)	220/240V ac, SPDT electromechanical relay output, 6-foot attached cable
OTBB5(L)QD	220/240V ac, SPDT electromechanical relay output, QD base (use MBCC-512 cable)
OTBVR81(L)	20-30V ac or dc*, SPDT electromechanical relay output, 6-foot attached cable)
OTBVR81(L)QD	20-30V ac or dc*, SPDT electromechanical relay output, QD base (use MBCC-512 cable)

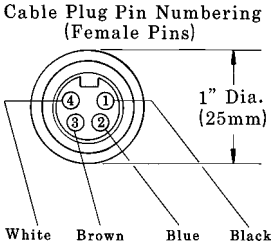
QD models require model MBCC-512 cable (p/n 25496, purchase separately).



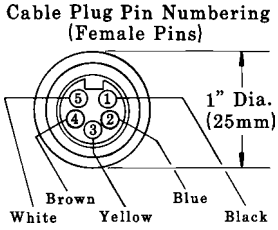
*20-30V dc power may be applied without regard to polarity

Quick Disconnect (QD) Option (order model MBCC-412 or MBCC-512 mini-type cable)

Cable connector end view, MBCC-412 cable (p/n 25226), **for dc-only models**

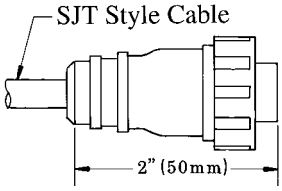


Cable connector end view, MBCC-512 cable (p/n 25496), **for ac and ac/dc models**



SJT-type cable, 12 foot lengths

Cable connector, side view (MBCC-412 and MBCC-512 cable)





The model SMB30S swivel-mount bracket (p/n 33204) is a versatile means for mounting a Banner OPTO-TOUCH Optical Touch Button. The SMB30S lets you *ergonomically position* the OPTO-TOUCH on most machinery for maximum operator comfort and convenience.

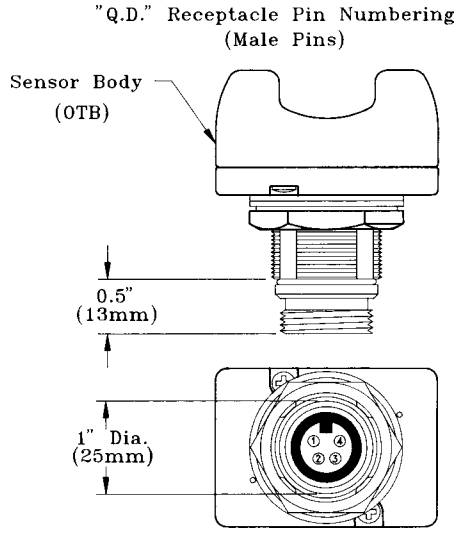
The SMB30S mounts by its base. Its swivel ball locks snugly in place when its two clamping bolts are tightened. Bracket material is black VALOX®. Hardware is stainless steel, and mounting bolts are included.

The photo shows a model SMB30S bracket with an OPTO-TOUCH attached.

OTB Series *Momentary Action* OPTO-TOUCH

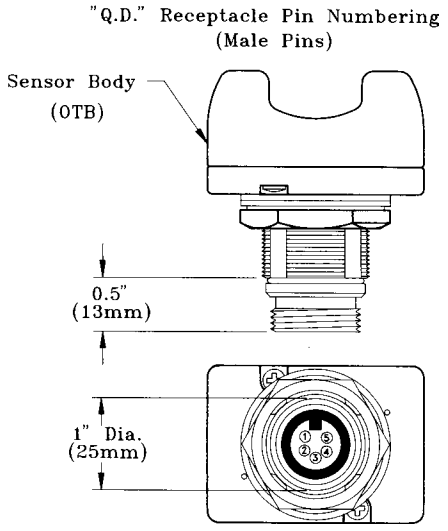
OPTO-TOUCH base

4-pin QD base (dc models)

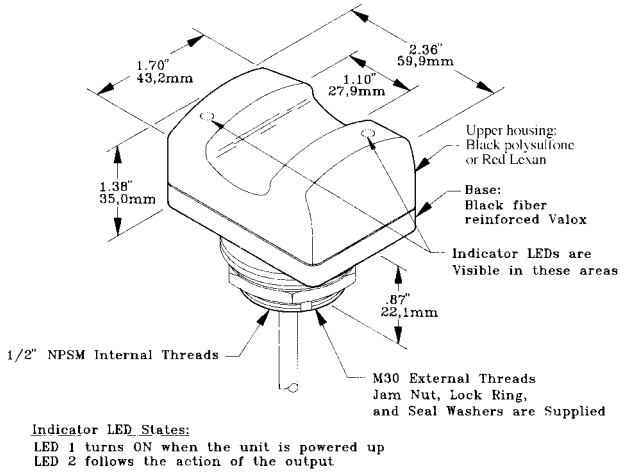


OPTO-TOUCH base

5-pin QD base (ac and ac/dc models)



Dimensions (see also QD base, shown above)



Indicator LED States:
LED 1 turns ON when the unit is powered up
LED 2 follows the action of the output

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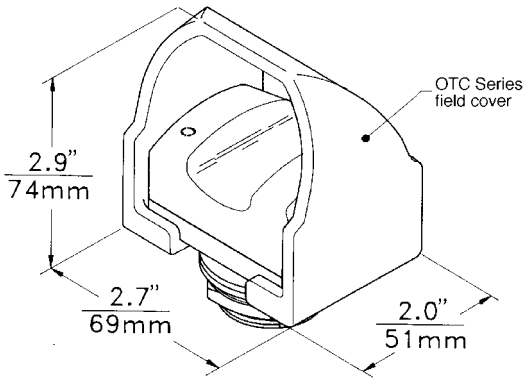
OPTO-TOUCH Field Covers

OPTO-TOUCH Field Covers (see drawing, below) 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 Polypropylene copolymer, which is capable of absorbing high impacts (even at low temperatures). This material is highly resistant to abrasion and to damage by most chemicals.

Every OPTO-TOUCH is supplied with a black field cover, as standard. Field covers are available separately in four colors, which can be used to differentiate touch button functions when several touch buttons are in use:

Black model OTC-1-BK, p/n 30221
Red model OTC-1-RD, p/n 30977
Yellow model OTC-1-YW, p/n 30978
Green model OTC-1-GN, p/n 30979



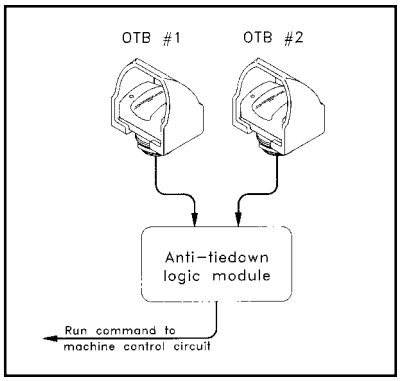
Safety Instruction

A field cover has been supplied with this OPTO-TOUCH. It should be installed, as shown in the drawing at the right, to minimize the possibility of unintended switch operation. If this cover is missing or has become lost or damaged, contact Banner immediately at (763) 544-3164 for a no-charge replacement.

Important Application Information

Use of OPTO-TOUCH Optical Touch Buttons for Two-hand Machine Trip Controls

Requirements for Anti-tiedown Circuitry



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

OSHA Requirement for Anti-tiedown Control

Use of OTBs for two-hand trip 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 trips is the most popular approach to anti-tiedown control. European Standard prEN 574, titled "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 control 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 Buttons can provide protection only for the hands of the machine operator, and is not a point of operation personnel guarding device, as defined by OSHA regulations. 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 Button 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 Buttons 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 at the bottom of page 6.

Important Application Information

Prevention of False Actuation

Any anti-tiedown control must be designed to prevent accidental actuation. Anti-tiedown circutry must be designed to ignore false input signals. False signals include (but are not limited to) voltage transients, contact "bounce", and EMI or RFI "noise". If a PLC or any other solid-state controller is used to provide anti-tiedown, the design must assure that short duration signals (typically any signals less than a few milliseconds) are ignored. There are several manufacturers of anti-tiedown logic modules which include circuitry to minimize the possibility of false actuation.

Definitions:

Two-hand Trip (Control): A control that requires the operation of two separate control actuating devices by a machine operator's hands for initiation of a machine cycle.

Anti-tiedown (Control): A two-hand trip control configured so that both of the operator's hands must be removed and then reapplied to the control actuating devices to start another machine cycle. (Also called *"anti-defeat"* control.)

Ordering Information:

OPTO-TOUCH Optical Touch Buttons are shipped with a black field cover, as standard. A black field cover will be received if the OPTO-TOUCH is ordered by its model number (only). Red, yellow, or green field cover may be specified instead by ordering the OPTO-TOUCH using the appropriate 5-digit part number from the table, below. Field covers may also be ordered separately (page 3).

OPTO-TOUCH Optical Touch Buttons
Part Numbers - Momentary Action Models

120V ac	220/240V ac	20-30V ac or dc	10-30V dc	SPDT relay	NPN (sinking)	PNP (sourcing)	Attached 6-foot cable	Quick disconnect	Polysulfone upper housing	Lexan® upper housing	Model	Black Cover	Red Cover	Yellow Cover	Green Cover
●				●			●		●		**OTBA5**	27986	35058	35078	35098
	●			●			●		●		**OTBB5**	27987	35062	35082	35102
		●		●			●		●		**OTBVR81**	33080	35066	35086	35106
			●		●		●		●		**OTBVN6**	28591	35070	35090	35110
			●			●	●		●		**OTBVP6**	28589	35074	35094	35114
●				●				●	●		**OTBA5QD**	28149	35059	35079	35099
	●			●				●	●		**OTBB5QD**	28150	35063	35083	35103
		●		●				●	●		**OTBVR81QD**	34078	35067	35087	35107
			●		●			●	●		**OTBVN6QD**	28585	35071	35091	35111
			●			●		●	●		**OTBVP6QD**	28590	35075	35095	35115
●				●			●			●	**OTBA5L**	32167	35060	35080	35100
	●			●			●			●	**OTBB5L**	32254	35064	35084	35104
		●		●			●			●	**OTBVR81L**	34040	35068	35088	35108
			●		●		●			●	**OTBVN6L**	33706	35072	35092	35112
			●			●	●			●	**OTBVP6L**	34110	35076	35096	35116
●				●				●		●	**OTBA5LQD**	32255	35061	35081	35101
	●			●				●		●	**OTBB5LQD**	32256	35065	35085	35105
		●		●				●		●	**OTBVR81LQD**	34041	35069	35089	35109
			●		●			●		●	**OTBVN6LQD**	35057	35073	35093	35113
			●			●		●		●	**OTBVP6LQD**	34997	35077	35097	35117

NOTE: Banner Optical Touch Buttons are manufactured and sold under license for U. S Patent #4,939,358.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period.This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.

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