VTB Pick-to-Light Optical Touch Button

Datasheet

Ergonomic optical touch button for pick-to-light applications



- Microcontroller-based photoelectric touch buttons
- A cost-effective and easy-to-install alternative to capacitive touch switches and mechanical push buttons for errorproofing and parts-verification applications
- Ergonomically designed to eliminate hand, wrist, and arm stresses associated with repeated switch operation; requires no physical pressure to operate
- Illuminated base provides a bright, easy-to-see job light in one or two colors, depending on model
- LED power and output indicators
- NPN or PNP output, depending on model
- Immune to ambient light, EMI and RFI interference
- High excess gain cuts through heavy airborne contamination to function in almost any environment; optional protective field cover available
- 12 to 30 V dc operation

One-Color Job Light Models						
Job Light Color			Cable*	Upper Housing	Output Type	Job Light Input
Green	Red	Blue				
VTBN6	VTBN6R	VTBN6B	2 m 4-wire cable	Polysulfone	NPN	0 V dc
VTBN6Q	VTBN6RQ	VTBN6BQ	4-pin Euro QD			
VTBN6L	VTBN6RL	VTBN6BL	2 m 4-wire cable	Polycarbonate		
VTBN6LQ	VTBN6RLQ	VTBN6BLQ	4-pin Euro QD			
VTBP6	VTBP6R	VTBP6B	2 m 4-wire cable	Polysulfone	PNP	+10 to 30 V dc
VTBP6Q	VTBP6RQ	VTBP6BQ	4-pin Euro QD			
VTBP6L	VTBP6RL	VTBP6BL	2 m 4-wire cable	Polycarbonate		
VTBP6LQ	VTBP6RLQ	VTBP6BLQ	4-pin Euro QD			

Two-Color Job Light Models				
Green and Red (see Wiring)	Cable*	Upper Housing	Output Type	Job Light Input
VTBN6GR	2 m 5-wire cable	Polysulfone	NPN	0V dc
VTBN6GRQ	5-pin Euro QD			
VTBN6GRL	2 m 5-wire cable	Polycarbonate		
VTBN6GRLQ	5-pin Euro QD			
VTBP6GR	2 m 5-wire cable	Polysulfone	PNP	+10 to 30V dc
VTBP6GRQ	5-pin Euro QD			
VTBP6GRL	2 m 5-wire cable	Polycarbonate		
VTBP6GRLQ	5-pin Euro QD			

To order the 9 m (30 ft) cable models, add the suffix "W/30" to the cabled model number. (For example, VTBN6 W/30.) Models with a quick disconnect (QD) connector require a mating cable. (See *Quick Disconnect (QD) Cables* on page 5).

WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Overview

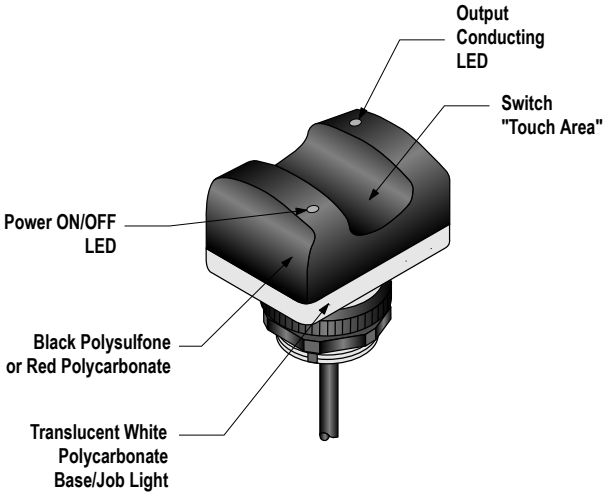
Banner VTB Series touch buttons are ergonomically designed to eliminate the hand, wrist, and arm stresses associated with mechanical push buttons. They require absolutely no physical pressure to operate. LED indicators light when power is on and outputs are activated.

The interfaces to a system controller, which is pre-programmed for a specific sequence of tasks. Mounted in or near each bin in an assembler's work station, the sensor job light signals the assembler which bins contain items to be picked in a given operation and in what order they should be picked.

As the assembler takes a part in sequence , then reaches a finger into the yoke of the corresponding Touch Button, the sensor senses that the part was removed and it sends an output signal to the controller. The controller then verifies if the correct part was taken and may respond by turning that job light OFF, activating the job light of the next bin in the sequence.

All models are immune to EMI, RFI, and ambient light interference. VTBs have either a black polysulfone or red polycarbonate upper housing (depending on model) and a translucent white polycarbonate base. Environmental considerations for use of the two upper housing types differ; see specifications. The entire base section lights to provide a bright job light where a task is to be performed. The 30 mm threaded base on all models provides easy mounting.

Indicators



Power ON/OFF (red):
Steady ON when power is applied

Output Conducting (red):
Steady ON when button is activated
OFF when button is not activated

Job Light:
Steady ON or flashing* when a task is to be performed

* Flashing job light is dependent on wiring. Color is dependent on model and wiring.

Installation

Consider ergonomic principles to avoid unnecessary fatigue in the installation of the hand controls. Install the touch buttons at a height and in a location that will be comfortable for the user.

The following figure shows two methods for mounting the touch buttons, to prevent accidental switch actuation. When mounting them on top of the control bar, the protective field covers should be in place, as shown; or for added protection, mount the touch buttons sideways under and/or behind a protective hood, rather than on top of the bar, without using the field covers. This side mount prevents an object from being left in the path of the beam. In addition, shields, covers, rings, collars, dividers, or similar protection may be used to prevent accidental switch actuation.

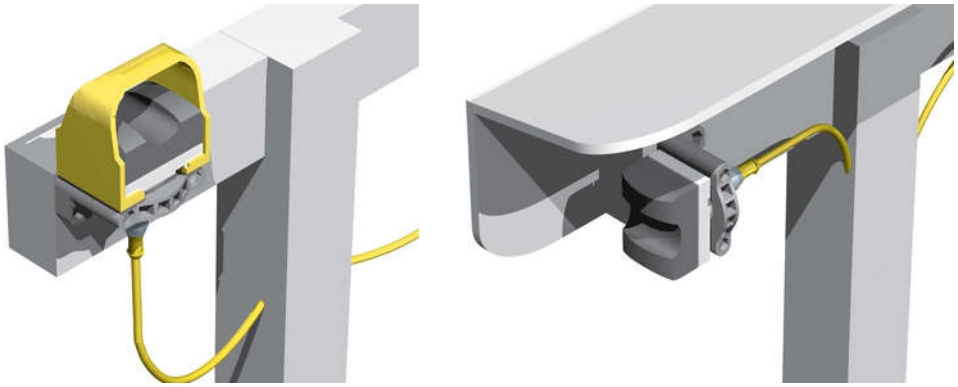


Figure 1. Protect VTB touch buttons to prevent defeat or inadvertent actuation

CAUTION: Install Hand Controls to Prevent Accidental Actuation

Total protection for the two-hand control system from defeat is not possible. However, the user is required by U.S. and International standards to arrange and protect hand controls to minimize the possibility of defeat or accidental actuation.

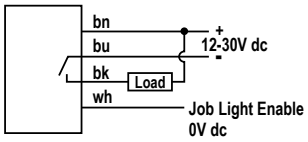
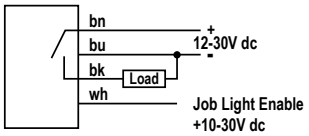
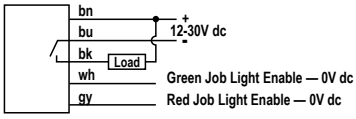
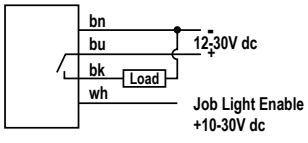
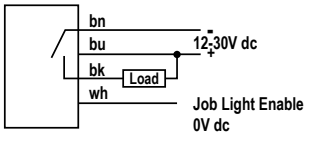
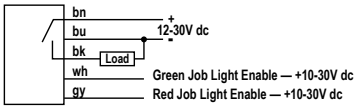
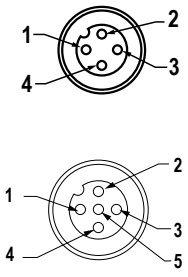
CAUTION: Hand Controls

The environment in which hand controls are installed must not adversely affect the means of actuation. Severe contamination or other environmental influences may cause slow response or false On conditions of mechanical or ergonomic buttons. This may result in exposure to a hazard.

Wiring

Single-color models may be wired for either a solid or flashing job light. The wiring of two-color models determines the job light. Color flashing job light is not available. Cabled model wiring shown. Cabled and QD model wiring is functionally identical.

- For solid color, use the standard wiring diagram.
- For flashing (2 Hz), use the alternate wiring diagrams.

One-Color Job Light, NPN (Sinking) Output Models	One-Color Job Light, PNP (Sourcing) Output Models	Two-Color Job Light Models	Wiring Key
Solid Job Light 	Solid Job Light 	NPN (Sinking) Output Models 	1 = Brown 2 = Blue 3 = Black 4 = White 5 = Gray
Flashing Job Light 	Flashing Job Light 	PNP (Sourcing) Output Models 	Pinouts 

Specifications

Supply Voltage and Current
One-color job light models: Less than 120 mA max current @ 12V dc and less than 70 mA max current @ 30V dc (exclusive of load)
Two-color job light models: Less than 67 mA max current @ 12V dc; less than 40 mA max current @ 24V dc; and less than 35 mA max current @ 30V dc (exclusive of load)

Supply Protection Circuitry
Protected against transient voltages (fast-transient and over-voltage) and reverse polarity

Output Configuration
1 current sinking (NPN) open collector transistor or 1 current sourcing (PNP) open collector transistor, depending on model

Output Rating
Max. load: 150 mA
On-state saturation voltage: < 1.5V @ 150 mA
Off-state leakage current: < 10 µA

Output Protection Circuitry
All models protected against false pulse on power-up (outputs held OFF for 1 second at power-up), overload and short-circuits.

Output Response Time
100 milliseconds ON/OFF

Indicators
2 green LED indicators: Power ON and Output Conducting
Base lights green, red or blue (depending on model and hookup) as a job light when input line is enabled. One-color models may be wired for flashing, rather than solid color operation.

Connections
PVC-jacketed 2 m (6.5') cables or 4-pin Euro-style QD fitting, depending on model; integral 9 m (30') cables are also available. Accessory QD cables required for QD models.

Ambient Light Immunity
Up to 120,000 lux (direct sunlight)

EMI/RFI Immunity
Immune to EMI and RFI noise sources, per IEC 947-5-2

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

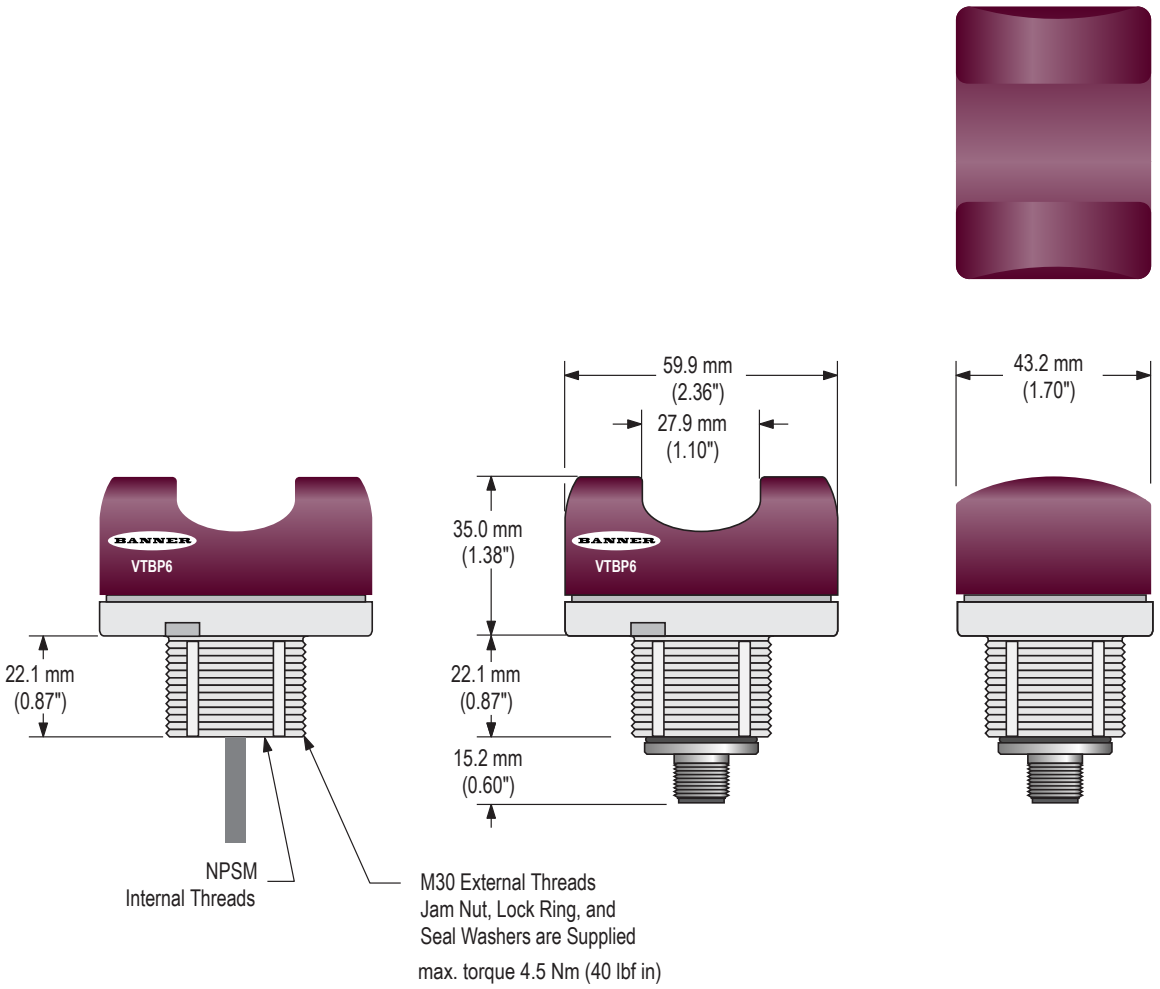
Construction
Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Note below); translucent white polycarbonate base. Electronics fully epoxy-encapsulated.

Operating Conditions
–20° to +50° C (–4° to +122° F)
90% @ +55º C max. relative humidity (non-condensing)

Application Notes
Environmental considerations for models with polysulfone upper housings: The polysulfone upper housing will become brittle with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight. Avoid contact with strong alkalis. Clean periodically using mild soap solution and a soft cloth.
Environmental considerations for models with 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 alkalis. Clean periodically using mild soap solution and a soft cloth.

Certifications

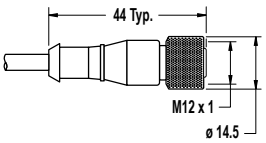
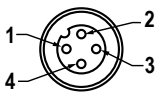
Dimensions

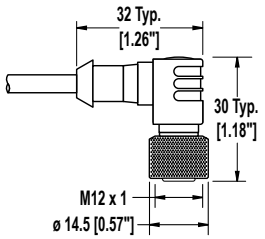


Accessories

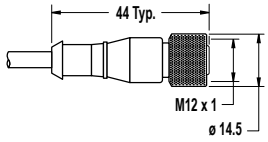
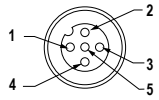
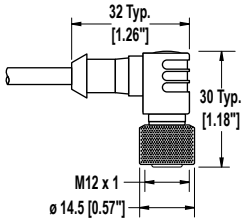
Quick Disconnect (QD) Cables

Use the 4-pin Euro-style cordsets with the one-color job light models.

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
MQDC-406	1.83 m (6 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
MQDC-406RA	1.83 m (6 ft)	Right-Angle		
MQDC-415RA	4.57 m (15 ft)			
MQDC-430RA	9.14 m (30 ft)			
MQDC-450RA	15.2 m (50 ft)			

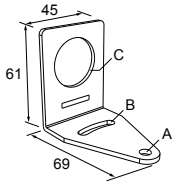
Use the 5-pin Euro-style cordsets with the two-color job light models.

5-Pin Threaded M12/Euro-Style Cordsets (Single Ended)				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC1-501.5	0.50 m (1.5 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC1-506	1.83 m (6 ft)			
MQDC1-515	4.57 m (15 ft)			
MQDC1-530	9.14 m (30 ft)			
MQDC1-506RA	1.83 m (6 ft)	Right-Angle		
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

Brackets

SMB30A

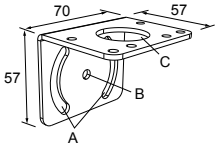
- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
- 12-ga. stainless steel



Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 x 6.3, C=ø 30.5

SMB30MM

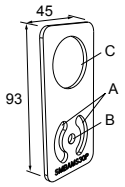
- 12-ga. stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor



Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 x 7, B = ø 6.4, C = ø 30.1

SMBAMS30P

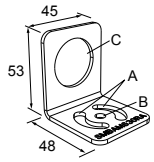
- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-ga. 300 series stainless steel



Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 x 7.0, B=ø 6.5, C=ø 31.0

SMBAMS30RA

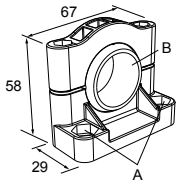
- Right-angle SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-ga. (2.6 mm) cold-rolled steel



Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 x 7.0, B=ø 6.5, C=ø 31.0

SMB30SC

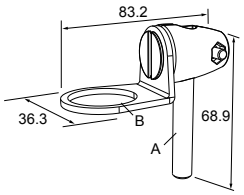
- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included



Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0

SMB30FA

- Swivel bracket with tilt and pan movement for precise adjustment
- Mounting hole for 30 mm sensor
- 12-ga. 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
- Metric and inch size bolt available

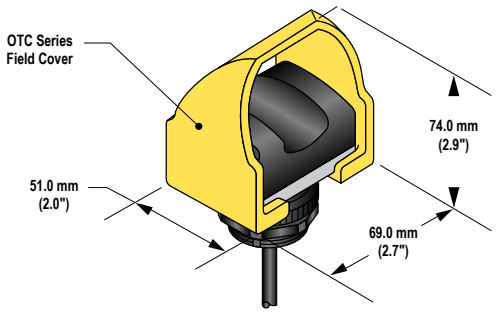


Bolt thread: SMB30FA, A= 3/8 - 16 x 2 in; SMB30FAM10, A= M10 - 1.5 x 50
Hole size: B= ø 30.1

Field Covers

Field covers are designed to prevent inadvertent activation of optical touch buttons by objects that accidentally block the sensing beam. Field covers are constructed of rugged polypropylene and are highly resistant to abrasion and to damage by most chemicals. A variety of colors is available, allowing color-coding when multiple touch buttons are used. Note that when a field cover is used, it also blocks a portion of the job light.

Model	Description
OTC-1-BK	Black cover
OTC-1-GN	Green cover
OTC-1-RD	Red cover
OTC-1-YW	Yellow cover



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